DEVELOPMENT AND EVALUATION OF THE INDIVIDUALISED PSYCHOSOCIAL PROGRAM TO IMPROVE WELL-BEING AND MITIGATE BURNOUT IN CRITICAL CARE HEALTHCARE PROFESSIONALS: A REALIST MIXED METHOD STUDY

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RN, BACHELOR OF NURSING (HONOURS)

THESIS SUBMITTED TO FLINDERS UNIVERSITY

FOR THE DEGREE OF

Doctor of Philosophy

COLLEGE OF NURSING AND HEALTH SCIENCES

25TH JANUARY 2024

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ABSTRACT

Background: Critical care healthcare professionals frequently experience high levels of burnout due to the demanding nature of their work. While numerous studies have explored organisational and systemic factors contributing to burnout, the role of individual-level interventions as coping mechanisms remains understudied. This research aims to investigate the effectiveness of individual-level interventions for critical care healthcare professionals' well-being and burnout, employing a realist approach to uncover what interventions work, why, how, and under what conditions.

Methods: An umbrella realist review was initially conducted to explore the existing literature and identify potential program theories. Subsequently, an expert opinion was sought to refine and develop a program theory for a unique individual-level intervention for critical care healthcare professionals. This program theory served as the foundation for a pilot randomised controlled trial (RCT) to assess the feasibility and effectiveness of the consult and problem-solving debrief intervention.

Results: The umbrella realist review highlighted the limited availability of individual -level interventions and the need for tailored approaches to address burnout among critical care healthcare professionals. The expert opinion refined the program theory, which emphasised the importance of personalised consult and problem-solving debriefs in mitigating burnout. The pilot RCT compared the individualised intervention with an active control group that received debrief sessions without the problem-solving approach. The intervention group demonstrated feasibility for recruitment (n=112) and retention for consult (100%) and debrief (93%). Data collection methods, including journal entries (33%), feedback questionnaire (53%), and semi-structured interviews (67%), were completed successfully. The intervention was deemed acceptable based on structural integrity, innovative approach, and implementation. Preliminary efficacy was evident, with significant improvements observed in personal accomplishment ($p=.022$) and emotional exhaustion ($p=.039$) post-intervention. Although depersonalization outcomes remained comparable, meaningful improvements were noted over time ($p=.015$). Significant improvements were also observed for various measures over a longitudinal three-month period.

Conclusion: This research contributed to the understanding of individual-level interventions for critical care healthcare professionals' burnout through a realist lens. The study findings have the potential to inform the development of effective interventions by identifying key elements, contextual factors, and mechanisms for successful implementation. The pilot RCT provided initial insights into the feasibility of the consult and problem-solving debrief as a potential intervention strategy, emphasising the need for further investigation and refinement.

DECLARATION

I certify that this thesis:

1. does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university

2. and the research within will not be submitted for any other future degree or diploma without the permission of Flinders University; and

3. to the best of my knowledge and belief, does not contain any material previously published or written by another person except where due reference is made in the text.

Signed:

Date: 25th January 2024

ACKNOWLEDGEMENTS

بِسْمِ ٱللَّهِ ٱلرَّحْمَٰنِ ٱلرَّحِيمِ

bi-smi llāhi raḥmāni r-raḥīm

"In the name of God, the Merciful, the Compassionate"

I begin by expressing my profound gratitude to Allah (SWT) for His boundless blessings and guidance throughout this thesis journey.

I extend my heartfelt thanks to my esteemed supervisors, Professor Di Chamberlain, Dr. Hila Dafny, and Dr. Claire Baldwin, for their invaluable guidance, mentorship, and encouragement. Their expertise and insightful feedback have been instrumental in shaping the outcome of this research.

To my beloved parents, Adnan and Siti, your love, prayers, and unwavering belief in me have been a constant source of strength and motivation. I am forever indebted to you for your unwavering support and encouragement.

I extend my heartfelt thanks to my dear brothers, Farhan and Haris, for their willingness to listen, provide valuable insights, and offer a helping hand whenever needed throughout this thesis journey.

I am also grateful to my friends in my PhD room, whose camaraderie, intellectual discussions, and support have created a stimulating and nurturing environment for learning and growth.

Furthermore, I wish to extend my appreciation to all those who have supported and believed in me throughout this academic journey. Your encouragement and positivity have been crucial in reaching this milestone.

May Allah (SWT) accept this humble effort and make it a source of benefit for others.

AWARDS

I would like to recognise the receipt of the following awards:

Flinders University Research Scholarship (FURS)

Matthew Flinders Scholarship Fund – Domestic

Research Student Conference Travel Grant 2023

LIST OF PUBLICATIONS

RESEARCH PUBLICATIONS:

Adnan, N., Baldwin, C., Dafny, HA., Chamberlain, D., et al. (2022), “What are the solutions for well-being and burn-out for healthcare professionals? An umbrella realist review of learnings of individual-focused interventions for critical care. BMJ Open, Vol. 12, No. 9.

Adnan, N., Baldwin, C., Dafny, HA., Chamberlain, D., (2022), “What are the essential components to implement individual-focused interventions for well-being and burnout in critical care healthcare professionals? A realist expert opinion. Frontiers in Psychology, Vol. 13, No. 1.

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ORAL PRESENTATIONS (CONFERENCES)

Adnan, N., Baldwin, C., Dafny, HA., Chamberlain, D., (2023, March 16-18), Mitigating the impacts of COVID-19 on critical care: *An umbrella realist review of individual focused interventions for healthcare professionals* [Conference presentation]. International Nursing and Public health Conference, Singapore City, Singapore.

Adnan, N., Dafny, HA., Baldwin, C., Beccaria, G., Chamberlain, D., (2023, August 26-30), Mitigating the impacts of COVID-19 on critical care: *Feasibility and Acceptability of a Realist-Informed Individualised Psychosocial Intervention to Mitigate the Impacts of Covid-19 Burnout in Critical Care Healthcare Professionals* [Conference presentation]. 16th World Intensive and Critical Care, Istanbul, Turkey.

Adnan, N., Baldwin, C., Dafny, HA., Beccaria, G., Chamberlain, D., (2024, April 10-12), An individualised psychosocial program to alleviate burnout for the critical care workforce. [Conference presentation]. ANZICS/ACCCN Intensive Care Annual Scientific Meeting (ASM), Brisbane, Australia.

CONFERENCE PROCEEDINGS

Adnan, N. Baldwin, C., Dafny, HA., Beccaria, G., Chamberlain, D., (2023, March 26-30 August). *Mitigating the impacts of COVID-19 on critical care: Feasibility and Acceptability of a Realist-Informed Individualised Psychosocial Intervention to Mitigate the Impacts of Covid-19 Burnout in Critical Care Healthcare Professionals* [abstract]. In: Journal of Critical Care, 16th World Intensive and Critical Care, Istanbul, Turkey [Published post-conference].

CHAPTER IN PUBLISHED E-BOOK

Adnan, N., Baldwin, C., Dafny, HA., Chamberlain, D., (2022), "What are the essential components to implement individual-focused interventions for well-being and burnout in critical care healthcare professionals? A realist expert opinion. In: "*Well-being and work motivation brought by technological changes, coping and adaptations during and post COVID-19 pandemic: Barriers and opportunities.* Luasanne: Front Media SA.

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LIST OF KEYWORDS

ACCCN	Australian College of Critical Care Nurses
ANOVA	Analysis of Variance
ANZICS	Australian and New Zealand Intensive Care Society
CCHP	Critical Care Healthcare Professionals
CINAHL	Cumulative Index of Nursing and Allied Health Literature
CMOC	Context-Mechanism-Outcome Configuration
COR Theory	Conservation of Resources Theory
COVID-19	Coronavirus Disease-19
DASS-21	Depression, Anxiety, Stress Scale - 21
EAP	Employee Assistance Program
ENSS	Expended Nursing Stress Scale
HCP	Healthcare Professional
ICD-11	International Classification of Diseases, 11th Revision
ICU	Intensive Care Unit
IES-R	Impact of Event Scale-Revised
ISRCTN	International Standard Randomised Controlled Trial Number
IP Program	Individualised Psychosocial Program
IRLM	Implementation Research Logic Model
JD-R Model	Job Demands-Resources Model
MBI-HSS	Maslach Burnout Inventory Human Services Survey
MEDLINE	Medical Literature Analysis and Retrieval System Online
MeSH	Medical Subject Heading
MRC Framework	Medical Research Council Framework

PANAS	Positive Affect Negative Affect Scale
PEACE Rounds	Patient Experience and Communication Excellence Rounds
PERMA	Positive Emotion, Engagement, Relationships, Meaning, and Accomplishment
PICOT	Population, Intervention, Comparator, Outcome, Type of Study
RAMESES II	Realist And Meta-narrative Evidence Syntheses: Evolving Standards II
R-AMSTAR	Revised Assessment of Multiple Systematic Reviews
RCT	Randomised Controlled Trial
SPSI-SF	Social Problem-Solving Inventory-Short Form
TIS	Turnover Intention Scale
TTSC	Transactional Theory of Stress and Coping
UK	United Kingdom
UWES-SF	Utrecht Work Engagement Scale-Short Form
WHO	World Health Organization

CHAPTER 1

INTRODUCTION TO THE THESIS

1.1 Chapter overview

Chapter 1 of this thesis will examine existing literature and provide insights on well-being and burnout experiences among Critical Care Healthcare Professionals (CCHP). The Chapter offers an understanding of the thesis' significance and relevance in addressing the issues of low well-being and high burnout rates. An introduction to theoretical and methodological framework will be provided, alongside discussions on the application of the Medical Research Council (MRC) framework. This framework will be used to guide the development and evaluation of complex interventions. This Chapter will present the aims, objectives and an outline of the thesis structure to conclude this chapter.

1.2 Background

1.2.1 An introduction to burnout

Burnout emerged as a critical and far-reaching issue in today's professional landscape, affecting individuals across diverse industries and occupations (1). Its detrimental consequences on well-being and performance have garnered considerable attention and recognition in occupational health (1). Notably, the World Health Organisation (WHO) has acknowledged the gravity of burnout by classifying it as an "occupational phenomenon" in its International Classification of Diseases, 11th Revision (ICD-11) (1, 2). This official recognition highlighted the urgency and importance of addressing burnout effectively.

Within the healthcare domain, the risk of burnout looms particularly large among CCHP (1, 2). This group included dedicated intensivists, nurses, respiratory therapists, physiotherapists, pharmacists, and other Healthcare Professionals (HCP) who spend significant time in critical care units (1, 2). Their work exposed them to many stressors, including caring for patients with

life-threatening illnesses, navigating high patient density, shouldering demanding job responsibilities, and grappling with end-of-life challenges (1, 2). Additionally, they faced pressures related to workload, perceived futility in some instances, and contended with interpersonal conflicts (1, 2). This amalgamation of stressors fostered a fertile ground for chronic workplace stress and burnout (1, 2).

The Coronavirus Disease-19 (COVID-19) pandemic has further exacerbated the already alarming levels of burnout among CCHP (3). The surge in cases has intensified their workload and demands, leading to emotional exhaustion and physical fatigue (3). Witnessing the immense suffering and operating in high-risk environments while grappling with limited resources and support have heightened stress experiences to unprecedented levels (3). The repercussions of burnout extended beyond individual well-being, severely compromising patient care, workplace morale, and the overall functioning of critical care units (3). Effective communication, collaboration, and decision-making may be hindered, posing potential risks to patient outcomes and safety (3).

The Critical Care Societies Collaborative issued a compelling "Call for Action", highlighting the alarming rates of burnout among CCHP (4). Research suggests that these professionals face one of the highest rates of burnout, with levels exceeding 50% (4). This significant prevalence of burnout can harm their ability to provide optimal patient care (4). The "Call for Action" emphasised the urgent need to address burnout in the critical care field (4). It was a rallying cry to organisations, policymakers, and HCP to take concrete steps to mitigate and prevent burnout among CCHP (4).

The urgency to address burnout and support the well-being of CCHP cannot be overstated (4). These professionals are crucial in delivering high-quality healthcare, particularly in demanding and high-pressure environments like critical care units (5). By prioritising their well-being and implementing strategies to mitigate burnout, organisations can ensure the sustainability of healthcare delivery and promote the overall quality of patient care (6).

Organisations, leaders, and HCP need to recognise that addressing burnout requires a multifaceted and collaborative approach (4, 5). Organisations and professionals have acknowledged the significance of addressing burnout and have prioritised preventive measures and interventions to support CCHP (4, 5). For example, implementing supportive policies and practices within healthcare settings cultivates a positive work culture and fosters open communication, thus contributing to a healthier work environment (7, 8). Moreover, providing resources like leadership check-ins, active feedback listening, resilience training, and mindfulness and cognitive interventions can assist CCHP in managing and coping with burnout experiences (9, 10).

1.2.2 Why are there high levels of burnout among critical care healthcare professionals?

Despite the availability of support systems, why do CCHP persistently experience high levels of burnout? What factors contribute to this persistent burnout experiences despite the availability of support systems?

Literature suggests that CCHPs face unique and intense demands and stressors in their daily work (6). Even with the availability of organisational and individual resources, the persistence of burnout can be attributed to a combination of factors (6). While these resources and interventions are valuable and can positively impact burnout, they may not fully address burnout's multifaceted and complex nature in the critical care setting (4, 6, 11). To effectively combat burnout, it is essential to ensure that the resources and interventions are easily accessible to CCHP (6, 11). Tailoring these resources to meet the specific needs of this specialised workforce is equally important (12). Burnout is a multifaceted phenomenon that arises from a combination of factors operating at different levels (12). It is not simply a result of individual shortcomings or weaknesses but rather a product of interactions between individuals and their work environments (13, 14). Understanding and addressing burnout requires a comprehensive approach considering the intricate interplay of individual,

organisational, and systemic factors (15). Furthermore, successful implementation required integrating these measures seamlessly into their work environment (15). By taking these steps, healthcare organisations can enhance the effectiveness of their efforts in addressing burnout and supporting the well-being of CCHP.

1.2.3 The focus of this thesis

While a comprehensive approach is necessary to address burnout effectively, this thesis narrowed the scope to focus on individual-level interventions to reduce burnout among CCHP. It is essential to emphasise that the intention is not to disregard or undermine the significance of other levels of intervention. However, attention to such a complex phenomenon require greater depth and scope, which is limited by this thesis and the duration of the author's candidature. By examining individual-level interventions, this research acknowledges the significance of addressing burnout at the individual-level. While individual-level interventions may not directly address the broader organisational or systemic factors contributing to burnout, they serve as essential tools for self-care and personal well-being. These interventions can provide CCHP with practical skills and strategies to manage stress, regulate emotions, and establish work-life balance. By equipping individuals with these resources, they can enhance their ability to navigate and cope with the demanding nature of their work.

1.2.4 Gap in literature

The unique stressors and challenges faced by CCHP created a gap in research regarding the need for tailoring interventions to meet their specific needs (12). While burnout and its impact have been widely studied in various professional contexts, there is a relative lack of research focusing specifically on the effectiveness of interventions tailored to the needs of CCHP (15). Tailored interventions for this population would involve understanding their unique stressors and developing strategies to address those challenges effectively (12, 16). By conducting research that targets explicitly CCHP, we can gain insights into the effectiveness of tailored individual-level interventions in reducing burnout, enhancing well-being, and improving job

satisfaction among this population (12, 16). Such research would not only fill the existing gap in the literature but also provide evidence-based recommendations for healthcare organisations and policymakers to implement targeted interventions and support systems for CCHP. Furthermore, studying the effectiveness of tailored interventions can help identify best practices and guidelines for addressing burnout in critical care settings, leading to the development of evidence-based interventions and policies that can be implemented on a broader scale.

1.3 Definitions of terms

1.3.1 Well-being

WHO defined well-being as encompassing mental, physical, and social states and not simply the absence of infirmity or disease (17). It is the ability to flourish – promoting a 'good' life where individuals are healthy, happy, capable and engaged (18). Positive mental health includes emotional, psychological, and social well-being (19). It is characterised by a person's ability to fulfil several essential functions and activities, including learning, feeling, expressing and managing positive and negative emotions and forming and maintaining good relationships with others (19-21). Conversely, poor mental health may be related to rapid social change, stressful work conditions, gender discrimination, social exclusion, unhealthy lifestyle, physical ill-health, and human rights violations, where specific psychological and personality factors can make people vulnerable to mental health problems (22-24). Applied to the workplace context, poor mental health may include experiences of stress, anxiety, and depression, as well as syndromes such as burnout and compassion fatigue (25-27).

Acquiring well-being enables individuals to possess lifelong health and healthy ageing, whereas contrasting outcomes contribute to disease and mental disorders (28). Generally, well-being refers to the cognitive process of contentment, happiness, and satisfaction (28). Well-being can be classified into two categories subjective and objective (28). Subjective characteristics include components of well-being, for example, "satisfied with life" and "having

a good feeling", whereas objective well-being includes economic, social, and environmental factors (28). Subjective well-being follows two schools of thought, hedonic and eudemonic (28). Hedonic belief aims to reduce pain and maximise happiness by attaining satisfaction and pleasure when achieving a goal (28). Eudemonic belief aims to attain pleasant feelings and pursue meaning and purpose (28). Eudemonism follows the ethical theory pathway (living following their true self) and strives to actively contribute to life by giving rather than receiving and enjoying (28).

1.3.2 Burnout

The concept of burnout, rooted in the fields of psychology and occupational health, revolves around a prolonged response to chronic workplace stress that manifests in physical, emotional, and mental exhaustion (29). This multifaceted phenomenon often results from the persistent demands of the work environment, characterised by high workload, lack of control, and limited resources (29). The Job Demand-Resources (JD-R) model highlights the importance of job demands, control, and social support in shaping the experience of burnout (30). The theoretical framework underpinning burnout commonly draws from models such as the Maslach Burnout Inventory (30).

According to Maslach and Jackson (29), burnout is defined as a psychological syndrome consisting of three dimensions: emotional exhaustion, depersonalisation, and reduced personal accomplishment. Burnout occurs when individuals encounter chronic stress in healthcare (30). The foundation of emotional exhaustion stems from the depletion of emotional resources, which forces employees to feel that they cannot cope at a psychological level (31). Depersonalisation refers to pessimistic, cynical, and dehumanised perceptions and attitudes about the patient (in the context of healthcare), leading to the notion that patients are deserving of their (employee) troubles (31). Nevertheless, reduced personal accomplishment includes a negative evaluation of oneself, especially concerning work (31). Burnout poses a risk to the physiological, behavioural, and psychological well-being of employees. However, it is a

conceptually different variable from well-being (32, 33). As a dynamic and evolving concept, burnout research continues to integrate elements from organisational psychology and sociology, providing a comprehensive theoretical foundation for understanding the complexities of this pervasive occupational phenomenon (29, 31).

1.3.3 Individual and organisational interventions

The JD-R model suggests that resources play a crucial role in coping with job demands and preventing burnout (34-37). They serve as buffers against the adverse effects of job demands and facilitate achieving work goals (34-37). In the context of coping strategies, resources can be seen as tools or support systems individuals utilise to effectively manage job-related stressors (15). These resources for addressing burnout can be categorised as individual- and organisational-level interventions (15). Individual-level interventions aim to support and empower individuals to manage and reduce burnout by focusing on their well-being and coping mechanisms (15). These interventions are designed to enhance resilience and help individuals navigate the challenges of their work environment (15). Contrastingly, organisational-level interventions are strategies and initiatives implemented at the organisational level to address burnout and promote employee well-being (15). These interventions focus on improving the work environment, policies, and practices to reduce stressors and foster a supportive and healthy workplace culture (15).

1.3.4 Complex interventions

Complex interventions are multifaceted and context-dependent interventions designed to address complex problems or bring about desired changes in various settings (38-40). They involve multiple interacting components, such as strategies, activities, and processes, that work together to achieve the desired outcomes (38-40). Complex interventions often target complex systems, such as healthcare delivery systems or social systems, and aim to improve these systems by considering the intricate relationships and interdependencies among various factors (38-40). These interventions may involve changes at multiple levels, including

individual, organisational, and societal, and require various stakeholders' coordination and collaboration (38-40). Due to their complexity, these interventions often require careful planning, implementation, and evaluation to ensure effectiveness and achieve desired outcomes (38-40).

1.4 Overview of theoretical and methodological frameworks

This thesis employed the theoretical underpinnings of realism to provide a comprehensive understanding of individual-level interventions in the context of CCHP. Realism was selected as the guiding framework because it emphasises investigating the underlying mechanisms and causal relationships involved (41-43). By adopting a realist approach, this thesis aimed to develop an intervention tailored to the unique requirements and circumstances of CCHP, addressing essential inquiries such as what individual-level interventions work, for whom, and under what conditions (41-43). The thesis can provide valuable insights into the enablers and barriers to individual-level intervention implementation and delivery to the critical care workforce through this lens.

The development and evaluation of the individual-level intervention (Individualised Psychosocial (IP) program, introduced in Chapters 6 and 7) employed a philosophical approach known as sequential, exploratory, mixed methods design. This approach involved two sequential stages, namely Stage 1 and Stage 2. Stage 1 adopted a qualitative research paradigm, utilising semi-structured interviews to gather expert opinions on contextual factors, mechanisms of action, and outcomes related to individual-level interventions. This expert realist opinion informed the refinement of a program theory, which was the foundation for developing the individual-level intervention, guided by the MRC framework. In Stage 2, a quantitative research paradigm was conducted, employing a pilot Randomised Controlled Trial (RCT) to assess the individual-level intervention's (IP program) feasibility, acceptability, and preliminary effectiveness. This stage collected both quantitative results and qualitative

feedback on the IP program, allowing for data integration into a single dataset[1]. By combining the data, comprehensive insights were gained, facilitating the development of recommendations based on a holistic understanding of the intervention's (IP program) performance.

1.5 The Medical Research Council (MRC) Framework

The MRC Framework, developed by the United Kingdom (UK) Medical Research Council, is a comprehensive approach used in the design, development, and evaluation of complex interventions in healthcare (39, 44). It provided a systematic and structured process for conducting research on interventions by considering key factors such as feasibility, acceptability, and effectiveness (39, 44). The MRC Framework consists of several stages that guide researchers through the intervention development and evaluation process (39, 44). These stages included identifying the problem and establishing the theoretical basis, defining the intervention and its key components, conducting feasibility and piloting studies, and implementing and evaluating the intervention in larger-scale trials (39, 44). A strength of the MRC Framework included its emphasis on understanding the underlying mechanisms and contextual factors that influence the interventions' effectiveness (39, 44). It recognised interventions as unique components and are not a 'one-size-fits-all', whereby their success can depend on various factors, including target population, setting, and implementation process (39, 44). Guidance from the MRC Framework can enable researchers to ensure that interventions are evidence-based, rigorously tested, and well-suited to the specific context in which they will be implemented (39, 44). It provided a structured approach to intervention development and evaluation, enhancing the quality and reliability of research in healthcare interventions (39, 44).

The MRC Framework served as a valuable guide for the author (of this thesis) in developing and evaluating complex individual-level interventions aimed at improving well-being and

[1] Randomised controlled trials are quantitative in nature. Further explanation can be found in Chapter 3.

mitigating burnout among CCHP. It offered a comprehensive and systematic approach to intervention research, ensuring intervention feasibility and effectiveness tailored to the target population's needs (CCHP).

1.5.1 Development and evaluation of the IP Program

The MRC framework was used in the development and feasibility and effectiveness evaluation of the IP program (individual-level intervention). A concise overview of how the MRC framework was applied to the IP program is presented in Figure 1, which highlighted key elements and activities associated with each stage. The arrows indicated the main interactions between the phases, emphasising that the stages may not necessarily follow a linear or cyclical sequence (39, 44).

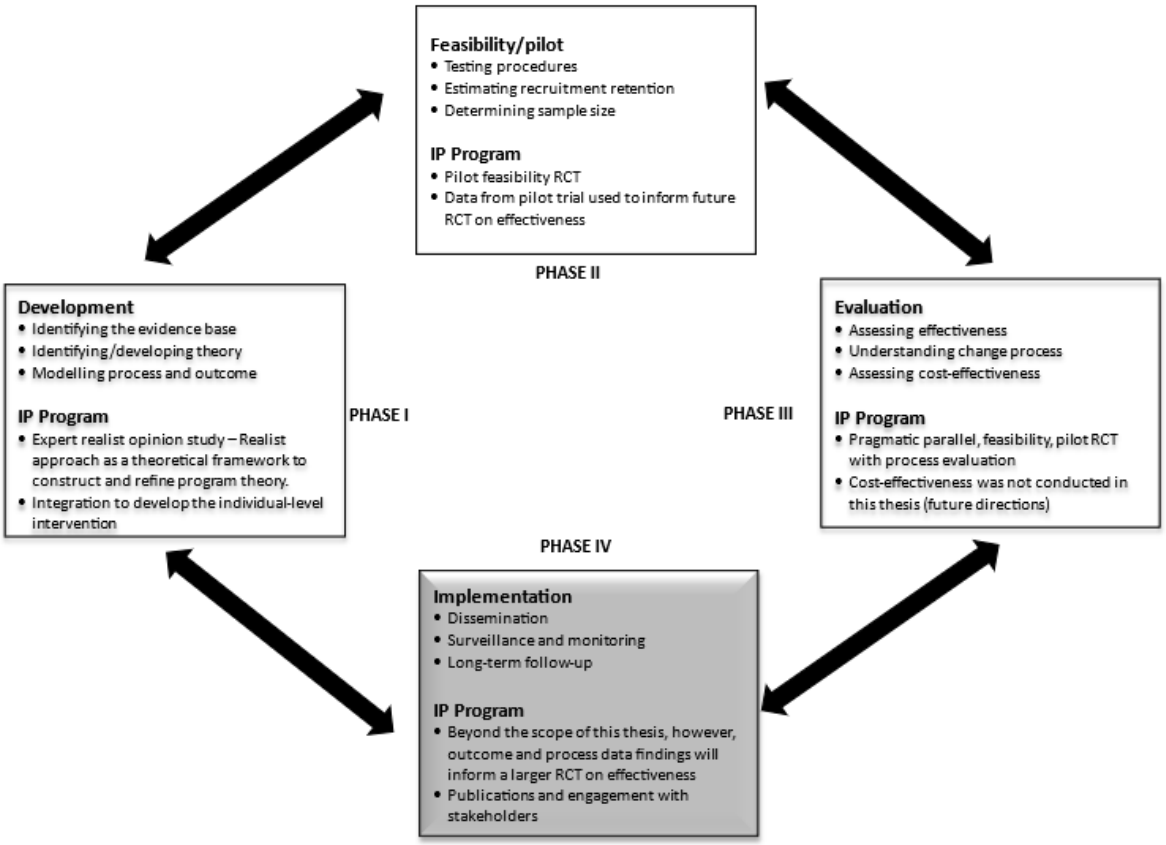


Figure 1 **The MRC Framework**

(adapted from Craig et al. (45))

1.5.2 Phase I: Development

The MRC Framework was a crucial element in this thesis as the framework assisted in developing the IP program (i.e. individual-level intervention). An extensive literature review used an umbrella and realist approach (Chapter 4) to facilitate a solid understanding and development of the IP program[2]. It gathered evidence on individual-level interventions (that targeted burnout and improved well-being), determined their effectiveness, and provided an understanding of contextual factors that influenced their outcomes. The umbrella realist review indicated research gaps in the context, mechanisms, and outcomes configuration (CMOC)[3] specific to CCHP. An expert opinion was conducted (Chapter 5) to address the research gap, which involved semi-structured interviews with CCHP experts to determine what individual-level interventions work, for whom, and under what conditions (guided by the realist approach). Findings assisted in elucidating the CMOC and provided refinement of the existing program theory[4], which was initially constructed using middle-range theories at the initial phase of the umbrella realist review. The refined program theory served as a guide in developing the individual-level intervention in Chapter 6 - integration. The integration process used building methods, where existing knowledge was incorporated into the principles of intervention development proposed by the MRC Framework. The framework facilitated the systematic development and refinement of the intervention for addressing burnout and promoting well-being among CCHP.

[2] The umbrella realist review served as a literature review to understand research surrounding individual-level interventions; hence, its absence in Figure 1 of the MRC Framework. The development process primarily occurred in the expert realist opinion (described in Chapter 5) and integration (Designing and Developing a Complex Intervention) described in Chapter 6.

[3] CMOC was used to create theory prepositions, which assisted in refining a program theory. The concepts of CMOC, theory prepositions, and program theory was further elaborated in Chapter 2 – Paradigms and theoretical framework.

[4] The initial program theory was constructed at the beginning of the umbrella realist review (Chapter 4), which was refined using the umbrella realist review's and expert realist opinion's findings.

1.5.3 Phase II: Feasibility/piloting

The IP program was tested in Phase II to assess its feasibility, acceptability, and preliminary effectiveness through a pilot RCT (Chapter 7). Pilot studies are a subset of feasibility studies that aim to determine whether a particular intervention can be implemented, whether it should be continued, and how it should be further developed (46). In the context of the IP program, the pilot study involved conducting a smaller-scale version of what a future study or part of a future study could be – if proven feasible and acceptable. By conducting a pilot RCT, implementation feasibility data was collected in the intended setting, supported by acceptability findings reported by critical care participants. The pilot RCT also assessed the preliminary effectiveness of the IP program, which provided initial insights into the potential impact of the intervention on improving well-being and mitigating burnout outcomes.

1.5.4 Phase III: Evaluation

The IP program was evaluated (using process evaluation) in the thesis discussion (Chapter 12), assessing feasibility, acceptability, and preliminary effectiveness outcomes. This evaluation drew upon the pilot RCT findings, the auto-ethnographic view of the research process, fidelity, and evidence-based literature. The evaluation process involved analysing and interpreting the data collected during the pilot RCT. This process provided valuable information on the feasibility of implementing the IP program in the targeted setting, the acceptability of the intervention to CCHP, and the preliminary effectiveness in improving burnout and well-being outcomes. Additionally, the auto-ethnographic view of the research process contributed to the evaluation by providing the researcher's personal experiences and reflections on the study and fidelity evaluation. This perspective provided an understanding of the challenges encountered, researcher-participant dynamics, fidelity, and the overall feasibility and acceptability of the intervention. Relevant evidence-based literature was incorporated, which enabled comparisons of findings with existing research and theories that provided a broader understanding of the results and their implications.

Cost-benefit analysis compares the costs associated with implementing the intervention to the benefits derived from its outcomes (47). Quantifying both the costs and benefits facilitates informed judgments about the value and feasibility of the intervention (47). A cost-benefit analysis was not conducted in the current study due to time restrictions of the author's candidature. A list of costs incurred from the pilot RCT was provided, which may assist in informing future research efforts for IP program studies. It enhanced a comprehensive understanding of the intervention's potential impact and informed decision-making regarding its implementation on a broader scale.

1.5.5 Phase IV: Implementation

The implementation phase was not conducted in this thesis due to the limitations of the author's candidature. However, the author was able to disseminate research findings on pilot RCT development successfully. Key stakeholders were advised about IP program development (disseminated at the International Nursing and Public Health Conference in Singapore) and implementation (disseminated at the 16th World Intensive and Critical Care Conference, Istanbul, Turkey). Dissemination of findings enabled the generation of awareness and interest in the potential benefits of the IP program among key stakeholders. Furthermore, this process facilitated feedback and collaboration in shaping the future implementation of the IP program. Nevertheless, it assisted in bridging the gap between research and practice, ensuring that the knowledge generated from the study reaches the relevant audience and has the potential to inform decision-making and policy development.

1.6 The thesis' aims and objectives

This thesis aimed to investigate and develop an individual-level intervention and to evaluate its feasibility, acceptability, and preliminary effectiveness. The intervention was intended to serve as a valuable resource for CCHPs, providing them with the necessary support to improve well-being and mitigate burnout outcomes at the individual-level. The thesis' objectives were to:

- Investigate existing knowledge on the types of individual-level interventions and what works for CCHPS and HCP.
- Develop a program theory using middle-range theories and refine it using findings from the umbrella realist review and realist expert opinion studies.
- Develop an individual-level intervention and pilot test for feasibility, acceptability, and preliminary effectiveness.

1.7 Thesis structure

This thesis comprises 13 chapters. This section provides an overview of each Chapter.

Chapter 1: Introduction to the Thesis highlighted the significance and contextual relevance of the research, identified the mixed method approach as the most suitable framework, and introduced the MRC framework.

Chapter 2: Paradigms and Theoretical Framework provided an in-depth exploration of the adoption of realism. It delved into the intricacies of understanding context, mechanisms, and outcomes configuration and developing and refining a program theory.

Chapter 3: Mixed-Method Design outlined the utilisation of a mixed methods approach, guided by the philosophical underpinnings of realism as discussed in Chapter 2. It highlighted the incorporation of sequential and exploratory elements within the research design and elaborated on the philosophical considerations that shaped the development of the two distinct phases of the study.

Chapter 4: Literature Review revealed the context, mechanism, and outcomes of individual-level interventions for critical care and general HCP. It used a realist approach to develop and refine a program theory using relevant middle-range theories.

Chapter 5: Stage 1: Realist Expert Opinion presented a qualitative study using semi-structured interviews with critical care experts. It aimed to understand the context,

mechanisms, and outcomes of individual-level interventions for improving well-being and mitigating burnout in CCHP. Valuable insights from the interviews contributed to refining the program theory for effective individual-level interventions in the critical care setting.

Chapter 6: Designing and Developing Complex Interventions highlighted the use of the MRC framework in designing the individual-level intervention. It outlined how the framework guided the systematic development process. Applying the MRC framework resulted in a robust and evidence-based intervention for addressing burnout and promoting well-being in CCHP.

Chapter 7: Pilot Randomised Controlled Trial Methods outlined the methods employed to conduct the pilot RCT of the individual-level intervention (IP program) on CCHP in Australia and New Zealand. This pilot RCT incorporated quantitative and qualitative components to assess the intervention's feasibility, acceptability, and preliminary effectiveness. The Chapter described the study design, participant recruitment, data collection procedures, and analysis procedures used in this pilot trial.

Chapter 8: Results for Feasibility and Acceptability presented the findings related to the feasibility and acceptability of the individual-level intervention (IP program) assessed in the pilot RCT.

Chapter 9: Results for Preliminary Effectiveness presented the findings related to the preliminary effectiveness of the individual-level intervention (IP program) as assessed in the pilot RCT.

Chapter 10: An Autoethnography of the Pilot RCT Fidelity provided a unique perspective on the feasibility of the study, as experienced by the researcher. In this Chapter, the author reflected on their personal experiences and observations throughout the pilot RCT, offering valuable insights into the challenges, successes, and lessons learned during the study.

Chapter 11: Integration of pilot RCT Results focused on integrating the findings from the pilot RCT using merging and joint display methods. The integrated findings refined the existing program theory, focusing on context, mechanisms, and outcomes relative to the IP program.

Chapter 12: Discussion of the pilot RCT enhanced the reader's understanding of the feasibility, acceptability, and preliminary effectiveness of the individual-level intervention (IP program) by employing evaluation methods proposed by the MRC Framework. It drew on relevant literature findings to provide additional insights and context to the pilot RCT results.

Chapter 13: Conclusion and Research Implications provided a comprehensive summary of the study's outcomes, highlighted the limitations encountered during the research process, and discussed the implications of the findings for both research and practice in CCHP well-being and burnout.

1.8 An original contribution to knowledge

The thesis contributed significantly to knowledge by addressing well-being and burnout challenges among CCHP. It synthesised existing knowledge on individual-level interventions for HCP and adapted these insights to the unique critical care context. The study developed an innovative theoretical framework, integrating middle-range theories and insights from realist reviews to guide the design of a tailored intervention. In addition, the research extended its impact by contextualising knowledge from broader healthcare contexts to critical care settings. Notably, it marked the first and novel application of a realist approach and lens to this work, which uncovered deeper and new understandings about Context, Mechanisms, and Outcome Configurations. These insights enabled the development of an original and unifying program theory used to understand, explain, and develop likely effective individual-level interventions for the CCHP. Furthermore, the author successfully developed and pilot-tested the unique individual-level intervention (IP program) among CCHPs in Australia and New Zealand, guided by the MRC framework. The thesis' empirical evaluation of the intervention's

feasibility, acceptability, and preliminary effectiveness provided evidence-based guidance for enhancing well-being strategies in critical care units.

1.9 Chapter summary

Chapter 1 introduced the thesis' context, aims, and objectives. The subsequent Chapter 2 delved into paradigms and introduced the theoretical framework of realism, which was employed throughout the thesis. This Chapter further detailed the application of CMOC and program theory within the chosen framework.

CHAPTER 2

PARADIGMS AND THEORETICAL FRAMEWORK

2.1 Chapter overview

Chapter 2 will present a comprehensive discussion of the theoretical framework . The chapter commences by introducing the concepts of research philosophy and paradigms and will provided an overview of prominent paradigms including positivism, constructivism, and pragmatism. Thereafter, this chapter will delve into the selected paradigm, realism, elucidating its fundamental components within the research approach. Additionally, the application of realism in health research will be discussed, followed by the research strategy employed in this thesis.

2.2 An introduction to research philosophy and paradigm

Research philosophy develops research assumptions through nature and knowledge (48). These research assumptions served as the foundation for preliminary statements of reasoning derived from the researcher's introspection and intellectual insights (48). Hitchcock and Hughes (49) proposed that research evolved from these underlying assumptions, with researchers holding varying perspectives on knowledge, its acquisition, and the nature of truth. By applying philosophy to the research context, scientists could effectively generate and transform ideas into evidence-based knowledge (48).

Research philosophy is the foundation of a research project (48). It guided the researcher's decisions regarding selecting a research strategy, formulating research problems, and the methods employed for data collection, processing, and analysis (48). Hence, a well-considered research philosophy was integral to the research process, ensuring rigour and coherence in the pursuit of scientific knowledge (48).

Thomas Khun was the first to use the word, 'paradigm' (aetiology in Greek, meaning *"pattern"*) to describe the philosophical way of thinking (50). Paradigm describes the researcher's worldview – school of thought, thinking, perspective, or shared beliefs about the world (50). It included the principles and abstract beliefs that shape their views, interpretation, and consequent actions within the world (50). In research paradigms, this concept serves as a conceptual lens through which researchers can examine and determine the most appropriate methodological approaches and data analysis techniques for their research projects (50). Therefore, paradigms play a crucial role in guiding the research process, providing a foundation of beliefs for the dedicated research topic, and aiding in interpreting collected results (50). Adopting a specific research paradigm has significant implications for the decisions made throughout the research journey, including the methodology and methods employed (50). By understanding and adhering to a particular paradigm, researchers can ensure coherence and consistency in their investigations, fostering robust and reliable scientific inquiry (50).

2.3 Components in research paradigms

Research paradigms consist of four core components: ontology, epistemology, methodology, and methods (48). These components are vital in research, aiding theory development, guiding solutions, and establishing tool criteria (43, 48, 50). Ontology addresses reality and assumptions shaping beliefs, affecting problem framing and solution approaches (43, 48, 50).

Epistemology, interpreted diversely, separates assurance from opinions, emphasises knowledge creation, and validates reality representation (43, 48, 50). It is linked to ontology, as its reasoning relies on ontological assumptions (43, 48, 50). Methodology studies data techniques, shaping method selection and research execution (43, 48, 50). Methods involve data collection and analysis, determined by project design and the researcher's approach. They include quantitative, qualitative, and mixed methods, each serving distinct purposes (43, 48, 50).

2.4 Paradigms in health research

There were four main research philosophies, including (1) positivist, (2) interpretivist, (3) pragmatist, and (4) realist research philosophies (51). The three philosophies were discussed to explain the chosen realist research philosophy. Each philosophical perspective could be considered explicit and implicit assumptions, categorised as ontology and epistemology. Table 1 summarises positivist, constructivist, pragmatist, and realist perspectives. The details presented in this table are discussed further in the following sections.

Table 1 Positivist, constructivist, pragmatist, and realist paradigms in research

	Positivist	Constructivist	Pragmatist	Realist
Ontology	Realists exist and are understood using observations or direct experience (51).	Reality is based on the subjective outlook of human thinking (51).	Reality is based on both observations and subjective outlook (51).	A reality exists, but our experiences of reality are created (51).
Epistemology	The uptake of knowledge is not related to moral content and values (51).	Knowledge is acquired by relative agreements of mental structures (51).	Knowledge is acquired by experience (51).	Our reality is created and constrained by our interpretation of the experience (51).

2.4.1 Positivism

August Comte, a 19th-century philosopher, characterised positivism as a research approach involving experiments, observations, and comparisons (42). "Positivity" here does not denote value but signifies "posited" or postulated (42). In the social sciences, "posited" signifies empirical observations versus metaphysical speculations (42). Positivism posits an objective reality understood through rigorous methods independent of researchers' perceptions (51). Its epistemology supports testable, repeatable results for predictive insights (51). Positivism is a standard in science and healthcare research, often employing controlled experiments,

quantitative methods, and focusing on cause-effect relationships (52-54). Pawson and Tilley's positivist approach includes comparing experimental and control groups (55). However, controlling context limits understanding complex, interdependent phenomena (56). System-wide care transformation in implementation science faces challenges due to context variation, hindering replicability (57). Blueprint approaches can obscure intricate social processes (57). Rather than composition, understanding intervention properties in context is crucial for replication (57).

In evaluating interventions for CCHP's well-being and burnout, understanding how, why, and under what conditions interventions work is vital, moving beyond a strict "what works" perspective (58). Given burnout's multidimensional nature and contextual influences on interventions, comprehensive understanding is essential (58-60). Such interventions operate within the healthcare system's complex dynamics, influenced by individuals, institutions, processes, and structures (55). Focusing solely on "what works" through context control disregards the intricate relationships and processes this thesis aims to uncover (58-60).

2.4.2 Constructivism

Constructivism posits that truth emerges through the interaction of subject and object, guiding social phenomenon investigation (61). It emerged to rationalise knowledge foundations, offering cognitive understanding by studying the world (62, 63). Ontologically, it asserts reality's construction within a social context, allowing multiple interpretations due to diverse realities (61). Language, narrative, and discourse provide different perspectives based on individuals' experiences (61). Reality, as per constructivists like Onwuegnuzie (48), results from the human mind shaped by social means, linking "what is known" and "who knows". Epistemologically, constructivism acknowledges multiple equally valid truths, non-objectively measurable (64). Robson explains the epistemological premise as involving conscious, purposive actors attributing meaning to behaviour (65). This understanding delves into cause-and-effect relationships as "webs of meanings and practices" (66). Constructivist research

focuses on participant views and experiences within a social context, often using qualitative methods for exploration (65). It centres on relevant situations to derive generalisable findings across similar contexts (65).

However, the lack of generalizability challenges its application for this thesis seeking adaptable individual-level interventions across CCHP (67). Pawson and Tilley note that this challenge impedes evaluation research's goal of developing transferable knowledge for comprehensive future initiatives (55). Thus, this study rejects constructivism due to its context-specific focus and hindrance of generalisable knowledge. The following section discussed the pragmatic paradigm. We discuss the pragmatist paradigm in this thesis due to its association and frequent utilisation in mixed method studies (used foundationally in this research) (68).

2.4.3 Pragmatism

Researchers like Denscombe (69) and Mitchell (70) propose pragmatism as a flexible partner for mixed-method research, enabling the integration of quantitative and qualitative methods. Teddlie and Tashakkori (71), along with Creswell (72), support pragmatism as ideal for mixed methods due to method, paradigm, and data flexibility, minimising philosophical bias (73). Pragmatism prioritises practical problem-solving over philosophical assumptions about knowledge nature (73, 74). It rejects rigid paradigms like positivism and constructivism (73, 74). Ontologically and epistemologically, pragmatism lacks a singular reality system, valuing human experience in solving practical issues (75). It unifies action and knowledge, deriving from the Greek "pragma", meaning 'action' (68, 76, 77).

Pragmatism emphasises action's role, linking thoughts and actions, suggesting problem-solving actions stem from existing knowledge, evolving into new insights (78). This aligns with the action research cycle (78), asserting knowledge as a starting point for future problem-solving (78). Pragmatic trials, seemingly reasonable, have limitations due to interpretation variability, bias, and lack of causality (79). Outcomes can be skewed by researcher bias, undermining generalizability (79). Ernest and Canter(79) suggest that pragmatic trials

complement efficacy trials. Given the efficacy gap in individual-level interventions for well-being and burnout, this study rejects pragmatism until efficacy is established.

2.4.4 Realism

The realist paradigm offered an option to capitalise on the strengths of both constructivist and positivist approaches by offering generalisability of research outcomes and acknowledging the social complexity of a research study (80). Thus, in rejecting the constructivist and positivist paradigms, it can be argued that the realist-based approach is a particularly attractive to the present research.

Realist ontology believes in the existence of reality that is independent of our understanding of it and that it cannot be observed or seen (81). It emphasised that reality is created by the human mind, with subsequent and differential degrees of interpretation by the individual (81). Crotty (82) highlighted the relationship between the external reality and the individual:

> *"…the existence of a world without a mind is conceivable. Meaning without a mind is not* (82)*."*

Thus, critical realism can be viewed as adopting the positivist ontology of 'what is' (existence of reality) and the constructivist epistemology of 'what does it mean to know and understand reality' (reality is created in the mind and can be understood through exploration of social processes) (81, 82).

Reality can also be understood as 'complex' as Pawson and Tilley (55) further iterates the *"embeddedness of all human actions within a wider range of social processes"*. Thus, the broader range of social processes can include individual, group, institutional, and societal stratification (83). For instance, societal beliefs and values influence adopting and adapting new standards and practices (84). Likewise, cultural attitudes and values can influence the manner and extent of institutional resistance to change (84). De Jonge (84) suggests that such stratification is not meant to be caused unidirectionally but rather a bidirectional and

multidirectional sense, which help to form and are all formed by each other. In terms of this thesis, we can view the operation of individual-level interventions as being influenced by the complex interplay of interactions, including organisational structures, historical and cultural factors, and the motivation of individuals that work within the organisation (critical care).

Critical realism was first developed in the 1970s by Bhaskar (81) and subsequent others (85), who suggest that reality can be understood as a complex, multi-layer and multi-causal web of interactions that consists of empirical, actual, and real levels, where the influences of these interactions would likely change the facts over time (55). This layered approach to reality is further described in Figure 2, which adapted Fletcher's (41) iceberg metaphor to demonstrate this stratification.

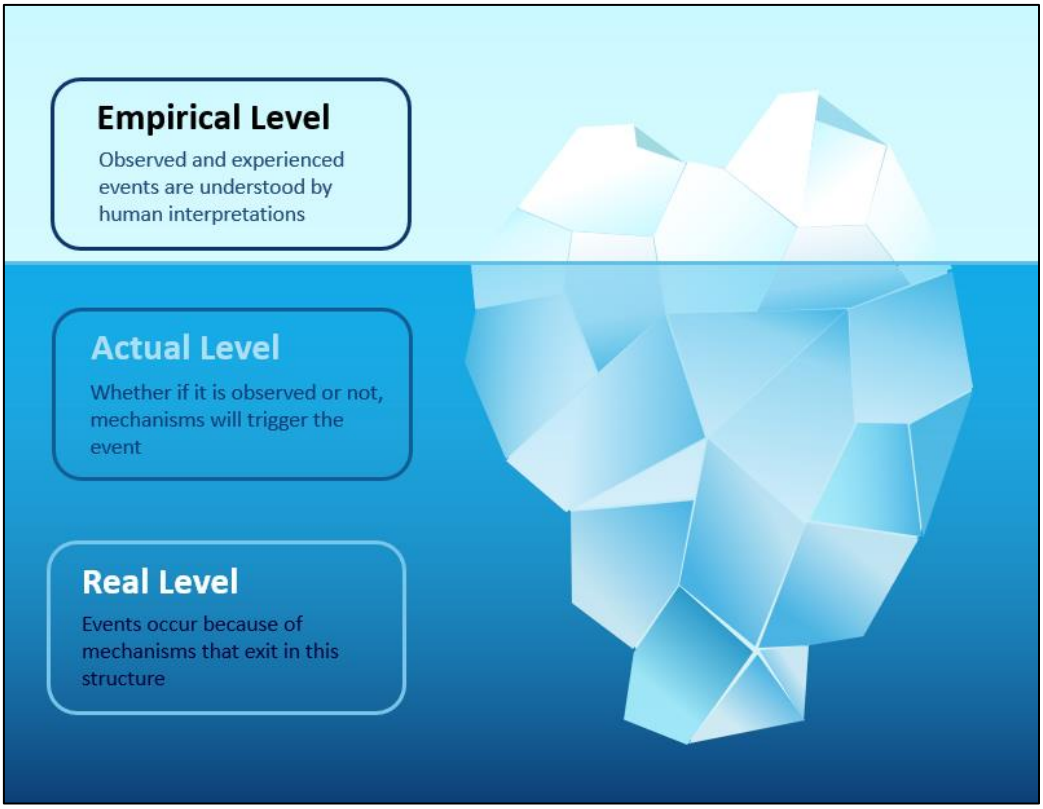


Figure 2 Iceberg metaphor of reality

(Adapted from Fletcher et al. (41))

"The personal iceberg metaphor of the Satir model" by Yayun Zheng, Limin Liu, and Xianhe Zheng, used under CC BY 4.0 / Original words and sentences were replaced and additional layers of colours were added to the image.

The iceberg metaphor does not suggest that the levels do not interact or that one level is less or more 'real' than another (41). Instead, it suggests that all levels within the iceberg are related and part of the same entity, or in this case, the same reality (41). Bhaskar (86) states that social structures are activity-dependent, unlike the natural world. Further explanation of causal mechanisms suggests that they "*exist only in virtue of the activities they govern and cannot be empirically identified independently of them"* (86). Thus, causal mechanisms are a social product that can be understood through a phenomenon located at the empirical level (i.e., human ideas and actions are developed by mechanisms), making the phenomena a relevant area for further scientific investigation (41).

All social structures on the iceberg have causal powers and liabilities (41). These are potentialities intrinsic to a structure or object that impedes or allows it to act in a particular way (41, 86). The conditions present within the open social world can either facilitate or prevent the actualisation of causal power in a structure, which means that it can either have or not have an observable impact within the empirical level (41, 86). Thus, retroduction processes are essential to investigate a particular social conduction, where causal mechanisms may take effect in the world (41). Through these mechanisms, we can explain how and why an event occurs, providing research focus on social systems and processes (41, 86). In explaining the realist approach, we can therefore view the real world through understanding how context and social structures affect processes, actions, and mechanisms that result in an observable phenomenon (41). Realism assumes that there are existing theories about how an intervention or program may work (i.e. middle range theories) with respect to individual and group beliefs, management, organisation, and social behaviour (87). Thus, to understand and explore how, why, and for whom an implemented intervention or process works, it is paramount to determine hidden mechanisms within the real and actual levels (41).

2.5 Realist Evaluation

This thesis encompassed the realist evaluation methods. Realist evaluation was first developed by sociologists Ray Pawson and Nick Tilley in the late 1990s to evaluate how, for whom, and under what conditions complex social programs may function (88, 89). When referring to 'social program' in realist studies, it often referred to 'interventions', 'strategies', or, in the case of this research, 'interventions' (88, 89). The realist research paradigm is a valuable framework that offers analytical tools to articulate contextual factors' effects within an implementation strategy's causal processes (57).

The realist research paradigm considered the interactions between theoretical mechanisms of change, contextual factors, and the outcomes it produces, which generated explanations of conditional causality – what would work, for whom, and under what conditions (57). Realist research is grounded in the philosophy of scientific realism and is a form of theory-driven research that believes that interventions can work under a particular circumstance and that the success of that intervention is influenced by the agents and their different responses to it (57). In realist research, interventions must have a theoretical underpinning, whether implicit or explicit, which is used to test the theory against empirical evaluations (57). Moreover, it heavily relies on the belief of people's reactions and reasoning as influencing factors to the success or failure of an intervention, in comparison to having a 'technical solution' offered by the strategy (55). Therefore, the role of a researcher is to explore, understand, and examine the close and intertwined relationships between human interactions and activities, the context of the intervention whereby mechanisms are triggered, and relationships between the mechanisms of change (55, 90, 91). Doing this will allow a clearer understanding of why intervention can be successful in one setting yet unsuccessful in another (55, 90, 91). Unravelling such interactions can, therefore, enable the understanding of complex and complicated stratum of social reality that exists foundationally of what is observed at the surface (55, 90, 91).

2.5.1 Program theory

Realist evaluation consists of a program theory that describes how the program or intervention (often used interchangeably)[5] should lead to an outcome and under what circumstances it will require (92). Pawson (92) defined the dynamics of complex social strategies and reinforced that an individual's choices and decisions create the outcome:

> *"Programs are active, not passive. Interventions do not work in and of themselves; they only have affect through the reasoning and reactions of their recipients […] Programs have long implementation chains and multiple stakeholders. Recipients are many and varied; reactions to programs thus differ; outcomes are thus generally mixed* (92)(p.8).*"*

Realist evaluation techniques focus on a logic of inquiry rather than a prescription of methodological steps that must be followed (93). Principles of generative causation guide the research process, seeking to identify the Context (C), Mechanism (M), and Outcomes (O), whereby, when combined, it describes what the intervention is expected to do, how it should work, and under what circumstances (93). These elements can be expressed as 'CMOC' (Context-Mechanism-Outcome Configuration), described in the following sections (93).

2.5.1.1 Generative causation

Harre (94) described the successionist view as a consistent relationship between the variables of 'X' and 'Y' within a controlled observation sequence. Comparatively, generative causation, used in realist approaches, focuses on identifying mechanisms (M) that can explain the 'X' and 'Y' variables (94). The two views are depicted in Figure 3.

[5] Chapters 1 to 6 used the term, intervention and chapters 7 to 13 used the term program. The beginning chapters used intervention as it initially referred to a specific action/activity, whereas, after refinement and development of the intervention in Chapter 6, the term program was used to refer to a set of activities with a particular long-term aim.

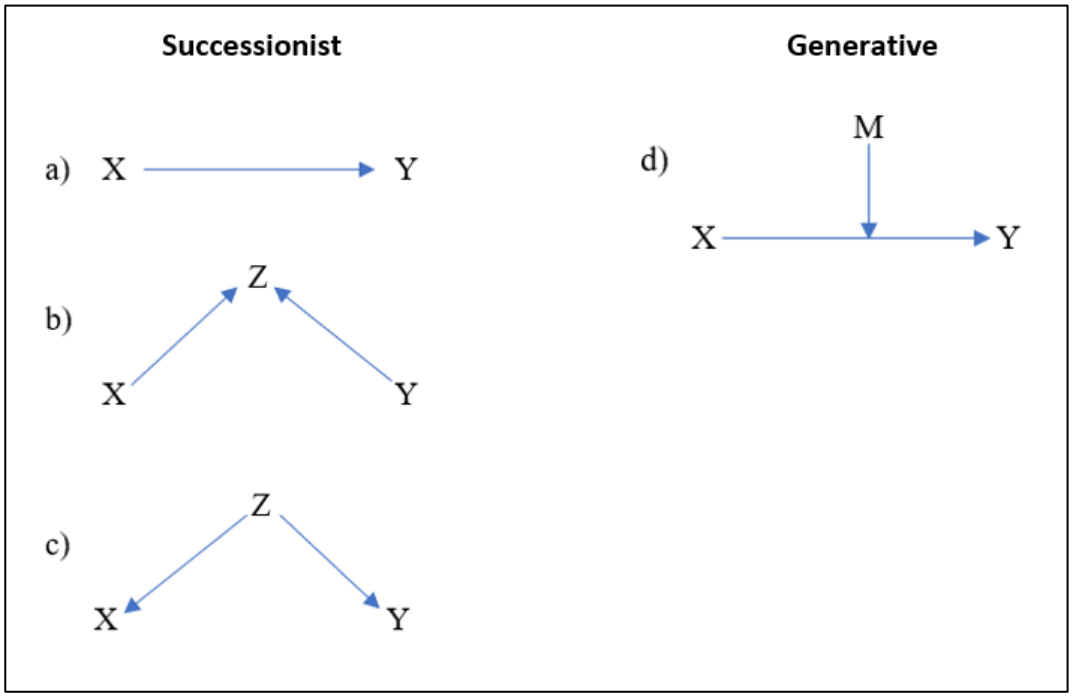


Figure 3 Two models of causation

(Adapted from Pawson et al. (95))

Generative causation attempts to understand an intervention outcome through contextual factors surrounding implementation and the mechanisms that trigger the intervention (82). The realist approach used CMOC as a formula to determine causation (82):

Context (C) + Mechanism (M) = Outcome (O)

Generative causation does not imply an indirect relationship between an intervention and outcome, where variable 'Z' moderates or mediates the relationship (55, 82). Instead, it suggests an underlying mechanism that plays a role in the relationship between an intervention and outcome. Pawson and Tilley (55) demonstrated that an intervention or program can initiate different mechanisms, which may subsequently produce different outcomes. This belief was described in Pawson and Tilley's (55) example of gunpowder ignition and its relationship with the chemical composition of the gunpowder (mechanisms) within a particular condition (context):

> *"We know that gunpowder does not always ignite when the flame is applied […]. The causal connection involved is thus not established by constant conjunction […]. Rather we know that spark causes explosion because of the chemical composition of gunpowder […] We also know that there will be no explosion if the conditions are not right- if the mixture is damp, if there is insufficient powder, if it is not adequately compacted, if there is no oxygen present, if the duration for which heat applied is too short, and so on* (55)(p.28)*."*

This explanation of generative causation suggests that realist approaches examine the context of the situation or experience and identify causal mechanisms triggered in a particular condition to understand the observed outcomes (55). The following section discussed the concepts of context, mechanisms, and outcomes in greater detail in relation to this thesis.

2.5.1.2 Context

In social sciences, context is a set of social values, rules, or interrelationships that function within spaces and tomes that either support or constrain the activation of program mechanisms (96). Sayer (97) further suggests context as the social structures, social resources, systems, and rules of meanings where reasons are formulated. Pawson and Tilley (95) suggest that context is essential to understand the conditions needed for a measure to initiate the mechanism. Context is often inextricably enmeshed with a program's mechanisms (96). Therefore, it is paramount to instil the understanding that context has a relationship with particular mechanism(s) as an interconnected and constituent element of the CMOC and not as an entity by itself (96).

The conceptualisation of context in realist evaluation can be found in other works, such as the Realist And Meta-narrative Evidence Syntheses: Evolving Standards II (RAMESES II) project (96), where the authors proposed that (98):

"Context are therefore bound up with the mechanism(s) through which programmes work, and need to be understood as an analytically distinct but interconnected element of a Context-Mechanism-Outcome configuration".

Furthermore, the authors described context as possessing five criteria (1) the condition needs to be pre-existing for an intervention, (2) multi-layered, (3) multi-factor, (4) it enables or disables the mechanisms, and (5) its interaction with mechanisms may potentially produce newer contexts (98).

Context can include a broad and pre-existing set of cultural, social, institutional, or historical factors (96). Moreover, context does not necessarily pertain to the settings in which the intervention is introduced; instead, it considers how such settings operate (96). For example, individual-level interventions may be implemented in critical care, general medical, and surgical wards. However, there is a distinct difference between those settings, which can affect how the intervention works due to the differences within each setting type (96). An example can include critical care possessing different degrees of a 'heavy workload' or even leadership styles compared to a general medical ward. Therefore, the intervention may work in some settings and not others due to the differences in contextual factors, which translates to differences in mechanisms (96).

2.5.1.3 Mechanisms

Mechanisms can be conceptualised using the concept of behaviours and reasonings of individuals (55). Literature also suggests that mechanisms should extend their definitions to include the understanding of 'how' and 'why' a change occurs at different levels in a system (99). Mechanisms should not be directly equated to a variable and as "observable attributes of some unit of analysis" (99, 100). Even though mechanisms are not directly observable, realist approaches suggest that they are still real, such as in the example of accepting the pull of gravity even though it cannot be directly observed (99). Mechanisms can also be considered elements in the cognitive decision-making process, such as norms, collective beliefs, and

preferences, which interact with opportunities, constraints, and resources to influence behaviour change (59, 91, 101-103). Examples of mechanisms are explained using the previous example, where implementing individual-level intervention can be successful because of contextual factors such as meaningful recognition by their leaders. Mechanisms that may influence this outcome can include components such as mutual respect between employees and leaders or even having supportive leaders and colleagues that encourage individual-level interventions (59, 91, 101-103). However, mechanisms can change when the context shifts – for example, not having meaningful recognition (context) leads to ineffective uptake of the individual-level intervention for burnout (outcome) (59, 91, 101-103). This is because employees may view themselves as being vulnerable, fear that their mental health condition is exposed to their colleagues and leaders and have self- and/or perceived- stigma as a sign of weakness, or even fear of employment redundancy relative to their mental health (mechanisms); all of which impedes them to seek help (outcome) (104). Therefore, these examples demonstrate that mechanisms can function at an individual-level (micro) or organisational-level (macro), operating within individual reasoning and available resources (55).

2.5.1.4 Outcomes

Outcomes of an intervention program can be defined as either intentional or unintentional, and short- medium- and long-term changes brought about through involvement (91). It is not the direct result of applying a program intervention, but rather, by gradually activating mechanisms found in the correct conductive context (91). The realist approach does not seek to test the efficacy of a program, but instead, it seeks to explore impactful mechanisms, context, and outcomes (91). This current research focuses on the adaptive capacity (in terms of feasibility and acceptability) of individual-level interventions to improve well-being and burnout. Moreover, outcomes from one strategy can become a mechanism or context that creates another outcome – such as the 'ripple effect' (105). For instance, the outcome of a feasible

intervention can be used as a contextual factor in a CMOC to produce further outcomes such as improved employee engagement.

2.6 Realist evaluation in health research

After considering various paradigms such as positivism, constructivism, pragmatism, and realism, the author's choice of a realist evaluation as the methodological approach for this thesis is well-founded. The thesis delved into the intricate interplay of factors influencing well-being and burnout within individual-level interventions. Realist evaluation, therefore, emerges as a suitable approach to delve into the intricate workings of healthcare systems' complexities (57). By comprehending and addressing queries about the 'what,' 'how,' and 'under what conditions' of intervention effectiveness, the possibility of generalising results – a challenge often encountered in research – becomes attainable (106). Practitioners employing the realist evaluation methodology have come to recognise the formidable nature of healthcare problems and the demand for profound insights into intervention dynamics and contextual implementation (57). Given the application and assessment of realist research in various domains like health services, public health, and international development, adopting a similar strategy to comprehend implementation mechanisms can prove advantageous within this thesis (57).

2.7 Research strategy

A consistent correlation exists between the research's ontological and epistemological viewpoints and methods. As previously described, the epistemological stance strives to unveil causal explanations through generative principles. This, in turn, contributes to the ontological understanding that the outcomes of interventions targeting CCHP hinge on contextual resources and reasoning. The implementation of realist evaluation encompassed a fusion of methodologies, illustrated in Figure 4, effectively depicting the interplay between the research's ontology, epistemology, methodology, social theories, and practical investigative

approaches. The framework used in this study adapted Saunders and Tosey's (107) 'The Research Onion' diagram.

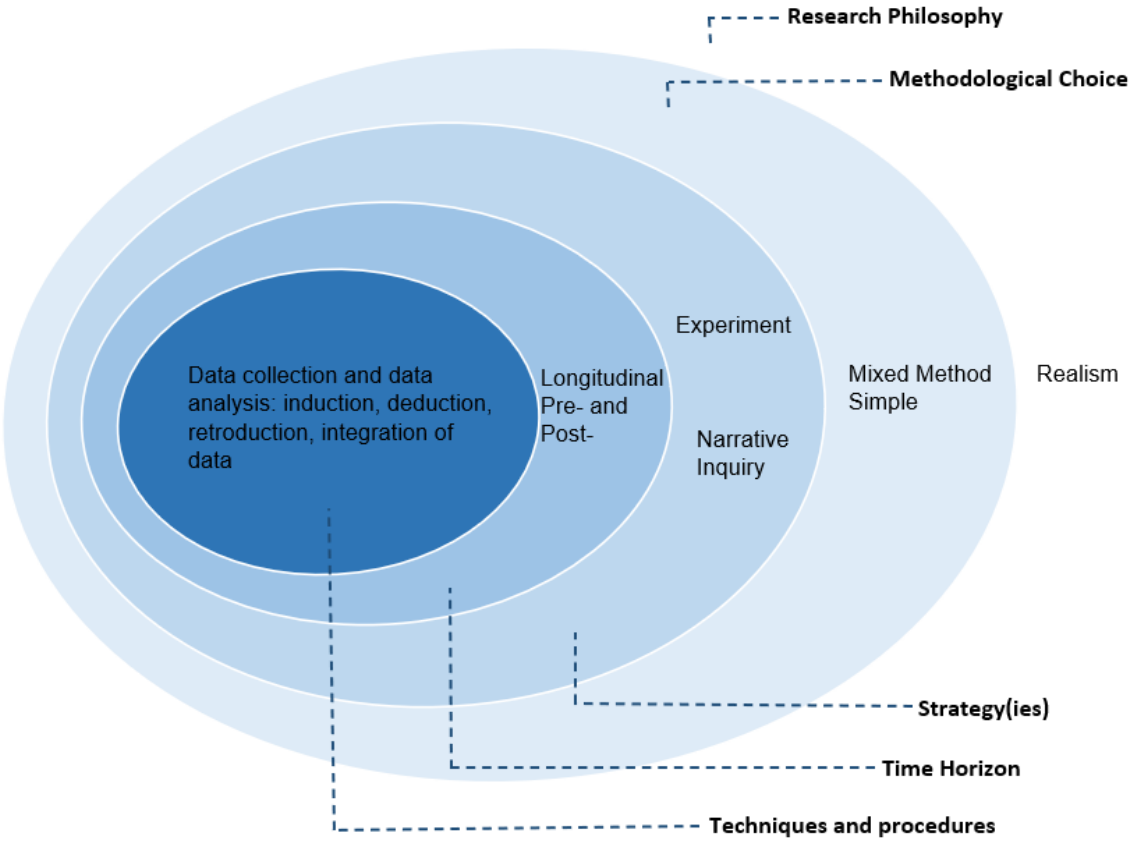


Figure 4 The research onion

(adapted from Saunders and Tosey (107))

In the outermost layer, the research philosophy for this thesis is portrayed. The chosen approach involves adopting realism as the ontology and utilising mixed methods as the methodological framework. Applying a realist evaluation employing mixed methods is intended to facilitate data acquisition with sufficient scope to comprehend the underlying mechanisms. This is achieved through synthesising qualitative and quantitative data, a topic explored in greater detail in Chapter 3.

The selected data collection methods encompass a narrative inquiry, tapping into expert opinions to fortify the evidence regarding effective interventions for CCHP. Additionally, a RCT

experiment is employed to assess the feasibility and acceptability of individual-level interventions. The techniques and procedures embraced within this research align with the principles of realist evaluation. These include the use of induction, deduction, and retroduction, alongside integrating both qualitative and quantitative data to inform the development of the program theory.

2.8 Chapter summary

This chapter introduced paradigms, including positivism, constructivism, pragmatism, and realism. The realist approach emerged as the most suitable for investigating individual-level interventions to enhance well-being and reduce burnout among CCHP. Positivism emphasises control over context for replicable cause-effect outcomes, hindering the exploration of intervention variations. Constructivism lacks generalisability across similar settings, impeding effective interventions. Pragmatism offers limited generalisability and causality, often complementing efficacy trials. As efficacy data for critical care interventions is lacking, the realist approach offers a balanced middle ground, combining strengths of positivism and constructivism for causal and generalisable insights. Theory-driven evaluation permits a focused assessment, aiding organisations. Chapter 4 details the mixed method design, timing, priority, and integration point.

CHAPTER 3

MIXED METHOD DESIGN

3.1 Chapter overview

Chapter 3 will discuss the methodologies considered and applied in this thesis. The chapter will compare the differences between quantitative and qualitative methods and define mixed methods. A summary of worldviews in the mixed method context will be provided, followed by different mixed method designs and justification for using a sequential exploratory design. The typology, theoretical drive, timing, point of integration, and degree of complexity will be discussed in this chapter.

3.2 Quantitative and qualitative methods

Quantitative and qualitative methods should be regarded as points along a continuum, with mixed methods positioned at the centre as they combine both approaches (108). Qualitative research involves delving into and comprehending meanings within the context of individuals or groups, especially concerning human or social issues (108). The research process includes emerging questions and procedures; data is often collected in participants' settings, then inductively analysed and structured around general or specific themes, leading to interpretations drawn from the data (108). The resulting report takes a flexible structure, and researchers employing such methods typically approach research inductively, focusing on individual significance and the complexities of situations (108). In contrast, quantitative research tests objective theories by examining variables and their relationships (108). These variables are measurable, and data collection often involves instruments enabling statistical analysis of numerical data (108). Compared to qualitative research, the final report is structured and employs deductive theory testing, safeguards against biases, controls for alternative explanations, and facilitates generalisation and replication of findings (108). Rather than adhering to a single distinct method, this research opts for a mixed method design to

provide flexibility in addressing the research question (109). Adopting realism as a philosophical worldview further encourages the integration of qualitative and quantitative methods, with qualitative methods capturing contextual and procedural intervention data, while quantitative data aids in understanding the intervention's impact (109).

3.3 Defining mixed method

The term 'design' in mixed method research encompasses two meanings, firstly, as a verb to engage in designing a study, and secondly, as a product resulting from designing (noun) (110). The integrated approach of mixed method designs had increasing recognition within the past two decades, evident in many books, articles in academic and professional journals, dissertations, and other outlets (i.e. conference presentations) (111). The emergence of the mixed method research design aimed to challenge the traditional separation between qualitative and quantitative approaches, offering a third option that enables researchers to determine the extent to which they utilise each approach (111). Such designs' widespread acceptance and popularity can be found in behavioural, social, educational, and health sciences (111). The mixed method is an approach to inquiry that systematically integrates qualitative and quantitative approaches to provide solutions for complex research questions (108, 111). It gathers numerical and narrative data and employs emergent and structured designs, analyses data through content and statistical analysis, and integrates findings from both qualitative and quantitative sources to generate meta-inferences as outcomes to the research question (111). This thesis used Tashakkori and Creswell's (112) definition of mixed-method research was used:

> *"Mixed Methods Research is a research in which the investigator collects and analyses data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or program of inquiry* (112) (p.3)*."*

The purpose of using a mixed method design includes the ability to generate hypotheses and test within a single project to consider the combination of both researcher' and participants'

perspectives to discover relationships that may not have been reported in prior research – enabling a diversity of viewpoints (113). According to Greene et al. (114), mixed-method designs are proposed to integrate the distinct characteristics and traditions of both qualitative and quantitative approaches to provide answers that cannot be obtained through either method in isolation. It allows questioning why, how, what, and why (i.e. an intervention may work), often a result of interrelated components from qualitative and quantitative orientations and are seen in the roots of realism (43).

3.3.1 Justification for using mixed method design

Mixed method designs balance flexibility from qualitative exploration (with fixated characteristics found in hypothesis testing) and theoretical grounding from quantitative methods (43). This conforms with the thesis' research structure, where qualitative exploration was conducted in an expert opinion study, followed by theoretical grounding from the pilot RCT. This process allowed the generation of new theoretical explanations and tested the understanding of such concepts, leading to complementary and confirmatory conclusions (111). Johnstone (115) suggests that mixed methods can complement, triangulate, or expand the contribution of a single approach. This thesis used Greene, Caracelli, and Graham's (114) five reasoning to justify using mixed method design. These include triangulation, complementarity, development, initiation, and expansion (114).

- *Triangulation* is a technique that intentionally uses more than one method to gather and analyse one phenomenon to allow corroboration and convergence and eliminate biases found from using only one method (114, 116). The methods should be independently and simultaneously implemented to allow for triangulation (116).
- *Complementarity* seeks to elaborate, illustrate, enhance, and clarify the results from one method using results from another (114, 116). Therefore, qualitative and quantitative results are used to measure overlapping but different phenomena (116).

- *Development* refers to using results from one method to inform or develop the other (114, 116). Each method is sequentially conducted, and results from one method are used to develop the design of the second method to assess the same phenomena (114, 116).
- *Initiation* seeks to identify contradictions, paradoxes, and new perspectives to allow the discovery of why such contradictions may exist (114, 116). It uses an iterative approach, where Greene et al. (114) suggest that mixing paradigms is encouraged and acceptable because of its ability to maximise potential possibilities of identifying inconsistencies (114, 116).
- *Expansion* seeks to extend the range and breadth of the research inquiry using different methods for different inquiry components (114, 116).

3.4 Classifying mixed-method design

Several authors have proposed classifications of mixed method designs, including Tashakkori and Teddlie (111), Johnson and Onwuegbuzie (117), and Bazeley (118, 119). These different approaches in mixed method designs share commonalities, such as acknowledging the central role of the study's research question in shaping the design (118). However, they may diverge in prioritising design types within the overall problem, research question, and research purpose (118). For this thesis, the approach choice was determined by effectively addressing the study's problem and question (118). Guidance from Creswell et al. (120) was adopted to inform the research design, as it offered a fitting design framework aligned with the thesis aims and objectives. Creswell et al. (120) outline six distinct types of mixed method designs, guided by four criteria: implementation, priority, integration, and theoretical perspectives. These decision criteria inform the different research designs, encompassing the design variants (120). This thesis opted for the sequential exploratory design among the six types of mixed method designs—sequential explanatory, sequential exploratory, sequential exploratory, sequential transformative, concurrent triangulation, concurrent nested, and concurrent

transformative—as its research guidance (120). Subsequent sections provide an in-depth discussion of the selected research design—sequential exploratory design (120).

3.4.1 Sequential exploratory design

The sequential exploratory design shares resemblances with the sequential explanatory design as it follows a sequential structure (120-122). This design comprises two stages, with priority granted to the first stage, which may or may not align with a specific theoretical perspective (120-122). The outcomes from both stages are then synthesised during interpretation (120-122). This design intends to firstly collect qualitative data to explore the topic, and the information is then used to inform quantitative data collection methods (120-122). This design is also commonly used to explore the topic prior to instrument or intervention development and testing (120-122). Researchers opt for this design when primarily conducting a quantitative study – emphasis is placed on the quantitative stage – but incorporating qualitative data collection to examine potential variables (120-122). The primary distinction between the two sequential designs rests in their objectives; sequential explanatory designs aim to expound and interpret relationships, while sequential exploratory designs aim to explore the phenomenon in question (120-122).

3.5 Justification for sequential exploratory design

3.5.1 Timing (sequence)

Data collection for qualitative and quantitative methods can occur either sequentially or concurrently (122, 123). In sequential studies, qualitative and quantitative data are gathered in distinct stages, while concurrent studies involve data collection simultaneously (122, 123). The design chosen for this thesis is the sequential (exploratory) design, which features two prominent stages—qualitative and quantitative (122, 123). The initial qualitative stage informed the development of individual-level interventions, which were subsequently employed as a guide during the second quantitative stage of the pilot RCT (122, 123).

Consequently, concurrent designs (such as nested, triangulation, and transformative) were not considered.

3.5.2 Priority decision

Exploratory was chosen due to the consideration of priority and integration. Priority refers to the decision to emphasise either or both methods (i.e. qualitative or quantitative) (122, 123). In sequential exploratory designs, priority is given to the initial qualitative study, which is then used in the quantitative stage to test or generalise the initial findings (122, 123). In this thesis, the initial concepts (i.e. individual-level interventions for burnout and well-being), relationships, and variables within studies are initially unclear. Therefore, prioritising the qualitative elements would uncover the 'pool' of relationships and variables that may be subsequently used in the quantitative study (122, 123). The sequential explanatory design prioritised the quantitative study and instead used the qualitative study to explain and provide greater depth to the quantitative findings (122, 123). Relative to this thesis, the literature review could not determine what, why, and how individual-level interventions would work for CCHP, which provided an unclear understanding of the concepts. The qualitative study (expert realist opinion, Chapter 5) could decipher hidden contexts and mechanisms, providing clarity of concepts, variables, and relationships used to create an individual-level intervention and tested quantitatively in the proceeding pilot RCT (122, 123). Pilot trials are quantitative due to quantifiable measures such as recruitment and retention rate, which inform the design and feasibility of a more extensive study (124). As demonstrated in the later chapters (Chapter 7), the primary outcomes for the pilot RCT included quantitative data to measure the feasibility of the intervention.

Additionally, qualitative data using semi-structured interviews of participants was concurrently collected to provide depth in understanding the feasibility of the intervention by informing recruitment and retention processes (124). Although qualitative data was used, the pilot RCT remains a quantitative study due to the study's design (124). Baldeh et al. (125) explained that

pilot RCT maintains the element of random sampling, a component found in quantitative studies (126, 127). Furthermore, RCTs are prospective, comparative, and experimental and are performed under controlled conditions, making such studies quantitative (128). The explorative design was chosen as it used an interactive level of interaction due to the direct interaction between the study's qualitative and quantitative methods, allowing the two methods to be mixed before the final interpretation (122, 123). Therefore, the exploratory sequential design is informed by the collection and analysis of qualitative study (expert realist opinion, Chapter 5), where findings were used to inform the proceeding quantitative study (pilot RCT).

The sequential explanatory design was excluded for consideration. Although the sequential transformative design is flexible in that it allows for the same design as sequential exploratory, it uses a range of theoretical perspectives instead of possible methodological choices; that is, it uses a transformative framework to guide both quantitative and qualitative stages (122, 123). Figure 5 provides a visual presentation of the exploratory sequential design for this thesis. An arrow (→) indicates a form of data collection following another (sequential); upper case letters (i.e. QUANT or QUAL) suggest significant emphasis on data collection and stature, whilst lower case letters (i.e. quant or qual) demonstrate less emphasis (120).

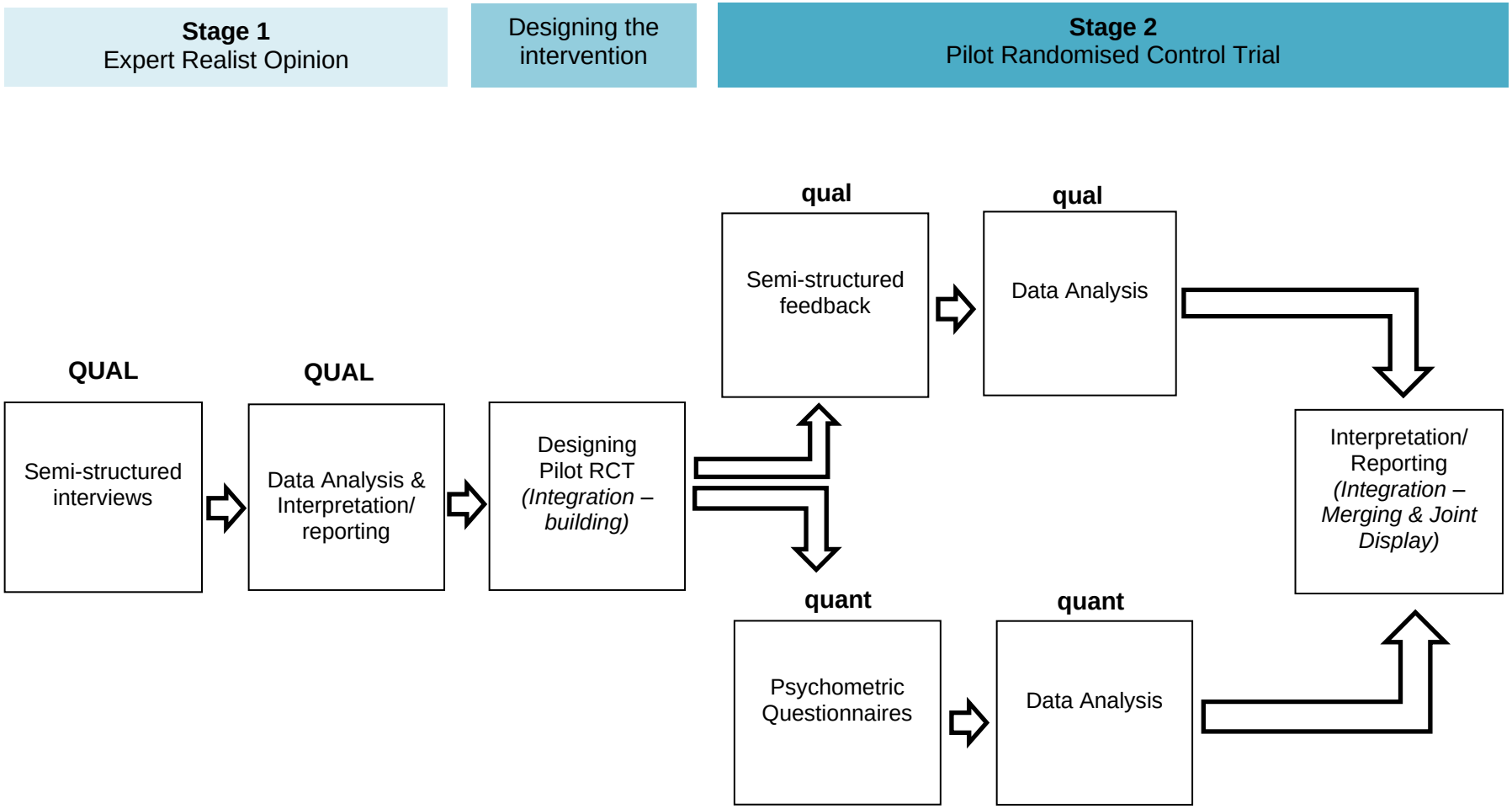


Figure 5 Thesis flow using sequential exploratory design

3.5.3 Fixed design in mixed method

Mixed method designs can be classified as fixed or emergent; thus, the author needed to consider the best alternative when designing the thesis (118). Fixed mixed method designs referred to predetermined methods for qualitative and quantitative studies, which were planned at the beginning of the research process and implemented per the stated procedures (118). Emergent mixed method designs occur due to issues that arise in the initial research process, which leads to using a second approach (i.e. qualitative or quantitative) to provide greater depth in answering the research question (118). The fixed design was used in this thesis as the second quantitative approach (pilot RCT) was planned in the initial stages of designing the thesis.

3.5.4 Integration

Integration in mixed methods refers to the 'mixing' of qualitative and quantitative methods. In sequential exploratory design, data analysis is conducted independently for both stages – qualitative and quantitative (129). The standard data analysis approach is used for both methods (i.e. thematic analysis, descriptive analysis), and integration is conducted at interpretation (122). In this thesis, integration was conducted at two points; firstly, at the methods stage using the 'building' approach where the data from the initial qualitative stage was used to inform the data collection approach for the second quantitative stage (pilot RCT) (129). The second integration was conducted at the interpretation and reporting level, that is, at the pilot RCT. The 'merging' approach was used to form a 'joint display' (129). The terms building, merging, and join display are defined in the following sections. Table 2 provides an overview of the sequential exploratory mixed method process and integration relative to this research thesis.

Table 2 Sequential exploratory design and integration

			Procedures	Products
Stage 1	Expert Realist Opinion	Qualitative data collection and analysis	Semi-structured interviews (N=20) Thematic analysis using NVivo coding and theme development	Transcripts Determining key themes on how, why, and under what conditions individual-level interventions can improve well-being and decrease burnout in critical care
Design		Qualitative findings inform quantitative pilot RCT (Building – using MRC Framework)	Constructed an intervention using the revised program theory from the qualitative stage 1	Developed consult and Problem-Solving Debrief sessions
Stage 2	Pilot Randomised Controlled Trial	Quantitative data collection and analysis	<u>Feasibility:</u> Collection of trial records <u>Preliminary effectiveness:</u> Psychometric questionnaires (N=30), two-way repeated measures ANOVA	<u>Feasibility:</u> Recruitment methods, retention rate, and data collection procedures. <u>Preliminary effectiveness:</u> Numerical survey item scores
		Qualitative data collection and analysis	Semi-structured feedback and feedback survey Thematic analysis using NVivo coding and theme development	Transcripts and survey Key themes about feasibility, user-perceived acceptability, and preliminary effectiveness
		Interpretation/ reporting for pilot RCT (Merging & Joint Display)	Explored the extent to which the qualitative findings were integrated. Evaluation of congruence between the qualitative and quantitative data.	Understanding the feasibility, user-perceived acceptability, and preliminary effectiveness of the intervention

Note: MRC Framework=Medical Research Council Framework, ANOVA= Analysis of Variance

3.5.4.1 First integration

Integration through 'building' refers to the process where the initial data collection procedures inform the following data collection approach (129). This thesis used semi-structured expert opinion to determine what, why, how, and under what conditions individual-level interventions would improve well-being and decrease burnout among CCHP. The findings from the study assisted in the refinement of the initial program theory through a realist evaluation approach. The refined program theory was then used to inform the type, format, and delivery of the intervention and data collection approach for the following quantitative study (pilot RCT). The

integration process was guided by the MRC Framework, which paved a pathway for developing and evaluating complex interventions[6], as proposed in this thesis. Further in-depth details on integration can be found in Chapter 6.

3.5.4.2 Second integration

Integration through 'merging' refers to the combination of two findings together for analysis and comparison (129). It occurs after the individual stages are conducted, that is, the statistical analysis of numerical data and qualitative analysis of textual data (129). A 'joint display' refers to visually combining the qualitative and quantitative findings to allow new insights beyond the data gained from the qualitative and quantitative results (129). The second integration was conducted during the pilot RCT stage, where qualitative and quantitative data on the feasibility, acceptability, and preliminary effectiveness were merged and demonstrated using a joint display. Further details on integration can be found in Chapter 11.

3.6 Chapter summary

Chapter 3 introduced qualitative, quantitative, and mixed-method design methods. It provided justifications for using mixed methods and the employment of sequential explorative design, with justifications on timing, priority, fixed design, and integration.

The next Chapter 4 presented the literature review (umbrella realist review), which provided initial insights into the identification of research gaps.

[6] Complex interventions are those that involve multiple components or interact with the context in which they are delivered, making their evaluation and implementation challenging.

CHAPTER 4

LITERATURE REVIEW

This chapter contains contents from:
Adnan, B. B., Dafny, H. A, Baldwin, C., Jakimowicz, S., Chalmers, D., Aroury, M. A., Chamberlain, D. (2022). What are the solutions for well-being and burnout for healthcare professionals? An umbrella realist reviews of learnings of individual-focused interventions for critical care. *BMJ Open*, *12*(19), e060973.

Statement of co-authorship: All authors were involved in formulating the concept and design of the review. Nurul Adnan conducted the literature search and data analysis and completed the initial draft of the manuscript. All authors edited multiple revisions of the manuscript. See Appendix 1 for the complete publication.

4.1 Chapter overview

Chapter 4 presents an umbrella realist review, which explores individual-level interventions that promotes wellbeing and mitigates burnout. Firstly, the chapter provides the aims and objectives of the umbrella realist review, followed by a presentation of the initial program theory. Thereafter, the employed methods will be presented, synthesising and summarising evidence from the chosen studies. These findings refine the initial program theory, which will contribute to a greater understanding of mechanisms and contextual factors that may impact the effectiveness of individual-level interventions.

4.2 Introduction

4.2.1 Coping and interventions to improve and prevent well-being and burnout

Coping is vital in dealing with stress and burnout, as the lack of sufficient coping resources leads to increased psychological vulnerability to the situation or threat (130). Various emotions are seen as a natural response when working in Intensive Care Unit (ICU) settings, ranging from guilt, anger, grief, and sadness to emotional exhaustion and depersonalisation (131). From this perspective, burnout can be conceptualised as progressively developed resulting from ineffective coping strategies that professionals attempt to protect themselves from work

stressors (130). Preventative interventions seek to decrease the likelihood of adverse outcomes by increasing protective factors and reducing risk factors (132). Preventative approaches may be most effective when there is a collaboration between risk reduction and efforts to increase resources that build upon an individual's strength (132). This study aimed to conduct an umbrella review on individually focused interventions for promoting Critical Care Healthcare Professional (CCHP) well-being and preventing burnout. The review objectives were the following:

- Conduct a realist synthesis analysing what, why, and how interventions (such as mindfulness and cognitive training, self-care intervention, self-improvement, low-intensity exercise, social support, mixed interventions, and miscellaneous uncategorised interventions) are effective for burnout management and prevention; and produce an actionable theory.
- How context may affect the mechanisms to achieve an outcome.
- How tailoring or modifying interventions can impact the functioning of interventions.
- Produce recommendations supporting tailoring, implementing, monitoring, and evaluating contextually sensitive strategies to improve well-being and prevent burnout.

4.3 Methods

This realist umbrella review was conducted according to the RAMESES II reporting standards for realist evaluations and prospectively registered on PROSPERO (Registration No. CRD42020155386). The study was conducted in five parts[7] guided by Borghi et al. (133) and summarised in Table 3. It was identified early at the stage of search piloting that there was likely very little systematic review literature specifically focussed on CCHP. The decision was made to broaden the eligibility criteria to all HCP (other variations after the full-text review are later described). The realist approach allows gaps in knowledge to be bridged (such as

[7] The published study reported the different processes as ‘phases’ (i.e. phase 1, phase 2). The author amended and defined it as ‘parts’ to ensure clarity of the thesis. ‘Phases’ referred to the MRC framework, ‘Stages’ referred to mixed-method design, and ‘parts’ referred to the processes undertaken within the umbrella realist review (literature review).

between critical care and other health professionals) about "what works, for whom, under what circumstances, and how?" (134). Briefly, this methodology synthesises evidence and interrogates data sources (in this case, systematic review findings) to develop, refine and test what is known as CMOC (134). CMOCs are then consolidated and configured to develop and build a theoretical explanation or program theory of the intervention's function regarding the circumstances (135). This umbrella review fills the gap in the literature as there is minimal evidence and a lack of solid research to contribute to the effectiveness of individual-level interventions for CCHP.

Table 3 Study design to complete the systematic realist review

	Parts	Task(s)
1	Develop an initial program theory	Develop an initial program theory using middle-range theories
2	Search methods	Search for electronic databases for peer review and grey literature using Medical Subject Heading (MeSH) terms and keywords.
3	Study selection and appraisal	Screen relevant abstracts and articles using inclusion and exclusion criteria and retrieve full-text articles.
4	Data extraction	Extract relevant data using a modified extraction tool (modified and tested).
5	Process of synthesising data	Analyse for context and outcome patterns of intervention using middle-range theories Synthesise the mechanisms of interventions using middle-range theories.
6	Present initial program theory	Finalise the program theory by refinement (bringing in new theories, downplaying others, adding depth through explanations and inter-connections)

4.3.1 Parts of the review

4.3.1.1 Part 1: Initial program theory

The initial program theory (see Figure 6) was developed using middle-range theories, including the Positive emotion, Engagement, Relationships, Meaning, Accomplishment (PERMA) theory (136), Transactional Theory of Stress and Coping (TTSC) (137),

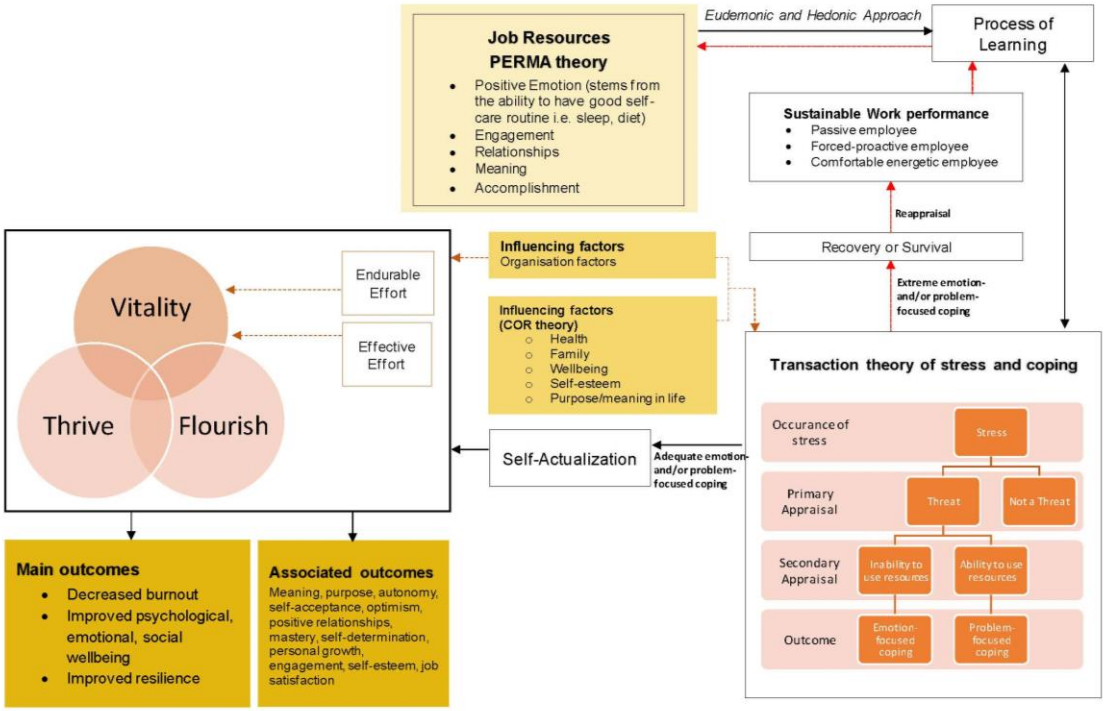


Figure 6 Initial program theory

Conservation of Resources (COR) theory, (138) JD-R model (139), and resilience theory (see Appendix 2 for further middle range theory discussion) (140). The initial program theory commences with resources guided by the PERMA theory (136). Job resource is essential in well-being as it provides efficient coping strategies to decrease job stressors and demands (37). Individuals use the PERMA components to assess areas they may lack in and choose the resource from the specific component (i.e., lack of engagement, individuals will use resources to improve engagement). This is followed by lifelong learning and retaining the resource (141). Learning and retaining are essential for individuals to adapt to challenges, facilitate transformational changes, and encourage positive behaviours (141). After learning the resource, individuals are expected to apply the learned resource within stressful or challenging environments (141). Using the TTSC theory to explain the process, the individual will first internally appraise the situation, then use the resource, and then analyse the outcome in their ability to overcome the challenge (142). If individuals cannot overcome the challenge (stress), it could represent a lack of learning or retaining the resource (142). However, there is also a complex interplay between coping styles (problem- and emotion-focused coping) and

the use of resources (142). The theory assumes that individuals with problem-focused coping will adapt better to challenging situations as they believe that their resources or the situation demands are changeable (143). For example, individuals may seek help from others for social support (143).

Comparatively, emotion-focused coping pertains to controlling one's emotional response (143). Emotional-focused coping is often used when individuals feel they cannot change the stressful situation, reflecting on the lack or insufficient knowledge of the resource (143). The inability to cope with the challenge will lead to unsustainable work performance and stress (144). It demonstrates the need for individuals to reappraise, relearn, and re-utilise the resource until they can overcome the challenge (142, 144). The initial program theory suggests that choosing an alternative resource is possible depending on the PERMA component. For example, an individual using one type of engagement resource, such as family and friend support, can provide another type of engagement resource as debriefing. It is also possible for individuals to add other resources (i.e. mindfulness, self-care resources) whilst maintaining the current resource. According to the Conservation of Resources (COR) theory, individuals should strengthen existing resources and build on new ones (145).

If individuals can cope with the challenge, they will achieve self-actualisation – a growth dimension of flourishing and psychological well-being (146, 147). The concept of self-actualisation pertains to an individual's realisation of their potential and self (148). Conceptually, self-actualisation requires a foundation of lifelong learning to develop knowledge maturity in individuals and an accommodating environment (contextual factor) (146, 147). Self-actualisation results in an individual's ability to flourish and thrive within the work environment and achieve vitality (146, 147). Effective and endurable efforts are crucial to employee vitality (146, 147). An effective effort is essential to produce active contextual performance, whereas an endurable effort ensures that the work effort's expenditure does not deplete the resources required for future effort expenditure (146, 147). The ability to flourish, thrive, and achieve vitality will improve well-being, resilience, and burnout (146, 147).

Throughout the initial program theory process, there are organisational factors that may impede the ability to cope with stressors. However, this umbrella review will not discuss organisational factors as it focuses on individual- factors and the level of interventions.

4.3.1.2 Part 2: Search methods

A search strategy (Appendix 3) was refined and administered in the PsycINFO, Web of Science, Cumulative Index of Nursing and Allied Health Literature (CINAHL), Medical Literature Analysis and Retrieval System Online (MEDLINE), Scopus, ClinicalTrials.gov and International Standard Randomised Controlled Trial Number (ISRCTN) databases, augmented by reviewing eligible article's reference lists and performing further citation searches on Google Scholar and Web of Science. Study citations were imported to Endnote X9 (149), and duplicates were removed before uploading search results into Covidence (150). Initial screening of titles and abstracts was performed against the originally described (a priori) eligibility criteria, except for population, where independent authors used modified criteria in duplicate (NA, DC, LT, SJ, CC, DC, DH, GT). Study full texts were then screened using the same process. At both title/abstract and full-text screening stages, studies that had disputes (i.e. disagreement to include/exclude the study) were resolved by discussion between the authors and an external author was prepared to be the mediator but was not required.

After full-text screening (and prior to data extraction), it was identified that literature was abundant from systematic reviews so that data extraction could be limited to this study design. Similarly, there was a large body of literature relating to organisational and practice environment interventions (n=18 reviews), at this time, it was decided to exclude those from the present analysis and instead focus on individual-level interventions. At the same time, the year of publication was limited to the last five years due to the repetition of primary studies within the systematic reviews (i.e. the same RCT amongst different systematic reviews), causing bias and weakening the validity of the review's outcome (151). The last five years

demonstrated the least number of duplicate publications when reviews were compared and were of the latest evidence.

4.3.1.3 Part 3: Selection criteria

The *a priori* and modified eligibility criteria are outlined in Table 4. The results of the search strategy reflect studies in which (1) participants were adult CCHP (as defined by WHO, see Table 5) (152), (2) interventions were initiated for the individual healthcare worker, (3) a comparison group was included, and (4) an objective measure of well-being or burnout was reported.

Table 4 Inclusion criteria using PICOT

PICOT	A priori criteria		Modified criteria	Rationale for modification
	Inclusion criteria	**Exclusion criteria**		
Population	Critical care healthcare professionals are defined by the American Association of Critical Care Nurses (definition provided in Table 5) (153).	Healthcare professionals who do not practice in a critical care environment	Included all healthcare professionals defined by the World Health Organisation, including student healthcare professionals (Table 5) (152).	Insufficient studies (n=1) focused on only critical care healthcare professionals. Students are also predisposed to high stress significantly intensified during clinical years of training (154).
Intervention	Individual-level interventions (self-care interventions, coping strategies, well-being interventions, supplemental nutrients), Organisational interventions	Studies that do not have or did not report the intervention	Included individual-interventions only (excluded organisational interventions)	Healthcare is complex. Combining both individual- and organisational-interventions would impede the quality of the review.
Comparator	The usual practice, no interventions, comparison between interventions. Included one or more experimental arms	Not applicable	No modifications made	Not applicable
Outcome	Well-being, compassion satisfaction, mindfulness, resilience, coping, burnout, violence, self-care indicators, practice environment, workforce retention and recruitment.	The review does not address well-being and/or any type of modulating factor outcomes	Including well-being, compassion satisfaction, mindfulness, resilience, coping, burnout, and self-care indicators.	Workplace violence, practice environment, workforce retention and recruitment were excluded as these are outcome measures for organisational interventions.
Time	No date restriction	Not applicable	Date restriction 2016 – 2020	An extensive number of reviews to analyse – date restrictions provided the latest evidence.
Types of Studies	Systematic review (in well-published interventions), randomised control trials (with no systematic reviews), or cohort studies if not randomised controlled trials.	Before- and after-studies, non-systematic literature, and scoping reviews	Systematic reviews only	Not Applicable
Other	Excluded studies that did not meet criteria domains three and six of the R-AMSTAR tool	Not applicable	Not Applicable	Not Applicable

Abbreviations: R-AMSTAR= Revised Assessment of Multiple Systematic Reviews

More specifically, the definition of individual-level interventions included self-care interventions, coping strategies, well-being interventions, and supplemental nutrients. Self-care was defined as an intrinsic and continuous (self) practice to ensure positive mental, physical, emotional, and social well-being that may be used as a preventative and therapeutic intervention to ensure a sustainable and healthy work-life balance (155, 156).

Table 5 Inclusion criteria population definition

Term	Defined by	Definition
Critical care	The American Association of Critical Care Nurses (153)	The definition of 'critical care' areas was adopted for this review and thus included intensive care units (ICU adult, neonatal and paediatric), emergency departments, cardiac care units, cardiac catheter labs, step-down units, telemetry units, and recovery rooms.
Healthcare Professional	World Health Organisation (152)	The definition of healthcare professionals: generalist and specialist medical practitioners, nursing, midwifery, traditional and complementary medicine professionals, paramedical, dentist, pharmacist, environmental and occupational health and hygiene, physiotherapist, dieticians and nutritionists, audiologist and speech therapist, optometrist and ophthalmic opticians, health professionals not elsewhere classified.

Self-care examples include the practice of a healthy lifestyle (exercise, nutrition, sleeping habits) and coping strategies (psychological and behavioural counselling) (155). Interventions for well-being activities that promoted the experience of challenge, meaning, and personal expressiveness to improve mental, physical, social, and integrated (eudemonic, life satisfaction, spiritual and overall quality of life) well-being and self-care were also included (157, 158). The comparison group included usual practice, no intervention, or comparison between interventions. In terms of outcomes, this review considered primary outcome measures of well-being and illbeing.

Well-being outcomes refer to positive psychological components of health, characterised by positive feelings and functioning. Examples include quality of life, resilience, mindfulness, positive mood, compassion, and satisfaction (159). Conversely, illbeing is described as pervasive negative feelings and poor life functioning characterised by factors such as burnout,

violence, anger and coping (159-161). To be eligible for inclusion, the above constructs needed to have been reported from an objective measure of health (e.g. heart rate variability, blood pressure) or a validated psychological instrument (e.g. Maslach burnout inventory). Secondary outcomes included measures of compassion satisfaction, mindfulness and resilience.

4.3.1.4 Part 3: Quality Assessment

Quality appraisal was conducted in this review to 'illuminate the richest picture' and to warrant findings' reliability, verifiability, and validity, as demonstrated in Table 6 (162). The full texts of included studies were appraised for quality using the Revised-Assessing the Methodological Quality of Systematic Reviews (R-AMSTAR) tool (163). The R-AMSTAR tool documents assessed the risk of bias at the review level to quantitatively measure the methodological quality of included systematic reviews by assessing the presence of 11 domains (163). One reviewer (NA) conducted a quality assessment of each full text, and quality ratings were checked by a second expert reviewer (DC). The publications not fulfilling the R-AMSTAR tool domains three (comprehensive literature search) and six (characteristics of the included studies) were excluded from this review. Meeting criteria three and six were essential as the inability to assess study characteristics meant no transparency in identifying individual-level interventions, participants, methods, and outcomes of studies. This would make it difficult to map out individual-level interventions and their effectiveness, implicating the inability to produce detailed findings in this review. One study by Stanulewicz et al. (164) met this study's inclusion criteria (PICOT) but did not meet domain six in the R-AMSTAR tool – that is, the absence of an included studies table. This has resulted in exclusion from the study (164). Although this study was excluded, the study characteristics were still reported in the included studies of this review to demonstrate transparency.

4.3.1.5 Part 4: Data Extraction

The authors developed a customised version of the "Data collection form for intervention review" of The Cochrane Collaboration in Microsoft Excel to facilitate later categorisation of interventions, context, and mechanisms for the realist approach. The form was trialled on three studies from the review to ensure all required data was included. Independent reviewers (NA and LT) completed data extraction, which was compared to ensure the rigour of the extraction process. Final data extraction columns included:

- Study details (date form completed, name of person extracting data)
- Author's details (study title, year, country, sponsorship source)
- Methods (aims/objectives, methodology, inclusion and exclusion criteria, outcome measure)
- Population (profession, context/setting, design, data source, sample size, follow-up length)
- Intervention (type of intervention, frequency, duration, delivery, resources, economic, engagement)
- Outcomes (description of outcome, scales, power, effect size, assumed risk estimates, mean difference, heterogeneity, narrative reporting)
- Other (funding, conflicts of interests, theories, or mechanisms).

Table 6 R-AMSTAR Results

	First author, year	R-AMSTAR													
		1	2	3	4	5	6	7	8	9	10	11	Total R-AMSTAR score	/ 44	%
1	Alkhawaldeh, 2019	3	4	4	2	2	4	4	3	1	3	3	33	44	75
2	Bischoff, 2019	3	4	4	2	3	4	4	1	1	1	2	29	44	70
3	Chesak et al., 2019	3	1	4	2	1	4	1	3	1	2	1	23	44	52
4	Clough, 2017	3	4	4	2	1	4	3	3	1	2	1	28	44	63
5	Fox, 2018	3	4	4	0	1	2	3	1	1	2	3	24	44	55
6	Ghawadra, 2019	3	2	4	2	4	2	4	3	1	3	3	31	44	70
7	Lamothe, 2016	3	4	3	2	1	4	4	2	1	2	3	29	44	70
8	Lee, 2016	2	4	4	3	2	4	4	3	4	3	2	35	44	80
9	Li, 2019	4	4	4	3	4	4	4	3	1	2	3	36	44	82
10	Lomas, 2017	3	1	3	1	3	4	3	1	4	4	1	29	44	70
11	Lomas, 2018	4	1	3	1	3	4	3	1	4	4	1	29	44	70
12	Murray, 2016	3	4	4	1	1	4	3	2	1	2	3	28	44	63
13	Phillips, 2019	3	4	4	1	1	4	4	1	1	2	3	28	44	63
14	Ravalier, 2016	3	3	4	2	2	4	4	3	1	3	2	31	44	70
15	Rudaz, 2017	3	1	4	2	1	3	1	1	2	2	2	22	44	50
16	Stanulewicz, 2019	4	1	4	1	1	1	1	1	2	2	3	21	44	48
17	Venegas, 2019	4	4	4	4	3	4	4	3	4	3	3	40	44	90
	Mean	3.2	2.9	3.8	1.8	2	3.5	3.2	2.1	1.8	2.5	2.4	29.2	44	67.1
	Standard Deviation	0.5	1.4	0.4	1	1.1	0.9	1.1	1	1.3	0.8	0.5	5	0	11.5

NOTE: The study by Stanulewicz, 2019 met the inclusion criteria but did not meet domain six (absence of included studies table) of quality appraisal. This has led to the exclusion of this paper, and findings will not be contributed to this review.

4.3.1.6 Part 5: Data synthesis

4.3.1.6.1 Create Context Mechanism Outcome Configuration

Each study was analysed for CMOC, interactions, and theory informing each intervention (165). To do this, authors assumed that each study design was informed by a middle-range theory, which authors had implicitly or explicitly stated. Authors discussed, reflected, and extracted hidden data from all included studies and sometimes used extracts of narratives to foster the reflection process. When discussing and reflecting, authors used the following analytic thinking process:

- Juxtaposition of the data sources – it aligns the sources to clarify and/or build on each other
- Reconciling data discrepancies – explores reasons and rationales for data disparities
- Adjudication of data – considers the relevance and trustworthiness (data quality)
- Consolidation of data – inference of mechanisms for outcomes
- Situation of evidence – considers the setting of intervention.

Identifying the theories assisted the process of understanding how interventions may work to generate a specific outcome. The next stage identified common themes across the included studies. Using a narrative and interpretative approach, authors discussed and synthesised initial conclusions to refine or refute the candidate theories. This synthesis process was chosen in preference to a meta-analysis, given the diversity in interventions, populations, and outcomes (166, 167). All data were then categorised into context, mechanism, and outcome tables, where each intervention was examined based on (135):

> *What were the effects of well-being and self-care interventions (outcomes) when implemented among HCP (context)? What caused these effects (mechanisms), and were internal and external influences (context) facilitating such outcomes?*

'Context' can be understood as external influencing factors on the mechanisms, whereas 'Mechanisms' are the context-sensitive and hidden forces that create the 'Outcome' (135). All authors agreed upon the final synthesis.

4.3.1.6.2 Using CMOC to create theory prepositions and revise program theory

To integrate theories into different levels of social structures (micro- about individual and macro- about social), (165) authors appraised theories following four criteria (Tables 7 and 8). It was important to note that this review did not focus on the macro-system as it describes organisational components, which were excluded from this review.

Table 7 Theory criteria measures

Criteria No.	**Description**
I	The level within the social system is the extent to which they offered guidance for explaining phenomena at or between micro-, meso-, or macrolevels.
II	Their potential fit with the aims of the current research project, that is, the extent to which they offered guidance, in this case, for explaining the likely phenomena observed when looking at the transformation of youth sexual health services.
III	Their simplicity—how readily they inspired theory generation.
IV	Their compatibility with realist notions of causation, that is, the extent to which they offered guidance for articulating underlying causal processes building the notion of complexity consistency theory. For example, these theories would address some of the following: the constituent elements of the system, interactions within and between system levels, and the properties that may result in one level of the system as a consequence of the interactions at other levels (88).

Table 8 Middle Range Theory

Middle-Range Theory	Criteria No.				Include to refine program theory
	I	II	III	IV	
Locus of Control theory	✓	✓	✓	✓	Included
Job-Demand-Resources Model	✓	✓	✓	✓	Included
Self-Regulation Theory	✓	✓	✓	✓	Included

Abbreviations: ✓ = Yes, *X = No*

Theory prepositions were developed by connecting underlying causal processes to CMOC concepts (165). This was done by iteratively hypothesising how an outcome is achieved based on understanding (1) retroduction – how it was achieved in other circumstances, and (2) abduction – the development of a new hypothesis based on data. This process enabled the development of theory prepositions (165). The next step was to draw on connections and relationships between theory prepositions (165). Theories were positioned within a web of causations, which enabled the development of a rich picture (165). Gaps identified within the overall theory enabled the formation of hypotheses using abductive and retroductive inferences – the same process forming original prepositions (165). The Theory Prepositions (TP) were then used to develop the revised program theory (Figure 7).

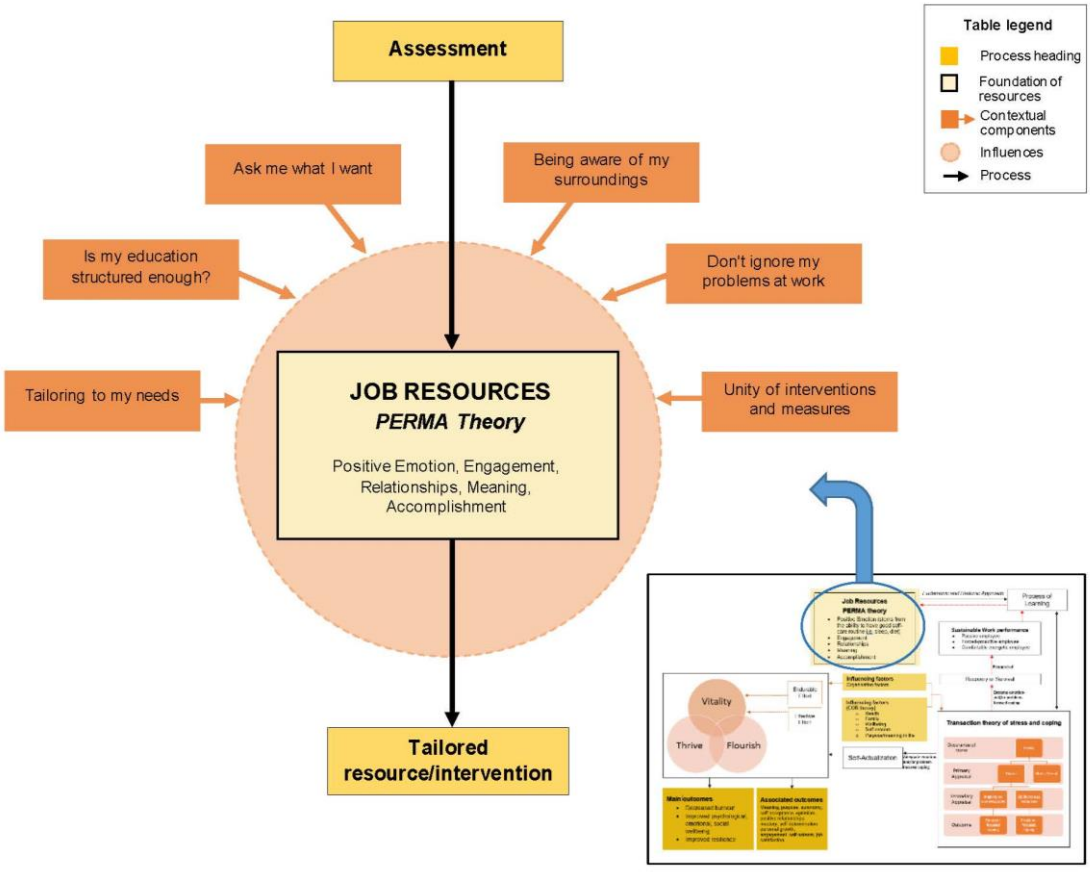


Figure 7 Revised program theory

The revised program theory focused on refining the job resources component. The revised program theory depicts an interrelated model where each contextual component operates together to influence job resources. They do not operate linearly. The program theory commences with an assessment to identify skills, knowledge, and attitude gaps and needs of HCP. The assessment outcome informs the design of the intervention, considering contextual components to achieve the desired outcome, such as prevention or decreasing burnout. Design of the intervention will be tailored to the individual, requiring a single or a combination of interventions. For example, the assessment outcome may determine insufficient social support and lack of awareness. Debriefing sessions and mindfulness intervention can be administered to cater to recovery and job crafting. An example of integrating contextual factors (contextual component) can include assessment outcomes suggesting a busy work schedule for the healthcare professional. Thus, using technology-based debriefing and mindfulness sessions may facilitate ease in access, time management, and adherence to the intervention. Mechanisms (not included in Figure 7) such as acceptance, interests, and receptivity will be generated. HCP are expected to undertake the processes of learning, self-actualisation, and vitality as reflected in the macro level of the program theory to achieve the primary outcomes of well-being and decreased burnout.

4.4 Results

4.4.1 Study characteristics and design

The database search strategy yielded n=4467 records, and n=189 duplicates were removed. After screening the titles and abstracts, the authors excluded 3,678 studies. The remaining 3,982 studies were retrieved for full-text assessment. 287 studies were excluded as they did not meet the inclusion criteria. Finally, a total of 17 studies met the inclusion criteria. The process of including and excluding studies is reported on the PRISMA Flow Diagram (Figure 8).

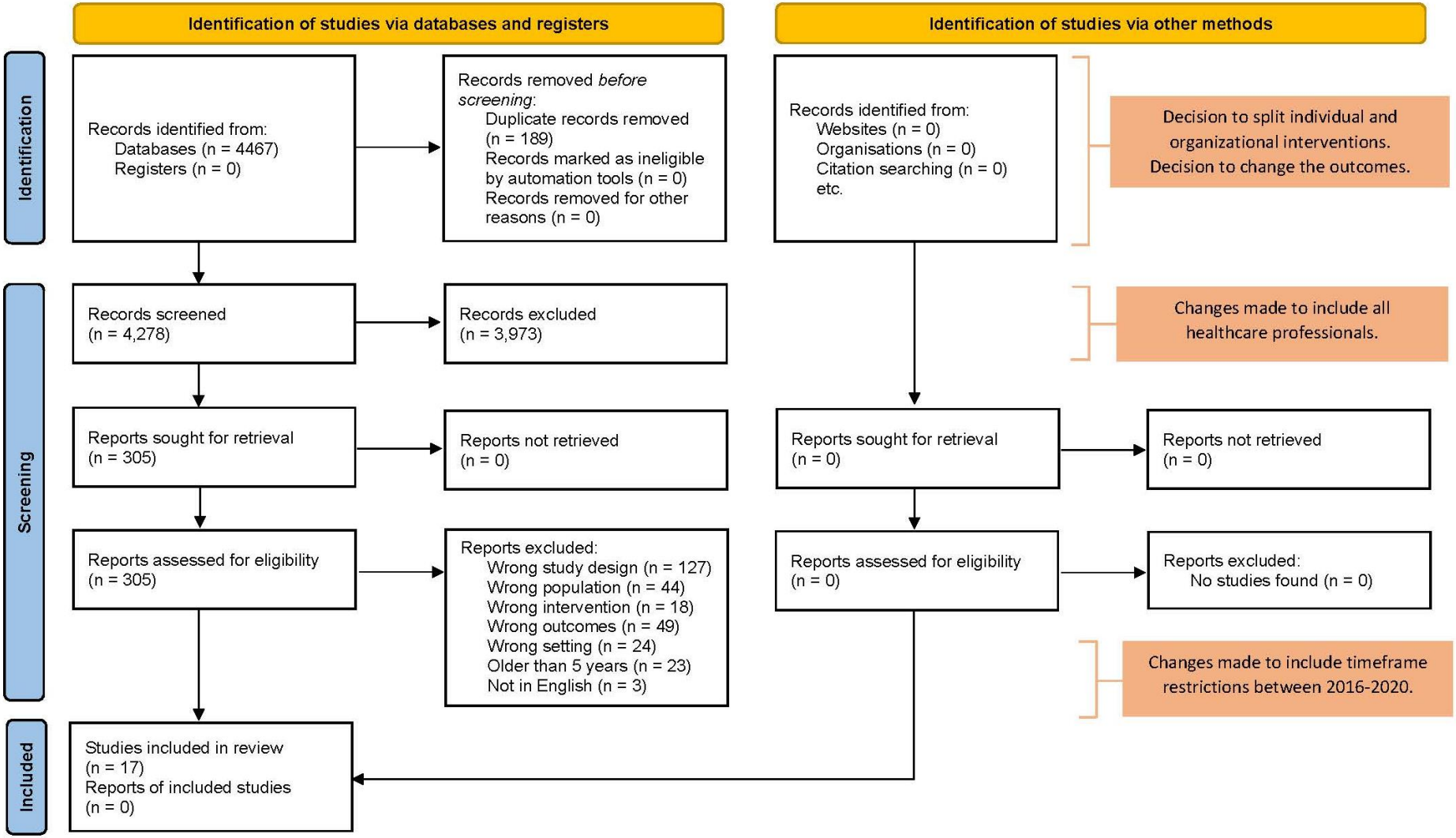


Figure 8 PRISMA flow diagram

Included studies were reported in characteristics of included studies (Table 9), and excluded studies were reported in an excluded table with the rationale for exclusion (Appendix 4). Included articles spanned a 5-year period (2016-2020), which incorporated the compilation of systematic reviews (n=17). The articles were derived from a range of countries, including the United Kingdom (n=4), USA (n=3), Canada (n=2), Ireland (n=2), Malaysia (n=2), Australia (n=1), China (n=1), Germany (n=1), and Taiwan (n=1). Only one article by Alkhawaldeh et al. (168) specifically focused on the population CCHP in comparison to all other 16 articles focusing on general HCP (168).

A total of n=81 interventions were identified from n=17 systematic reviews. Data collected from each of the 17 included systematic reviews incorporated (1) specific programme context that may influence programme outcomes, (2) processes of programme implementation, (3) how contexts may shape specific mechanisms creating change, and (4) programme impacts (89). Variations of interventions included are summarised below:

- **Mindfulness and cognitive training (n=37)** *(mindfulness (n=22), acceptance and commitment therapy (n=1), cognitive behaviour therapy (n=1), emotional intelligence (n=5), resilience (n=1), Self-Management and Recovery Training (n=1), Balint group (n=1), neurolinguistic programming (n=1), resilience (n=1), Relaxation Response Resiliency Program for Palliative Care Clinicians (n=1), Background Affect Trouble Handling and Empathy (n=1), Activities Contributing Comparisons Emotions Pushing Away Thoughts Sensations (n=1)).*
- **Self-care intervention (n=16)** *(self-compassion (n=2), massage (n=2), aromatherapy (n=4), breathing (n=1), relaxation (n=1), narrative (n=2), knitting (n=1), music (n=2), art (n=1).*
- **Self-improvement (n=9)** *(Education/workshop (n=4), self-reflection (n=1), career training (n=1), mental practice session (n=1), micro-task (n=1), adaptation practice (n=1))*
- **Low-intensity exercise (n=5)** *(yoga (n=2), Qigong (n=1), Tai chi (n=1), Physical exercise ((non-) workplace-based, individually designed (n=1)).*

- **Social support (n=5)** *(counselling (n=1), support group (n=2), debriefing (n=2)).*
- **Mixed interventions (n=5)** *(education on CBT (n=1), job awareness with assertive training and time management (n=1), massage and aromatherapy (n=1), biofeedback relaxation and workshop (n=1), mindfulness and communication and self-awareness workshop (n=1).*
- **Miscellaneous uncategorised interventions (n=4)** *(heart touch (n=1), auriculotherapy (n=1), Didactic or interactive instruction in biopsychosocial approach (n=1), respiratory one (n=1)).*

Table 9 Summary characteristics of included studies

First author, review year (Country)	Aim	Design	Search strategy & search inclusion criteria	No. of studies	Country of reviewed studies	Total/Range of participants and population	Design of reviewed studies
Alkhawaldeh, 2019 (Malaysia)	To summarise interventions to manage occupational stress among critical and intensive care nurses (keeping in consideration of its methodological quality)	SR	CINAHL, The Cochrane Library, PsycINFO, EBSCO, MEDLINE, PubMed - Search terms provided - Restricted to the English language - Jan 2009 – Jun 2019	12	Iran, USA, Armenia, India, Turkey, Malaysia	Range (N=13-76) Not reported	RCT, Pre-post design, Quasi-experimental
Bischoff, 2019 (Germany)	To examine whether physical activity interventions decrease occupational stress among healthcare professionals and identify its components (including intervention type, duration, frequency, and intensity).	SR	PsycINFO, Medline and CINAHL - Search terms provided - Restricted to English and German language - No date restrictions **NOTE:** Search conducted Feb 2018 and repeated in Mar 2019	18	USA, Sweden, China, Brazil, Taiwan, Canada, Spain, Israel, Norway	Range (N=9-282) Health professionals, nursing aides and assistants, unidentified profession of employees working in hospital and home care services	RCTs, Pre-post design
Chesak, 2019 (USA)	To explore the available types of stress management interventions to reduce stress and burnout among nurses and identify assessment tools to measure the efficacy of interventions.	SR	CINAHL, Academic Search Premier, EBSCO MegaFILE, PubMed, MEDLINE (ProQuest), PsycINFO. - Search terms provided - Restricted to the English language - Jan 200 to Aug 2017	90	Not reported	Range (N=27-194) Population not reported	Not reported
Clough, 2017 (Australia)	To review the evidence and determine the effectiveness of behavioural and psychosocial interventions in decreasing stress and burnout for medical doctors	SR	PsycINFO, Medline, Informit, CINAHL, and ProQuest Dissertations and Theses - Search terms provided - Restricted to the English language - Prior 2016	23	USA, Developing nation - NS	Range (N=6-227) Family/primary care doctors	Pre-post intervention, RCTs, Quasi-experimental

First author, review year (Country)	Aim	Design	Search strategy & search inclusion criteria	No. of studies	Country of reviewed studies	Total/Range of participants and population	Design of reviewed studies
Fox, 2018 (Ireland)	To synthesise evidence and outline the type and efficacy of interventions to improve physicians' resilience.	SR	MedLine, PsycINFO, CINAHL, Web of Science and Psychology and Behavioural Sciences - Search terms provided - Restricted to the English language - No date restrictions	22	USA, Germany, Israel	Not reported	Pertest- post-test design, RCT, mixed methods, qualitative
Ghawadra, 2019 (Malaysia)	To determine the effectiveness of MBSR in decreasing psychological distress in nurses	SR	Science Direct, PubMed, EBSCO host, Springer Link and Web of Science - Search terms provided - Restricted to the English language - 2002 - 2017	9	Canada, USA, Japan, Malaysia, Brazil, Portugal	Range (N=13-94) RN	RCT, Quasi-experimental
Lamothe, 2016 (USA)	To identify and determine the effectiveness of MBSR in healthcare professionals and assess its relationship with promoting empathy and three key emotional competencies Emotional acceptance)	SR	PubMed, Medline, PsycINFO, EBM Reviews, Web of Science, CINHAL and Embase. - Search terms not provided - Restricted to the English language - Prior 22 Jan 2015	39	USA	Range (N=12-320) Premedical, medical, psychology and nursing students; practising nurses	RCT, Quasi experiment, pre-post design.
Lee, 2016 (Taiwan)	Evaluating the effects of coping strategies to reduce burnout among nurses	SR	Med, CINAHL, Cochrane, PsycARTICLES,Airiti Library , and Index of the Taiwan Periodical Literature System databases. - Search terms provided - Restricted to English and Chinese language - 1979 - 2014	7	Netherlands, USA, Canada, Spain	Range: (N=30-376) Healthcare professionals	RCT & Quasi-experiment

First author, review year (Country)	Aim	Design	Search strategy & search inclusion criteria	No. of studies	Country of reviewed studies	Total/Range of participants and population	Design of reviewed studies
Li, 2019 (China)	To determine the effectiveness of massage and aromatherapy in relieving stress among nurses	SR	PubMed, Web of Science, PsycINFO, Embase and the Cochrane Library PubMed, Web of Science, PsycINFO, Embase and the Cochrane Library - Search terms provided - Restricted to English and Chinese language - No date restrictions	10	Not reported	Range (N=14-120) Population not reported	Not reported
Lomas, 2018 (UK)	To determine the effectiveness of mindfulness interventions to improve well-being among healthcare professionals – not limited to a particular mental health outcome (i.e. stress).	SR	MEDLINE and Scopus electronic databases - Search terms provided - Restricted to the English language - Prior Jan 2016	41	Not reported	Total participants (N=2101) Health professionals, healthcare students.	Pre-post design, RCT and non-randomised studies
Lomas, 2017 (UK)	To determine the efficacy of mindfulness mediation interventions to improve the well-being of healthcare professionals	SR	MEDLINE and Scopus - Search terms provided - Restricted to English and Chinese language - Prior 10 Jan 2016	81	Not reported	Total participants (N=3,805) Healthcare professionals	RCT, convenience sample (unspecified methodology)
Murray, 2016 (Northern Ireland)	To evaluate the effectiveness of interventions in improving well-being among GPs.	SR	Cochrane Register of Trials, MEDLINE, EMBASE, PsycINFO, CINAHL and Web of Science - Search terms provided - Restricted to the English language - Until Jan 2015	4	Not reported	Total participants (N=997) Mixed occupational group	Before- and After-studies, RCT

First author, review year (Country)	Aim	Design	Search strategy & search inclusion criteria	No. of studies	Country of reviewed studies	Total/Range of participants and population	Design of reviewed studies
Phillips, 2019 (USA)	To synthesise the evidence on the effectiveness of expressive arts interventions in decreasing stress amongst healthcare professionals.	SR	SocINDEX, PsycINFO, Pubmed, CINAHL - Search terms provided - Restricted to the English language - 1997 – 2017	14	USA, Lituania, Hong Kong, Italy	Range (N=6-248) Healthcare professionals	RCT, pre-experimental, quasi-experimental
Ravalier, 2016 (UK)	To examine if complementary therapies offered by workplaces can improve well-being among its employees	SR	Cochrane Central Register of Controlled Trials, PsycINFO, MEDLINE, AMED, CINAHL Plus, EMBASE and PubMed - Search terms provided - Restricted to the English language - Since the year 2000	10	USA, Greece, Austria, Netherlands, UK	Range (N=13-152) Population not reported	RCT, Pre-post design
Rudaz, 2017 (USA)	Examine acceptance and mindfulness-based interventions amongst healthcare professionals working in mental health	SR	EBSCOhost (i.e., PsycINFO,PubMed) - Search terms provided - Language restriction not reported - Up to 30 Nov 2016	26	Not reported	Range (N=9-140) Student or trainee healthcare professional	Pre-post study design
Stanulewicz, 2019 (UK)	To explore, report and determine the efficacy of lifestyle interventions to improve behavioural- and clinical- health risk factors and outcomes among practising nurses. The study also seeks to determine the efficacy of the interventions in improving work-related outcomes.	SR	Cochrane Central Register of Controlled Trials, MEDLINE and PubMed, EMBASE, CINAHL, PsycINFO, and BioMed Central - Search terms provided - Restricted to the English language - Jan 200 – Dec 2018	136	North and South America, Asia, Europe, Australia	Total participants (N=16,129) Population not reported	RCT, RCT crossover design, Pre-post design

First author, review year (Country)	Aim	Design	Search strategy & search inclusion criteria	No. of studies	Country of reviewed studies	Total/Range of participants and population	Design of reviewed studies
Venegas, 2019 (Canada)	To identify interventions that can improve practising physician resilience working in any type of environment	SR	Medline, EMBASE, PsychInfo, CINAHL and Cochrane Library, Google Scholar, BMJ Careers, grey literature, Clinical trial registries - Search terms provided - Restricted to the English language - 1998 – 2016	17	USA, Europe (Norway, UK, Germany), and Australia.	Range (N=40-290) Physicians practising in all various settings and specialties	RCT, Pilot RCT, Observational studies, before-after studies and one unknown

Abbreviations: Jan=January; Jun=June; Mar=March; Aug,=August; Nov=November; Dec=December; AMED= Allied and Complementary Medicine Database; EBM Reviews=Evidence-Based Medicine Reviews; CINAHL=Cumulative Index of Nursing and Allied Health Literature; MEDLINE= Medical Literature Analysis and Retrieval System Online; EMBASE=Excerpta Medica dataBase; RCT=Randomised Control Trial; PsychINFO=Psychology Information; BMJ=British Medical Journal; UK=United Kingdom; USA=United States of America; US=Unspecified; CIS= Critical Interpretive Synthesis; SR=Systematic Review.

4.4.2 Context-mechanism-outcome configurations

This section presents findings on the effectiveness of interventions and how context may affect the mechanisms to achieve an outcome, that is, the interaction to yield CMOC. Six theory prepositions were identified by drawing on the Locus of Control theory, Job-Demand-Resources Model, and Self-Regulation Theory. The theory preposition is postulated in Table 10.

Table 10 Umbrella realist review theory prepositions

Identifier	Theory Prepositions
TP1	Healthcare professionals are more likely to engage with resources if they are personalised to their needs, considering that resources should cover two adaptive self-regulation strategies: recovery and *job crafting* (37). The adaptive strategies modify the stressor or stress response, often resulting in new personal (individual) and job resources.
TP2	Structured education is relative to intervention engagement as it teaches the process of 'how to cope'.
TP3	Potential solutions for preventing or decreasing burnout experiences and improving well-being within healthcare workforces are influenced by the ability to engage with the intervention. Being engaged enables individuals to adhere to the intervention through self-initiated practices. The contextual factors' influences are equally important to consider, for example, personality traits, ethnicity, workload, and work schedule.
TP4	Awareness is a vital personal resource as it enables healthcare professionals to regulate feelings of stress and fatigue. The absence of awareness can aggravate the stressor or problem, resulting in increased daily job demands and decreased job and personal resources (37).
TP5	Having organisational resources is equally important as it can offer employees the right challenges and resources—for example, training and hiring healthcare professionals that can be healthy and transformational leaders.
TP6	If measures are unified, it is possible to determine the effectiveness of interventions and comprehensively understand why some interventions may or may not work for healthcare professionals.

NOTE: *Recovery* pertains to decreasing personal stress levels during an employee's off-job time, whereas job crafting is to adjust relationships, tasks, or job demands and job resources to optimise the work environment.

4.4.2.1 Theory Proposition 1 (TP1) – Tailoring

Tailoring or modifying interventions can be observed across all included studies, given that contextual factors such as ethnicity, work schedules, personality traits (i.e. perfectionists) and unique environments and responsibilities can impact the functioning of interventions (169-171). Ghawadra et al. (169) found that adapting interventions to cater to specific populations is essential as it meets their needs to facilitate the effective delivery of interventions. For

example, Malaysian participants found that a customised Mindfulness-Gym Program was effective as it met the requirements of their multi-ethnic community. Similarly, participants working with heavier work schedules, such as nurses, required shorter mindfulness programs to enable them to attend the entire course of the intervention (169). Chesak et al. (172) found that nurses used various holistic interventions to support healthful behavioural patterns and self-care to deliver high-quality care. The delivery method, such as the use of technology (i.e. telephones, smartphones), is also promising as it enables a greater sense of personalisation in terms of being less time-consuming, cost-effective, and more suitable and easier to access for individuals with heavier workloads (169).

4.4.2.2 Theory Proposition 2 (TP2) – Structured education

Alkhawaldeh et al. (168) suggested that integrating structured education within interventions is essential as it emphasises *how to cope with stressful events*. For example, stress management training that incorporated structured emotional intelligence education demonstrated improvements in the Expanded Nursing Stress Scale (ENSS – evaluates nurses' work-related stress) scores, 136.6 (SD=24.6, p-value=.001) and 113.02 (SD=16.2, p-value=.001) pre- and post- intervention accordingly. The structured education taught the five primary elements and 15 emotional intelligence subscales (168). This is further supported by other included studies that had also implicitly or explicitly included education and learning as the foundations of interventions. For example, Chesak et al. (172) reported mindfulness education programs and communication training, Clough et al. (170) reported on education intervention for cognitive behaviour therapy, and Venegas et al. (173) reported on adaptation practices that involve learning how to cope with anxiety, depression, and stress. Most interventions were modelled so that education is administered by teaching the intervention (170, 172, 173).

4.4.2.3 Theory Proposition 3 (TP3) – Engagement

Studies highlighted that 'engaging with the intervention' is essential to maximise intervention usage and prevent avoidance practices (174,175). Rudaz et al. (175) suggest that mental health professionals and trainees should engage in their self-care, described as self-initiated practices, to enable positive well-being and improved health outcomes. Interventions such as Acceptance and Commitment Therapy are promising to enhance psychological flexibility, which engages individuals with meaningful patterns of activity while considering acceptance and mindfulness of arising issues (175). Lee et al. (174) suggested that the use of frequent problem-focused coping can enable individuals to face crises and engage themselves to solve problems and stressors, which leads to improvements in personal accomplishment. Thus, the lack of intervention engagement can impede intervention uptake and result in low adherence (170). This is particularly important considering the contextual factors that impede intervention engagement, such as workload, shift work, and lack of support (170).

4.4.2.4 Theory Proposition 4 (TP4) – Quiet mental space and awareness

Incorporating interventions that facilitate a quiet mental space enables the mind to relax (176). It allows agency and promotes awareness of the situation, encompassing understanding and acceptance of oneself and others (176). Lamonthe et al. (177) proposed that mindfulness interventions are beneficial as they create curiosity and acceptance of emotions without attempting to change the experience or perceived judgements. Accepting emotions enables individuals to 'let go' of aspects of work that they were unable to do (176). This is likely due to the inability to detect and name the emotion, leading to feelings of distress (177). Hunter et al. (178) found that HCP who can practice acceptance are likely to provide enhanced patient care and become more attentive towards colleagues and patients.

4.4.2.5 Theory Proposition 5 (TP5) – Individual-level interventions should not replace work stressors (Do not ignore my problems at work)

Two studies reported that although individual-level interventions exist to address stress and burnout, interventions to improve work conditions should not be overlooked (171, 179). Lomas et al. (171) emphasised that addressing underlying structural causes is crucial to enhancing individual-level interventions' effects. This is incredibly profound considering that healthcare sectors are overworked and practice is becoming more acute (171, 179).

4.4.2.6 Theory Proposition 6 (TP6) – Unity of interventions and measures

Eight studies did not recommend a specific intervention to manage and/or prevent stress and burnout (164, 169-172, 176, 180, 181). Influences of contextual factors such as having the same intervention trial amongst different populations were prominent issues that led to the lack of consensus (164, 169-172, 176, 180, 181). Since HCP work in different settings and encounter different types of workloads, it makes their experiences of stress and challenges unique to the individual (169, 181). Three studies reported that the lack of focused measurements, including intensity, duration, mode of delivery, and outcome measures created a gap in determining the effectiveness of interventions (169, 172, 182). Li et al. (182) proposed that the intervention's subjective and objective data should be considered to fully understand the mechanisms of why and how an intervention works and produce an outcome.

4.5 Discussion

This umbrella realist review guided key stakeholders on the types of interventions that are effective in improving well-being and decreasing burnout amongst HCP. It provided practical guidance by showing the importance of contextual factors exemplified by HCP to achieve well-being beyond the simple acquisition of interventions. The realist approach enabled the understanding of what is effective, how, and under what conditions, as presented in Table 11.

Table 11 Overview of realist questions

What works	Choosing interventions that are tailored to the healthcare professional, relevant to their needs, and considering contextual factors. Adapting interventions to cater to contextual factors, such as adopting communications and information technology (i.e. technology-based intervention) Emphasising the balance between structured education and skills development (intervention use) Understanding the mechanisms of acceptance, interests, and receptivity to facilitate engagement with the intervention Removing systematic barriers, including un-unified measures.
For whom	Practising healthcare professionals
What circumstances	Supported by colleagues, managers, and care delivery leaders. An environment where the well-being of healthcare professionals is recognised as an essential component of improving healthcare delivery and outcomes. An environment that supports organisational interventions
What outcomes	Accomplishing work goals, personal growth and development, increased engagement, motivation, resiliency, and control Improved well-being and decreased burnout experiences

4.5.1 Tailoring interventions

Tailoring the intervention can cater to contextual factors and mechanisms (TP1). This can be done by addressing the individual's characteristics, such as goals, personality factors, preferences, needs, and resources, and tailoring one or a combination of interventions to suit the individual (183). For example, Conrod, Stewart, Comeau et al. (184) identified personality traits as a risk factor for alcohol abuse among adolescents. Personality-focused interventions such as psychoeducation and behavioural/cognitive coping skills training were then used to target specific personality dimensions (184). Tailoring adds meaning to the intervention by integrating unique individual characteristics – based on data collected about the individual (185). Likewise, in digital media, tailoring of content is used by collecting the user's personal information and/or behaviour and after that personalising the content based on the user's interest – for example, greeting users by name at login (186). Computer scientists view tailoring and customisation as a way to close the gap between user and computer by increasing personal relevance and prioritising the user's control and involvement (186, 187).

The same technique can be considered when designing a tailored or customised intervention for well-being and burnout (186, 187). Perhaps, efforts have been initiated to tailor, customise, and personalise interventions. However, there remains a gap in determining the 'right' and most effective process/framework to uniformly design the intervention to ensure consistency of intervention design, duration, intensity, and mode of delivery (TP6).

Intervention engagement is the time actively used in participating in the intervention (TP3) (188). The extent of intervention engagement is influenced by contextual factors such as personality traits, interests, and whether interventions are tailored to the individual (188). In an RCT, Ruiter et al. (189) found that individually tailored health messages received more attention than non-tailored counterparts. Essentially, recipients of the tailored message felt higher personal relevance, which increased engagement with the intervention (189). A positive linear relationship exists between engagement and intervention effectiveness, where highly engaged individuals will experience more excellent treatment effects than lower engagement (188).

4.5.2 Learning process

A key concept when designing the intervention is to integrate a structured education program (TP2) as it increases knowledge on the subject matter and develops reasoning, problem-solving skills, and awareness of one's emotions and others, such as emotional intelligence (190). Education is often used subconsciously within well-being and burnout interventions (191). For example, clinical debriefing in critical care, operating theatres, and resuscitation improved learning/education, staff performance, patient outcomes, and team efficiency and dynamics (191). Mindfulness interventions also use structured experiential learning to train attitudes and awareness (192). Learning may have its drawbacks due to contextual factors of the learning environment. Van Vendeloo et al. (193) demonstrated that complex constructs such as formal and informal aspects of training programs, atmosphere, and organisational factors play a key role in the type of education received. The learning environment may be a

crucial component of burnout (193). Contextual factors such as "hidden curriculum" are also widely known to occur outside the clinical setting, fostering competitiveness and performance above collaboration (194). Hidden curriculums erode professional behaviour, decrease compassion and empathy, and increase cynicism and burnout among HCP (194-196). Essentially, authors can hypothesise the reason (mechanism) why this review's findings suggest using emotional intelligence components, such as awareness (TP4), to structure the learning process (168).

4.5.3 Application to Critical Care Healthcare Professionals

This review could not analyse what interventions work, under what circumstances, to achieve what outcomes for CCHP. However, the authors were able to extract contextual factors that may be beneficial for future research. Interventions for CCHP focused on cognitive behaviour therapy, mindfulness, massage, yoga, and aromatherapy (168). Alkhawaldeh et al. (168) suggested that cognitive behaviour therapy and mindfulness interventions were effective for occupational stress, anxiety, and depression. These interventions teach individuals to develop cognitive flexibility and reframe experiences or perspectives, which facilitates the development of resilience and improved well-being (197). Resilience lowers levels of neuroticism by instilling protective factors such as emotional stability, openness, agreeableness, extraversion, and conscientiousness (198). This is necessary for CCHP as working environments can amplify emotional impact by perpetuating feelings of isolation (131). Systems to support collaboration within Critical Care workplaces are limited, where practices primarily occur within silos (131). Although the Critical Care team provides care through a diverse interprofessional team, the absence of a community affects the ability to manage emotions (i.e., symptoms of psychological stress) (131). Costa and Moss (131) suggest individual-level interventions should thus focus on self-care, self-awareness, and mindfulness for CCHP.

Similar contextual factors between findings from general HCP and CCHP include customisation of interventions (i.e. on-the-job mindfulness) and education using emotional intelligence components (168). Interventions also targeted lifestyle improvements, such as a stress management education programme that uses physical coping methods and practices (168). Essentially, negative coping techniques such as escape-avoidance behaviours often develop sedentary lifestyles (199, 200). Jordan, Khubchandani, and Wiblishauser (199) suggest that having high self-efficacy and social support can facilitate healthier coping behaviours and lifestyles for employees within highly stressful professions.

4.6 Future Directions

This paper expanded the search to include critical care and general HCP. Although contextual factors such as work environment and experiences are different between the two groups, there is a similarity in the experiences of burnout which provides an estimated picture of the context, mechanisms, and outcomes that CCHP may experience. Moreover, the combination of contextual factors and inconsistent outcome measures and intervention measures (i.e., intensity, duration) made conducting a meta-analysis of interventions difficult. Instead, using the realist approach was beneficial for this review as it facilitated a platform to showcase the complexity of interventions using theory prepositions and program theory. Based on the realist approach, findings suggested that tailoring individual-interventions and integrating structured education led to effective intervention outcomes for HCP. The PERMA theory components are recommended for interventions –interventions that do not meet these criteria should be reconsidered. When tailoring an intervention, contextual factors such as personal and organisational influences should also be considered. As previously discussed, personality traits, ethnicity, workload, and work schedule influence the interaction between the individual and the intervention (22-24). Specifically, the balance between self-care, social support, awareness/mindfulness, and self-efficacy, may also be prime components to improve emotional intelligence and resilience – which are essential components to improve well-being and decrease burnout (131).

The application of the proposed interventions within CCHP continues to demonstrate a gap in research. It is unclear if these interventions can be generalised to CCHP due to significant differences in the work environment (i.e., workload). When analysing the data at hand, there appears to be not one single intervention that may prove effective specifically for CCHP. This is because the revised program theory demonstrates that mechanisms such as personal and organisational factors may contribute to different degrees of stress, but also considering the different ways individuals may respond to stressors. Future research, such as seeking validation through expert opinion, would help to understand further hidden contextual factors, mechanisms, and their interactions to provide a greater depth of knowledge ready for application with the critical care population. Understanding contextual factors and mechanisms should facilitate the development of interventions catered for CCHP, providing realistic and reliable reporting of outcomes that can be easily implemented within the 'real world' setting.

4.7 An updated search of the umbrella realist review

In August 2023, a comprehensive and updated search was conducted using identical databases and keywords and adhering to the same rigorous inclusion and exclusion criteria as in the previous search. The database search yielded n=222 records that were between the years 2022 to 2023[8]. Duplicates (n=5) were removed, and articles were screened based on titles and abstracts. The author initially excluded n=212 articles as they did not meet the inclusion criteria. The remaining studies, n=10, were retrieved for full-text assessment, and a further n=8 articles were excluded (Appendix 5). A total of N=2 systematic reviews met the inclusion criteria (see Table 12 for the included studies characteristics) and were included in the updated search process. The articles were derived from the USA (n=1) and South Korea (n=1). One study by Choi and Lee (201) explicitly reported on CCHP (201). A total of n= 18

[8] An updated search was conducted from 2022 to 2023. The initial umbrella realist review conducted a search between 2016 to 2020.

interventions were identified from n=2 systematic reviews. An overview of individual-level interventions is provided below:

- **Mindfulness and cognitive training (n=15)**: Mindfulness (n=7), Gratitude (n=2), Mindful Self-Care Resiliency (n=1), Positive Psychology (n=4), Stress Management Program (n=1)
- **Self-care intervention (n=2):** Aromatherapy (n=1), Narrative Writing (n=1),
- **Social support (n=1):** Paediatrics Ethics and Communication Excellence (PEACE) Rounds[9] (n=1).

The two systematic reviews were appraised using the R-AMSTAR instrument, which indicated high quality for one study by Choi and Lee (201) and medium quality for Townsley et al. (202) (see Table 13).

4.7.1 Summary of findings

The two included systematic review reinforced findings of the umbrella realist review (201, 202). It suggested similar interventions from the initial search findings: mindfulness and cognitive training, self-care, and social support. Interestingly, the author indicated positive psychology and Patient Experience and Communication Excellence (PEACE) rounds as interventions not reported in the initial search (201). Primarily where positive psychology interventions were published between 2019 to 2021, and the PEACE round intervention was published in 2017 (201). No new findings were identified among the two included studies (201, 202). The context, mechanism, outcomes, and their corroboration with the revised program theory are summarised in the following sections.

4.7.1.1 Context

The two studies provided empirical support for the observation that critical care and general HCP face significant psychological stress, moral distress, and depression (201, 202). These

[9] Formal facilitated discussions

challenges are associated with various factors, including encountering inappropriate coping skills, frequent ethical dilemmas, and exposure to high mortality cases (201, 202). The frequent exposure to such situations places considerable cognitive and emotional demands on these professionals, particularly in making critical healthcare decisions and engaging in emotional work during taxing circumstances (201, 202).

4.7.1.2 Mechanisms

According to Choi and Lee (201), there is potential for converting negative emotions experienced by CCHP into positive ones through tailored interventions based on the specific negative emotions encountered. The study suggests the importance of identifying the emotion requiring support and implementing appropriate interventions to address it effectively. Townsley et al. (202) also emphasised the significance of intervention accessibility, making it readily available at home and in the workplace. They also highlighted the efficacy of group-based approaches as an enabling mechanism, as evidenced by Choi and Lee's findings (201) indicating that group-based interventions significantly improved effectiveness compared to individual approaches. Both studies highlighted the necessity of a comprehensive approach encompassing actions at all three levels: system, organisational, and individual (201, 202). This multipronged approach is crucial for effectively addressing the emotional well-being of CCHP (201, 202).

4.7.1.1 Outcomes

Choi and Lee (201) proposed that psychosocial and psychological interventions, such as stress management interventions and PEACE rounds, effectively supported Critical Care and CCHP. Similarly, Townsley et al. (202) highlighted the efficacy of mindfulness interventions, particularly mindfulness meditation, which improved executive attention. The study also indicated that mindfulness interventions reduced overall cognitive load, offering significant benefits for the well-being of HCP (202).

Table 12 Updated search study characteristics

First author, review year (Country)	Aim	Design	Search strategy & search inclusion criteria	No. of studies	Country of reviewed studies	Total/Range of participants and population	Design of reviewed studies
Choi and Lee, 2022 (South Korea)	To evaluate the effectiveness of psychological and psychosocial interventions	SR	PubMed, EMBASE, CINAHL - Search terms provided - Published in English - Articles published past ten years	4	Turkey, Iran, USA	Range (N=42-106) ICU and NICU nurses and physicians	Pre-post design, RCT, and quasi-experimental
Townsley et al. 2023 (USA)	To review studies that evaluated Positive Psychology Interventions (PPI) in healthcare professionals to improve well-being	SR	Google Scholar, PubMed., PsychInfo - Search terms provided - Published in English - No date restriction indicated	14	Not reported	Range 21 – 579 healthcare professionals (physicians, nurses, allied health professionals)	RCT, pre-post-design, survey, quasi-experimental

Abbreviations: USA=United States of America, ICU=Intensive Care Unit, NICU=Neonatal Intensive Care Units, RCT=Randomised Controlled Trial

Table 13 R-AMSTAR for updated search

	First author, year	R-AMSTAR											Total R-AMSTAR score	/ 44	%
		1	2	3	4	5	6	7	8	9	10	11			
1	Choi and Lee (2022)	4	4	3	4	3	4	4	3	4	4	4	41	44	93
2	Townsley et al. (2023)	4	0	2	4	2	3	0	2	3	4	4	28	44	64
	Mean	4	2	2.5	4	2.5	3.5	2	2.5	2.5	3.5	4	4	44	79
	Standard Deviation	0	3	1	0	1	1	3	1	1	1	0	0	0	21

4.7.2 Contribution to the revised program theory

The findings from the two systematic reviews supported and informed three theory propositions (TP1, TP4, TP5), leading to the development of a revised program theory. The updated search results emphasised the significance of personalising the intervention to cater to individual needs (C), facilitating modifications in stress-response mechanisms (M), and enabling the acquisition of new resources (TP1). The findings also indicated the effectiveness of mindfulness interventions in promoting awareness (O) and regulating emotions (M), particularly for individuals facing high job demands (C) (TP2). Lastly, the results underscored the importance (O) of adopting a multipronged approach (C), providing resources tailored to the specific nature of challenges or stressors (M) (TP5).

4.8 Chapter summary

This chapter presented an umbrella realist review that served as a comprehensive literature review for the thesis. The chapter began by introducing the topic of coping and individual-level interventions, highlighting their importance in addressing various challenges. The aims and objectives of the review were then outlined, emphasising the need to understand the underlying mechanisms and contextual factors that influence the effectiveness of individual-level interventions for coping. A rigorous process constructed an initial program theory based on relevant middle-range theories. This program theory provided a theoretical framework for understanding the mechanisms and processes involved in individual-level interventions for coping. The methods used in conducting the review were described, ensuring a systematic and comprehensive approach to identifying and analysing relevant literature. The review's findings were presented, synthesising the key insights and evidence from the selected studies. These findings not only contributed to the refinement of the initial program theory but also provided valuable insights into the effectiveness of individual-level interventions for coping. Overall, this chapter laid the foundation for the subsequent development of the individual-level intervention within the thesis. The next Chapter, 5 provides the methods and findings for an expert realist opinion.

CHAPTER 5

STAGE 1: REALIST EXPERT OPINION

This chapter contained contents from:

Adnan, B. B., Baldwin, C., Dafny, H. A, Chamberlain, D. (2022). What are the essential components to implement individual-focused interventions for wellbeing and burnout in critical care healthcare professionals? A realist expert opinion. *Frontiers in Psychology*, *13*.

Statement of co-authorship: *All authors were involved in formulating the concept and design of the review. Nurul Adnan conducted the literature search and data analysis and completed the initial draft of the manuscript. All authors edited multiple revisions of the manuscript. See Appendix 6 for the complete publication.*

5.1 Chapter overview

In chapter 5 a realist expert opinion will be presented, which will serve as a qualitative study to inform the development of the individual-level intervention. It will seek critical care experts' opinions on what individual-level interventions are suitable for CCHP and under what conditions are required for the intervention to work to improve well-being and mitigate burnout among CCHP. The methods of the expert opinion will be presented in this chapter, followed by the results that will be used to revise the existing program theory from Chapter 4.

5.2 Introduction

In 2016, the Critical Care Societies Collaborative announced a 'call for action' that encouraged stakeholder groups to promote well-being among CCHPs by protecting their mental and physical health (4). In addition, the Critical Care Societies Collaborative anticipated that novel methods for addressing burnout and well-being would be discovered with the assistance of stakeholders that may, in turn, shape regulations, promote quality patient care and decrease healthcare costs (associated with turnover) (4). Stakeholders are defined as an entity or a person with a conceivable or declared stake or interest in a policy concern (203). In this study, we focused on expert stakeholders (herein referred to as experts) being people whose

knowledge in the subject of interest (critical care workforce) has been earned through training or education and life experience (203).

Evidence of interventions that address well-being and burnout specific to the critical care health professional community is lacking (4). In an umbrella review and realist-theory synthesis (Chapter 4) that focused on individual-level interventions, the review identified contextual factors and mechanisms of interventions that broadly applied to the healthcare workforce (12). While the chapter was able to determine what interventions were likely to work, for whom and under what circumstances in the general population of HCP, theoretical synthesis and preposition were not specific to the unique needs and profile of CCHP (because of a limited number of original intervention studies in CCHP) (12). Additionally, the umbrella review identified gaps in understanding how self-efficacy, self-care, social support, and awareness/mindfulness may improve emotional intelligence and resilience–well–being indicators (12). There was also insufficient evidence to consider the context-mechanism-outcome configurations for the critical care population (12). To address the need for and support the design of targeted interventions to CCHP that are theoretically sound (thus likely effective) and feasible, this study sought opinions from critical care experts that determined contextual factors and mechanisms of potential interventions.

5.3 Objectives of this review

This study aimed to gather expert opinion to determine what types of individual-level interventions work, under what circumstances and how to improve well-being and decrease burnout for CCHP. The specific study objectives were to:

- Gather expert opinions on the anticipated effectiveness of implementing one or a combination of individual-level interventions to improve well-being and decrease burnout amongst CCHP.
- Identify issues relating to the feasibility of implementing identified singular or combination of intervention(s) amongst CCHP.

- Identify and confirm uncovered and present ideas about mechanisms and contextual factors that may contribute to the effective (or ineffective) implementation of singular or combination intervention(s).

5.4 MRC Framework Phase I: Development

The expert opinion attended to the development phase I of the MRC framework. Findings from this study identified evidence on individual-level interventions and refined the existing program theory. Figure 9 revisited the phases of the MRC framework.

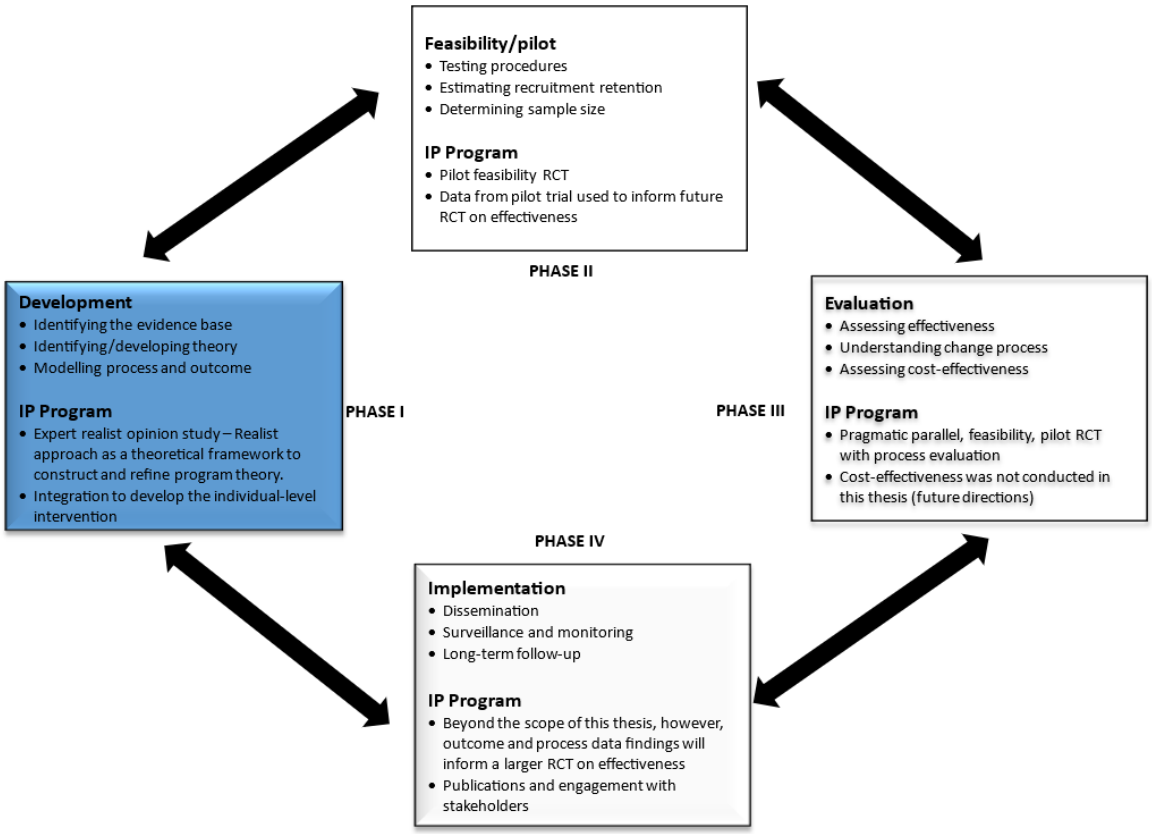


Figure 9 Phase I of the MRC Framework

5.5 Mixed Method: Stage 1 (Qualitative)

This expert opinion was a qualitative contribution to the overall mixed-method thesis. Figure 10 revisits the mixed method stage and highlights the qualitative expert opinion.

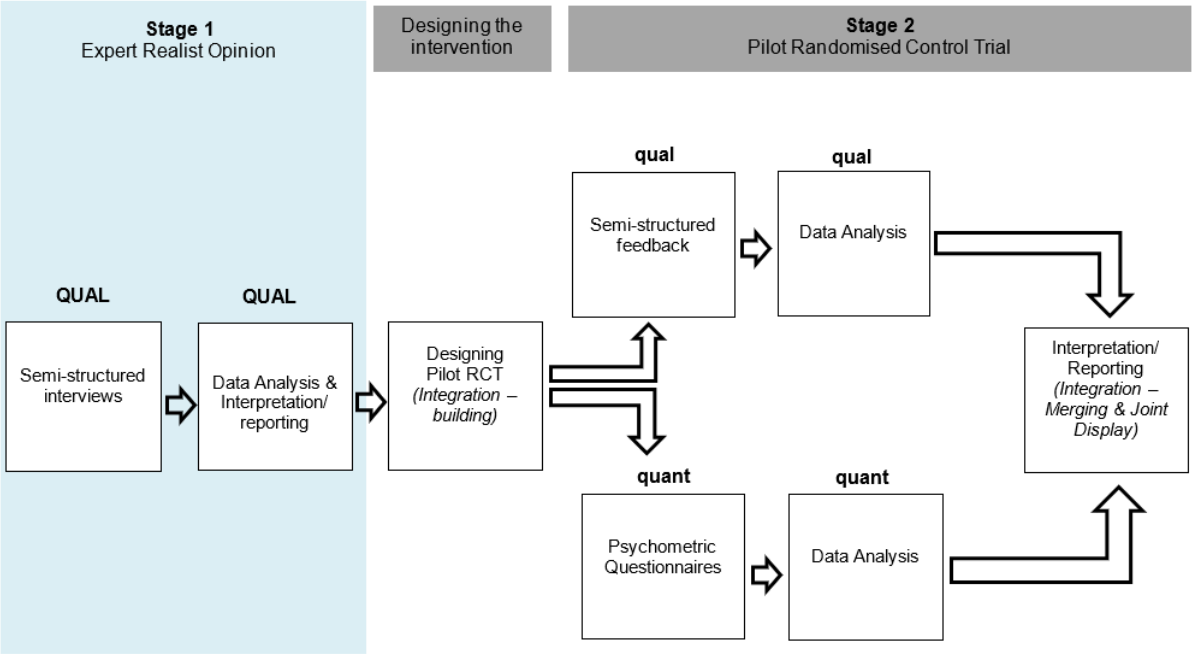


Figure 10 Mixed Method Stage 1

5.6 Materials and methods

This prospective qualitative study used semi-structured interviews with a realist evaluation method. In addition, this study was reported in adherence to the RAMESES II guideline (Appendix 7) (89). This study received ethics approval from Flinders University Human Research Ethics Committee (4901) (Appendix 8). The study information sheet is attached in Appendix 9.

5.6.1 Overview of the program theory

The paper used the earlier umbrella review's program theory (Chapter 4) to understand the context, mechanism and outcome of individual-level interventions to improve well-being and decrease burnout. The work environment of CCHP significantly contributes to emotional

distress that leads to burnout experiences (12). Work environments such as working within silos and lacking a system to support collaboration between CCHPs contribute to feelings of isolation and amplification of negative emotional impact (204). Awareness and mindfulness were suggested as enablers of cognitive flexibility, facilitating resilience and improved well-being (12). Resilience is associated with protective factors, particularly emotional stability (decreasing neuroticism) (12). In addition, improving lifestyle and self-care were also suggested as essential components for CCHPs, as they prevented the use of negative coping techniques such as escape-avoidance behaviours (12). The use of escape-avoidance behaviours is significant among intensive care employees (200). Although it may provide immediate or short-term stress relief, employees may use escapist fantasies, which often exacerbate stress experiences (200). High self-efficacy and social support levels can also improve lifestyle and coping behaviours, especially amongst stressful professions such as the CCHP population (12). The interconnected components (self-care, social support, awareness/mindfulness) can thus facilitate the development of emotional intelligence and, consequently, the improvement in resilience (12).

5.6.2 Study Population

A total of 21 CCHP were included in the advisory interviews. The CCHP included the following eight professions: intensivist, registered nurse, psychiatrist, social worker, speech pathologist, physiotherapist, psychologist, and dietitian, as summarised in Table 14. The authors used the WHO's definition of HCP (22) and the American Association of Critical-Care Nurses' definition of 'critical care' (22, 153). HCP were defined by the World Health (152). This includes the following professions: Generalist and specialist medical practitioners, nursing, midwifery, traditional and complementary medicine professionals, paramedical, dentist, pharmacist, environmental and occupational health and hygiene, physiotherapist, dieticians and nutritionists, audiologist and speech therapist, optometrist and ophthalmic opticians, health professionals not elsewhere classified. Critical care was defined by the American Association of Critical Care Nurses (153) which includes the following: ICU (adult, neonatal, and

paediatrics), cardiac care units, emergency departments, cardiac theatre labs, telemetry units, step-down units, and recovery rooms.

Table 14 Demographics and professional characteristics of participant's current practice

Characteristics	n (%) of participants
Response rate	
Invited and participated	21 (100%)
Gender	
Male	6 (29%)
Female	15 (71%)
Role in critical care	
Senior Registered Nurse	8 (38%)
Intensivist	3 (14%)
Psychiatrists	2 (10%)
Speech pathologist	2 (10%)
CC Clinical Psychologist	2 (10%)
Senior Medical Registrar	1 (5%)
Social worker	1 (5%)
Physiotherapist	1 (5%)
Dietitian	1 (5%)
Area of specialty	
Clinical	15 (71%)
Academia	6 (29%)
Country/State of service	
South Australia	7 (33%)
New South Wales	4 (19%)
Queensland	4 (19%)
New Zealand	3 (14%)
Western Australia	1 (5%)
Victoria	1 (5%)
Australian Capital Territory	1 (5%)

Abbreviation: CC=Critical Care.
Note: Percentages (%) depicted in this table have been rounded to full number.

5.6.3 Experts

This expert opinion defined 'experts' using Grundmann's definition, which included individuals with experience, technical skills (including intellectual and manual skills), judgment, trustworthiness, knowledge dissemination, and ability to advise others (205). Notably, technical skills are not merely knowledge; they include comprehensive reflections on relevant science and scientific activity (205). Therefore, in this paper, participants were screened based on these criteria to be included in the interview process.

5.6.4 Recruitment

The authors invited relevant organisations in Australia and New Zealand (Australian and New Zealand Intensive Care Society) to contribute towards the expert panel process by distributing a flyer and supporting the nomination of representative expert individuals from the critical care workforce. Key experts through professional networks were also identified and directly emailed and invited to participate. The authors ensured maximum variation in sampling to reflect diversity in terms of profession, professional experience, and skill level. Information sheet was provided to participants followed by attaining their verbal consent at recruitment, prior to distributing study materials. Verbal consent was also confirmed (and recorded) prior at the beginning of the interview. Participants were notified of the study processes including recording of interviews, transcription of data, and ensuring that all data are non-identifiable. They were also aware that recorded interviews were stored in the Flinders University R-drive. The information sheet included information about the preparation required for the interview and completion of the pre-reading of the preliminary results of the umbrella review in the form of CMOC results tables. The pre-readings and interview time and day were sent and arranged before the interviews.

The CMOC tables (Appendix 10 to 13) were provided (in confidence) with a relevant selection of provisional results of the umbrella review (Chapter 4), being a modified version of the results table that described the intervention's context (i.e. population and setting), mechanism (i.e. how/why the intervention works, duration, context, follow-up), and outcomes (i.e. implicit and explicit reasoning and effectiveness).

5.6.5 Semi-Structured Interviews

Each semi-structured interview consisted of up to sixteen questions and began with context-setting before the in-depth and core questions (206). An interview guide was developed and used, which had been pilot tested (by a research assistant and the author) in three mock interviews (two clinical psychologists, one senior registered nurse expert) to ensure ease of

comprehension, validity (able to extract appropriate data that correlated with the aim), and guidance in the pace of the interview (i.e. not to exceed the time limit of 30 minutes per interview) (206). Three questions (to the proposed initial 13 questions) were added due to the pilot interviews, which were directed to only clinical psychologists. The questions sought to determine the validity of each intervention's proposed contextual factors and reasonings. All authors agreed upon changes to the guiding questions to form the final interview guide (Appendix 14). This ensured questions were open-ended where appropriate, clear and neutral, and avoided leading language and jargon unsuited to this professional but multi-disciplinary group of participants (206). The 16 questions asked of all participants were about the perceived effectiveness of interventions (outcome) and reasoning (context and mechanisms) (Table 15). Interviews were conducted in real-time via an online meeting platform (Zoom Meetings Version 5.8.0) (207). The first interviewer (research assistant) asked experts a range of questions. The author was additionally present during each interview, taking observational notes, making reflective memos and answering any direct questions from the interviewer or participant that sought clarification of information and only if required to ensure the smooth continuation of the interview and depth of opinion obtained. Observational notes and reflective memos were recorded in a pre-defined form to ensure consistency in the note-taking process.

5.6.6 Methodological Rigor

To establish trustworthiness in this expert opinion, the study authors applied Lincoln and Guba's Four Dimensions Criteria, which included the following stringent criteria: credibility, dependability, confirmability, and transferability (208). These criteria were chosen because of the commonality of their prior use in other contexts of qualitative health research, their practical process to meet the trustworthiness criteria for qualitative processes, and their applicability to expert opinion methodology where there is a need to minimise bias (Table 16) (208). Furthermore, the semi-structured interviews were carefully planned and conducted based on the four-dimension criteria to assess and ensure the robustness of the expert opinions.

5.6.1 Data Extraction and Synthesis

Expert opinions were evaluated using an interpretative evaluation strategy where notes recorded by authors during interviews were accumulated and re-checked with the recording in order not to lose information and avoid any corresponding distortion. The main statements by experts were checked independently by two researchers (author and DC) and respective notes (209). Each interview (author and DC) was also discussed regarding its contribution to the CMOC. In the context of this study, the authors did not record non-verbal elements (209). Preliminary codes were initially generated, and overarching themes were identified. Within each theme, data were categorised into context, mechanism, and outcome configurations and examined for:

What individual-level interventions are effective and ineffective (outcome) when implemented on CCHCP (context)? What causes these effects (mechanisms), and what internal and external influences (context) produced this outcome?

Pawson et al. (95) defined context as the condition in which the intervention is being introduced, ensuring relevance to the operation of the mechanism (i.e. demographics, relationships, technology) (55, 210). Mechanism describes the underlying processes and how the intervention may produce the outcome (211).

Table 15 Expert opinion interview questions

Question No.	Question
1	Which interventions would be most effective for individuals in a critical care context and why?
2	What strategies/interventions would you personally implement?
3	Why do you think these interventions would work for the critical care workforce?
4	In your experience, what would you suggest are the barriers to implementing such interventions for people in the critical care workforce?
5	In your experience, are there any particular things that would enable them to implement these interventions more easily?
6	Are you aware of any interventions about sleep, exercise, or triangulation that have been used and thought to be effective? If so, please describe. How would you apply these interventions?
7	Do you think a combination of approaches would be more effective than one specific intervention? If so, can you suggest what combination of interventions might work for you and why?
8	Are there any interventions listed in the Ineffective table that you think should be considered/would be effective in a critical care context?
9	Are there any interventions you would have expected to be included as effective that were not listed in the CMOC tables?
10	In reading through the four tables, are the explanations of why interventions might work logically?
11	In the tables provided, do the interventions listed provide adequate reasoning for their effectiveness? (*refer to Reasonings Column)*
12	Anecdotally, organisational factors significantly impact well-being and burnout. What would you suggest are some of the key organisational influences that impact significantly on an individual's well-being and burnout?"
13	Is there anything else that you would like to add?
14*	Are there any theories/reasonings you would change or elaborate on in relation to those interventions that you believe would be effective?
15*	What interventions/approaches would you suggest for managing a group that was resilient but had high levels of emotional exhaustion?
16*	In your experience, what is the connection between depression and emotional exhaustion/burnout?

Abbreviations: No.=Number

*Questions 14 – 16 were added after the pilot interviews. See the *Questioning Structure* subheading for further details.

Table 16 Key FDC strategies adapted from Lincoln and Guba

Rigour criteria	Purpose	Original strategies	Strategies applied in this review to achieve rigour
Credibility	Establish confidence that the reported results (from the participant's perspective) are credible, true, and believable.	- Interviewing process and techniques - Establishing the investigator's authority.	- Used three pilot interviews. - Ensured interviewers had the required knowledge and skills.
Dependability	Ensure that the semi-structured interview findings are repeatable if it was conducted again in the same cohort of participants, coders, and context.	- Rich description of study methods - Stepwise replication of the data	- Prepared an outline of the study, including information sheet describing aims and endpoints - Used an interviewer with immense experience in conducting semi-structured interviews.
Confirmability	Confidence that results obtained were corroborated or confirmed by other researchers.	- Reflexivity - Triangulation	- Recorded (visual and audio) the interviews and had debriefing after the interviews. - Included triangulation techniques methodological, investigator and theoretical, and data source)
Transferability	Extend the degree of results to be generalisable or transferrable to other settings and contexts.	- Purposeful sampling to form a nominated sample	- Used a combination of purposive sampling techniques

Data (empirical evidence) were synthesised by connecting underlying causal processes to CMOC in order to produce theory prepositions (165). To determine causal processes, authors initially employed abductive and retroductive logic of internal relations of a phenomenon (i.e. intervention) to facilitate abstraction (212). Both abductive and retroductive inferences are analysis tools used to refine and redevelop a conceptual framework or theory (212). Retroduction sought to identify sufficient and necessary conditions and causes for the phenomenon to exist (213). Moving between data and theory, abductive reasoning was also used to compare, explore, and explain observable patterns within the data whilst exploring non-observable data that was overlooked by the umbrella review's program theory (213). Next, the authors used information from both retroduction and abduction to create associations (iteratively hypothesising how an outcome is achieved using identified mechanisms) and recontextualise data (determining the context within which those mechanisms were triggered) (213). The researchers (author and DC) discussed potential explanations, strategies, and new findings to refine CMOC, which then facilitated the creation of new plausible conclusions (213). The researchers (author and DC) then conceptualised the necessary processes and generative mechanisms to create empirical outcomes (213). Next, abstract conceptualisation was used, which involved learning about the phenomenon using theories, ideas, and logic to understand the phenomenon (213). An empirical social product was created, followed by generating a conceptual map and evaluating claims for causality using realist criteria to create theory prepositions (213). Next, the researchers (author and DC) determined the relationships and connections between theory prepositions, which created a web of causation that reflected a rich picture of the process and integrated into the umbrella review's program theory to enable refinement. The refined program theory is a complete collation of supporting evidence.

5.7 Results

5.7.1 Participant demographics

A total of 21 critical care experts were invited and individually interviewed. There were n=15 female and n=6 male participants, with n=18 from Australia and n=3 from New Zealand. A summary of the demographical and professional characteristics of participants is demonstrated in Table 14.

5.7.2 Context-Mechanism- Outcome Configuration

Four overlapping theoretical prepositions were generated, explaining what supported the successful implementation and uptake of interventions amongst CCHP. Four middle-range theories were used during data synthesis, which guided the development of theory prepositions: (1) skill acquisition theory (214), (2) self-determination theory (215), (3) social capital theory (216), and (4) collaboration theory (217). Descriptions of these theories in conjunction with the presented data/theory prepositions were provided below. Theory Prepositions (TP) developed within the data synthesis are described in Table 17. The data described below also provided memo notes from the second interviewer (the author) to promote transparency.

Table 17 Theory preposition using CMOC

Identifier	Theory prepositions using Context-Mechanism-Outcome configuration
TP1	Interventions that promoted knowledge and skill development (personal growth initiatives) *(C)* facilitated self-awareness *(M),* enabling individuals to exercise self-regulation with the assistance of appropriate resources *(O)*.
TP2	Critical care healthcare professionals assessed and established the intervention's effectiveness using evidence-based knowledge – where the ability to justify facilitated ease in the translational process of the intervention. Full awareness of its credibility *(C)* facilitated autonomy in their assessment and judgement of the intervention *(M)*. This led to successful intervention implementation, possibly allowing prolonged intervention usage *(O)*.
TP3	Interventions that are easily accessible and inclusive *(C)* provided opportunities for critical care healthcare professionals to interact with the resource *(M)*, which facilitated feelings of acceptance and enabled a more extensive reach to different social groups (i.e., organisational, cultural, personality barriers) *(O)*.
TP4	Interventions should be co-produced (C) as it facilitates collaboration *(M)*, which meets the end-user's expectations and needs *(O)*.

Abbreviations: C=Context, M=Mechanisms, O=Outcomes

5.7.3 Middle-range theories facilitating theory prepositions

5.7.3.1 Skill acquisition theory

The skill acquisition theory denotes how individuals progress in learning a range of skills, from initial learning to broader aspects of advanced proficiency (214). The acquisition of skills can be observed in everyday life (214). Individuals who wish to acquire a skill must learn the skill – either by trial-and-error, imitation, or seeking help from an instructor (218). Interventions that were chosen as effective by experts primarily concerned the process of skill acquisition (218). For example, learning stress management skills or even learning how to be mindful within mindfulness interventions (218). The individual's perception of their skill acquisition is paramount as it impacts their strategic decisions (218). Individuals use their perception (of their skill acquisition) and make choices that concern their strongest skills – and thus, how to take advantage of these (218). In other words, they are conscious of their strongest skills (i.e. self-awareness) (219). As individuals transition from being attentive to implicitly learning the skill, they develop performance fluency (automatisation), where the skill becomes entirely spontaneous, effortless, errorless, fast, and often practised without being aware of it anymore (219). It demonstrates individuals' ability to acquire, practice, integrate, and reach a standpoint

of automatically using skill in their daily life (i.e. clinical practice) and upon encountering challenging and stressful situations (219).

5.7.3.2 Self-determination theory

Full awareness of the credibility of an intervention is only one aspect of the successful uptake of an intervention (215). Instead, intervention uptake is also influenced by the individual's motivation (autonomous decision) to change (215). It engulfs the concepts and measures of autonomy, relatedness to others, and perceived competence and emphasises the social context to support optimal motivation (215). Namely, autonomous regulation is crucial, as individuals tend to provide more significant effort, persistence, engagement, and stability (215). Thus, if autonomy can be facilitated, it is likely that interventions would be internalised (i.e. more valued over time) (215). The self-determination theory also reflects that if interventions are implemented externally, for example, engaging in behaviours to receive rewards or avoid negative contingencies, it is likely that the intervention would not be internalised (215).

5.7.3.3 Social capital theory

The social capital theory contends that resources, namely social relationships, can develop and accumulate human capital (216). It is further described as the feature of social relationships (i.e. trustworthy networks, social relations) that produces productive benefits (i.e. collaboration) (216, 220). The theory of social capital is closely assimilated with theories of social interactions and social networks (220). By facilitating an environment that is inclusive and accessible, it facilitates collaboration and access to resources, mitigating issues of power struggles (220).

5.7.3.4 Collaboration theory

The collaboration theory describes the collaborative interactions of individuals irrespective of their formal structures (i.e. manager-with-subordinates or subordinate-with-subordinate)

(217). Collaboration in this theory is defined as ongoing interpersonal interactions that disregard power imbalances and achieve a common goal (217). Heaton, Day, and Britten (221) suggest that the 'co-production' of knowledge enables closer collaboration, facilitates an environment to seize opportunities and minimises barriers to reaching successful translation of knowledge. The co-production process was purported to conceptualise relations and increase engagement between service providers and end users (221).

5.8 Theory Prepositions

5.8.1 Theory Preposition 1 (TP1): Interventions focused on knowledge and skill development to enhance self-regulation

Knowledge and skill development was identified to be a common theme amongst interventions (advocated as effective by experts). For example, resilience training, mindfulness, cognitive-based intervention, and communication and stress management skills promoted education and learning for self-improvement. One expert (Critical Care Clinical Dietitian, 7 years of experience) described having conflicting preferences when choosing the most effective intervention for CCHP. However, the expert concluded that all interventions required education and skill development.

> *Everyone may choose an intervention based on their priorities and how it may help them. It is normal because everyone is different, but in the end, many interventions require education to develop and use skills.*

Another expert (Intensivist, 9 years of experience as a specialist) supported the idea of interventions comprising education as its foundations.

> *Using an intervention will educate us about an issue, which can be used to improve our day-to-day encounters. Education enables us to reason why we need to know something rather than looking at it as just faith. Without educating ourselves or*

improving our knowledge and skills, we cannot advance and overcome stressful and challenging experiences.

Self-awareness interventions also positively influenced the ability of CCHP to acquire personal development skills. For example, an expert suggested that mindfulness (a type of self-awareness intervention) facilitated positive perceptions of a stressor by putting situations into perspective, resulting in positive reactions. Similarly, debriefing interventions facilitated knowledge and skill development by sharing new knowledge through discussions, collaborations, and reflection. Shared information is learnt, used, and implemented in future stressful situations. The expert below (Intensivist, 15 years of experience) reflected on the debriefing process, which led to the uptake of emotional intelligence skills. Thus, this can be used within the workplace to overcome stressors.

Team debriefing or team discussions can normalise an experience, and it helps to de-escalate the issue in one's mind. This way, we can rationally think about our circumstances and use appropriate resources.

The ability to become emotionally aware and self-regulated in challenging situations is promising, as experts noted potential opportunities for strengthening an already resilient cohort (CCHP).

5.8.2 Theory Preposition 2 (TP2): Justifying interventions using evidence-based knowledge

Experts reported that CCHP required evidence to rationalise how and why an intervention is effective. The iterative requirements of ensuring that clinical interventions and performances are evidence-based have shaped their daily thought process to ensure the credibility of information prior to implementing it within their daily practices. Critical care health professionals use evidence-based reasoning daily within their workplace. Consequently, any

intervention implemented must be based on similar rigour before being accepted by this group, as stated by an expert (Critical Care Senior Registered Nurse, 28 years of experience).

> *These interventions work because they are evidence-based; this is how critical care healthcare professionals work. It is a cause-and-effect response…we are medically minded, that is, using evidence and education – what is the practice and its benefits.*

Experts suggested that interventions such as resilience training, communication and stress management, and mindfulness and cognitive interventions were 'logical' (provided sound reasoning to their effectiveness) and would resonate with CCHP. One expert (Intensivist, 18 years of experience) suggested that these interventions were proposed as 'logical' due to the abundance of literature and evidence of their effectiveness.

> *These interventions would work within the critical care workforce because there is much research and evidence to prove their effectiveness. I have also seen the effects of these interventions within the clinical setting, and there are positive results regarding improved well-being and decreased stress.*

5.8.3 Theory Preposition 3 (TP3): Accessibility and inclusivity of interventions

Nine experts reported that implementing the intervention would be practical and effective in terms of consistency and long-term use. One respondent (Critical Care Senior Registered Nurse, 22 years of experience) explained that interventions should be implemented within a whole system as factors that facilitate well-being and burnout are interrelated. For example, implementing communication skills on an individual level does not prevent the employee from being affected by negative conversations by their colleagues.

> *It is not only about the individual but rather a whole system. If you instil changes within the system, then everyone will follow.*

Another expert (Critical Care Senior Registered Nurse, 28 years of experience) suggested that exhaustion may also influence the accessibility to interventions.

> *Exhaustion potentially limits the critical care workforce to use an intervention. If you have an intervention done during personal time, it becomes hard to think about it and do it. Having the intervention during your work hours and within the clinical setting would be better.*

Twelve experts supported interventions used during the critical care healthcare professional's time. This decision was majorly influenced by workplace factors such as negative work cultures and lack of management support – preventing accessibility and engagement to interventions as mentioned by one expert (Intensivist, 9 years of experience as a specialist).

> *If you are in a unit that allows you to show your vulnerability and talk about well-being, then it can be an excellent place to implement the intervention (i.e., debriefing) – vice versa, it would be difficult to implement depending on the workplace culture.*

Other experts have also emphasised the extreme work environments within critical care settings. One expert suggested the following (Intensivist, 9 years of experience as a specialist).

> *Expecting staff to engage in interventions can be difficult if they already work hard.*

Other experts justified that implementing interventions at an individual level should not hinder the accessibility and consistency of using the interventions. One expert stated the following (Critical Care Senior Registered Nurse, 10 years of experience).

> *Critical care nurses would be motivated to participate in something good for them…they became nurses for a reason… don't think they will leave their role unless they can continue due to stress and burnout.*

One expert proposed using digital technology to ease accessibility, such as online debriefing sessions or mobile applications for mindfulness practice.

5.8.4 Theory Preposition 4 (TP4): Collaboration using co-production

Interventions enforced by managers tended to be short lasting and created an environment of reluctance. Experts reported that a top-down approach would be ineffective as CCHP felt unvalued of their feelings, thoughts, and ideas. As an expert (Critical Care Senior Registered Nurse, 22 years of experience) stated.

> *Ask people what they would like (implemented). People will provide suggestions and feel valued and invested in the project, which means they will be more likely to implement it (intervention)… when imposed, people become less motivated.*

Instead, working with CCHP and co-producing interventions was reported as potentially effective as it allowed end-user's expectations to be met. This process also considered differences in individual needs, which can be more engaging according to an expert (Critical Care Senior Registered Nurse, 22 years of experience):

> *People will resonate with different interventions, and everyone is at different levels as an individual, so it might be more beneficial to have interventions that address issues that the person may want to improve.*

5.8.5 Other established theory prepositions

This study identified theory prepositions previously reported in the umbrella review (Chapter 4). This included (1) the use of a tailored intervention, (2) the process of learning and education, (3) engagement, and (4) maintaining the quality of interventions in terms of delivery, duration, and intensity. Due to the similarity of these findings, the authors decided not to repeat the reporting of these findings. Nevertheless, these theory prepositions demonstrated similarities between CCHP and general HCP.

5.9 Revised program theory

Twenty-one experts were interviewed to determine what individual-level interventions work for the critical care workforce, under what circumstances, and why. The program theory from an umbrella review guided the questions and developed a refined program theory exclusively directed to CCHP. A wide range of experts from differing professional fields was included within the population sample, encompassing variations in gender, state/country, and specialty (academic/clinical). As a result, the depth and breadth of the population reached theoretical saturation and met this study's objectives. The interviews extrapolated four theory prepositions, which led to the identification of five main themes discussed below. The revised program theory is demonstrated in Figure 11, summarised below.

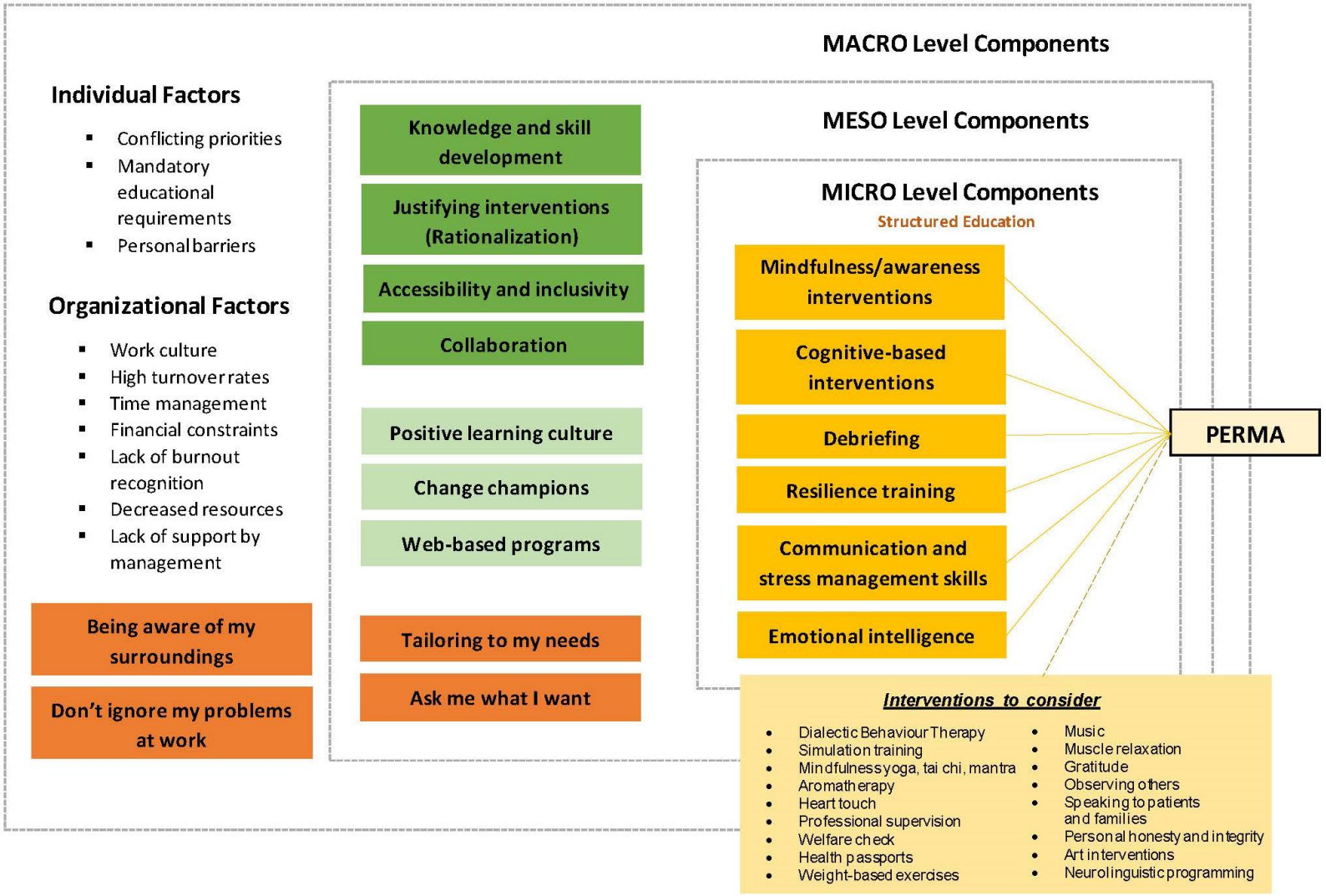


Figure 11 Expert opinion revised program theory

5.9.1.1 The standpoint of social structures (Macro context)

Experts were asked about factors that facilitated and impeded the implementation of interventions. It enabled authors to determine the standpoint of social structures within the critical care workforce, which permitted greater insight into mechanisms for consideration. The social structures reported surrounded organisational factors, including work culture, high turnover rates (including a large proportion of the junior workforce), time management, financial constraints, and the lack of burnout recognition, resources, and support from management. Critical care workforces have busy and challenging work environments, which hinders employees' time to seek stress management education. The lack of resources and financial support further impedes such opportunities, forcing the use of the individual's time. Thus, facilitating change requires a specific time and place for education so individuals can learn and implement the intervention.

Experts also raised issues about conflicting priorities, where there exists an array of mandatory educational requirements to be completed, and this often means that additional interventions, such as coping with burnout, may not necessarily be at the top of an individual's priorities. All experts also agreed that work culture was a barrier to implementation. Cultural barriers included the interrelated aspects of negative team perception of the intervention, stereotypes (i.e. showing stress is a sign of weakness and incompetence), the lack of team motivation, acceptance of change, and the level of management support. Experts suggested that management support is a key indicator of successful intervention implementation. Experts suggested that management attempt to understand employees' views to implement a 'top-down' or a 'bottom-up' approach. Experts also noted that personal barriers could significantly contribute to hindering implementation. Examples included feeling overwhelmed with additional tasks (intervention), emotional instability, personal views on the intervention, and the inability to find the right time at work. When focusing on emotional instability, experts suggest that expecting HCP to engage with the intervention can be challenging if they are already stressed, have low well-being, burnout, and are exhausted. The components of 'Being

aware of my surroundings' and 'Don't ignore my problems at work' were extracted from the umbrella review's program theory.

5.9.1.2 Components facilitating successful outcome (Meso context)

Enablers proposed were a contrast of the barriers, which also included facilitating web-based programs and having change champions driving the program. These two components were highlighted in light green compared to the dark green boxes. This is because the two components are identified as external enablers that facilitate successful intervention uptake. The darker green boxes comprising (1) knowledge and skill development, (2) justifying interventions (rationalisation), (3) accessibility and inclusivity, (4) collaboration, and (5) positive learning culture correlates to internal enablers that internally influence the intervention (micro level). It can be considered an essential component required in the intervention for successful uptake by critical care healthcare components. Both light and dark green boxes are similar as they consider (contextual) influences from the critical care healthcare professional and the environment. Further explanation of these components is described in the paper's discussion section. The components of 'Tailoring to my needs' and 'Ask me what I want' were extracted from the umbrella review's program theory.

5.9.1.3 Context of effective interventions (Micro context)

Experts advised that mindfulness interventions and cognitive behaviour therapy facilitated components of self-awareness, emotional intelligence, and emotional detachment from work, all interrelated components that enhance well-being and decrease burnout. The contextual conditions of these interventions included flexibility, evidence-based, and the ability to be time efficient. Both interventions also provide strong logical reasoning on how and why the intervention works, facilitating a logical process for CCHP to use and draw conclusions from facts. Experts advised that debriefing can be effective as it promotes job stress awareness, de-escalates stressful events, normalises feelings of stress amongst employees, and encourages support and assistance. The debriefing components would be beneficial for

critical care as it directly addresses issues including reoccurring and intensified stressful situations, negative work culture, feelings of inadequacy, and individualised work conditions (i.e., working in silos). Experts have also suggested using resilience training and communication and stress management development as it provides skills such as adaptation to stressful situations and the ability to reinforce clear objectives and facilitate open communication. The context of these interventions is the ability to be engaging, logical, and multifaceted. Although experts voiced that resilience is a characteristic that is already present amongst CCHP, employing interventions to improve resilience can be beneficial due to the differences in resilience levels within the workforce. Improving emotional intelligence can effectively protect and reduce burnout experiences through a more contained reaction. The contextual conditions opinionated by experts were similar to those of mindfulness and cognitive behaviour therapy interventions. Experts indicated that they would personally or are currently using the interventions mentioned above within their daily lives. The list extends to interventions such as self-compassion intervention, gratitude, relaxation techniques, and more listed in the revised program theory (Figure 11) under the heading Interventions to consider. Structured education was a vital component encompassing all 'effective' interventions – evidence extracted from the umbrella review's program theory.

5.10 Discussion

5.10.1 Personal growth and self-awareness

Personal growth initiatives were a prominent theme within interventions endorsed by experts. This is referred to as attaining skills for self-improvement by using cognitive skills (planfulness and readiness) and behavioural skills (utilise resources, intentional behaviour) (222). High levels of personal growth protect individuals from psychological distress (222), which mirrors the effects of (expert-endorsed effective) interventions – such as debriefing, mindfulness, and cognitive behavioural therapy. For example, mindfulness interventions develop the capacity to accept and tolerate painful experiences (personal growth and development) by acquiring resources that help stabilise distressful effects and reduce impulsivity (223). Van Woerkom

and Meyers (222) suggest that interventions surrounding personal growth and development restructure perceptions of stressors to build and enhance self-confidence, which provides opportunities for positive changes and growth. Self-awareness resonates with the ideologies of personal growth and development (224). Self-awareness enables individuals to perceive their traits, behaviours, and feelings (225). It facilitates positive thought changes, allowing changes in emotions and, eventually, actions (225). Reflection is a prime example of this process, where the cycle commences with awareness, description, analysis, evaluation, and learning, eventually leading to new knowledge and skills (226). Experts suggested that the lack of awareness and recognition of low well-being and high burnout hinders opportunities to cope with its symptoms and consequences. Self-awareness is paramount to preventing burnout – also known as self-knowledge (227). Relative to the concept of anosognosia, if individuals lack the insight or awareness of a condition, in this case, burnout, it can precipitate undesirable behaviours such as misperceptions, conflicts, recklessness, and avoidance of treatments (228). Likewise, if individuals are not self-aware of their burnout experience, they may not be interested in utilising interventions to overcome their negative experiences (228), impacting the usability and sustainability of interventions.

Reflection, such as reflective writing, meditation, and debriefing, are effective in developing self-awareness and overall improvement of burnout (227). When investigating the transactional model of burnout, it is prominent that all three stages, including (1) job stressors, (2) individual strain and (3) defensive coping, are relative to the concept of self-awareness (13). That is, in the component of (1) job stressors, the JD-R model proposed that an imbalance between work demands and individual resources may contribute to (2) individual strain that can elicit emotional responses such as anxiety and exhaustion (13). It is theorised in the program theory (from the umbrella review) that decreased job stress awareness discouraged the use of resources; this is also relative to the concept of anosognosia and avoiding treatments (228). Consequently, the lack of awareness and non-use of resources led

to an automatic (3) defensive coping behaviour and attitude, such as increased cynicism, a component prominent within the gold-standard definition of burnout (13).

5.10.2 Evidence and credibility

A prominent opinion amongst experts included the notions that attributes of rationality and evidence-based knowledge in decision-making processes are often found among CCHP. Rationale decision-making is a multi-step process favouring objectivity, logic, and analysis over insight and subjectivity (229). Rationale behaviours are often referred to as a decision-making process that chooses the optimal level of utility or benefits for the individual (230). Although no identified studies supported or opposed such claims, it is evident that there is a growing recognition of the applicability of intuitive strategies such as the heuristic and pattern recognition to be applicable within high acuity environments such as amongst critical care practitioners (230). The critical care workforce environment is recognised for its highly stressful and uncertain environment (231). HCP in this environment care for patients with few physiological reserves; hence, such professionals are forced to utilise and make timely and accurate decisions (230). Often, such decision-making is based on the hypothetical-deductive model and intuitive methods, creating a hypothetical framework for subsequent data collection and analysis and subjective experience and recognising clinical patterns, respectively (230). Rationality falls into the intuitive method of thinking, where authors such as Djulbegovic et al. (232) explained that in evidence-based medicine, actions and beliefs are justified by evidence of trustworthiness and reliabilism. Therefore, if the evidence is of higher quality, calibrating the estimates of harms and benefits is enhanced (232) due to the premise that "rational people respect theory evidence" (233). This relates to the results, where experts suggested that even though the proposed interventions provided logical and robust evidence on why or why not an intervention may work, the explanation of interventions lacked a depth of evidence and the exploration of physiological mechanisms. Thus, experts suggested that critical care health professionals would be captivated by interventions with strong logical evidence as it provides credibility and coincides with their thinking process. By providing solid evidence on the

effectiveness of interventions, it provides strengths of evidence to appropriately consider the application of intervention within one's life through the core principles of rationality – provides the autonomy to consider components such as benefits, harms, goals, reliability, probabilities, uncertainties, context, constraints, and ethics and morality (232).

5.10.3 Autonomy in assessment and judgement

The ability to provide evidence also facilitates the autonomous decision-making process of an intervention. Autonomy is a critical concept proposed by experts and within the literature (234, 235). Experts suggested that if interventions are enforced on the individual by higher authority, it is likely that interventions would not flourish and produce ideal well-being outcomes. Wancata and Hinshaw (234) proposed that respecting an individual's autonomy enables them to make the best decision for themselves, as they are the best judges of those interests. For example, a physician does not decide for their patient even though they possess a depth of knowledge that the patient may not have. Instead, the physician may guide the patient through the process (234). Likewise, experts and literature such as Wensing and Grol and Miech et al. (235) suggested that a key stakeholder or a change champion should 'guide' the process of intervention uptake to enable successful implementation and utilisation of the intervention (236).

5.10.4 Accessibility

Experts suggested that accessibility to interventions is paramount to enable successful uptake. A combination of organisational and personal barriers impeded successful access and uptake of the intervention. Experts suggested that modifying the intervention to suit an individual's needs may be promising in minimising such barriers, for example, integrating web-based instruments such as video conferencing and applications. Hersch et al. (237) conducted a study using seven web-based intervention modules consisting of nurses sending emails describing their work environment's main stressors. The nurses were then given directions on how to deal with the work stressor, which subsequently demonstrated overall improvements

in stress management (237). Another study that investigated the effects of web-based life skills education demonstrated improvements in burnout experiences (238). Heber et al. (239) compared web- and computer-based interventions with face-to-face interventions for stress management and found no differences in the outcomes of depression or stress levels. However, the benefits of web-based interventions extend to their ability to have greater reach and facilitate a platform that reaches affected individuals at earlier stages of their burnout experiences (239).

5.10.5 Collaboration using co-production

Collaboration was also a significant theme raised during the interview, where experts suggested that individual-level interventions should be created based on the needs of end users – that includes seeking their advice on what would or would not work (240). Research suggests that it is currently widely acknowledged that stakeholder involvement is paramount to enhancing the quality of healthcare delivery (240). Integrating the involvement of stakeholders within the planning and development stage of projects can facilitate the successful implementation of interventions and enhance sustainability and scalability within the healthcare workforce (241). Moreover, the shared co-production experience may leave a more beneficial and enduring legacy than traditional service development – often due to service user satisfaction (242). Co-production led to interventions more likely to meet end-users needs through transparency, accountability, learning, responsiveness, and trust, which led to a more responsive organisation (243). Although experts raised no limitations regarding the use of co-production of individual-level interventions, Flinders, Wood, and Cunningham et al. (244) suggest that factors such as the 'rhetoric-reality gap' between the promised and delivered 'co-produced' intervention was a significant impedance of successful utilisation of co-production. That is, despite the positive normative spirit of co-production, there exists a possibility where interventions may not meet the high expectations of end-users – often termed an expectation gap (244). Another significant gap in co-production included the assurances of validity, how lived experiences can be translated into academic knowledge and what

information may be lost in translation (244). This is relative to the research objectivity and results, where the interests of researchers or partners can affect questions asked in the co-production stage and the inclusion of information that may be deemed interesting or valuable (244). Although limitations exist in the concept of co-production, experts proposed that the absence of co-production can decrease the utilisation and sustainability of the intervention, as observed in many confounding factors within studies.

5.11 Strengths, limitations, and avenues for future research

This expert realist approach determined the context, mechanisms, and outcome of individual-level interventions and understood why, how, and under what circumstances interventions may work amongst CCHP. It included a multi-disciplinary population to enable robust nursing and medical workforce representation. However, it was impossible in this review to determine if questions directed to only psychologists reached theoretical saturation due to the inclusion of only two clinical psychologists. Nevertheless, expert interviews reached a point of theoretical saturation on all other questions.

As previously discussed, contextual factors such as work culture, high turnover rates, time management, and the lack of resources and support from management influenced how interventions are used within the critical care workforce. Determining what makes the intervention valuable and applicable for the workforce was beneficial for future applications within the 'real world'. Components such as ensuring interventions promote knowledge and skill development are evidence-based, accessible, inclusive, and take on a collaborative pathway were discussed as prime importance for critical care to accept and use the intervention. Future research, such as piloting individual-level interventions and integrating these theoretical findings, may be promising to better understand its effectiveness for future translation and implementation with the 'real world' setting – potentially providing a unique evidence-based solution to improve well-being and decrease burnout amongst CCHP.

5.12 Chapter summary

Chapter 5 presented the methods and findings of a realist expert opinion. The chapter determined four theory prepositions (knowledge and skill development, evidence-based knowledge, accessibility and inclusivity, and co-production) which informed the refinement of the existing program theory. Chapter 6 presented an integration chapter that developed an individual-level intervention informed by findings from this realist expert opinion study.

CHAPTER 6

DESIGNING AND DEVELOPING COMPLEX INTERVENTIONS

6.1 Chapter overview

In chapter 6, the methods of the individual-level intervention development process will be conducted using integration (integration at methods level – from mixed strategy) and guided by the MRC framework. The refined program theory (from Chapter 5) will be used to inform the development process. The intervention development will be conducted through collaborations between the research team and key stakeholders.

6.2 Medical Research Council (MRC) Framework

The MRC framework was used to guide the development of complex interventions (245). The MRC framework was previously discussed in Chapter 1, which described the structure of this thesis about the framework. The MRC framework proposed four phases: development, feasibility/piloting, evaluation, and implementation (245). This Chapter focused on the Development of Phase I of the MRC framework. Figure 12 provided a recollection of the MRC framework phases, helping to contextualise the current Chapter within the broader research process.

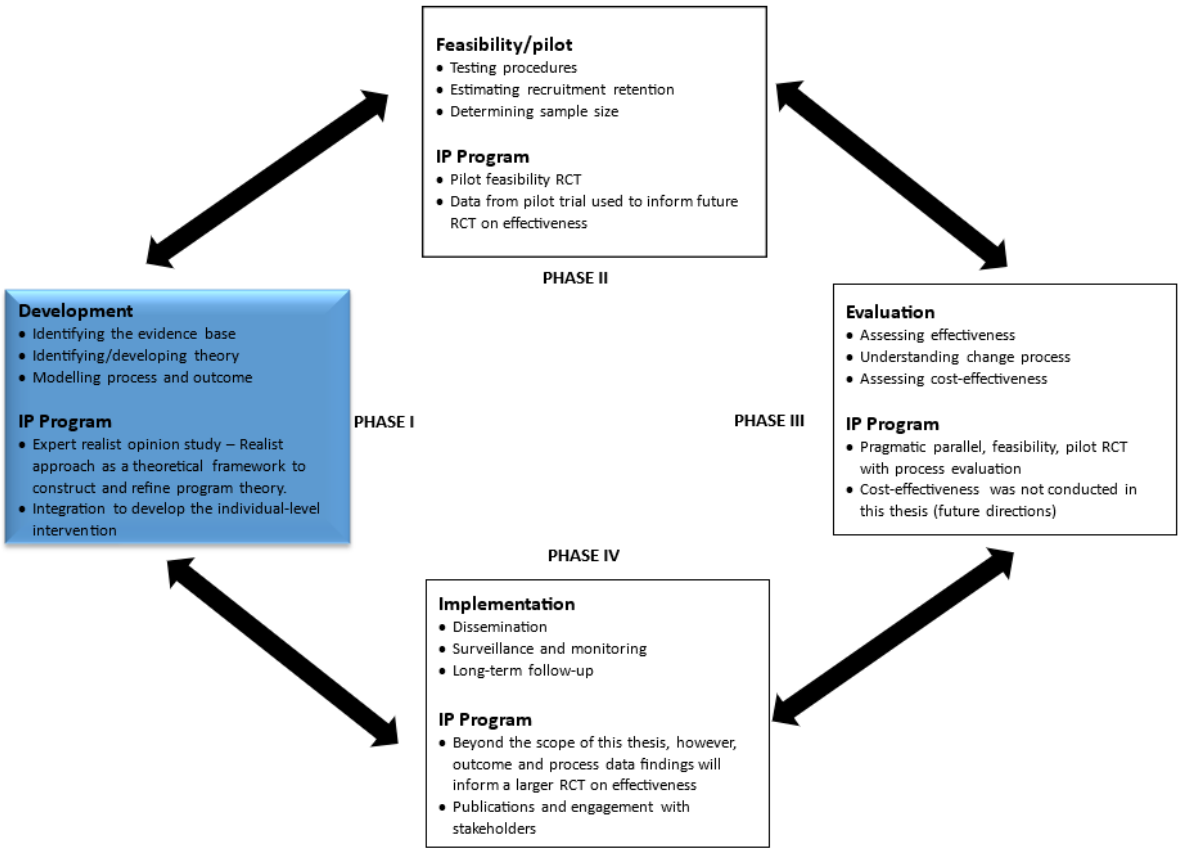


Figure 12 MRC Framework phase I development

6.3 Mixed method building approach in integration

The exploratory sequential mixed method design recommends utilising an instrument development approach (246). Qualitative findings from Stage 1 (expert realist opinion, Chapter 5) informed the creation of a new intervention for testing in the subsequent quantitative Stage 2 (pilot RCT, Chapter 7) (246). The exploratory sequential mixed method design signifies the qualitative insights guiding the approach of the ensuing quantitative study, building[10] upon the former (246). Creswell and Plano-Clark (122) assert that sequential exploratory mixed method designs emphasise a greater emphasis on the qualitative phase, offering substantial potential for context-specific intervention or instrument development (122). Younas et al. (246) propose four types of new variable development: (1) theories or frameworks, (2) surveys (questionnaires, scales, inventories), (3) interventions, and (4) digital tools. This thesis

[10] The building approach refer to a type of integration at the methods level.

adhered to the third option, intervention development. Qualitative findings and the refined program theory from the expert opinion study (Stage 1, Chapter 4) were employed in this phase to develop an individual-level intervention for CCHP. Figure 13 revisited the mixed method stage and highlighted the 'designing the intervention'.

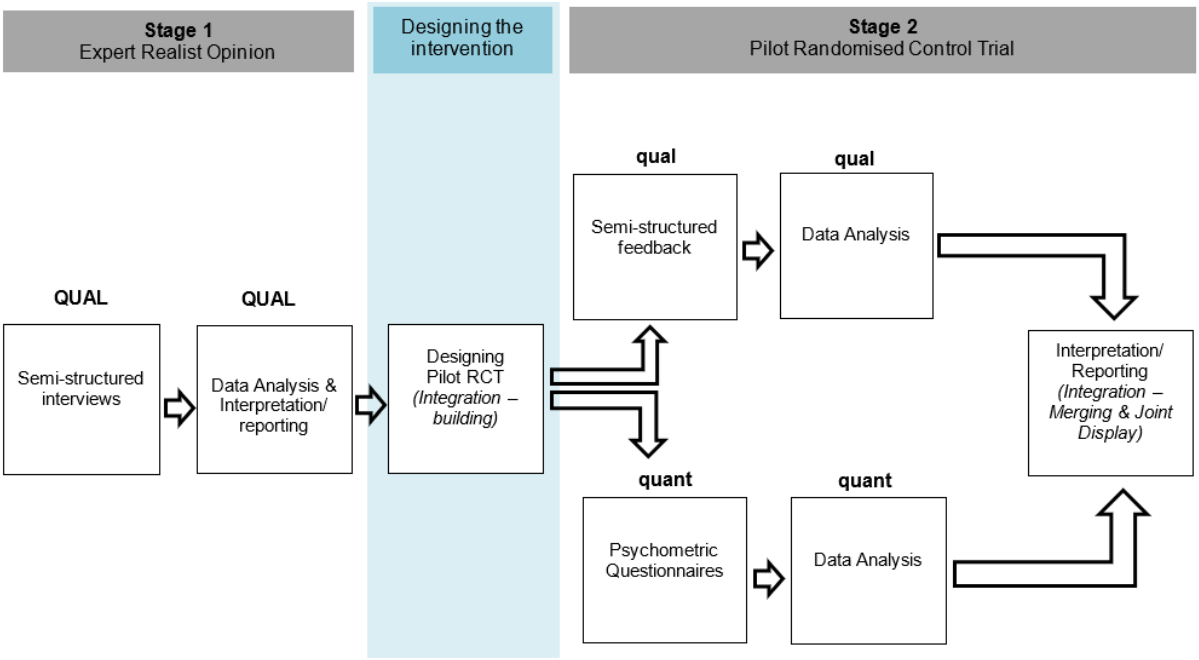


Figure 13 Mixed Method Developing an Intervention

6.4 Definitions in intervention development

6.4.1 Intervention

A health intervention is an activity, effort, or combination of program elements designed to improve health status, in this case, burnout and well-being (247). In this case, complex interventions include several components that function independently or interdependently (247). This includes innovations in policy such as introducing a new health service (i.e. services to improve well-being and burnout in CCHP) (247). Complex interventions to improve health outcomes can be delivered in differential settings such as healthcare facilities, local communities or national populations (247). Delivery can be facilitated by different personnel,

from HCP and practitioners, social care professionals, and professionals outside the healthcare sectors, such as peers, teachers, or charity workers (247).

6.4.2 Intervention development

Intervention development was defined as the interplay between creativity, science, and art, which focused on generating interventions to improve an outcome (248). Craig et al. (45) described intervention development as:

> *"intervention must be developed to the point where it can reasonably be expected to have a worthwhile effect* (45)(p.14)*".*

O'Cathain et al. (247) suggest that the development phase may not necessarily have a clear start and end point, whereby it may overlap between the development phase and subsequent phase of piloting and feasibility due to further feasibility exploration as part of the development process. The development phase may sometimes be lengthened due to a series of studies conducted to inform the development of the intervention, for example, the assessment of evidence, reviewing the effectiveness of an existing intervention and/or qualitative research conducted with key stakeholders (247). An indicator of the end of the development phase includes the production of a manual or document that describes the intervention and its delivery (247).

6.5 Development versus design

Researchers sometimes use the words 'development' and 'design' interchangeably. In this thesis, we used the word 'development' to define the entire intervention development process, and 'design' was used to determine the development process, referring specifically to decisions about the intervention format, content, and delivery.

6.6 Method for intervention development

O'Cathain et al. (245) highlighted a research gap in intervention development methods for health interventions. Despite various systematic reviews focusing on specific published approaches, actions, or effective intervention development results, a gap persists in reporting these methods within healthcare intervention research (245). The thesis used O'Cathain's et al. (245) guidance on complex intervention development and the MRC framework to structure the intervention development process (38).

Figure 14 provides an understanding of the intervention development process. Integration (using building) proposed an approach to be chosen; in this case, the thesis utilised theory- and evidence-based health promotion program planning. The recommended steps to the process were undertaken using the proposed key actions. The concept of integration, the approach chosen, and the key actions taken were informed by the MRC framework.

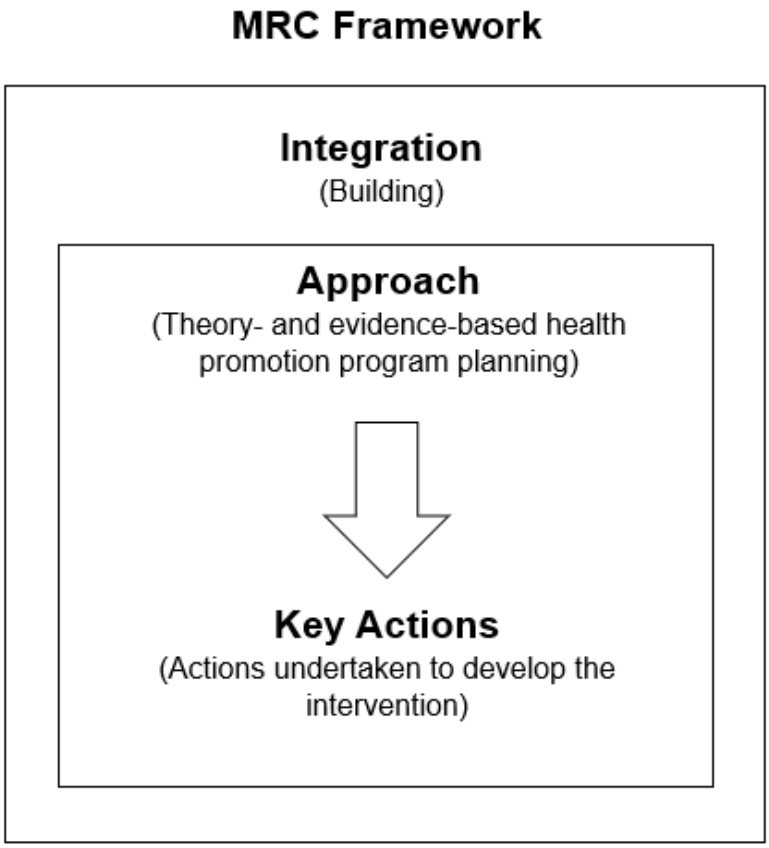


Figure 14 Intervention development process

6.7 Published approach for intervention development

An approach is a systematic process guiding intervention development, often documented in books, websites, or journal articles (245). Research doesn't propose the superiority of one approach over another or suggest a specific approach leads to successful interventions (245). Authors and developers select an approach based on various factors, such as the intervention's purpose or their personal beliefs (245). Experts recommend a flexible selection to match the study's context (245). Combining different approaches to leverage strengths is also possible (245). Approaches include efficiency-based, stepped or phased, intervention-specific, combination, and partnership models (245).

6.7.1 Theory- and evidence-based health promotion program planning

The approach employed in this Chapter was theory- and evidence-based health promotion program planning (245). This approach integrated published research evidence and existing middle-range theories to guide the development of interventions (245). It posits that empirical evidence alone lacks the depth required for effective practice; hence, the theory's predictive and explanatory capabilities are essential for sound intervention design (249). Within the health promotion program planning cycle, two types of theory are crucial: explanatory theory and change theory (249). Explanatory theory sheds light on the underlying nature of the identified problem and aids in identifying factors necessitating modification (249). Conversely, change theory guides the creation and execution of intervention programs (249).

Combining these theory types ensures the comprehensiveness and potency of interventions, enhancing their design and effect potential (249). A pertinent example is provided by Green et al. (249), who illustrates that while research evidence supports the effectiveness of encouraging condom use among young adults, without considering theoretical questions regarding skill-building or partner communication, interventions might not optimally demonstrate their efficacy. Furthermore, the synergy between theory and evidence enables identifying and mitigating type III errors – rejecting program effectiveness due to inadequacies

in design and delivery (249). Relying solely on evidence evaluates the methodology while disregarding program adequacy (249). Integrating evidence and theory (evaluating program adequacy) extends the focus to process and outcome indicators (249).

Pawson and Tilley propose that realistic evaluation permits a theory-based assessment of programs, considering contextual elements and mechanisms alongside outcome measurement (249). Fundamental questions such as "does it work?", "how does it work?", "what components and conditions are necessary for success?", and "why does it succeed within this context?" facilitate the harmonious integration of theory and evidence (embracing process and outcome indicators) (249).

6.7.2 Approach application in this thesis

Different examples of the theory- and evidence-based published approach (250). This thesis used the revised program theory (from phase 1 expert realist opinion, Chapter 5) to develop the intervention (250). The revised program theory considers process and outcome indicators by answering questions such as what, how, why, and under what conditions individual-level interventions work for CCHP, considering context, mechanism, and outcome components (250). It is instrumental in generating and interpreting evidence about complex interventions by using a diverse range of evidence – including theoretical and empirical literature (umbrella review, Chapter 4) and key stakeholder involvement (expert opinion, Chapter 5) – which increases the understanding and clarity to why an intervention may or may not succeed (250). Realist methods can be used in all stages of an intervention, from design to implementation and evaluation (250). However, although there are well-established and developed guidance and standards on generating a realist program and undertaking a realist evaluation, an evidence gap exists on designing and developing interventions using the proposed or refined program theory (250). The gap is further found in the insufficient emphasis on sharing intervention development throughout evaluation and program planning (250). Therefore, in

guiding the theory- and evidence-based program planning, we used the MRC Framework for developing and evaluating interventions.

The MRC framework has three steps, including (1) identifying evidence, (2) identifying and developing theory, and (3) modelling process and outcomes.

6.7.2.1 Identifying evidence

Understanding similar interventions (individual-level interventions) and methods used to assist CCHPs in improving well-being and decreasing burnout experiences allows an intervention to be rigorous and effective (44, 45). In this thesis, an umbrella realist review (Chapter 4) was conducted as a literature review that explored the different types of interventions and methods, considering context, mechanisms, and outcomes.

6.7.2.2 Identifying and developing theory

The thesis developed a theoretical understanding of the intervention by drawing upon existing theories and evidence, supplemented by new primary research through the expert realist opinion study (Chapter 5) (45). The study interviewed critical care experts to attain their expertise and recommendations on the CMOC, which were used to refine the program theory (44, 45).

6.7.2.3 Modelling process and outcomes

The process of modelling a complex intervention bears significant potential to offer valuable insights pertinent to formulating the intervention itself and the subsequent evaluation strategy (44, 45). A succession of preliminary studies may be imperative to progressively fine-tune the intricate design facets before embarking on a full-scale evaluative endeavour (44, 45). A pilot RCT was conducted in Stage 2 (Chapter 7), which informed the modelling process and outcomes of a program evaluation and preliminary effectiveness of the intervention.

6.8 Key actions

O'Cathain et al. (45) suggest facilitating intervention development is enhanced by addressing inquiries concerning the intervention's contextual backdrop, values, and requisites. These inquiries and proposed responses are detailed in Table 18. The comprehensive framework encompasses 18 pivotal actions distributed across seven domains, crucial for the trajectory of intervention development (45). While some may depict the process as a sequential endeavour, O'Cathain et al. (45) characterise it as a non-linear and iterative progression, where specific actions may precede others, revisitation occurs, or concurrent tasks are undertaken. The following sections (Sections 6.8.1 to 6.8.3) summarise the expected outcomes for each domain, followed by Section 6.9, describing the application of key actions for this research.

Table 18 Evaluation questions to consider in intervention development

Questions		Theory Preposition (TP)	Considerations
1	What is the intention of the intervention	TP1	The intervention intended to provide knowledge and skill development to critical care healthcare professionals to enhance self-regulation
2	What is the context of the intervention	TP2, TP3, RPT	Critical care healthcare professionals who are stressed and 'burnt out'. Contexts to consider may include accessibility, inclusivity, and evidence-based knowledge. It is also essential that the intervention attends to problems at work.
3	What values inform the intervention development?	TP4, IPT	Working collaboratively, perhaps through co-production with the target population and tailoring the intervention. This was done through expert opinion semi-structured interviews.
4	What skills and experience does the team bring?	NA	Experiences of stress and burnout in critical care, understanding the work environment and contextual factors, and understanding the research gaps.
5	Which approaches have resulted in interventions shown to be effective?	IPT, RPT	Integration of learning and education, ability to engage with the intervention, positive learning culture, web-based program, and maintaining the quality of interventions in delivery, duration, and intensity.
6	What resources are available for the intervention development?	RPT	Several interventions were effective, which were identified from the umbrella realist review. The following provided greater evidence for effectiveness: mindfulness/awareness interventions, CBT, debriefing, resilience training, communication and stress management skills, and emotional intelligence.

Abbreviations: ITP: Initial Program Theory; RTP: Revised Program Theory.

6.8.1 Domain 1 & 2: Conception and planning

The conception domain contains one action: emphasising transparency of where the intervention ideas originated (45). The planning domain included seven actions, from the decision on individuals involved in the process of intervention development, how, and through consideration of whether it is worthwhile to design the intervention (45).

6.8.2 Domain 3 & 4: Designing and creating

The following two domains include designing and, after that, creating the intervention (45). There are two ways of attending to these two domains, including (1) prioritising stakeholder involvement and engagement – particularly the target audience (CCHP), or (2) focusing on theory (45). These domains require creativity, and often, using a multidisciplinary team can maximise the generation of ideas and innovative approaches (45).

6.8.3 Domains 5-7: Refinement, documentation, and evaluation planning

The last three domains include refinement, documentation, and evaluation planning (45). The refinement domain tests early versions of the intervention to determine the rigour and external validity of the program before it can be tested on the proposed sample (45). This can be an iterative process, where new insights may emerge, and changes can be made to the proposed intervention (45). The documentation domain includes writing instructions (i.e. manual or document) so that others can use the intervention (45). This process is also iterative in that multiple versions of the manual can be conducted to refine the intervention before formal pilot or evaluation studies are conducted (45). The evaluation domain includes considering the intervention program's refinement and the feasibility of a full RCT (45).

6.9 Application of key actions

O'Cathain et al. (45) suggest that the MRC framework uses three domains (planning, designing, and documenting) alongside four action labels in Table 19[11]. The following sections provide the application of key domains and actions of the MRC framework.

6.9.1 Domain 2: Planning (action 3)

An umbrella realist review (literature review, Chapter 4) constructed and refined a realist program theory that considered the CMOC. This was done through intentional and unintentional causal pathways created using contexts and mechanisms extracted from multiple published interventions. Additionally, the review mapped effective and ineffective individual-level interventions to consider improving well-being and decreasing burnout experiences. The research gap from the umbrella realist review – insufficient evidence for solely CCHP – led to a semi-structured interview with critical care experts (expert realist opinion, Chapter 5). Expert opinions were sought about the umbrella review's CMOC, and further contextual factors were sought to facilitate the refinement process of the program theory. Examples of contextual factors indicated in the theory prepositions of the revised program theory included interventions needed to be accessible, flexible, time efficient, and inclusive. They should consider the use of evidence-based knowledge. Realist reviews suggest testable theories instead of judgements of the relative effectiveness of an intervention. Therefore, theory prepositions from the revised program theory on individual-interventions to improve well-being and burnout experiences amongst CCHP were used in conjunction with the intervention development process. An emphasis on context considerations, triggered mechanisms, and intended and unintended outcomes was placed on the intervention development process using theory prepositions (Table 20).

[11] Not all domains and action labels were required to be reported. It depended on the framework and approach used. In this case, the thesis used Domains 2, 3 and 6 (which correlated with the reported approach and (MRC) framework.

Table 19 Domains and actions about intervention development

Domain No.	Domain	Actions	Description	Explanation of actions	Methods used		
					Umbrella review	Expert opinion	Comments
2	Planning	3(i)	Understand the context of the target population	This is important to understand the lived experiences and needs of the population and the basis of the intervention. Qualitative research is recommended to explore contextual factors. This can be done by obtaining the views of the population.	Yes	Yes	Contextual factors were explored through the umbrella realist review and expert realist opinions. The context was identified and presented in the context-mechanism-outcome configuration (CMOC).
		3(ii)	Assess the causes of the problems	Recommendations on the use of evidence-based via systematic reviews or literature search.	Yes	No	Umbrella realist review
		3(iii)	Describe the wider context	Understanding the context regarding population, setting, and community is essential when developing an intervention program. Qualitative research is recommended; however, theories can also be used to understand the context for implementation in the real world.	Yes	Yes	We conducted the umbrella realist review, demonstrating gaps in context, setting, and community for critical care. The expert opinion was then undertaken to determine the broader context to inform intervention development.
		3(iv)	Identify evidence of the effectiveness of interventions	Systematic reviews of quantitative evidence of the effectiveness of interventions can be used to determine what worked, and qualitative evidence can be used to understand why or why not an intervention worked.	Yes	Yes	The umbrella realist review identified effective and ineffective individual-level interventions for well-being and burnout. A realist opinion allowed refinement catering to the critical care context (use of CMOC).
2	Planning	3(v)	Understand the wider perspectives	Working with stakeholders such as community leaders, policymakers, or service providers can assist in clarifying and understanding the problems.	No	Yes	Expert realist opinion – semi-structured interview with critical care experts (stakeholders). Collaborative agreements.

Domain No.	Domain	Actions	Description	Explanation of actions	Methods used		
					Umbrella review	Expert opinion	Comments
		5	Identify possible changes	Existing theories can be used alongside research evidence base to create a link between the problem and the objectives of the intervention.	Yes	Yes	Program theory was created and refined. Logic Model.
		7	Reduce the risk of failure at a later stage	Considering broader issues such as stigmas of the intervention how it may fit with current expectations or delivery methods.	No	Yes	Expert opinion paper provided insights into individual-level interventions' possible feasibility and acceptability.
		8	Consider it worthwhile continuing	The cost of providing the intervention may outweigh the potential benefits. This can be undertaken through modelling processes in the pilot feasibility study or the planning stage.	NA	NA	This will be conducted at the pilot feasibility stage.
3	Designing	9	Generate intervention components and features	There are two ways to generate ideas: (1) working with stakeholders creatively or (2) using theory and evidence-based approaches.	No	Yes	We worked with key stakeholders to generate ideas from different perspectives.
		10	Revisit the wider system in which the intervention will operate	Several meetings are required, and decisions are made about the intervention scope, target population, levels of intervention aim (i.e. individual, community), intervention key features, components that will address required change, and amount of exposure to allow effect.	NA	NA	Conducted in collaboration with stakeholders.
6	Document	17	Document the intervention	Developers write the document or manual and should undergo review by stakeholders.	NA	NA	Conducted in collaboration with stakeholders.

Abbreviations: NA=Not Applicable.

Theory preposition four proposed using collaboration and co-production to develop the intervention. Therefore, we included stakeholders through expert opinion and collaborative agreements with professionals across Australia, as we believed it would be instrumental when rolling out and upscaling the intervention program if effective. Keyholders from the collective agreements were sought to join the forming team.

6.9.1 Domain 2: Planning (actions 5 and 7)

As mentioned in the above sections, the MRC framework placed little attention on the intervention development stage, impeding comprehensive and transparent reporting of methods (251). The framework did not include specifications on the selection and application of theory (252). Thus, the Implementation Research Logic Model (IRLM) was used to guide the process of complex intervention development, enhancing transparency and rigour (251). A logic model demonstrates shared relationships of variables within a program or study and is often used in program development (251). It was used to facilitate agreement between diverse key stakeholders on the “what” and “how” of the proposed projects and demonstrated planning improvements by highlighting practical and theoretical gaps (251). Logic models can also be useful by supporting the development of process indicators used for tracking and may assist in the transparent reproduction of successful studies (251). It can be applied in the context of a program theory, which demonstrates explicit statements on how the intervention program can be understood and its intended outcomes – using both Explanatory theory and Change Theory described in section 6.7 (251). The CMOC from the refined program theory/theory prepositions were integrated into the IRLM format to show the mechanisms of change and causal relationships between evidence and theory (247, 251). Existing theories (i.e. theory prepositions) and research evidence will be emphasised in the IRLM, which will allow the linking of the identified problem (i.e. current problems with existing individual-level interventions) to the intervention objectives (247).

Table 20 Overview of context mechanism outcome configurations

Theory prepositions		Refined theories – Context (C) Mechanisms(M) Outcomes (O)
TP1	Knowledge and skill development	Interventions that promoted knowledge and skill development (personal growth initiatives) *(C)* facilitated self-awareness *(M),* enabling individuals to exercise self-regulation with the assistance of appropriate resources *(O).*
TP2	Evidence-based intervention	Critical care healthcare professionals assessed and established the intervention's effectiveness using evidence-based knowledge – where the ability to justify facilitated ease in the translational process of the intervention. Full awareness of its credibility *(C)* facilitated autonomy in their assessment and judgement of the intervention *(M)*. This led to the successful implementation of the intervention, which may allow prolonged usage of the intervention *(O)*.
TP3	Accessible and inclusive	Interventions that were easily accessible and inclusive *(C)* provided opportunities for critical care healthcare professionals to interact with the resources *(M)*, which facilitated feelings of acceptance and enabled a more extensive reach to different social groups *(O).*
TP4	Co-production	Interventions should be co-produced *(C)* as it facilitate collaboration *(M)*, which meets the end-user's expectations and needs *(O)*.
TP5	Learning	Structured education *(C)* is relative to intervention engagement *(M)* as it teaches the process of 'how to cope' *(O)*.
TP6	Engagement	Potential solutions for preventing or decreasing burnout experiences and improving well-being within healthcare workforces *(O)* are influenced by the ability to engage with the intervention *(C)*. Engaging enables individuals to adhere to the intervention through self-initiated practices *(M)*. The contextual factors' influences are equally important to consider, for example, personality traits, ethnicity, workload, and work schedule *(C)*.
TP7	Maintaining the quality of interventions	If measures are unified *(C)*, it is possible to determine the effectiveness of interventions *(O)* and comprehensively understand why some interventions may or may not work for healthcare professionals *(M).*
TP8	Tailored intervention	Healthcare professionals are more likely to engage with resources *(O)* if they are personalised to their needs *(C)*, considering that resources should cover two adaptive self-regulation strategies of recovery and job crafting *(C)*. The adaptive strategy modifies the stressor or stress response *(M)*, often resulting in new personal (individual) and job resources.

Abbreviations: C=Context, M=Mechanisms, O=Outcome

6.9.2 Domain 3: Designing (actions 9 and 10)

The research team and stakeholders from Flinders University and the University of Southern Queensland (collaborative agreement) were established in October 2021 to establish an initial hypothesis for the CMOC about the IRLM. The IRLM provided specifications on the relationships between implementation determinants, strategies for implementations, mechanisms of action resulting from strategy and the affected implementation and clinical outcomes. These present as core elements within implementation research projects.

Figure 15 demonstrates the process of IRLM development for intervention program development. Figure 15 indicated four phases that were undertaken: i) initial collaborative meeting, ii) document review, iii) email and virtual meeting discussions, and iv) review and finalisation of IRLM (253).

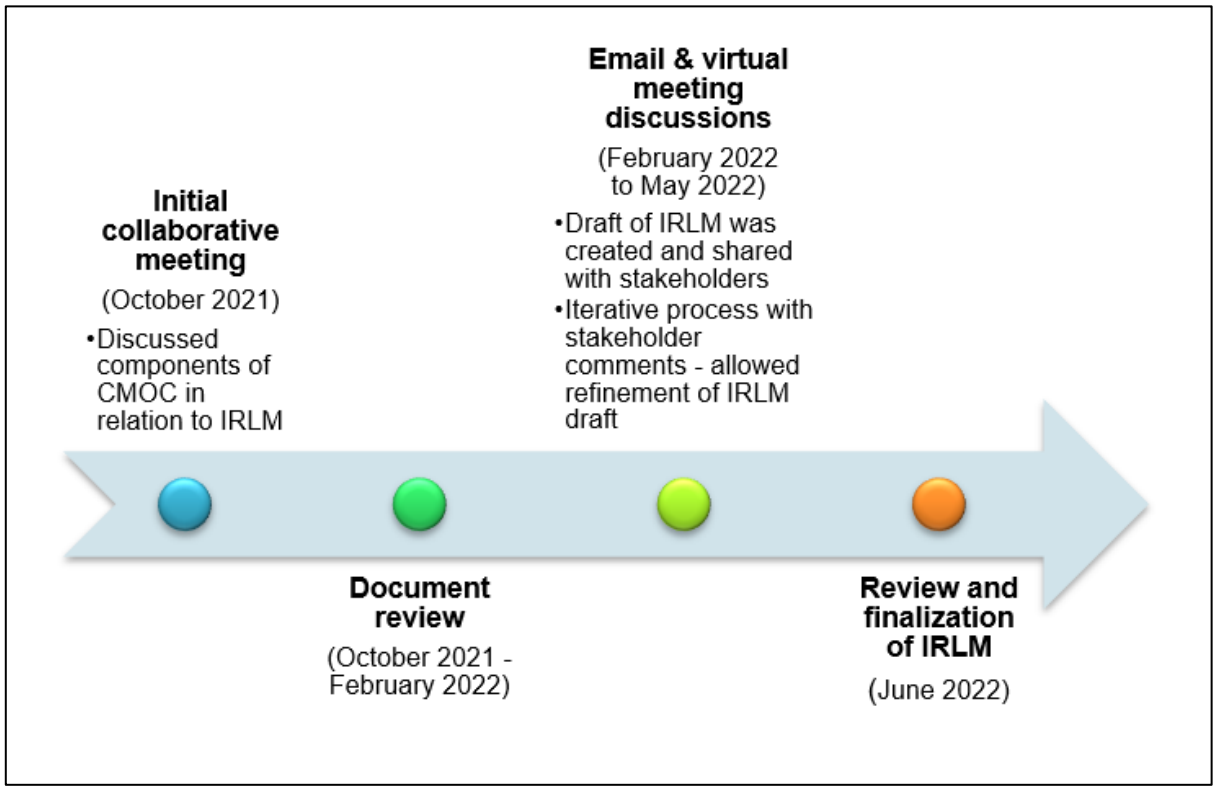


Figure 15 Process of IRLM development

6.9.2.1.1 Initial collaborative meeting

The research team included stakeholder collaboration from the University of Southern Queensland (Appendix 15), met in October 2021 to discuss the components of IRLM, where the team provided ideas on the possibilities of integrating realist evaluation principles, theory prepositions informed by CMOC into IRLM (253). Potential contextual factors derived from CMOC were extrapolated, and potential influences on the program intervention were discussed within the initial collaborative meeting (conducted virtually) (253). The revised program theory was also used during the meeting to provide further understanding of potential contextual factors – which also considered barriers and facilitators – at the micro-, meso-, and macro-levels (253). Given the layered nature of context, researchers explored a) standpoints of social structures (macro-context), b) components to facilitate successful outcome of interventions (meso-context), and c) context of effective interventions (micro-context), all of which have been explained in Chapter 5.

6.9.2.1.2 Document review

Following the initial collaborative meeting with researchers and stakeholders, a document review was conducted, whereby the research team and key stakeholders reviewed the umbrella realist review and semi-structured expert realist opinions to extract relevant information about the program components (253). Another meeting (conducted virtually) was conducted during this phase to allow sharing of ideas, including identifying long-term vision, expected impacts of the intervention program, and identification of inputs, activities, outputs, outcomes, and any other necessary information required to meet the expected goals and outcomes of the intervention program (253). During this meeting, tentative contextual factors in facilitators and barriers were also discussed and further refined (253).

6.9.2.1.3 Email and virtual meeting discussions

The researcher constructed a draft of the IRLM, and ideas discussed alongside evidence retrieved from the expert realist opinion (Chapter 4) were used in the designing process (253). The researcher used the 'IRLM for Comparative Implementation' as the format was suitable for the discussed findings. Figure 16 provided the IRLM about intervention program development for this research. The draft of IRLM was shared with the research team and stakeholders, where further written feedback and meetings for refinement were conducted from February to May 2022 (253). Due to geographical distances, most meetings used different information and communication technologies to support the interactions between the research team and program stakeholders (253). Specifically, monthly teleconferences and regular email discussions were used for the iterative refinement of the IRLM draft, allowing researchers' and stakeholders' collaborative input and thinking of the intervention program in the context of CCHP (253). The IRLM was refined through consulting, clarifying, and agreeing on the relationships of the intervention program components (253). The researcher harnessed the stakeholders' formal and professional knowledge whilst identifying components (including components from CMOCs) that were essential for the intervention program's intended outcomes (253). The collaborative process of choosing information to be included in IRLM was iterative and dynamic, which involved the addition of relevant and emergent components while excluding unnecessary components for the evaluation questions.

6.9.2.1.1 Review and finalisation of IRLM

In June 2022, the IRLM was reviewed and finalised by researchers and key stakeholders. The refinement process of IRLM was conducted in phase ii), and thus, it was conducted iteratively until all parties were satisfied with the IRLM. At finalisation, the researcher translated the IRLM into a manual, further revised and refined by researchers and key stakeholders. The following sections discuss the components of IRLM.

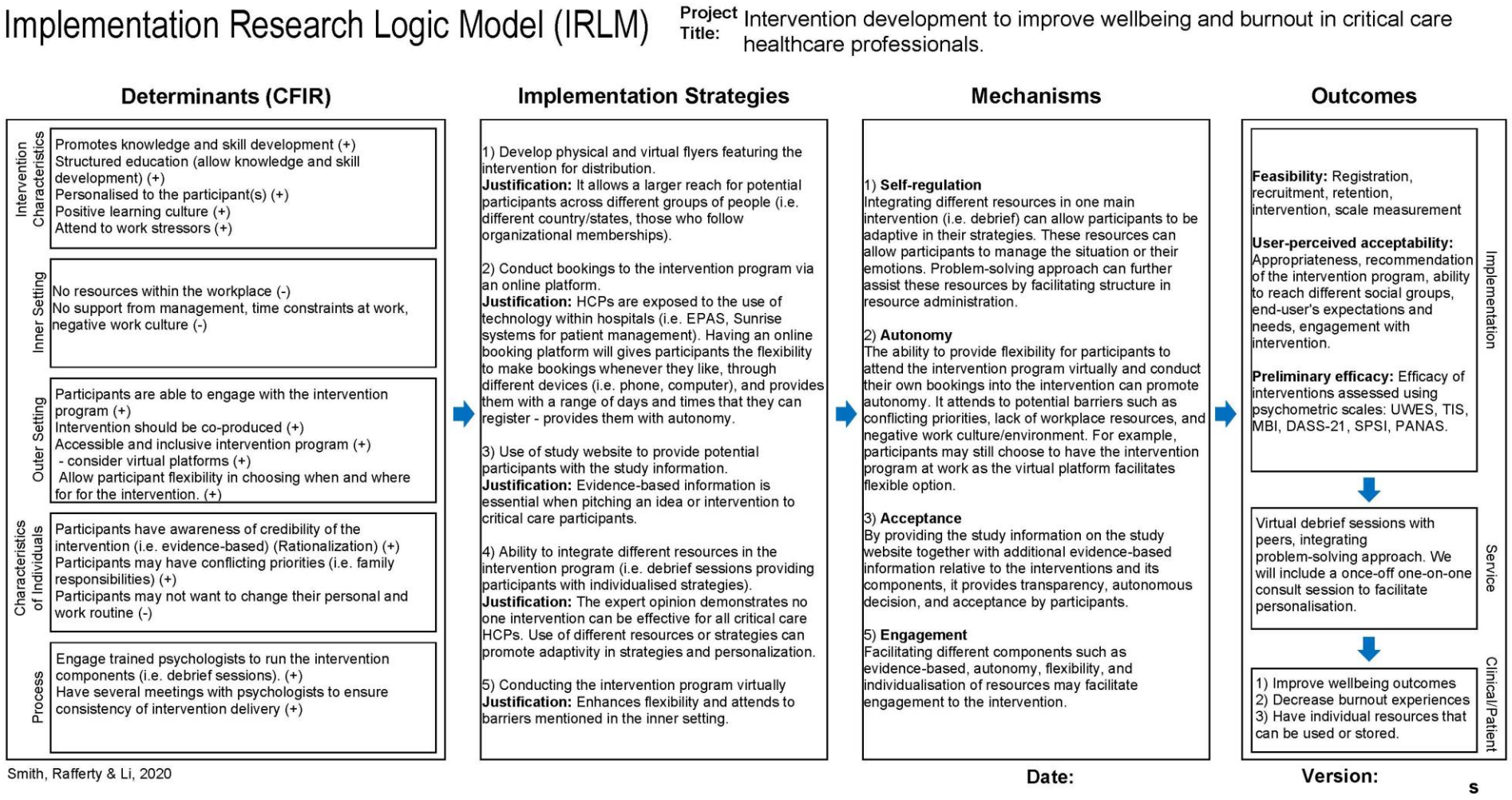


Figure 16 Implementation Research Logic Model (IRLM) of the intervention program

6.9.2.2 Components of the IRLM

6.9.2.2.1 Determinants

Determinants of implementation refer to factors that enable or prevent the implementation of the intervention program. They may act as moderators or mediators and indicate links in a chain of causal mechanisms. Determinants were coded as plus (+) or minus (-) to indicate facilitators and barriers. The context from CMOCs was used to define the determinants of IRLM. Intervention characteristics refer to the facilitators for the intervention to possess to be acceptable to CCHP. The inner setting refers to facilitators and/or barriers within the intervention setting. In this case, we considered implementing the intervention within workplaces; however, factors such as the lack of resources at work and time constraints were barriers to implementation. Such identification allowed researchers and key stakeholders to innovate and consider using a virtual platform. The outer setting refers to external strategies that may facilitate and/or impede the intervention program. Characteristics of individuals included information about the critical care populations regarding barriers and facilitators, followed by process, which described the different processes required to structure the intervention.

6.9.2.2.2 Implementation strategies

The implementation strategies refer to supports and changes to strategies of the intervention program to increase the adoption of the intervention program into usual care. In this section, we provided conceptual reasoning for the selected strategy (i.e. justification), which informed the consideration, planning, and reporting of the following sections: determinants, mechanisms, and outcomes. The IRLM noted five main implementation strategies, including 1) developing physical and virtual flyers, 2) providing a platform for online booking, 3) creating a website to showcase evidence, 4) integrating different resources into the intervention program, and 5) conducting the intervention program virtually.

6.9.2.2.3 Mechanisms

Mechanisms are the events from which the implementation strategy operates to produce the expected outcomes. This can include changes in determinants, an aspect of the implementation strategy, proximal implementation outcome, or a combination of these components. In this case, we used mechanisms from the CMOC, which were used as implicit rationales for implementing strategy components, determinants, and outcomes. We identified four main mechanisms: self-regulation, autonomy, acceptance, and engagement.

6.9.2.2.4 Outcomes

The outcomes refer to the purposive actions in implementing new interventions. The outcomes demonstrated key intermediate outcomes about the targeted intervention program. The *implementation* describes the assessments required to understand the suitability of the intervention program. We assessed this using feasibility, user-perceived acceptability, and preliminary efficacy. The *service* refers to the intervention provided to potential participants – virtual debrief sessions using a problem-solving approach and consult sessions. Debrief was chosen out of six potential interventions. Both researchers and key stakeholders determined that debriefing encompassed and facilitated all six interventions/components: mindfulness/awareness, cognitive-based, resilience, communication and stress management, and emotional intelligence.

Further details on the interrelationship between these components and the debriefing were discussed in Section 6.14. The *clinical/patient* referred to outcomes expected for participating participants. We included improving well-being outcomes, burnout experiences, and possessing life-long individual resources that participants can keep or use and apply to stressors within the workplace and/or personal lives.

6.9.3 Domain 6: Documentation (action 17)

The intervention program format, length, time, delivery and aesthetic were developed by considering the features of the realist theory prepositions (through CMOC). A manual (Appendix 16) detailing the intricate details of the intervention was developed and revised by stakeholders. The details reported in the manual can be found in the next Chapter 7. A pilot realist-informed RCT was conducted to evaluate the intervention program's feasibility, user-perceived acceptability, and preliminary efficacy.

6.10 Main components of the intervention

The thought process of developing the individual-level intervention was reported as an autoethnography in Appendix 17. The following sections demonstrated the relationship between the individual-level intervention (IP program) and the refined program theory.

6.10.1 Essential components identified by the research team and key stakeholders

The research team and key stakeholders engaged in comprehensive discussions regarding the refined program theory, highlighting three pivotal dimensions that demanded primary focus within the individual-level intervention. These areas encompassed knowledge and skill development, fostering a culture of continuous learning intervention tailoring. Further deliberations highlighted the importance of addressing the issue of loneliness among CCHP, a concern discerned from insights of key stakeholders and reported evidence within literature (discussed throughout the thesis). The remaining facets of the refined program theory were subsequently integrated within the individual-level intervention—namely, evidence-based intervention, accessibility and inclusivity, co-production, engagement, and the maintenance of intervention quality. The subsequent section elaborated on the strategies employed to accomplish this integration, providing a comprehensive account of incorporating these components to bolster the effectiveness and impact of the intervention. Figure 17 provides an overview of the relationships between the refined program theory components and the intervention.

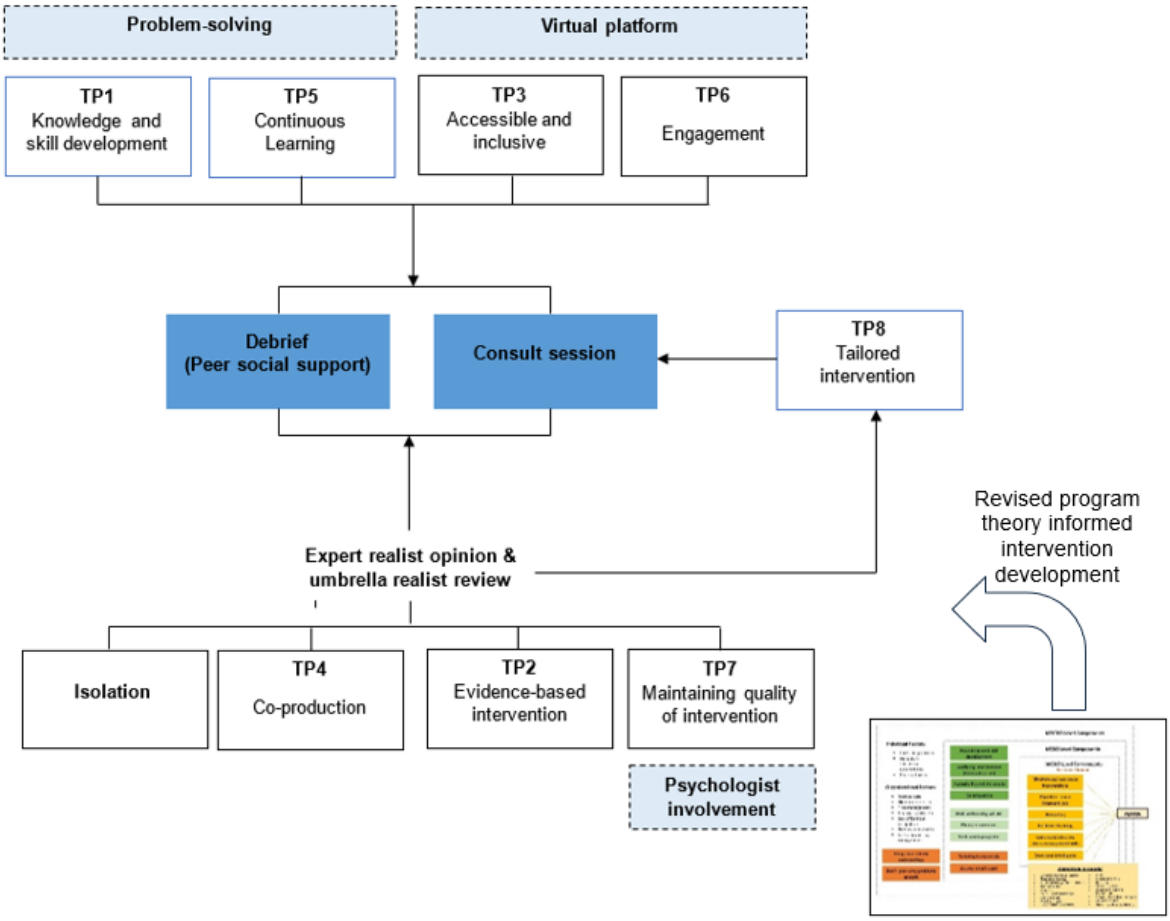


Figure 17 Intervention relationship with the refined program theory

6.10.2 Descriptions of the three pivotal components

6.10.2.1 Fostering a culture of continuous learning (TP5) and knowledge and skill development (TP1)

Problem-solving abilities significantly influence overall psychological well-being and social competence, owing to their capacity to facilitate effective personal and social functioning (254, 255). Problem-solving is a self-directed cognitive-behavioural process that enables individuals to seek adaptive resolutions for the challenges encountered in daily life (255). Ineffectual or maladaptive coping strategies can give rise to adverse outcomes, encompassing anxiety, anger, and psychological distress (255). Conversely, adept problem-solving skills serve as a

protective shield, ameliorating the detrimental impacts of stress (255). Problem-solving complexity is heightened in high-risk situations, time constraints, uncertain objectives, ambiguous or incomplete information, and the need for teamwork (256). The iterative process of committing errors and learning from them is pivotal in cultivating effective problem-solving skills (256). Dealing with setbacks, confronting challenges head-on, and rectifying mistakes are intrinsic to developing resilience, constituting a fundamental aspect of mental toughness (256). This journey through setbacks fosters a unique learning experience that fosters acquiring new knowledge and skills (256). This process encapsulates the theoretical propositions of continuous learning (TP5) and knowledge and skill development (TP1).

6.10.2.2 Tailoring the intervention (TP8)

Tailoring (TP8) denotes a customisation process that aligns with individuals' unique characteristics (257). It honours the distinctiveness of each person, influences their attitudes, and effectively fosters behaviour change by addressing their specific needs (185, 257). This principle of tailoring emerged prominently from the umbrella realist review (Chapter 4) and realist expert opinion paper (Chapter 5), wherein the essential contextual factors and mechanisms crucial for intervention efficacy among CCHPs were delineated using theory propositions. Informed by this emphasis on tailoring, a consultative session was formulated, allowing for customising interventions to participants' requirements. This approach shifts the focus towards the individual, ensuring that their unique needs are met effectively within the intervention framework.

6.10.3 Evidence-supported components

6.10.3.1 Isolation and loneliness

Loneliness emerged as a prominent issue among CCHP, and heightened levels of loneliness were identified during the COVID-19 pandemic (258). Loneliness manifested when employees experienced a shortage of meaningful social relationships, regardless of the number of contacts they maintained (259). Its occurrence was primarily influenced by relationship quality

and disparities between desired and actual social interactions (259). Loneliness, recognised as a significant health concern, predicted elevated emotional exhaustion and workplace burnout (259, 260). Moreover, it is associated with unfavourable workplace outcomes, including reduced job performance, creativity, organisational commitment, and work engagement (261, 262). This understanding of loneliness's far-reaching implications informed the research team and key stakeholders (263). It highlights the necessity for peer support as a viable intervention strategy (263). The concept of peer support gained traction as it could address the intricate interplay of health and social needs by connecting individuals with shared life experiences (263). Doing so aimed to counteract the challenges of loneliness within the critical care healthcare professional context (263).

6.10.3.2 Peer-support

Critical care employees working in extremely challenging and high-risk conditions require urgent mental support (259). Peer support is a significant work resource, positively impacting mental health outcomes (259). It fosters decision-making, problem-solving, coping, and stress-management skills (264). Support from co-workers and friends was shown to reduce emotional exhaustion, burnout experiences, and loneliness (259, 265). According to Maslach and Goldberg (266), peer support groups offered new insights, personal rewards, and emotional comfort and served as a source of optimism, humour, and encouragement during difficult and stressful times (265, 267). This insight played a pivotal role in shaping the development and consensus-building process for the debrief sessions.

6.10.1 Remaining components of the program theory

6.10.1.1 Accessibility, inclusivity (TP5) and engagement (TP6)

To ensure enhanced accessibility and inclusivity, the research team proactively adopted innovative measures, opting for a virtual platform to conduct both the debrief and consult sessions. This strategic decision was underpinned by promoting equitable access to the intervention, particularly considering the diverse range of work and family commitments that

participants might have. By leveraging a virtual environment, the research team aimed to transcend geographical and temporal barriers, fostering a setting where participants could readily engage with the intervention's content and interactive sessions. This approach aligned with contemporary technological trends and the overarching commitment to making the intervention easily accessible to a broader spectrum of participants, thus nurturing a sense of inclusivity, fairness, and increased engagement in the implementation process.

6.10.1.2 Co-production (TP4), evidence-based (TP2), and quality control (TP7)

The intervention underwent a co-production process facilitated by expert opinion. This involved the active participation of critical care specialists who contributed extensive expertise to developing the intervention. This collaborative endeavour directly aligns with theory propositions 2 and 3, which highlight the importance of crafting high-quality evidence-based interventions. The author developed a program theory, subsequently refined through an iterative process detailed in Chapters 4 and 5. This theory-driven approach laid the foundation for the systematic development of the intervention, ensuring that it was firmly grounded in theoretical underpinnings and practical insights from seasoned professionals in the critical care domain. Moreover, the quality of the sessions was preserved through the integration of the psychologist's expertise in facilitating debriefing and consultation sessions.

6.11 Chapter Summary

This Chapter presented the application of realist methods in developing an individual-level intervention to promote well-being and decrease burnout experiences in CCHP. The MRC framework guided the intervention development. Debrief and consult session, termed an IP program, was proposed as an intervention designed using guidance from the refined program theory. The next Chapter presented the pilot RCT methods to evaluate the IP program's feasibility, acceptability, and preliminary effectiveness.

CHAPTER 7

STAGE 2: PILOT RANDOMISED CONTROLLED TRIAL METHODS

This chapter contained contents from:

Adnan, B. B., Dafny, H. A, Baldwin, C., Chamberlain, D. (2023). Is this the solution to wellbeing and burnout management for the critical care workforce? A parallel, interventional, feasibility and realist informed pilot randomized control trial. PloS One, *18*(4), e0285038.

Statement of co-authorship: All authors were involved in formulating the concept and design of the review. Nurul Adnan conducted the literature search and data analysis and completed the initial draft of the manuscript. All authors edited multiple revisions of the manuscript. See Appendix 18 for the full publication.

7.1 Chapter overview

In chapter 7, the methods used in a pilot Randomised Control Trial (RCT) of IP program will be presented. The aim is to assess its feasibility, acceptability, and preliminary effectiveness. The chapter will firstly outline the aims, objectives, and study procedures for the IP program, followed by a discussion of the procedures planned for the Phase III process evaluation.

7.1.1 Study aims and objectives

This study aimed to assess the feasibility, acceptability, and preliminary effectiveness of the IP program. The program integrated aspects of peer support, problem-solving, and tailoring to enhance well-being and mitigate burnout among CCHP. To the best of the author's knowledge, no prior studies had been conducted with such an intervention within the critical care workforce. The primary objective was to evaluate the feasibility and acceptability of the IP program. This program encompassed a one-on-one virtual consult session in the initial week, followed by a six-week virtual debrief session employing a problem-solving approach. In contrast, the active control group underwent a 6-week period of informal debriefing that lacked a problem-solving component. The feasibility of recruitment strategies, retention rates, and data collection methods were scrutinized, while the program's acceptability was gauged

by participants' engagement with the IP program. A secondary objective was to investigate the preliminary effectiveness of the IP program using psychometric questionnaires to evaluate well-being and burnout metrics.

The primary aim was answered using the following objectives:

- Gather feedback from critical care professionals on the recruitment processes, retention rate, and data collection procedures of the trial.
- Identify potential barriers and facilitators to the implementation of the IP program, including resource availability and individual-level factors that may impact its adoption and sustainability.

The secondary aim was answered using the following objectives:

- Determine if IP program had significant effect in achieving improved measures related to well-being and burnout.
- Determine if positive effects of IP program are maintained over time.
- Identify and understand components of the IP program that contributed to the desired outcomes (i.e. significant improvements in well-being and burnout related measures).

7.2 MRC Framework Phase II and III: Feasibility/Pilot and Process Evaluation

A pilot Randomized Controlled Trial (RCT) was conducted in alignment with Phase II of the MRC framework. Within this phase, the Intervention Program (IP) underwent a pilot test, with the objective of evaluating its feasibility, acceptability, and preliminary effectiveness, as illustrated in Figure 18. Although RCTs are esteemed for determining the efficacy of interventions, relying solely on their outcomes might not provide policymakers with sufficient insights to replicate interventions or understand potential variations in results across different contexts (39).

To address this limitation, the MRC framework advocates for the integration of Phase III process evaluation within RCTs. This supplementary step aims to enrich the understanding of the mechanics and nuances of the intervention, thereby refining its delivery. By adopting this methodology, a holistic perspective of the intervention's operation can be acquired, paving the way for optimized implementation.

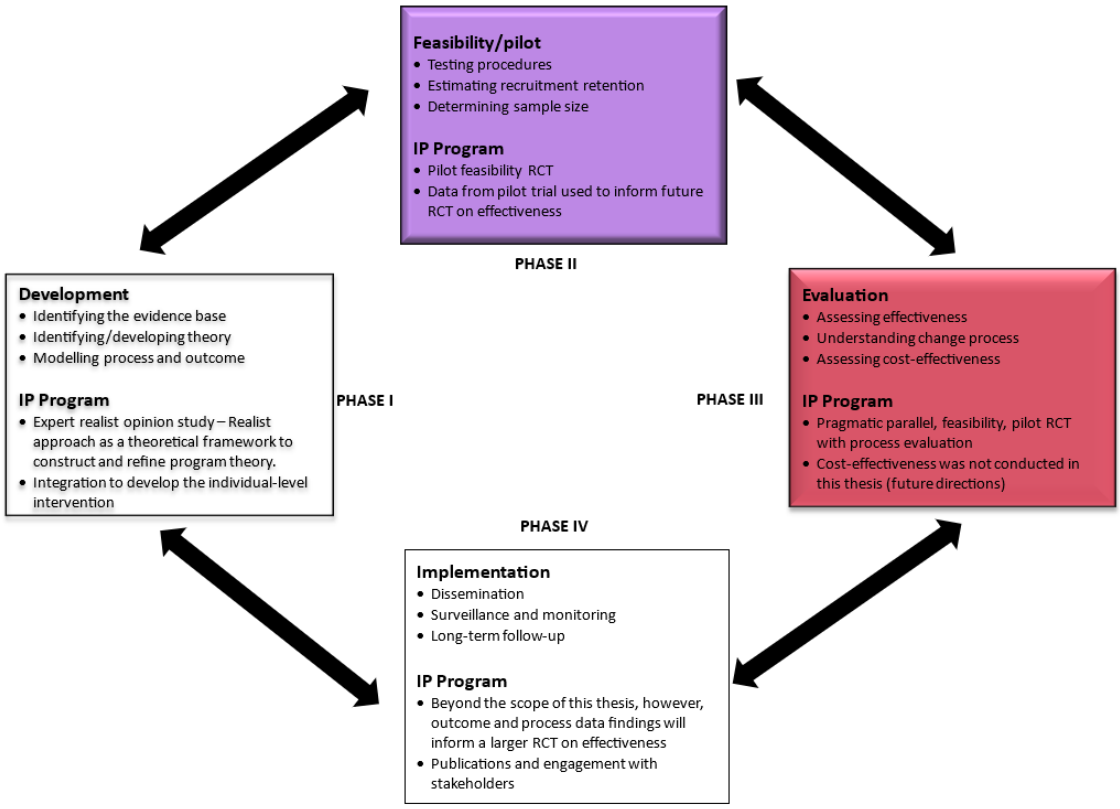


Figure 18 MRC Framework highlighting Phase II and III

Process evaluations are designed to decipher the reasons behind the success or failure of an intervention, such as the IP program, and to pinpoint potential strategies for improvement (39). They distinguish between interventions that are conceptually flawed and those that might have encountered implementation hurdles (39). Such evaluations illuminate the causal pathways that connect the intervention's theoretical foundation to its observed results (39). Moreover, process evaluations offer a more profound understanding of the intervention's implementation,

the mechanisms underpinning its operation, and the contextual factors that shape its effectiveness (39).

In the scope of the present study, a process evaluation of the IP program was undertaken to deepen the understanding of the intervention's mechanics and to refine its delivery. The insights gleaned from the process evaluation enriched the outcome evaluation, furnishing invaluable guidance for policymakers and practitioners aiming to roll out similar interventions in varied environments.

7.2.1 Process evaluation study design

In this study, the process evaluation aimed to assess the feasibility and acceptability of the IP Program, drawing guidance from the MRC framework (39). This framework underscored the significance of explicitly articulating the intervention and its foundational causal assumptions regarding its effectiveness in yielding desired outcomes (39). This multi-dimensional evaluation method deepened insights into the program's strengths, limitations, and prospects for success (39). Such a comprehensive understanding is pivotal in informing future program designs, implementations, and refinements, ensuring that interventions are meticulously tailored to meet the unique needs and contexts of the target group, namely CCHP (Figure 19) (39). Specifically, the process evaluation concentrated on three principal functions, as delineated in the MRC guidance:

- **Implementation:** This involved examining how the IP Program was delivered, including the necessary training and resources for full implementation (39). It assessed the quantity and quality of the delivered intervention, the fidelity and dose of implementation, and the extent to which the intervention reached its intended audiences (39).
- **Mechanisms of Impact:** This function focused on understanding how the IP Program did or did not produce change (39). It investigated the specific mechanisms through which the intervention affected outcomes and sought to identify factors that contributed

to or hindered its effectiveness (39). This understanding of mechanisms was crucial for replicating and optimising the intervention's effects (39).

- **Context:** Exploring the contextual factors that influenced implementation and effects was considered another crucial aspect (39). This involved examining external factors that acted as barriers or facilitators to both the implementation of the intervention and its effects (39). Understanding the context played a vital role in interpreting the findings and assessing the generalisability of the intervention beyond the specific evaluation setting (39).

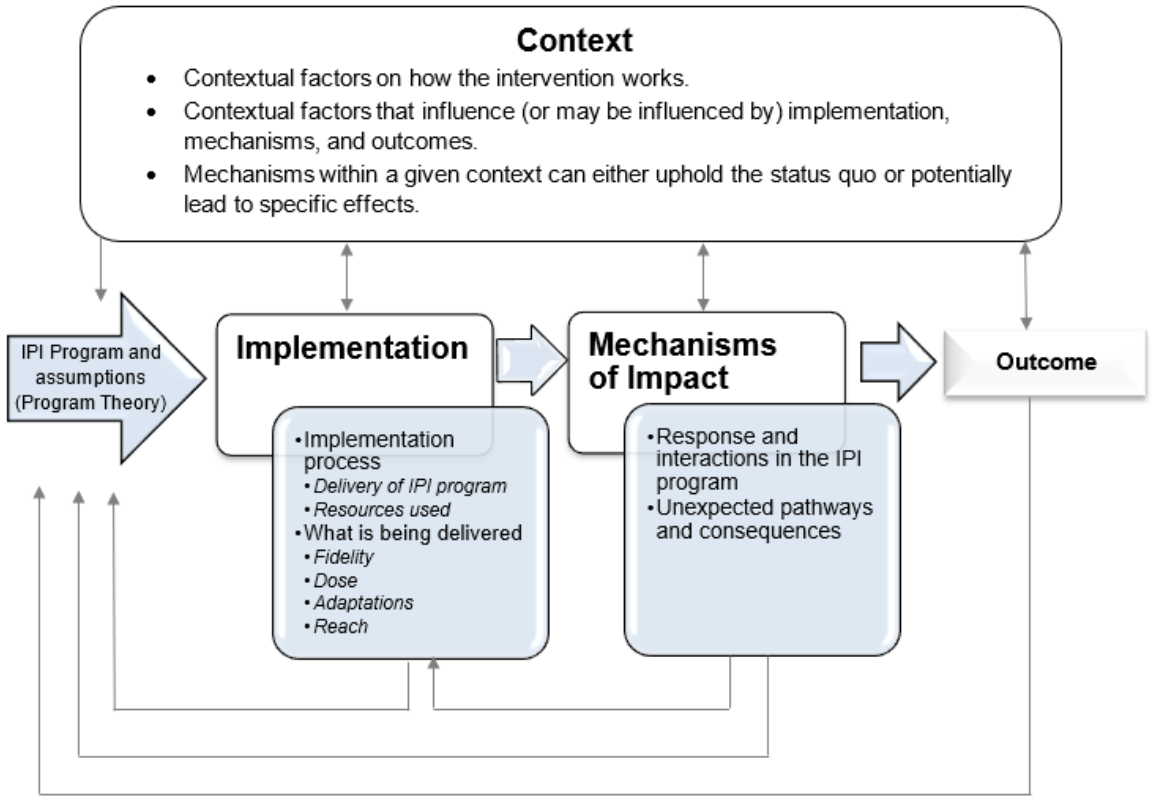


Figure 19 Key functions of process evaluation

(adapted from Moore et al. (268))

7.3 Mixed Method: Stage 2 (quantitative)

This expert opinion also served as a qualitative contribution to the overall mixed method thesis. Figure 20 revisited the mixed method stage and highlighted the qualitative expert opinion.

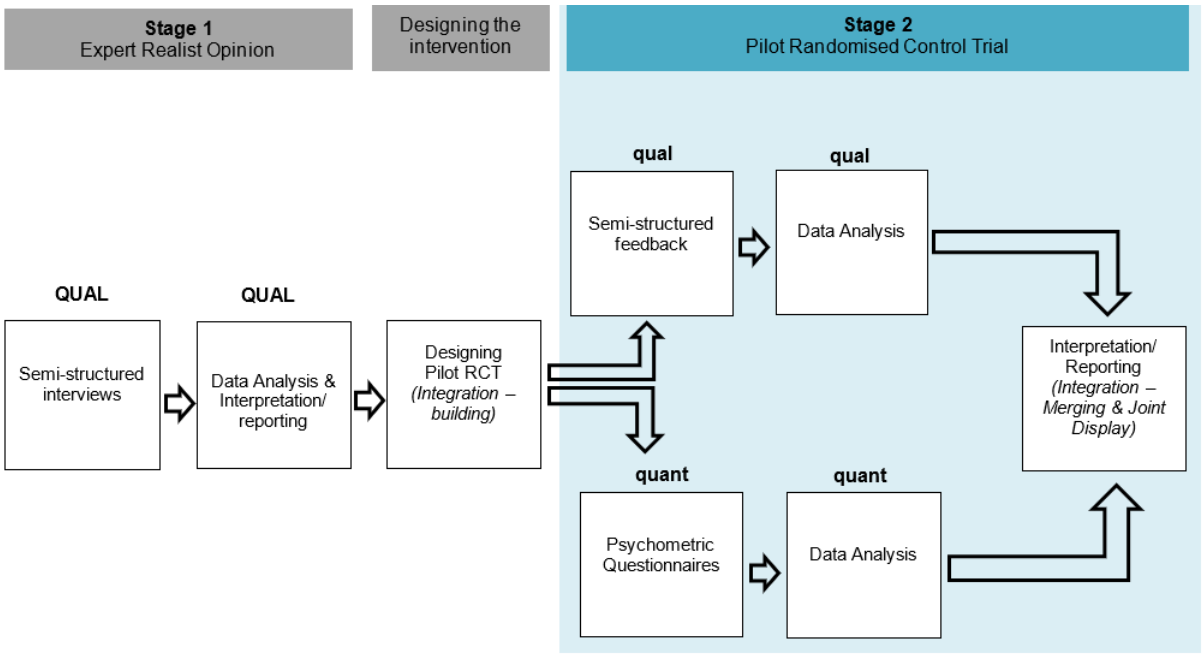


Figure 20 Mixed Method Stage 2

7.4 Definitions

7.4.1 Feasibility

A feasibility study serves as a thorough evaluation undertaken prior to the initiation of a primary research project (269, 270). Its primary role is to assist researchers in discerning whether an intervention is apt for subsequent, more extensive testing (269, 270). Essentially, it aids in establishing the relevance and sustainability of ideas and findings (269, 270). Moreover, feasibility studies pinpoint any requisite modifications to research methodologies or protocols and provide recommendations for implementing such changes (269, 270).

7.4.2 Pilot Study

A pilot study is a type of feasibility study that focuses on a particular design element suggested for the main research project, whether partially or completely (269, 271). It's conducted on a smaller scale. In essence, the pilot study comes before the main trial to assess its accuracy and effectiveness (269, 271).

7.4.3 Acceptability

Acceptability is not a fixed aspect of a trial or specific research process (270, 272). Instead, it's shaped by how individuals perceive it and by their personal and social surroundings (270, 272). Context plays a big role in this, as shown in discussions and studies about participant communities (270, 272). Different viewpoints among potential participants impact their willingness to join or reasons for not joining (270, 272). Making the intervention work well relies on it being acceptable to both those carrying it out (researchers) and those receiving it (CCHP) (270, 272).

7.5 Methods

7.5.1 Study design

This study was a parallel-designed, two-armed, pilot randomised control trial (RCT) with a realist evaluation method to determine and compare feasibility and acceptability of an IP program and conventional program (informal peer debrief) among CCHP. The study protocol adhered to the Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) guidelines (Figure 21 and a detailed version in Appendix 19) and the RAMESES II guideline. Ethical approval was obtained from the Flinders University (ref. number: 4703) and the University of Southern Queensland (ref. number: H22REA178) Human Research Ethics Committees (Appendix 20). Additionally, the study was registered with the Australian and New Zealand Clinical Trials Registry under the reference ACTRN12622000749707p (Appendix 21). The study flowchart is presented in Figure 22. All participants were provided with an information sheet detailing all study processes including the need to record consult and debrief sessions and transcribe data, ensuring de-identification of participants. Participants were also aware that their information will be stored in Flinders University R drive. Participants were successfully recruited after their consent forms were signed and returned to the research team.

	STUDY PERIOD											
	Enrolment	Allocation	During treatment								End treatment		
TIMEPOINTS →		T0	T1								T2	T3	T4
Week →			1	2	3	4	5	6	7	8			
ENROLMENT:													
Eligibility screen	X												
Informed consent	X												
Randomization		X											
Allocation		X											
INTERVENTIONS:													
*IP Program**			←	→	←					→			
Informal debrief					←					→			
ASSESSMENTS:													
Sociodemographic data	X												
IES-R	X												
Primary outcomes													
Journaling			X	X	X	X	X	X	X	X			
Post-treatment feedback											X		
Secondary outcomes													
DASS-21	X										X	X	X
MBI-HSS	X										X	X	X
PANAS	X										X	X	X
UWES-SF	X										X	X	X
TIS-6	X										X	X	X
SPSI-SF	X										X	X	X

*Consult will run for 1 week (blue arrow), PPSP debrief will run for the following 6 weeks (black arrow); IES-R, Impact of Event Scale-Revised, TIS, Turnover Intention Scale; MBI-HSS, Maslach Burnout Inventory-Human Services Survey; DASS-21, Depression, Anxiety, and Stress Scale-21; SPSI-SF, Social Problem-Solving Inventory-Short Form; PANAS, Positive and Negative Affect Schedule.

Figure 21 SPIRIT schedule of enrolment, interventions, and assessments

7.5.1 Overview of the refined program theory

The preceding Chapter 6 extensively explored the design and creation of an individual-level intervention (IP program), guided by the enhanced program theory. It accounted for interactive contextual elements and mechanisms, encompassing knowledge and skill enhancement, continuous learning, accessibility, engagement, co-production, evidence-based practices, tailoring, and quality upkeep. The collaborative engagement of the research team and key stakeholders also emphasized addressing isolation among CCHP. This pilot RCT aimed to assess the feasibility, acceptability, and initial effectiveness of the IP program. Additionally,

the study refined the existing program theory of the IP program, pinpointing succinct interactive contexts and mechanisms suitable for the CCHP population.

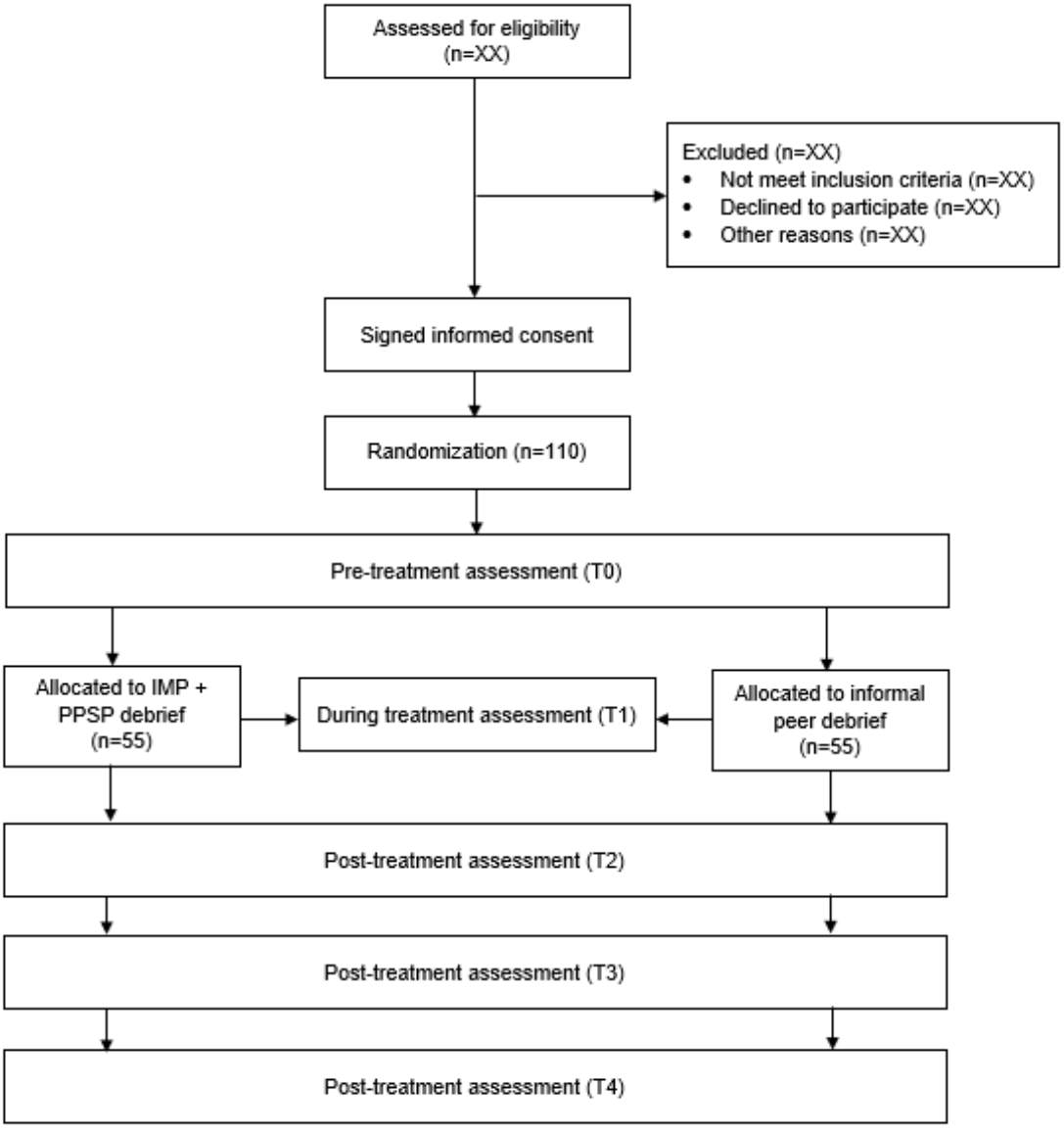


Figure 22 Pilot RCT study flowchart

7.5.2 Study setting

The study centre was located at the College of Nursing and Health Sciences, Flinders University. Study data were collected through online questionnaires using Qualtrics Research

Core *Version 2022.01* (273) and virtual consult and debrief sessions (intervention and active control group) using Zoom Meetings Version 5.8.0 (207).

7.5.3 Eligibility criteria

CCHP who were interested in participating registered their interest using an electronic form. The form included the Impact of Event Scale-Revised (IES-R), which was used to assess their eligibility before completing and signing the electronic informed consent form. The eligibility criteria encompassed (a) registered HCP practicing within an Australian or New Zealand critical care setting, including Physicians, Nurses, and Allied Health professionals, and (b) having access to a personal computer or device equipped with a camera and microphone. The trial also included individuals both undertaking and not undertaking prescribed treatments for mental health conditions.

The exclusion criteria comprised of (a) individuals involved in any type of work compensation claims, (b) those having contradictions to any of the interventions, and (c) those considered 'high risk' of self-harm or psychological harm, which was determined during the recruitment phase using the IES-R (274, 275). Participants scoring 37 or higher on the IES-R were excluded, as this demonstrated a score sufficiently high to suppress the individual's system functioning, necessitating referral for professional support (274, 275). Participants who scored 37 and above were contacted by the research team and offered a one-on-one consultation with a clinical psychologist, following which they were referred to an employee assistance program or their general practice for further professional support. The decision to exclude participants with a score of 37 or more was agreed between the research team, including an experienced clinical psychologist.

7.6 Intervention

7.6.1 Intervention group

The intervention group received the IP program, which consisted of consult and debrief sessions. The consult was a 30-minute, virtual, one-to-one session with a supervised psychologist student (in their final year and final placement, referred to as facilitator), who provided tailored and immediate strategies based on their clinical judgment. These strategies focused on the participants' everyday living, such as improving sleeping habits, encouraging exercise, and relaxation methods. Participants were advised by the facilitator to incorporate these strategies into their daily lives. The list of semi-structured questions used in the consult can be found in Table 21. The facilitator was provided a progress note template (Appendix 22) to record findings, which served as record keeping for the trial.

The study administered a problem-solving debrief led by a supervised psychologist students in their final year and final placement – referred to as facilitators –, who were supervised by a clinical psychologist (GB). This debrief session was semi-structured, 6-week, group-based, virtual, and informal, and aimed to encourage social interactions and engagement among participants, instead of achieving structured debrief objectives[12]. The debrief focused on achieving peer support using informal structures and incorporated theories of problem-solving. The facilitator supported participants in positively addressing problematic situations and reducing emotional distress related to those issues. This was facilitated through group discussions, experience sharing, and individual guidance to analyse the causes of the problem, develop feasible goals and strategies through problem-solving, and assess the effects (success or failure) of the implemented strategy.

[12] Structured debrief objectives referred to reflection on the process and outcomes of the endeavour and to identify key learnings and areas for improvements.

Table 21 Consult semi-structured questions

Themes	Guiding Questions
General Questions	How are you feeling?
	How are you finding your job at the moment? Are there any stressors that you are currently experiencing?
Mental Health	Can you tell me about any times over the past few months/weeks that you've been bothered by low feelings, stress, or sadness?
Physical Health	Has it affected your sleeping habits? Have you noticed any changed? Difficulty sleeping? Restlessness?
	How would you describe your appetite over the past weeks? Have your eating habits changed in any way?
Autonomy, choice, and control	How often during the past months/weeks have you felt as though your moods, or your life, were under control?
Relationships and belonging	Describe how 'supported' you feel by others around you—friends, family or otherwise
Self-perception	Let's talk about how often you have felt satisfied with yourself over the past months/weeks.
Hope and hopelessness	Can you tell me about your hopes and dreams for the future? What feelings have you had recently about working towards those goals?

7.6.2 Active control group

The informal debrief included mutual support among participants with shared experiences. Similar to the IP program, the primary goals of debrief were not to achieve specific debriefing outcomes, but rather, to encourage social interaction and engagement among participants, providing a platform to discuss concerns, problems, and feelings (276). The informal peer debrief was a semi-structured, 6-week, group-based virtual intervention. Facilitators (as defined in the intervention group Section 7.4.1) conducted the sessions but refrained from providing active solutions to participants' issues. The list of semi-structured questions used in both the intervention and active control debrief groups remained consistent, with variations in the 'Pre-briefing,' 'Discovering,' and 'Deepening' sections. Notably, the informal peer debrief did not include a problem-solving approach (see Table 22).

7.7 Project tools

Consult and debrief sessions were conducted virtually via Zoom Video Communications. Instructions on accessing and using the platform were provided to participants upon enrolment into the study (Appendix 23). Facilitators were also provided with pre-defined forms to

document consult and debrief findings, used as evidence of their involvement in the study (in compliance to their placement requirements) (Appendix 24 to 26).

7.8 Measurements

Participants completed self-reported questionnaire measures at four timepoints: baseline (Timepoint 0), after treatment (Timepoint 2), 1-month follow-up (Timepoint 3), and 3-month follow-up (Timepoint 4). Throughout treatment (Timepoint 1), participants completed qualitative journal entries that included reflective questions. At Timepoint 0, participants provided sociodemographic characteristics, including gender, age, living status, citizenship, employment, qualifications, and family responsibilities. Treatment feedback was collected at T2 through online questionnaire and semi-structured interviews (see templates in Appendix 27). Additionally, audits were conducted for study screening, enrolment logs, attendance lists for the consult and debrief sessions (both intervention and active control groups), and study records to ensure completion of the assessment measures at the five assessment points.

Table 22 Debrief session structure

Structure	Content
Introduction	Introduction of the support leader and researcher present in the session. What this study is about and who is conducting the study
Pre-briefing	Purpose of the debrief session and the role of the support leader in facilitating discussions and prompting self-reflection. Items that can be discussed (i.e., encounters/stressors at the workplace)
	Management of situations using problem-solving approaches and connecting new learnings into future situations.
Defusing	Encouraging participants to talk about how they feel when encountered with a stressful situation. Allow reflection of their feelings and recapping the scenario
Discovering	Allow other participants to reflect on the situation and provide their thoughts and ideas Enable participants to explore any similar situations that they may have encountered.
	Support leader(s) may ask other participants on how they would approach the situation, their rationale, and potential future strategies. The support leader(s) can also offer their own mental model on problem-solving approaches to deal with the situation.
Deepening	**Reflection on what can be done in similar future situations.** **Finding a relationship between the suggested strategy to other situations at work.**
Summary	Recapping what was discussed in the session Ending with one thing that can be taken away from the session and used in their workplace.

Note: The intervention group (IP program) will also use techniques stated in 'bold' typeface/highlighted blue box and 'normal' typeface/unhighlighted boxes, whereas the control group will follow techniques noted in 'normal' typeface/unhighlighted boxes only.

7.9 Primary outcomes

Table 23 and 24 provided an overview of feasibility and acceptability outcomes and its related measures. Both feasibility and acceptability outcome measured the recruitment process, retention rate, and data collection processes.

Table 23 Feasibility outcome measures

Measure outcomes	Main measures	Measure components	Where will the data be collected?
Feasibility	Recruitment processes	Ease in registration (registration rate)	Study auditing metrics
		Length of time to recruit target population	Study auditing metrics
		Feasibility of recruiting the number of participants required within the specified recruitment period (recruitment rate)	Study auditing metrics
		Waiting time before intervention commencement	Study auditing metrics
	Retention rate	Waiting time before intervention commencement	Study auditing metrics
		Retention rate: - Number of sessions attended (for consult) - Number of sessions attended (for debrief)	Study auditing metrics
		Safety	Study auditing metrics
	Data collection processes	Psychometric questionnaires completion rate	Study auditing metrics
		Journal entry completion rate	Study auditing metrics
		Feedback semi-structured interview and questionnaire completion rate	Study auditing metrics

Note: registration rate was defined as the number of participants registering for the trial and recruitment rate was defined as the number of participants who were successfully recruited and randomised into the study.

Table 24 Acceptability outcome measures

Measure outcomes	Main measures	Measure components	Where will the data be collected?
Acceptability	Recruitment processes	Where did participants find the advertisement?	Semi-structured feedback interview/questionnaire
		Ease in registration (registration rate)	Semi-structured feedback interview/questionnaire
		Ability to snowball	Semi-structured feedback interview/questionnaire
		Length of time to target population	Researcher field notes (autoethnography)
		Feasibility of recruiting the number of participants required within the specified recruitment period (recruitment rate)	Researcher field notes (autoethnography)
		Waiting time before intervention commencement	Researcher field notes (autoethnography)
	Retention rates	Retention rate *i.e. why did participants decide to continue with the consult and/or debrief sessions?*	Semi-structured feedback interview/questionnaire
		Engagement with self-booking platform and email/text reminders *i.e. how did participants feel about using the self-booking platform and did it help with attendance to the consult and/or debrief sessions?*	Semi-structured feedback interview/questionnaire
		Set-up and accessing the sessions *i.e. what was participant's experiences in accessing the consult and/or debrief sessions?*	Semi-structured feedback interview/questionnaire, Researcher field notes (autoethnography)
		Likelihood of recommendation	Semi-structured feedback interview/questionnaire
		Safety *i.e. Did the consult and/or debrief sessions provide sufficient support to participants?*	Semi-structured feedback interview/questionnaire, Researcher field notes (autoethnography)

Measure outcomes	Main measures	Measure components	Where will the data be collected?
Acceptability (continued.)	Data collection processes	Psychometric questionnaires completion rate *i.e. did participant's find the psychometric questionnaires to be acceptable?*	Semi-structured feedback interview/questionnaire, Researcher field notes (autoethnography)
		Journal entry completion rate *i.e. why were participants (not) consistent with journal entry completion?*	Semi-structured feedback interview/questionnaire, Researcher field notes (autoethnography)
		Feedback semi-structured interview and questionnaire completion rate *i.e. why did participants decide to complete the feedback questionnaires/semi-structured interviews and was it acceptable to participants?*	Semi-structured feedback interview/questionnaire, Researcher field notes (autoethnography)

Note: i.e. = for example. It referred to sample questions that were answered in the feedback semi-structured interview and/or questionnaire.

7.9.1 Feasibility

The feasibility of the study was assessed based on the recruitment processes, retention rate, and data collection procedures. Table 25 provided definitions for key terms used in the measurement of feasibility. Audits of participants referred to and attended the consults each week were used to measure recruitment and enrolment. Additionally, audits of completing questionnaires, journal entries, feedback questionnaires, and feedback semi-structured interviews were used to measure the feasibility of treatment delivery and data collection.

Table 25 Definitions of feasibility measures

Key terms	Definitions
Recruitment processes	It is referred to the methods employed to recruit potential participants into the study and the ability to reach the desired sample size (277).
Retention rate	It referred to the number of participants remaining in the trial in the last phase of data collection in comparison to the total number of participants recruited at baseline assessment (277).
Data collection procedures	Data collection procedures referred to the process of completing psychometric questionnaires, feedback questionnaire, journal entry completion rate, and semi-structured feedback interviews (277).

7.9.2 User-perceived acceptability

Acceptability was measured to assess participant intervention engagement and satisfaction. Both outcomes were measured using treatment feedback questionnaires, and feedback semi-structured interviews. Treatment feedback questionnaires were employed to measure user satisfaction, encompassing questions related to participant experience, barriers, enablers, and likelihood of recommendation. The measurement of participant satisfaction was further supported by feedback semi-structured interviews, which were conducted as 30-minute, one-on-one, once-off sessions for each participant[13]. These interviews aimed to gather insights on feasibility and user-perceived acceptability, covering topics such as benefits, improvements, and potential changes for future larger studies.

[13] Participants were provided with a $30 electronic voucher upon completion of the semi-structured feedback interview.

7.10 Secondary outcomes

The secondary measures were directed towards determining the impact of the intervention. These secondary outcomes were measured using psychometric questionnaires, self-reported questionnaire instruments, treatment feedback questionnaires, feedback semi-structured interviews, and journal entries. These data collection instruments collected two main measures: effectiveness in decreasing burnout related measures and effectiveness in increasing well-being related measures (see Table 26). The journal entry question "I feel burnt out" was used to measure the participant's perception of burnout (see Table 27). The journal entry functioned as a perceptive instrument for cataloguing participants' emotional states and perceptions over the duration of each week during the study. It served as an intricate means of measurement, capturing the intricate nuances of participants' sentiments, cognitions, and responses throughout the specified intervention period. The treatment feedback questionnaire and feedback semi-structured interviews addressed questions concerning the benefits of the intervention and changes in participants' viewpoints, which helped measure the impact of the intervention. The questions in both semi-structured interview and questionnaires were the same (see Table 28). This strategic alignment was grounded in the author's conviction that utilising two distinct formats would yield content from the same individuals, albeit through varying perspectives. This dual approach was anticipated to offer a comprehensive and multi-faceted understanding of the subject matter by capturing insights that might emerge uniquely in each context.

Table 26 Preliminary effectiveness outcome measures

Measure outcome	Main measures	Measure components	Where will the data be collected?
Preliminary effectiveness	Was it effective in decreasing burnout related measures?	Emotional exhaustion	Psychometric questionnaires (MBI-HSS)
		Depersonalisation	Psychometric questionnaires (MBI-HSS)
		Depression	Psychometric questionnaires (DASS-21)
		Anxiety	Psychometric questionnaires (DASS-21)
		Stress	Psychometric questionnaires (DASS-21)
		Negative Affect	Psychometric questionnaires (PANAS)
		Turnover intention	Psychometric questionnaires (TIS)
		Avoidant problem-solving	Psychometric questionnaires (SPSI-SF)
		Negative problem orientation	Psychometric questionnaires (SPSI-SF)
		Impulsivity/Carelessness	Psychometric questionnaires (SPSI-SF)
	Was it effective in increasing well-being related measures?	Work engagement measures	Psychometric questionnaires (UWES-SF)
		Positive Affect	Psychometric questionnaires (PANAS)
		Personal Accomplishment	Psychometric questionnaires (MBI-HSS)
		Rational problem-solving	Psychometric questionnaires (SPSI-SF)
		Positive problem orientation	Psychometric questionnaires (SPSI-SF)
	Note: qualitative answers may vary depending on participant's experiences. Findings from feedback interview/ questionnaires and journal (I feel burnt out) will be integrated with the above two main measures	i.e. What did you learn from this experience? Are there any changes in your views of living with stress, burnout, or mental health disorders?	Semi-structured feedback interview/ questionnaire

Abbreviations: MBI-HSS=Maslach Burnout Inventory- Human Services Survey, DASS-21=Depression, Anxiety, Stress Scale-21, PANAS=Positive Affect Negative Affect Scale, TIS=Turnover Intention Scale, SPSI-SF=Social Problem Solving Inventory-Short Form, UWES-SF=Utrecht Work Engagement Scale-Short Form.

Table 27 Journal entry questions

Journal Entry Question	
Q1.	Please reflect on how this statement: 'I feel burnt out'
Q2.	Are there any other reflections you would like to write about?

Note: Participants were required to ponder on this question and write a reflective piece on whether they felt burnt-out, and why or why not. The journal entry question was used as a journal guide. Participants were able to also write about other feelings or experiences.

Table 28 Feedback questions for semi-structured interview and questionnaire

Feedback components	Describe your experience in taking part in your allocated intervention.
Understanding	Why did you agree to participate?
	Why did you decide to continue with the consult and/or debrief sessions?
Process of change	What did you learn from this experience?
	Are there changes in your views of living with stress, burnout, or mental health disorders?
	What effort or involvement did it require of you? How did you feel about that?
	What components have helped you the most?
Acceptability	What was your favourite part of this experience?
	Would you recommend this experience to your family, friends and/or colleagues?
Implementing change	Will you be implementing what you've learnt? If so, what is it?
	In what ways do you think the program has impacted your health well-being so far?
	How confident do you feel about continuing to implement what you have learnt? Have these feelings changed along the way throughout the program?
Barriers	What was challenging in this experience?
Suggestions for further improvements	What was your least liked experience in this program and what and how do you it can be improved?
	Were there anything you think should have been included ion this program? What about the program structure and frequency of sessions/interactions, duration of the program?

The following sections provided an overview of the psychometric questionnaires used to measure secondary outcomes. These scales included Depression, Anxiety, and Stress Scale-21 (DASS-21), Maslach Burnout Inventory – Human Services Survey (MBI-HSS), Positive Affect and Negative Affect (PANAS), Utrecht Work Engagement Scale-Short Form (UWES-SF), Turnover Inventory-Scale (TIS), Social Problem-Solving Inventory-Short Form (SPSI-SF).

7.10.1 Depression, Anxiety, and Stress Scale (DASS-21)

The DASS-21 is a widely used self-report questionnaire designed to measure the severity of symptoms related to depression, anxiety, and stress (278). It consists of 21 items, with each subscale (Depression, Anxiety, and Stress) comprising seven items (278). Participants rate the extent to which each statement applies to them over the past week on a 4-point Likert scale ranging from 0 (Did not apply to me at all) to 3 (Applied to me very much or most of the time) (278). The DASS-21 indicated five scoring levels (278). The depression sub-scale indicated scores between 0-9 were normal, 10 to 13 were mild, 14 to 20 were moderate, 21 to 27 were severe, and 28+ were extremely severe depression levels (278). The anxiety sub-scale indicated scores between 0 to 7 were normal, 8 to 9 were mild, 10 to 14 were moderate, 15 to 19 were severe, and 20+ were extremely severe anxiety levels (278). The stress sub-scale indicated scores between 0 to 14 were normal, 15 to 18 were mild, 19 to 25 were moderate, 26 to 33 were severe, and 34+ were extremely severe stress levels (278).

The DASS-21 has demonstrated good psychometric properties in various populations and settings (278). The Cronbach's alpha coefficient, which assesses the internal consistency or reliability of the scale, provides an indication of the interrelatedness of the items within each subscale (278). The reported Cronbach's alpha coefficients for the DASS-21 include: Depression range between 0.81 and 0.97, (indicating excellent internal consistency), Anxiety ranges from 0.81 to 0.94 (indicating good to excellent internal consistency), and Stress between 0.85 and 0.93 (indicating good to excellent internal consistency) (278).

7.10.2 Maslach Burnout Inventory- Human Services Survey (MBI-HSS)

The MBI-HSS is a specific version of the Maslach Burnout Inventory (MBI) tailored to measure burnout in human service professions, such as healthcare, social work, counselling, and education (279). It was developed as a specialised tool for assessing burnout in these specific occupational settings (279). The MBI-HSS consists of 22 items in total, distributed across its three subscales: Emotional Exhaustion (9 items), Depersonalisation (5 items), and Personal

Accomplishment (8 items). Each item is rated on a 7-point Likert scale, ranging from "0" (never) to "6" (every day) (279). However, the MBI-HSS included items that are specifically relevant to human service professionals, capturing the unique aspects of burnout experienced in these fields (279).

- Emotional Exhaustion subscale assesses feelings of being emotionally drained and overwhelmed by work-related demands. It measures the extent to which individuals feel emotionally exhausted in their human service roles.
- Depersonalisation subscale examines the development of negative and detached attitudes toward the recipients of one's services, such as clients, patients, or students. It reflects the tendency to view clients as impersonal objects rather than individuals.
- Personal Accomplishment subscale measures feelings of competence, effectiveness, and successful achievement in one's work with clients. It assesses the extent to which individuals feel a sense of personal accomplishment and fulfillment in their human service roles.

The MBI-HSS indicated higher scores for emotional exhaustion and depersonalisation, and lower scores for personal accomplishment corresponded to greater experienced burnout (279). The reported Cronbach's alpha coefficients for Emotional Exhaustion ranges from 0.80 to 0.90 (indicating good internal consistency), Depersonalisation between 0.50 and 0.70 (indicating moderate internal consistency), and Personal Accomplishment ranges from 0.70 to 0.90 (indicating good to excellent internal consistency) (279).

7.10.3 Positive and Negative Affect Schedule (PANAS)

The PANAS is a self-report questionnaire designed to measure an individual's experience of positive affect and negative affect (280, 281). It consists of two separate subscales, Positive Affect (PA) and Negative Affect (NA). Each subscale consists of 10 items that represent different emotions or feelings (280, 281). The PANAS asks individuals to rate the extent to which they have experienced each emotion or feeling over a specific time period (e.g., the past week) using a 5-point Likert scale ranging from 1 (Very slightly or not at all) to 5

(Extremely) (280, 281). The PA subscale measures positive emotions such as joy, enthusiasm, and alertness, while the NA subscale measures negative emotions such as sadness, fear, and anger (280, 281). Lower positive affect scores are associated with pleasurable engagement with the engagement and higher negative effect scores denoted higher general distress, which summarises a variety of negative states such as guilt, anger, or anxiety (280, 281). The reported Cronbach's alpha coefficients for the PANAS include Positive Affect (PA) subscale between 0.85 and 0.91 (indicating good to excellent internal consistency) and Negative Affect (NA) subscale ranges from 0.87 to 0.91 (indicating good to excellent internal consistency) (280, 281).

7.10.4 The Utrecht Work Engagement Scale-Short Form (UWES-SF)

The UWES-SF is a widely used self-report measure designed to assess work engagement, which is defined as a positive, fulfilling, and motivational state of mind characterised by vigor, dedication, and absorption (282). It was developed by Schaufeli and Bakker based on the Job Demands-Resources model (282). The UWES-SF consists of 9 items that are divided into three subscales (282):

- **Vigor:** This subscale measures the level of energy, resilience, and enthusiasm that individuals experience while working. It assesses their willingness to invest effort and persistence in their work activities.
- **Dedication:** This subscale measures individuals' feelings of significance, enthusiasm, inspiration, and pride in their work. It reflects their sense of purpose and being engaged in their work tasks.
- **Absorption:** This subscale assesses individuals' ability to become fully absorbed and engrossed in their work, leading to a sense of timelessness and concentration. It measures how deeply individuals can concentrate and lose track of time when performing work-related tasks.

Each item is rated on a seven-point Likert scale, ranging from 0 (never) to 6 (always) (282). Higher scores indicate higher levels of work engagement (282). The UWES-SF indicated five scoring levels (282). Vigor scores with 2 or lower indicated very low, 2.01 to 3.25 was low, 3.26 to 4.80 was average, 4.81 to 5.65 was high, and 5.66 or more were very high experiences of vigor (282). Dedication scores with 1.33 or lower indicated very low, 1.34 to 2.90 was low, 2.91 to 4.70 was average, 4.71 to 5.69 was high, and 5.70 or more were very high experiences of dedication (282). Absorption scores with 1.77 or lower indicated very low, 1.18 to 2.33 was low, 2.34 to 4.20 was average, 4.21 to 5.33 was high, and 5.34 or more were very high experiences of absorption (282). Total UWES-SF scores with 1.77 or lower indicated very low, 1.78 to 2.88 was low, 2.89 to 4.66 was average, 4.67 to 5.50 was high, and 5.51 or more were very high experiences of work engagement (282). The UWES-SF has been extensively validated and has demonstrated good psychometric properties, including high reliability and validity (282). Studies reported the UWES-SF Cronbach's alpha coefficients ranged between 0.75 to 0.95, indicating strong internal consistency (282). It has been used in various organisational and occupational contexts to assess work engagement and its relationship with outcomes such as job satisfaction, performance, and well-being (282).

7.10.5 Turnover Inventory Scale (TIS)

The Turnover Intention Scale (TIS) was designed to measure employee turnover and related factors within organisations (283). The scale consists of 6 items that participants respond to using a 5-point Likert scale (283). The Likert scale ranges from 1, representing "never," to 5, representing "always" or a high level of intensity (283). Participants rate their agreement or disagreement with each item based on their own experiences and perceptions (283). Higher scores on the TIS indicated stronger turnover intention (283, 284). The Turnover Inventory is useful for evaluating employees' attitudes, intentions, and experiences related to turnover, as well as their overall job satisfaction (283). It provides valuable insights into the factors that may contribute to turnover within an organisation and can help identify areas for improvement

to retain and engage employees (283). Studies have reported Cronbach's alpha coefficients of 0.80 for the Turnover Intention Scale (TIS-6) (283).

7.10.6 Social Problem-Solving Inventory-Short Form (SPSI-SF)

The SPSI-SF is a self-report measure designed to assess an individual's social problem-solving abilities (285). It consists of several subscales that capture different aspects of problem-solving (285).

- Avoidant Problem-Solving: This subscale assesses an individual's tendency to avoid confronting and solving problems. It includes items related to avoiding difficult situations, ignoring problems, and procrastinating in finding solutions.
- Rational Problem-Solving: This subscale measures an individual's use of logical and systematic problem-solving strategies. It includes items related to gathering information, generating alternative solutions, and evaluating the pros and cons of different options.
- Negative Problem Orientation: This subscale captures an individual's negative beliefs and attitudes towards problem-solving. It includes items related to feeling overwhelmed by problems, having little confidence in problem-solving abilities, and expecting negative outcomes.
- Impulsivity/Carelessness: This subscale assesses an individual's tendency to make hasty or careless decisions without fully considering the consequences. It includes items related to acting without thinking, being impulsive in problem-solving, and making errors due to carelessness.
- Positive Problem Orientation: This subscale measures an individual's positive beliefs and attitudes towards problem-solving. It includes items related to feeling confident in problem-solving abilities, being motivated to find solutions, and expecting positive outcomes.

The SPSI-SF includes a total of 25 items, with each subscale consisting of a subset of these items (285). Respondents rate the extent to which each item applies to them on a Likert scale, ranging from 1 (not at all true) to 5 (very true) (285). Higher scores on negative problem orientation, impulsivity/carelessness, and avoidant style reflect a more maladaptive approach to problem-solving and higher scores on positive problem orientation and rationale problem-solving indicated more adaptive problem-solving (285). The Cronbach's alpha coefficient is commonly used to assess the internal consistency or reliability of the SPSI-SF subscales (285). The reported Cronbach's alpha coefficients for the SPSI-SF subscales vary, but typically fall within the range of 0.70 to 0.90, indicating good to excellent internal consistency (285).

7.10.7 Modifications to secondary outcome measures

The Practice Environment Scale (PES) was initially incorporated as a secondary outcome measure and detailed in the published pilot RCT protocol. However, it was subsequently excluded from the analyses of secondary outcomes, with this decision being a result of a consensus within the research team. The PES scale was employed to assess the nursing practice environment, encompassing factors that either bolstered or hindered a nurse's ability to proficiently practice nursing and provide high-quality care. Despite its relevance, the PES scale did not constitute a primary focus for this thesis's outcomes. Instead, the insights gleaned from PES will contribute to distinct research endeavour concentrating on organisational-level interventions.

7.11 Sample size estimation

Conducting sample size calculations for feasibility pilot RCT studies might not always be necessary due to their exploratory nature and limited resources. Feasibility pilots prioritise refining study procedures, evaluating participant recruitment, and testing intervention delivery, making the focus on process measures rather than statistically significant outcomes. The flexible design and potential adjustments during the pilot phase can render initial sample size

calculations inaccurate, while qualitative insights from participants provide valuable information that might not fit into quantitative calculations. As feasibility pilot studies aim to inform and shape the main RCT design, the emphasis lies on learning and adaptation, making traditional sample size calculations less pertinent in this context. However, to achieve the primary aims of determining feasibility and acceptability, a pragmatic approach was taken in that if sufficient data to address the secondary aim (preliminary effectiveness) could be achieved, it would also be sufficient for the primary aim. Power calculations were conducted to determine the sample size required for the secondary aim of this study. Analysis of variance with repeated measures between and within the design was used in relation to the participants' well-being, with a low effect size estimated ($\eta 2 = 0.061$). The significance level was set at 0.05, and the power was set at 0.95. This resulted in a minimum sample of 106 participants for the study, considering a 20% attrition rate. The sample size was rounded off to 110 participants (55 in each group) to enable equal sample sizes in both groups.

7.12 Recruitment

Recruitment was conducted using flyers (Appendix 28) that were distributed to members of the Australian and New Zealand Critical Care Society (ANZICS) and Australian College of Critical Care Nurses (ACCCN). The target audience for recruitment included CCHP within the organisational membership, who were then able to forward the information to their networks and people who may not be members. The flyer included a link to the study's website, where interested participants could find further information about the trial and a registration form to be completed by those who were interested in participating.

7.13 Informed consent

Those interested in participating were able to register for the study through the study's website (www.wellbeingandburnout.com)(Appendix 29) or by using the distributed flyers. Additional information about the study, including its purpose, significance, study content, risks and benefits, and confidentiality principles, could also be accessed through the study's website.

Participants had the option to ask questions through the study website's platform, as well as through emails, text messages, and phone calls. Upon registering for the study, participants were provided with an electronic version of the information sheet and consent form (Appendix 30). They were required to sign and return the consent form before being accepted into the study. The consent form also informed participants that all sessions (debrief and consult) will be recorded, and the data will be transcribed for analysis. Participants were also informed that their data will be de-identified and original copies of the recordings will be stored in Flinders University secured R-Drive. Prior to the debrief and consult sessions, participants were also reminded of the recording process.

7.14 Group allocation and blinding

The research team included experienced researchers who had previously been involved in project management. The researcher was responsible for the recruitment and intervention delivery in both the intervention and active control groups. Randomisation was conducted using a randomisation table created by computer software and conducted by an independent research assistant. The research assistant was unaware of the study's characteristics, had no involvement in the trial, and had no access to the trial data. This made it a single-blinded study, where the outcomes of assessment were blinded, but participants were aware of their group assignment. Members of the project's workgroup who were involved in the assessment of participants were blinded to the participants' group assignment. Since participants had direct access to their intervention, they were not blinded to their group allocation but were not aware of which intervention group was active.

7.15 Data collection methods

Psychometric questionnaires, demographic questionnaire, journal entry, and feedback questionnaire were performed by sending a survey link to participants' email addresses. Participants were able to complete the questionnaires on an electronic device, such as a computer, tablet, or smartphone. The questionnaires were frequently check by the researcher

after each delivery to ensure participants' completion. Participants who did not complete the questionnaires within the specified time (participants were given one week) received a reminder via email. Likewise, if participants did not attend their consult and/or debrief sessions, the research team contacted them via email to join the session or to re-book into another session during the week. The feedback semi-structured interviews were conducted by inviting participants to attend a virtual one-on-one semi-structured interview, organised through email communication and Calandly booking system.

7.16 Data management

All data files, including consent forms, intervention materials, participant's data, consult and debrief notes, questionnaire data, and journal entry data were stored in the Flinders University and managed on-site through Enterprise Storage. After the last data collection timepoint (T3), any identifiable data was de-identified and stored for five years after the publication of the results. Following the required data storage period, all data will be securely destroyed. Deidentified research data was made publicly available when the study was completed and published. Feedback of the study outcomes was provided to participants via a short summary of the research outcomes and a copy of the published research project.

7.17 Data monitoring

A data monitoring committee was not deemed necessary for this study as the planned intervention was short, and there were no expectations of any harms or adverse effects during the intervention. Instead, an independent Safety Officer (a researcher independent from the study team) monitored the participant's safety from participant recruitment to the end of intervention delivery, along with scientific integrity, study risks and benefits, and ethical conduct of the study. While no serious adverse events were expected, there were potential adverse events that could occur during the consult and debrief sessions, such as negative emotional reactions and mild distress. In the event of an adverse event, the safety officer would be notified immediately.

7.18 Data analysis

Since this study primarily sought to determine the feasibility and acceptability of the intervention, the analysis focused on key parameters required to conduct a future larger trial. Feasibility of recruitment processes, retention rate, and data collection procedures were measured and reported descriptively and presented tabularly. Acceptability was analysed using thematic analysis, guided by Braun and Clarke's (286) six-step process, which includes 1) becoming familiar with the data, 2) generate initial codes, 3) search for themes, 4) review themes, 5) define themes, and 6) write-up. In step 1, transcripts of the data were re-read until the data corpus was familiar – notes of early impressions were also taken (286). Step 2, open coding was conducted and each relevant and interesting segment of data that addressed the research question was coded (286). In open coding, codes were developed and modified simultaneous to the coding process (286). In Step 3, a pattern from the codes was identified, which was labelled as a (descriptive) theme. These started as broader themes, which was refined over time to create specific themes about the research question (Step 4) (286). The process considered questions such as ‘Do they make sense?’ and ‘Does the data support the themes?’ (286). Each theme and its associated data were colour coded (286). In instances where the data did not support the theme, the data was reconsidered in other themes. In Step 4, the themes were also critiqued to ensure that its suitability in the context of the entire data set through question such as ‘Am I trying to fit too much into a theme?’, ‘Are there themes within themes (subthemes)?’, and ‘Are the other themes within the data?’ (286). Step 5 indicated the final refinement of themes and aims to identify what each of the theme is about (286). The refinement process should result in an overarching theme that has foundations in other themes (286). Lastly, step 6 indicated the end-point of the analysis, suggesting a write-up of the themes and its associated data (286). The analysis process was conducted by two researchers (NA, HD) and disagreements were resolved by a third researcher (DC). The thematic analysis facilitated an essentialist method, allowing for the reporting of meanings, experiences, and the participants' reality, aligning well with the study's aims and objectives of

determining feasibility and acceptability. Thematic analysis also enabled the reporting of secondary outcome measures on the impact of the intervention (preliminary effectiveness), for example, outcomes of and related to well-being and burnout. Thematic analysis was conducted using NVivo (Version 10) software (287).

A two-way repeated measures Analysis of Variance (ANOVA) was also conducted on secondary outcome measures (psychometric scales) to compare the longitudinal changes and differences between two groups at different time points (i.e., from baseline to post-intervention). Post hoc analysis were conducted to further investigate and compare specific group differences when the overall ANOVA indicated significant main effect or interaction (where p-value <.05). It identified the specific combinations of groups with statistically significant differences, providing comprehensive understanding of the results. Eta squared was used to estimate the effect size related to the main effects or interactions of time, group, and group and time interactions in the two-way repeated measures ANOVA. By conducting a post hoc analysis, the researcher was able to determine the exact instances where the intervention had the most significant impact or where differences between groups were most prominent. Following data analysis, summary tables were generated for all evaluations and reported descriptively.

7.19 Refining the exiting program theory

The pilot RCT's primary and secondary outcomes were discussed in relation to their contribution to the CMOC framework (212). Preliminary codes were generated, leading to themes categorized by context, mechanism, and outcome configurations using the following questions (212):

What components of the IP program made it effective (outcome) when implemented amongst CCHP (context)? What causes these effects (mechanisms), and what internal and external influences (context) produced this outcome?

The discussions aimed to understand effective components of the IP program, causal mechanisms, and internal/external influences (213). Abductive and retroductive logic were employed for refining the framework, followed by associating mechanisms with outcomes and recontextualizing data (213). The author and DC deliberated to enhance the CMOC, creating new conclusions (213). They identified generative mechanisms and integrated them into the expert realist opinion's program theory (Chapter 5) for refinement. The refinement process in this pilot RCT study mirrored the approach taken in the expert realist opinion discussed in Chapter 5.

7.20 Statistical analysis

When conducting secondary outcome analysis (two-way repeated measures ANOVA), the author considered four statistical assumptions – independence, normality, homogeneity of variance, and sphericity.

- **Independence:** The study ensured the assumption of independence by implementing measures that guaranteed each participant completed the psychometric questionnaire only once across all time points. Researchers ensured that individuals were not included in multiple comparison samples, which supported the assumption of independence.
- **Normality:** Visual inspection of the data was conducted using histograms to determine the distribution of the dataset – assessing for normality. Histogram, stem-and-leaf plots, overlaid box plots, P-P plots, and Q-Q plots, were used to examine statistical skewness and kurtosis (288). The Shapiro-Wilk test was additionally used to determine normal distribution within the dataset, confirming visual assessments of the data set distribution. All data sets were checked for normality, and the findings suggest that all data sets did not significantly deviate from normal distribution.
- **Homogeneity of variance:** The Levene's test for equality of variance was conducted for each comparison group and time point in the study. The results of the Levene's test

indicated that there were no statistically significant differences in variance between the comparison groups and time points. This finding suggests that the assumption of homogeneity of variance was not violated for the statistical tests performed in the study. Consequently, the data met the necessary assumptions for the validity of the statistical analyses. The results of the Levene's test can be found in Appendix 31.

- **Sphericity:** Mauchly's Test was conducted to determine the sphericity of the dataset. Given that Mauchly's test is impacted by non-normality and by sample size, it is not highly recommended when evaluating whether the sphericity condition has been met (i.e. contributes to type 1 error). To ensure valid interpretation of the results, the author considered the Greenhouse-Geisser. The Greenhouse-Geisser correction adjusted the degrees of freedom, accounting for the violation of the sphericity assumption and providing more accurate p-values. For more detailed information on Mauchly's Test of Sphericity and the Greenhouse-Geisser correction, please refer to Appendix 32, where an overview of these tests can be found.

7.21 Rationale for not applying statistical corrections

In the statistical analysis of research data, decisions regarding the application of corrections for multiple comparisons are of paramount importance. This section elucidates the rationale behind the decision not to utilise statistical corrections in the present study, considering the context, objectives, and implications of this choice.

7.21.1 Exploratory nature of the study

In the context of a pilot RCT employing an exploratory approach, statistical adjustments such as Bonferroni corrections are typically avoided (289). The exploratory nature of the study involves open-ended data exploration, where adjustments can overly restrict analysis and impede the identification of new trends or relationships (289). This approach prioritizes hypothesis generation and flexibility, potentially leading to an increased risk of Type II errors.

Transparency in reporting analytical decisions remains crucial to communicate the methodology's alignment with the study's exploratory objectives (289).

7.21.2 Small sample size

Given the sample size of n=30 in the pilot RCT, the decision on statistical corrections gains significance. With this modest sample, applying rigorous corrections might yield overly conservative significance thresholds (289). Such conservatism could inadvertently elevate the risk of disregarding potentially meaningful effects (type 2 errors) due to the challenge of meeting adjusted significance criteria (289). By abstaining from statistical corrections, the study recognizes the delicate equilibrium between managing Type I errors (false positives) and Type II errors (false negatives) within the confines of this sample size (289).

7.21.3 Transparency

Moreover, transparency of analysis enables readers and prospective researchers to precisely interpret the study's results within the chosen analytical framework (289). This holds particular significance considering the pilot study's role in shaping the design of a subsequent, confirmatory investigation (289). By openly acknowledging the absence of corrections in the analytical process, the study enhances the grasp of its methodological foundations, empowering readers and future researchers to aptly contextualise and decipher the study's implications (289).

7.22 Quality control

Considerations for rigor were taken into account in this study to ensure the validity and reliability of the findings. The following sections provided quality considerations for qualitative and quantitative data in this study.

7.22.1 Rigour and trustworthiness of qualitative data

Maintaining rigour in qualitative research involves adhering to procedures that accurately capture and comprehend participants' experiences (290). To ensure rigour in a qualitative descriptive study, the approaches proposed by Milne and Oberle (291) align with the primary validity criteria framework outlined by Whittemore, Chase, and Mandle (292). These criteria encompass authenticity, credibility, criticality, and integrity (290, 291). Authenticity pertains to accurately reflecting the meanings and experiences of the participants, while credibility involves having confidence in the truthfulness of the findings (290, 291). Criticality emphasises the importance of critically appraising all decisions made throughout the research process, and integrity is demonstrated through ongoing reflection and self-criticism (290).

Milne and Oberle highlight the interconnectedness of these factors, where credibility enhances authenticity by maintaining fidelity to the phenomenon under study, and integrity reflects the study's criticality (291). In this study, strategies were implemented in pairs to promote rigour. These strategies addressed credibility and authenticity, ensuring that the findings were trustworthy and genuinely represented the participants' experiences (291). Additionally, strategies were employed to enhance integrity and criticality, fostering continuous reflection and critical evaluation of the research process (291). A summary of strategies used to enhance rigour is provided in Table 29.

Table 29 Methods to ensuring rigour in qualitative research

Proposed strategy	Factors that contribute to scientific rigour	Strategy to address these factors	Application in the study
Credibility and authenticity	Freedom to speak	Purposeful sampling	Yes
		Ensuring that the data is participant driven	Yes
		Sample size	Yes
	Ensuring participant's voices are heard	Probing technique to allow clarification and depth	Yes
		Facilitating a one-one-one semi-structured interview	Yes
	Ensuring that perceptions of participants are accurately represented	Accuracy of transcription – use of two independent transcribers	Yes
	Content analysis: ensure data-driven coding and categorising	Ensure that attention is placed on the context	Yes
Integrity and criticality	Considering and reflecting on bias from the researcher	NA	Yes
	Validation of respondent	NA	Yes
	Peer reviewed	NA	Yes

Abbreviations: NA=Not Applicable.

7.22.1.1 Credibility and authenticity

To promote authenticity in the study, participants were given the freedom to express themselves, ensuring their voices were heard and their perceptions accurately presented (291). The following sections outline the methods employed to enhance credibility and authenticity in this study.

7.22.1.1.1 Freedom to speak

To ensure participant autonomy, the study implemented several strategies: (a) purposeful sampling, (b) participant-driven data, and (c) an appropriate sample size (291). Purposeful sampling was employed by inviting trial participants to participate in feedback semi-structured interviews (291). This approach allowed for the selection of participants who could provide relevant insights (291). Participant-driven data was facilitated by using semi-structured interview questions that offered flexibility and encouraged participants to share their unique experiences (291). Participants were free to expand on topics beyond the initial questions if they were relevant to the research objectives (291). Adequate sample size was determined

by reaching theoretical saturation during the feedback interviews (291). Theoretical saturation refers to the point at which new data no longer generates novel insights. Although the feasibility of attaining theoretical saturation was initially uncertain, it became apparent during recruitment that a sample size of 30 would likely be sufficient (291). This estimation was based on previous research, specifically an umbrella realist review that achieved theoretical saturation with 20 interviews (291).

7.22.1.1.2 Ensuring participant's voices are heard

To ensure participants' voices were heard in the study, two key methods were employed: (a) probing questions and (b) individual interviews (291). Probing questions were utilised during individual interviews to clarify and encourage participants to elaborate on their responses, resulting in rich and detailed data (291). Individual interviews were chosen as a suitable method to create a safe environment where participants felt comfortable expressing their views (291). This interview format provided a secure and confidential setting for trial participants to respond to specific questions, enabling their voices to be fully heard and documented (291).

7.22.1.1.3 Perceptions of participants are accurately represented

To ensure accurate representation of participants' perceptions, a meticulous transcription process was followed (291). Initially, one independent researcher (NA) transcribed the interview data (291). This was followed by a second researcher (DC) who carefully read through the transcripts while simultaneously listening to the corresponding audio-recordings (291). This dual approach was taken to ensure the direct and accurate quotes from participants were obtained, maintaining fidelity to their original expressions (291).

7.22.1.1.4 Data-driven coding and categorising

To ensure a data-driven approach to coding and categorising, content analysis is recommended in qualitative description by Milne and Oberle. A thematic analysis method was employed for this study (291). Thematic analysis allows for a detailed exploration of the data set, going beyond a simple descriptive approach (291). It focuses on identifying themes and patterns that emerge from the participants' responses. Rather than imposing predetermined codes and themes based on the research question, a data-driven coding process was employed (291). This meant that codes and themes were developed as the analysis progressed, based on the actual data (291). The researcher continuously reviewed and evaluated the codes and themes to ensure accuracy and meaningful interpretation (291). To maintain the authenticity and credibility of the findings, the researcher considered the context of each interview as a whole (291). This holistic understanding helped capture the full meaning behind participants' responses. Additionally, listening to audio recordings allowed the researcher to note participants' tones, adding depth and nuance to the analysis (291). During and after the interviews, the interviewer took field notes to document observations, impressions, and any assumptions made (291). These notes provided valuable context and insights during the analysis (291).

7.22.1.2 Integrity and criticality

Criticality, essential for maintaining a study's integrity, involves appraising research decisions (291). To ensure overall integrity in qualitative descriptive studies, methods including reflecting on potential biases (including the author's role), respondent validation, and peer review were recommended (291).

7.22.1.2.1 Considering and reflecting on bias from the researcher

Research integrity necessitates researchers to critically reflect on their biases and their potential influence on the research process (291). In line with qualitative description principles,

strategies like promoting participant-driven data and data-driven analysis were employed to mitigate interpretation bias (291, 293). Considering the researcher's involvement in the study's development, managing assumptions and biases was crucial to ensure the collection of relevant and truthful qualitative data (291, 293). This was particularly vital during interviews, as the researcher held multiple roles as project manager, researcher, and occupational therapist (291, 293). While the researcher's comprehensive knowledge facilitated tailored and contextually relevant questions, continual reflection was essential to acknowledge the potential influence of these multiple roles on the interviews (291, 293). To facilitate this reflection and identify any potential impact, an autoethnography was conducted, allowing the researcher to reflect on their experiences and consider how their multiple roles may have influenced the interview process (291, 293).

7.22.1.2.2 Validation of respondent

Respondent validation was employed to ensure that participants' perceptions were accurately represented in the interviews (294). The research process included ongoing participant checking, which involved probing and summarising the key points of the interviews during data collection (294). This allowed for clarification of participants' statements and provided an opportunity for them to confirm or disagree with the provided summary (291).

7.22.1.2.3 Peer reviewed

To ensure the research was rigorous, the study employed peer review, where research supervisors (HD, DC, CB) reviewed the analysis and presentation of findings. This helped ensure that the researcher stayed true to the data and qualitative description principles (291). The purpose of peer review was not to find a single objective truth, but to maintain fidelity to the research process. During the analysis, codes were reviewed with a supervisor (HD) to ensure they were directly derived from the data. The themes were also discussed to ensure they logically progressed from the data and to consider alternative interpretations. While both latent and manifest codes were used, the majority of codes were manifest, which reflects the

nature of qualitative description. By incorporating peer review and employing a data-driven analysis approach, the study aimed to enhance the credibility and trustworthiness of the findings. This ensured that the research faithfully represented the participants' experiences and provided a thorough understanding of the data.

7.22.2 Bias for quantitative data

When analysing quantitative data in a pilot RCT, it is essential to consider the potential sources of bias that may influence the results (295). Bias refers to systematic errors or deviations from the true value of a measurement, resulting in inaccurate or skewed findings (295). Identifying and addressing bias is crucial for maintaining the integrity and validity of the study (295).

One potential source of bias in quantitative data is selection bias (296). In the pilot RCT, participants were randomised into an intervention and active control group. However, there is a possibility of selection bias if the randomisation process did not effectively ensure the comparability of the two groups (295, 296). Factors such as participant self-selection, recruitment methods, or eligibility criteria could influence the composition of the groups and introduce bias into the data analysis (295, 296). To mitigate selection bias, it is important to carefully design and implement the randomisation process, ensuring that it is truly random and that both groups are comparable at baseline (295, 296). Another potential source of bias is measurement bias, which can arise from errors or inconsistencies in the measurement instruments used (295, 296). This can include issues such as unclear survey questions, response bias, or inadequate reliability or validity of the measurement tools (295, 296). To minimise measurement bias, it is crucial to use well-designed and validated measurement instruments and provide clear instructions to participants (295, 296). Regular training and calibration of data collectors can also help reduce measurement bias (295, 296). Additionally, there may be bias associated with attrition or missing data. If participants drop out or fail to complete follow-up assessments, it can introduce bias if the reasons for attrition are related to the intervention or outcome being studied (295, 296). Differential attrition between the

intervention and control groups can distort the findings and compromise the internal validity of the study (295, 296). To address attrition bias, efforts should be made to minimise participant dropout and systematically collect information on the reasons for attrition (295, 296). Appropriate statistical techniques, such as intention-to-treat analysis, can also help handle missing data and reduce the impact of attrition bias (295, 296). Furthermore, investigator bias can influence the collection, analysis, and interpretation of quantitative data (295, 296). Researchers' preconceived notions, expectations, or personal beliefs about the intervention or outcome can unintentionally influence their behaviour and decisions during the study (295, 296). To mitigate investigator bias, it is important to establish blinding procedures, use standardised protocols, and employ independent data collection and analysis processes (295, 296).

7.23 Strengths and limitations

The pilot RCT design employed in this research study possessed several notable strengths that collectively bolstered the study's rigor and depth. The foundational element of randomisation ensured a fair and unbiased allocation of participants into intervention and control groups. By mitigating potential biases and confounding factors, this random assignment bolstered the internal validity of the study. This meticulous allocation method bolstered the credibility of observed treatment outcomes, underscoring the study's capacity to attribute changes to the intervention itself rather than external variables.

The incorporation of control groups, notably an active control group, represented another pivotal strength of the pilot RCT. This inclusion facilitated a rigorous comparison between the effects of the intervention and an established treatment or placebo, thereby isolating the distinct impact of the investigated intervention. Furthermore, the study's design stood out for its incorporation of two follow-up time points: one at 1 month and another at 3 months post-intervention. This longitudinal perspective offered a comprehensive understanding of treatment effects over time, capturing both immediate and early longitudinal patterns of

change. This multi-time point approach not only captured immediate post-intervention responses but also provided insights into the endurance and sustainability of observed effects.

Acknowledging its limitations, the use of an active control intervention instead of a waitlist control design was noted at the outset. While active controls held ethical advantages by providing care to participants seeking assistance and enabling non-intervention assessment, they may have inadvertently led to overestimations of the intervention's effects. Integrating an active control helped counterbalance and mitigate such potential biases. Nevertheless, gaining a deeper understanding of the feasibility and acceptability of the intervention program was crucial, laying the foundation for a more extensive study aimed at assessing the intervention's effectiveness in enhancing well-being, work engagement, and diminishing burnout symptoms among CCHP.

7.24 Participant consent and ethical approval

The studies involving human participants were reviewed and approved by the Flinders University (ref. number: 4703) and University of Southern Queensland (ref. number: H22REA178) Human Research Ethics Committee. The participants provided their written informed consent to participate in this study. Details of ethical approvals were described in the above section 7.5.1.

7.25 Chapter Summary

This chapter presented the methods employed in a pilot RCT to evaluate the effectiveness of the IP program. This chapter served as the foundation for the subsequent Chapter 8, where the primary results of the pilot RCT are presented, shedding light on the feasibility and acceptability of the IP program and its impact on the outcomes of interest.

CHAPTER 8

RESULTS FOR FEASIBILITY AND ACCEPTABILITY

8.1 Chapter overview

This Chapter 8 will present the pilot RCT primary results on feasibility and acceptability of the IP program. The chapter will provide participants' demographics, descriptive feasibility statistics, and thematic analysis findings of acceptability outcomes.

8.2 Revisiting the primary aims and objectives

The primary aim of the pilot RCT was to determine the feasibility and acceptability of the IP program. The primary aim was answered using the following objectives:

- Gather feedback from critical care professionals on the recruitment processes, retention rate, and data collection procedures of the trial.
- Identify potential barriers and facilitators to the implementation of the IP program, including resource availability and individual-level factors that may impact its adoption and sustainability.

8.3 Results

8.3.1 Flow of participants through the study

Between September 2022 and October 2022, a total of N=112 potential participants registered for the study (Figure 23, reported in accordance to the Consort Statement for RCT). After screening the participants based on inclusion criteria, n=50 participants were eligible, and n=62 participants were excluded as their scores on IES-R were 37 or higher[14]. Out of the eligible participants, n=17 potential participants withdrew their registration before consent, leaving n=33 participants who completed and returned the consent form. The n=17

[14] Exclusion criteria, IES-R scores 37 or more.

participants that withdrew provided reasons for withdrawal, which included traveling (n=8) and feeling less burnt-out compared to their initial registration (n=9). An additional n=3 participants withdrew from the study after providing consent due to holiday travel. Finally, a total of n=30 participants were successfully randomised into intervention (n = 15) or active control (n = 15) groups in a 1:1 allocation ratio. All the participants who were included in the study completed demographic and psychometric questionnaires at baseline. Participants who were randomised into the intervention group attended the IP program, which included a consult session followed by six weekly debrief sessions that incorporated problem-solving techniques. The active control group participants attended six weekly informal debrief sessions without problem-solving techniques. Throughout the 6-week debrief period, both intervention and control groups completed weekly journal entries to provide the research team with insights into their perceptions and feelings. During the intervention roll-out, n=1 participant from the intervention group and n=1 participant from the active control group withdrew from the study due to travelling commitments or holiday plans. These participants had initially informed the researchers about their intention to withdraw from the study due to traveling commitments or holiday plans. However, they decided to continue participating, as they believed they could still attend the sessions while traveling. Despite their initial intention to stay, both participants eventually withdrew from the study. Upon the completion of the last debrief session, both groups were invited to attend one-on-one semi-structured feedback sessions and to complete a feedback questionnaire and post-intervention psychometric questionnaires. The psychometric questionnaires were also administered at 1-month and 3-month follow-up.

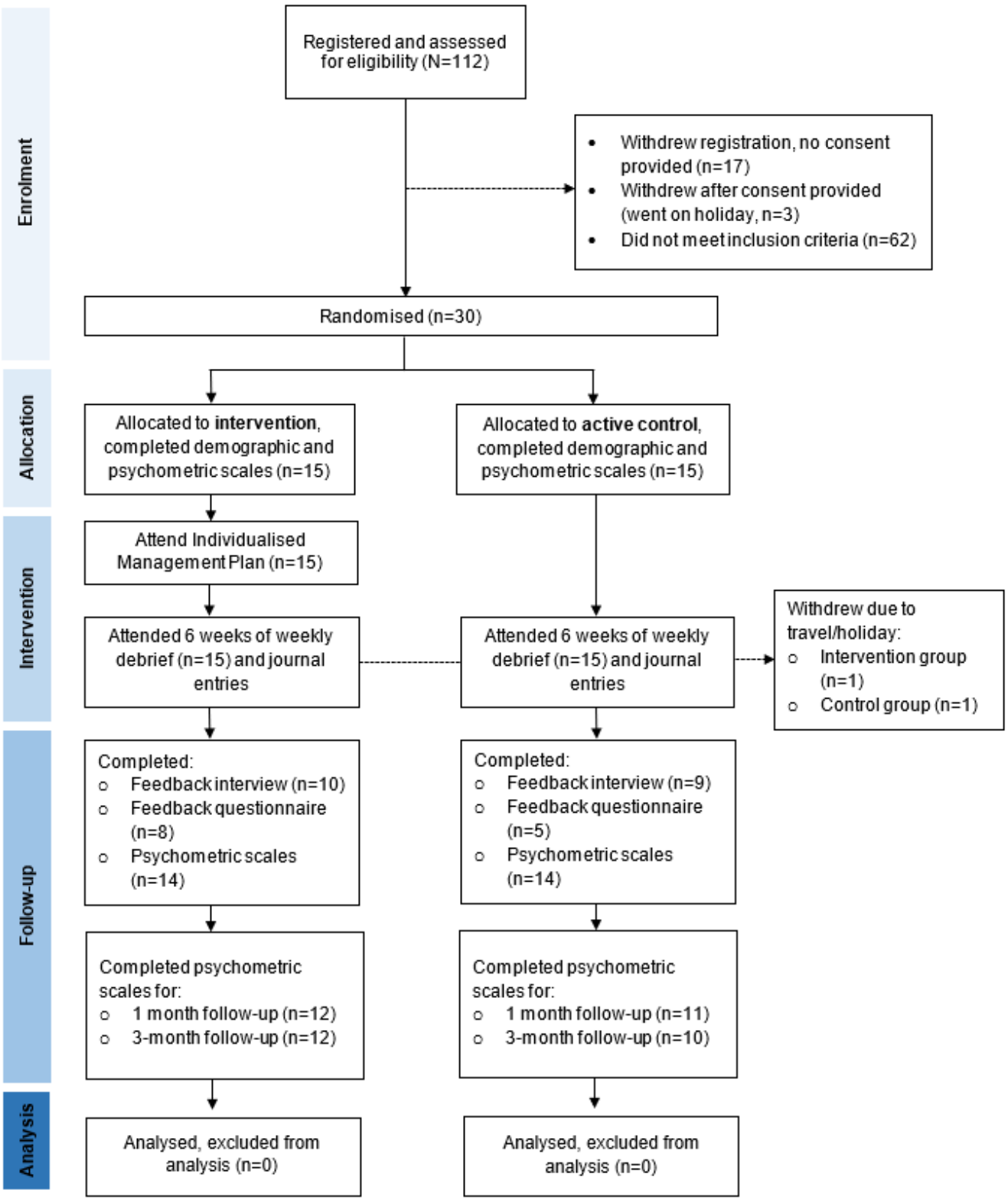


Figure 23 Consort statement participant flowchart

8.3.2 Demographics of participants

Table 30 provided an overview of demographic traits among the 30 study participants. Their mean age stood at 42 years (SD=11). The participant cohort skewed predominantly female (90%, n=27) and mostly residing in Australia (93%, n=28). Among the Australian participants, New South Wales was the prominent residence (43%, n=13), while New Zealand participants were primarily from the North Island (7%, n=2). The majority were Registered Nurses (97%, n=29), spanning multiple ICU levels, notably Level 1 (30%, n=9), Level 2 (37%, n=11), and Level 3 (3%, n=10). A substantial fraction operated under 1:1 or 1:2 patient ratio allocation (67%, n=20), with variations depending on daily patient acuity. The majority of participants worked part-time (56%, n=17) and held additional qualifications, primarily a graduate certificate (47%, n=14) and lived with a partner and dependent (50%, n=15). Both groups had a mean Impact of Event Scale-Revised score of 19. The mean years worked score for both the intervention and active control groups was 17 years. Additionally, most participants lived with a partner and had dependents (50%, n=15).

Table 30 Baseline descriptive characteristics

	Intervention (*n* = 15)		Active Control (*n* = 15)		Total (*n* = 30)	
Variable	**Mean (Min-Max)**	**SD**	**Mean (Min-Max)**	**SD**	**Mean (Min-Max)**	**SD**
Age (years)	40 (27-59)	10	43 (22-60)	13	42 (22-60)	11
IES-R	20 (8-36)	9	19 (0-36)	10	19 (0-36)	9
Years worked as a health professional	18 (3-38)	11	19 (3-40)	12	18 (3-40)	12
Years participants expect to work	17 (5-60)	14	17 (6-40)	10	17 (5-60)	13
	N	**%**	***N***	%	***N***	**%**
Gender						
Male	0	0	3	20	3	10
Female	15	100	12	80	27	90
Country						
Australia	14	93	14	93	28	93
New Zealand	1	7	1	7	2	7
Australian & New Zealand States						
*New South Wales	7	47	6	40	13	43
*Victoria	3	20	3	20	6	20
*South Australia	3	20	2	13	5	17
*Tasmania	1	7	1	7	2	7
*Australian Capital Territory	0	0	1	7	1	3
*Western Australia	0	0	1	7	1	3
**North Island	1	7	1	7	2	7
Profession						
Registered Nurse	14	93	15	100	29	97
Physiotherapist	1	7	0	0	1	3
Intensive Care Unit (ICU) Level						
Level 1 Intensive Care Unit	5	33	4	27	9	30
Level 2 Intensive Care Unit	6	40	5	33	11	37
Level 3 Intensive Care Unit	4	27	6	40	10	33

Variable	Intervention (*n* = 15)		Active Control (*n* = 15)		Total (*n* = 30)	
	Mean (Min-Max)	SD	Mean (Min-Max)	SD	Mean (Min-Max)	SD
	N	**%**	***N***	%	***N***	**%**
HCP to Patient Ratio (HCP:P)						
Between 1:1 to 1:2	9	60	11	73	20	67
Between 1:3 to 1:4	0	0	2	13	2	7
1:5 or more	1	7	0	0	1	3
Variation of HCP-to-patient ratio depending on acuity	5	33	2	13	7	23
Employment type						
Full Time (38 hours/week)	6	40	7	47	13	43
Part Time (less than 38 hours/week)	9	60	8	54	17	56
Additional Qualifications						
Honours	1	7	1	7	2	7
Graduate Certificate	8	53	6	40	14	47
Graduate Diploma	2	13	3	20	5	17
Masters	4	27	1	7	5	17
No additional	0	0	4	27	4	13
Living Arrangements						
Alone	0	0	2	13	2	7
Partner	4	27	4	27	8	27
Partner and dependent	9	60	6	40	15	50
Dependent	2	13	2	13	4	13
Family[15]	0	0	1	7	1	3

Abbreviations: IES-R=Impact of Event Scale-Revised, Min=Minimum, Max=Maximum, SD=Standard Deviation, N=Total Number (Population), HCP=Healthcare Professionals, *=Australian States, **New Zealand State, /week= per week.

[15] Family referred to mother, father, and siblings (if applicable).

Table 31 provided descriptive statistics on strategies participants used for well-being and burnout prior to trial commencement. There were 90% (n=27) of participants that used strategies to promote health and well-being. Most participants used a combination of self-care and social-support strategies. Among non-users, most cited unawareness of resources as the reason (67%, n=2).

Table 31 Demographic on strategies for well-being and burnout

	Intervention (N=15)		**Active Control (N=15)**		**Total (N=30)**	
	N	***%***	***N***	***%***	***N***	***%***
Do you use other strategies to promote your personal health and well-being?						
Yes	13	87	14	93	27	90
No	2	13	1	7	3	10
Types of strategies						
Self-care (mental and physical)	4	31	3	21	7	26
Social support	3	23	4	29	7	26
Combination of self-care and social support	6	46	7	50	13	48
Reasons for not using						
Unaware of resources	1	50	1	100	2	67
No response	1	50	0	0	1	33

Abbreviations: N=Number of participants (population), %=Percentage.

8.4 Feasibility

The following section presented the results on feasibility of the IP program. The study assessed feasibility of recruitment processes, retention rate, and data collection procedures. Table 32 summarised the descriptive statistics for feasibility outcomes.

Table 32 Descriptive statistic for feasibility

	Potential Participants (N=112)	
	N	%
Excluded due to high IES-R	62	55
Attrition rate	17	15
Recruitment rate	112	NA

	Intervention (n=15)		Active Control (n=15)	
	N	%	N	%
***Retention rate**				
Post-intervention (T1)	14	93	14	93
1-month follow-up (T2)	12	80	11	73
3-month follow-up (T3)	12	80	10	67
Retention rate				
Consult session	15	100	NA	NA
6 debrief sessions	11	73	2	13
3-5 debrief sessions	3	20	6	40
Less than 3 debrief sessions	1	7	7	47
Adverse event rate	0	0	0	0
Journal entry completion rate				
6 journal entries	5	33	2	13
3-5 journal entries	6	40	11	73
Less than 3 journal entries	4	27	2	13
Feedback completion rate				
Interview	10	67	9	60
Questionnaire	8	53	5	33

Abbreviations: IES-R: Impact of Event Scale-Revised

*The retention rate measured completion of psychometric questionnaires.

8.4.1 Recruitment

A total of 112 participants registered into the study. Flyers were initially distributed to the ACCCN and ANZICS, which were advertised on their websites and social media pages. The flyer was also distributed via the organisations' membership emails within their monthly newsletters between 23rd to 28th September 2022. Figure 24 depicted the registration rate across the one-month recruitment duration. Recruitment was conducted over one month (September 2022 to October 2022) and resulted in an excellent recruitment rate of 112 potential participants[16].

[16] The study compared total number of recruitment against sample size (n=110).

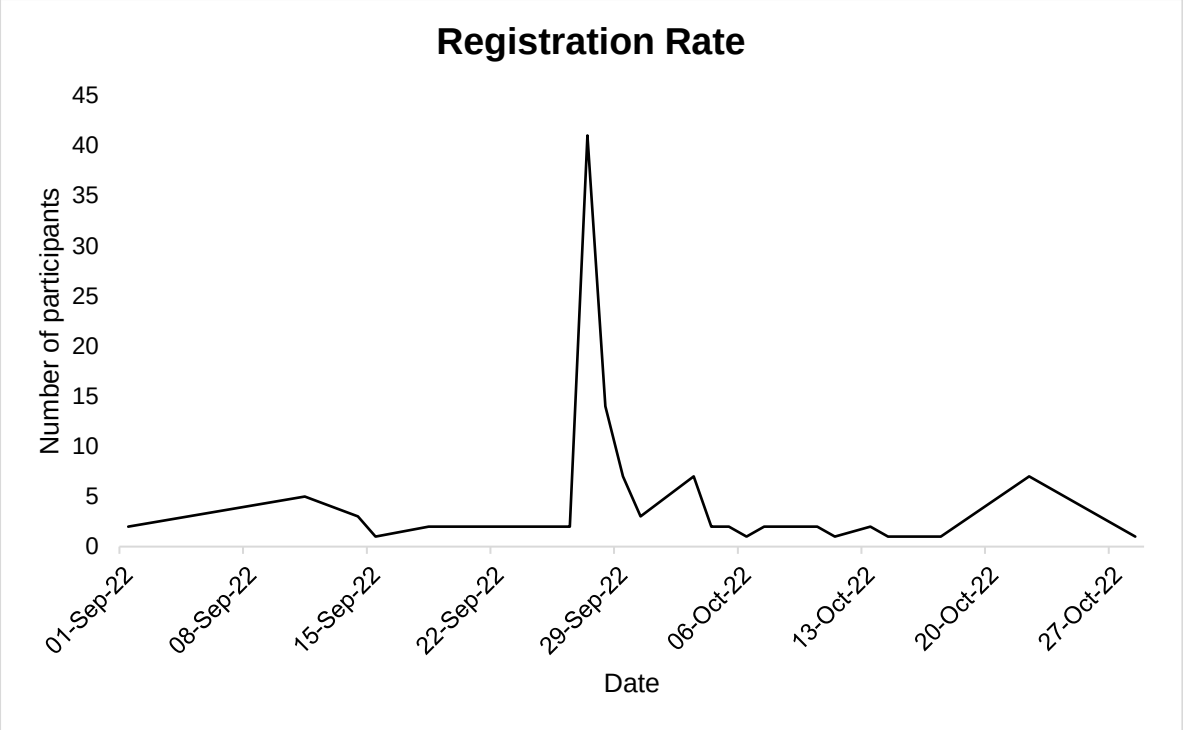


Figure 24 Recruitment rate

8.4.2 Retention

The intervention group indicated 100% (n=15) retention rate to consult sessions. The debrief session retention rate for both the intervention and active control groups at post-intervention, was 93% (n=14). At the 1-month follow-up, the retention rate for the intervention group was 80% (n=12) and the active control group was 73% (n=11). At the 3-month follow-up, the intervention group maintained the retention rate at 80% (n=12), while the active control group indicated a retention rate of 67% (n=10). Notably, there were no adverse events reported in either the intervention or active control groups (0%).

8.4.3 Data collection methods

8.4.3.1 Journal entry completion rate

In the intervention group, 33% (n=5) of participants completed all journal entries, 40% (n=6) of participants completed three to five journal entries, 27% (n=4) completed less than three

journal entries (Table 32). In the active control group, 13% (n=2) of participants completed all journal entries, 73% (n=11) completed three to five journal entries, 13% (n=2) completed less than three journal entries.

8.4.3.2 Feedback semi-structured interview and questionnaire completion rate

In the intervention group, 53% (n=8) of participants completed the feedback questionnaires, while the active control group had a completion rate of 33% (n=5). There were 67% (n=10) of participants in the intervention group that participated in the semi-structured interview, and 60% (n=9) from the active control group.

8.5 Acceptability

A thematic map (Figure 25) was used to illustrate three main themes (structural integrity, innovative approach, implementation) and subsequent sub-themes derived from the thematic data analysis[17]. The theme of structural integrity encompassed four sub-themes (consult, debrief, facilitator), while the theme of innovative approach comprised three sub-themes (confidentiality, flexibility, and confidence). The theme of implementation was divided into three sub-themes, namely, areas for improvements, enabling components, and recommendations. The following section offers a comprehensive discussion of these key and sub-themes.

[17] The thematic raw unidentifiable data and thematic analysis process can be found in Appendix 33.

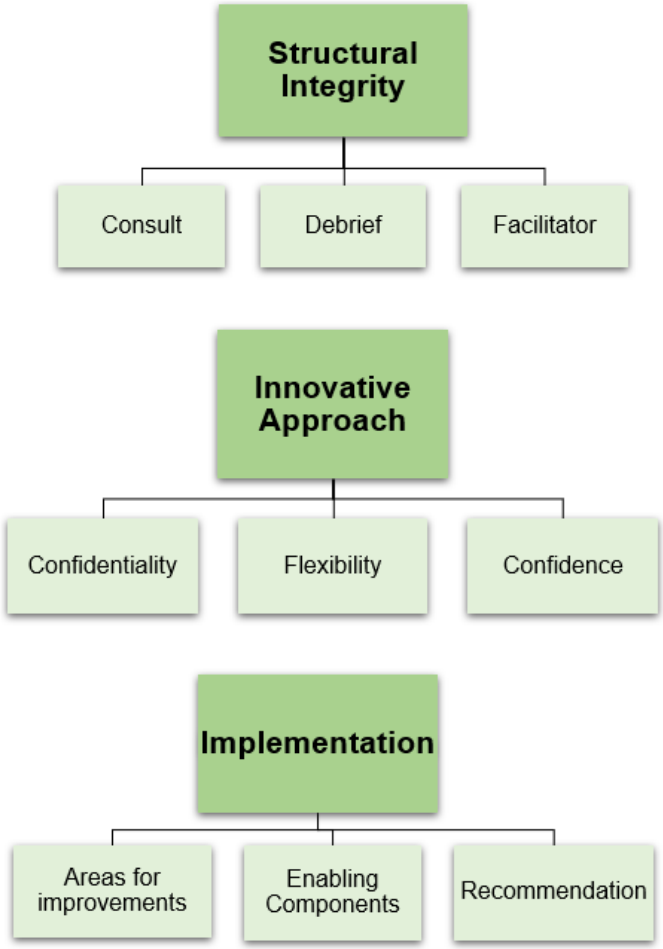


Figure 25 Thematic mapping for feasibility and acceptability outcome

Participant quotes were presented in the following sections. Participants were deidentified to maintain confidentiality. Each participant was coded with an identification (ID) in the following format: (group allocation – I denoted intervention and C denoted active control group)(profession initials)(ICU level)(ID). For example, IRN201 referred to intervention group, registered nurse, ICU level 2, and ID 01 (see Table 33).

8.6 Structural integrity

Structural integrity focused on the structural aspects of the trial's design. This encompassed qualitative feedback on the consult (for the intervention group), debrief, and debrief facilitator.

Table 33 Participant identification for qualitative quotes

ID	Profession	Group Allocation	Age	Gender	Location	ICU Level	Are you currently using strategies?	IES-R
IRN201	Registered Nurse	Intervention	37	Female	South Australia	2	Self-care	14
IRN101	Registered Nurse	Intervention	37	Female	Victoria	1	Combination	8
IPS201	Physiotherapist	Intervention	28	Female	North Island	2	Self-care	15
IRN202	Registered Nurse	Intervention	34	Female	Queensland	2	Social support	18
IRN203	Registered Nurse	Intervention	45	Female	New South Wales	2	Self-care	18
IRN102	Registered Nurse	Intervention	55	Female	Victoria	1	Self-care	22
IRN103	Registered Nurse	Intervention	33	Female	New South Wales	1	Combination	13
IRN204	Registered Nurse	Intervention	32	Female	South Australia	2	Social support	21
IRN301	Registered Nurse	Intervention	55	Female	New South Wales	3	Combination	36
IRN302	Registered Nurse	Intervention	45	Female	Tasmania	3	Not using a strategy	31
IRN104	Registered Nurse	Intervention	47	Female	New South Wales	1	Combination	21
IRN303	Registered Nurse	Intervention	53	Female	South Australia	3	Social support	20
IRN304	Registered Nurse	Intervention	51	Female	New South Wales	3	Not using a strategy	25
IRN205	Registered Nurse	Intervention	32	Female	New South Wales	2	Combination	20
CRN106	Registered Nurse	Active Control	59	Female	New South Wales	1	Social support	37
CRN206	Registered Nurse	Active Control	37	Female	Australian Capital Territory	2	Self-care	35
CRN107	Registered Nurse	Active Control	46	Male	Victoria	1	Combination	39
CRN305	Registered Nurse	Active Control	29	Female	Victoria	3	Self-care	0
CRN306	Registered Nurse	Active Control	50	Female	Tasmania	3	Combination	19
CRN108	Registered Nurse	Active Control	56	Female	New South Wales	1	Combination	12
CRN207	Registered Nurse	Active Control	49	Female	New South Wales	2	Self-care	29
CRN307	Registered Nurse	Active Control	59	Female	South Australia	3	Not using a strategy	0
CRN109	Registered Nurse	Active Control	22	Female	New South Wales	1	Social support	36

ID	Profession	Group Allocation	Age	Gender	Location	ICU Level	Are you currently using strategies?	IES-R
CRN208	Registered Nurse	Active Control	44	Female	Queensland	2	Combination	6
CRN209	Registered Nurse	Active Control	60	Female	Western Australia	2	Combination	13
CRN210	Registered Nurse	Active Control	26	Male	South Australia	2	Combination	7
CRN308	Registered Nurse	Active Control	36	Female	New South Wales	3	Social support	0
CRN110	Registered Nurse	Active Control	31	Female	Victoria	2	Social support	5

8.6.1 Consult

This section included analysed data from the intervention group (and not the active control group) as they received the consult sessions. Most participants in the intervention group felt that the consult sessions were beneficial as it enabled them to reflect on parts of their job.

> **IRN103:** "[…] it was helpful to be able to reflect on both the big and little things of work. I think I liked the fact that it was group based so it meant that the conversation just kind of moved around and was helpful for reflecting on parts of the job."
>
> **CRN206:** "I felt like they were helpful and was good going into the weekly debrief with a strategy to share."

Moreover, the consults were a way for participants to discuss situations and stressors about themselves, enabling it to be more targeted and individualised. Two participants described their experiences as the following:

> **IRN202:** "The (consult) session was certainly personal and about you."
>
> **IRN103:** "I think the more targeted ones probably wouldn't have come out in the group discussion."

One participant suggested that the consult sessions were not as helpful as the debriefing sessions.

> **IPS201:** "It didn't help me with what the debriefs did like it didn't help me with burnout. I don't feel my one-to-one consult really gave me any strategies."

One participant explained that she did not portray herself accurately and suggested that a follow-up may have been beneficial.

> **CRN207:** "I'm actual not as fine as I said I was but I just wanted to portray that I was fine (be-)cause I didn't know anyone so having like a follow up might help too."

Another participant also agreed that a follow-up consult may be beneficial as a means to reflect and compare between the two consult timepoints and determine any improvements in terms of her well-being.

> **IPS201:** “Obviously you need an initial consult with the you need another one like this follow up or something. I just feel that another consult can help me gauge between how I was initially and any improvements in myself. I think that’s always good to know that something is working.”

8.6.2 Debrief

8.6.2.1 Environment

All participants from both the intervention and active control groups were grateful that the debrief intervention was conducted on via a virtual platform. It provides them with time during work or after work to be involved in a session that helps with their mental health and well-being. One participant used her break time during work hours to attend the sessions.

> **IPS201:** “I got the email through work (referring to debrief session bookings) so I can at times sort of justify it to do it at work, but it didn't come from my management structure it came through my colleagues and ICU who I don't report to […] I felt like I was skipping out on work to come to something but as soon as you're in it I was like that kind of distress […] I sort of alleviated it by having my lunch in the session so because obviously we got half an hour for lunch so was only about half an hour so maybe it is a caveat.”

Most participants attended the sessions from home as they found it difficult to find time at work.

> **CRN307:** “I did the sessions at home because its just too difficult to find spare time at work.”

Overall, participants found the sessions to be beneficial and efficient. One participant described her experience as eye opening and time saving.

> **IRN101:** “I found it to be eye-opening as it made me aware of feelings and weather I’m stress. Its beneficial and it wasn't too much like time out of your week.”

Two participants commented that they participated in the debrief sessions virtually, which was helpful as they explained that it is difficult to conduct debrief sessions within the workplace due to factors such as workload, staffing, and distractions from the clinical space.

> **CRN305:** “When your debriefing at work, you’re not totally into the debrief you’re probably thinking on the side of like your patient and you know if they are alright out there, do you need my help that kind of thing, so yeah at all like in the middle your debrief session is like your emergency buzzes and stuff going it really like it ruins it like it's just it's hard to kind of have that in the back your head.”

> **IRN301:** “My workplace is very small so it wouldn't work in my workplace environment because you wouldn't get enough people like you couldn't get them off the floor to engage for an hour for a start and you know there's only ever four people on shift at a time.”

8.6.2.2 Innovative Approaches

8.6.2.2.1 Group size and debrief length.

The majority of participants from the intervention and active control groups agreed that the group size was sufficient. Having too many participants may be a struggle to allow all participants to be engaged and share their feelings.

> **IRN102:** “I think the size you had them that I was all part of was good I think if you have too many you really struggle.”

Participants reported that the group size varied based on each session, where they found that larger groups between three to five participants worked well.

> **IRN204:** “I feel like conversation kind of flowed a little bit more when there were more people, like more than three people and maybe less than six, because more people had input and I didn't feel like there was a point in time where people didn't get hurt or didn't have the opportunity to speak yeah.”

> **CRN108:** “I feel that you had enough people in the group and it wasn’t too much or too little. It was good to have the right number of people so that everyone can have a chance to talk.”

Participants in both groups also noted that the debrief length was good and explained that one hour enabled them to share their stressors.

> **CRN110:** “I think one hour was just nice. It gave everyone enough time to talk and debrief about our day.”

Another participant also agreed as it enabled her to attend their busy schedule.

> **CRN305:** “I think an hour was probably definitely enough I wouldn't want to go past the hour more so because I mean I've got three kids that are very busy schedule kind of as it is and sometimes like blocking an hour out of my day without the interruption of kids is a little bit challenging.”

8.6.2.3 Content structure and content

Participants in the intervention group felt that the context structure enabled them to have a systematic approach during the debrief sessions. One participant explained that the content would digress at times, however, it was beneficial as it enabled the exploration of affiliated topics. Moreover, the facilitator was able to maintain the content being discussed and bring back the discussion back to the main topic.

> **IRN204:** “I just felt we kind of went off little tangents in a bit all over the place which is absolutely OK because we picked up all sorts of different things.”

> **CRN107:** “Having the psychologist facilitate the sessions were good because it they tend to bring us back to our initial topic.”

Another participant suggested that although the same or similar contents were brought up due to the interrelationships between topics. Although participants found it repetitive at times, it was still beneficial in that it enabled other participants who experienced the similar scenario at a later time to revisit and strategize their approach for the particular situation.

> **IRN204:** “There were a lot of the similar themes that were coming up but I think it was good because it like it was repetitive but then it was also good because it allowed other people in the team to bring up their issues later on as well and it kind of became clear of those big themes.”

Another participant explained their understanding of different encounters and situations that participants encounter and regarded repetitive topics to be normal. She added that it gave her the opportunity to reflect and was satisfied provided she received the opportunity to discuss and unpack her stressors.

> **IPS201:** “[…] everyone’s weeks are always different and its normal to go astray from the topic […] as long as I’m give me the opportunity to reflect on my week briefly and go what's bothered me most in the last week and then the ability to debrief on […] it’s exactly obviously the point of it.”

Participants also suggested that the problem-solving approach gave them a sense of individuality and anticipation for the next debrief session.

> **CRN308:** “I felt that the problem-solving helped me relate more to the debrief session and in a way, I was excited to report back to the group about how I went about with the strategies.”

Moreover, participants reported that they felt the problem-solving approach allowed them to view situations in different perspectives, which was advantageous especially during periods where they felt that they were unable to overcome a situation.

> **CRN207:** “[…] the problem-solving approach helped me in a way where when I was talking about my situation in the group, I was able to get feedback from the others and gain a different perspective on the situation. I think I was able to adopt some of these practices and look my future situations in a different light.”

Participants in the active control group suggested that although the debrief sessions were beneficial, they reported the need for the sessions to have more content structure. Two participants explained their views in terms of topic structure.

> **CRN107:** “I think a lot of us were expecting a little more structure but that wasn't necessarily bad thing.”
>
> **IRN301:** “I felt that sometimes I needed more structure I guess I think I would have benefited from go hey like what do you guys think about this and kind of the conversation flowing on from there maybe that would prevent it end from turning into like a massive bitch session about like how much we all hate word.”

Two participants explained that although they wanted more structure, the ability to allow the content to freely flow was expected due to the nature of the discussion.

> **CRN206:** “I guess I thought it would be a bit more structured but then in the end I kind of kind of like that it just flowed.”
>
> **CRN207:** “So I don't think you can change what content is discussed when it's an open forum it's just what people are feeling and their experiences for that week yeah.”

One participant described it to be a ‘fluid process’ and thus, restraining and structuring the content may hinder the ability for participants to express their concerns and stressors.

> **CRN306:** “You can’t really, because it was it was a very fluid process didn't feel particularly structured um and you know you just didn't know what was going to come from who so I think that putting restraints on it like there's actually would hinder the process overall especially because nursing nurses eating their young is a very real part of the nursing environment.”

Active control group participants also suggested that the content was not focused on improving, rather, a session to feel better by talking about their stressors. One participant explained it as ‘dwelling on the problem’ rather than attending to it.

> **CRN106:** “I think a the session just seems to be focused on how do we make ourselves feel better without bringing everybody down you know I guess we talk about it but we shouldn't we shouldn't dwell on as if that's going to be there and we should be able to like say oh this happened to me and someone says I will yeah that happened to me and this is what I did it should be more of a positive thing rather than rather than just dwelling on how bad it was.”

Another participant described the experience as ‘getting lost’ in the topic.

> **CRN206:** “[…] the same issues kept coming out which is OK because it was different people but I kind of feel like we got lost sometimes we got a bit lost in sort of more about nurses and not about why we love being a nurse.”

One participant explained that having a short duration without structure was beneficial, however, longer term interventions would benefit greatly with more content structure.

> **CRN306:** “[…] having some structure probably would have potentially provided some benefit but as you said it's a feasibility concept and I think that if you are going to do something that's much longer term like sitting down once a week over a six month or three month period of time allowing that fluidity for people to express themselves can get repetitive […] I think structure should dictate the content rather than the other way around.”

8.6.3 Debrief facilitator

Overall, participants from both intervention and active control groups were satisfied with the facilitator and their management of both consult (for the intervention group) and debrief sessions. One participant explained that the facilitators were efficient in extracting key ideas and discussion points, which enhanced self-reflection.

> **IRN103:** “[…] they were unsurprisingly good at listening and kind of pulling things out of our answers and yeah I guess helping us to think a little bit more about why we felt the way.”

Another participant also suggested that since the facilitators were unaware of medical terminologies that were discussed during the sessions, it enabled them to ask further questions, which enabled further reflective discussions on the topic.

> **IPS201:** “it's quite good to have someone who doesn't know that facilitating because then they can be like well I don't understand it can you explain that more kind of thing. It kind of helped us to reflect again about the situation which turned out really good”

Two participants suggested that the facilitators had a role within debriefing, especially in their ability to pick up on subtle ques. This can be particularly useful in situations where individuals may have experienced traumatic situations, for example, within critical care environments.

> **CRN207:** “I think that their trained to pick up on subtle things that would need following up yeah so that's really important especially if you’re debriefing about traumatic things that somebody is actually trained to say hey I think you should I think you need to go and talk to somebody else.”

> **IRN203:** “[…] psychologist would probably be better because I guess you kind of dealing with so many complex trauma type issues that comes with being a nurse in critical care and emergency wherever people are […] they are more nuanced into treating that type of vicarious trauma […] I really appreciated them.”

Another participant also explained that skills should be learnt from certified professionals, especially amongst those that understand and know effective coping skills.

> **IRN203:** “I think they better off learning these skills from psychologists because if I talk you know if this is we quiet the way we develop our coping skills is perhaps not the best so I kind of change my way of thinking by the end of it.”

However, four participants did raise their concerns in terms of having the facilitator. Two participants explained that they were unable to relate to the facilitators due to the differences in working environments. They also described the inability for other professions to understand the stressors that CCHP experience.

> **IRN204:** “[…] some of them when they offered their own kind of experience was similar but not the same […] I think it's really hard for anyone to really understand how it feels unless they're actively working in the field and you're not going to get a psychologist to understand especially in critical care.”

> **CRN106:** “I don't know how much they understood that the pressures on nurses on this is yeah I don't know whether that's something that I just didn't know that they understood the pressures of shift work and all that sort of stuff.”

One participant explained that during a debrief sessions, medical procedures were discussed and she felt that the facilitators did not understand the topic. However, she felt that this was not an issue since she was used to working in a multidisciplinary environment and thus understand the differences in scope of practice.

> **IRN103:** “[…] we talked about airway equipment and you could see that it didn't quite mean as much to them as it did to the rest of the nurses in the room but I think we're all fairly used to working in our multidisciplinary environment and fairly used to the fact that we all have kind of difference scopes of practise.”

Another participant felt that she did not need to relate to the facilitators since they were facilitators of the debrief sessions.

> **IRN101:** “They didn't necessarily understand but I don't think it mattered in that like that's when us like each other could come up with different ideas but and they were able to provide more general ideas as well, so I think it was good it was a good balance of having both.”

8.7 Innovative approach

8.7.1 Confidentiality

The majority of participants from the intervention and active control groups suggested that the use of technology (i.e. virtual debrief and consult sessions) enabled them to feel comfortable in sharing their workplace stressors as it encompassed confidentiality. They described the experience as the ability to share without implications.

> **IRN301:** “[…] you know they're not from your workplace there little bit more confidentiality.”

> **CRN305:** “I definitely think like that the level of anonymity in around it kind of makes it a little bit easier to sometimes get like the little niggles off with not not the ever worried with work that had come back to bite you.”

One participant suggested that admitting mistakes to colleagues can be difficult, and thus, discussing their situations with others that work in different workplace settings can create a sense of anonymity.

> **IRN301:** “[…] no one likes to admit that they made mistakes or that move you know that they've let them feel like they left themselves down with their colleagues but other colleagues in a different setting and you might feel free to talk in that fashion.”

> **CRN201:** “I think in a way it also helped to add a bit of a barrier see I think it actually helps me to feel like I can open up more because it's you not in person.”

Another participant described the experience as impeding judgements from their colleagues.

> **IRN101:** “[…] if you talk about it they might relay that information and things like that or you know judgments and stuff like that.”

One participant suggested that integrating technology into the intervention enabled the inclusivity of participants that wouldn’t necessarily commit to time outside work.

> **IRN203:** “I guess in the workplace you're going to capture people that perhaps need it but won't commit to the time outside of work.”

However, there were two participants that suggested that they would like to see such interventions integrated within their workplace. They explained that it provided colleagues working within the same area to discuss current stressors within the workplace and may better understand the context of the situation in comparison to individuals from different workplaces.

> **IRN203:** “I'd love to see it in the workplace. When I saw your study also interested because we're trying to start a bit of a debriefing thing at work you know facilitated debriefing and you just think you just nailed it really the topic look, I think in the workplace either (workplace of outside of workplace) works.”

> **CRN207:** “[…] if it's debriefing is integrated into our workplace then we would find that we would discuss it more between each other. I think they’ll (colleagues) understand what I was referring to, and I feel that gives a little more affirmation.”

One participant noted that they found it difficult to share their stressors and feelings with peers that they were unfamiliar with.

> **CRN109:** “I think my challenge in this experience was opening up to a group of strangers that are also peers.”

8.7.2 Flexibility

Participants suggested that the use of technology was beneficial as it provided them with flexibility. Especially for participants with family and children, they felt that they were able to join the sessions without worrying about arranging care for their children. Thus, it minimises stressful components that may be present in a face-to-face setting, for example, reduced travel time.

> **IRN201:** “[…] if it's in person then you've got to add in the travel time and like for me it was like I if I didn't have childcare I could still attend because I'm at home with the like daughter whereas I couldn't have attended in person.”

One participant suggested explained that it provided the opportunity that may not have been possible in a face-to-face setting.

> **IRN301:** “It's just they want to be engaged and that's why they're doing it and project that they have to have their child there makes it just a little bit more complex for them so next end it too long but I'm sure they appreciated the opportunity you know that's the joy of working from home really, baby dancing in the background on your knee and you know no one is just imposes exactly.”

Another participant suggested that having her child present in the room during the sessions was helpful and she did not feel discomfort in the topics discussed.

> **IRN103:** “I think that was fine I mean he's at a demanding age so sometimes he wants attention but that for the most part worked, and I feel like we never discussed anything there where I was uncomfortable with having the phone on.”

Moreover, other participants without family responsibilities also found the sessions flexible as they were able to choose the timing of the sessions and decide to participate during or after

work hours. Participants also proposed that the flexibility assisted in overcoming factors such as shift work.

> **CRN307:** “It's a lot more flexible so we I could just fitted around what my work or my life a lot easier.”

> **CRN209:** “It gave me a choice to decide on what days I want to have the session. Sometimes it so hard with shift work and I often can’t attend social gatherings or even these kinds of sessions just because its on one specific day.”

8.7.3 Confidence

Participants felt that the virtual sessions created an environment of anonymity, which was beneficial as it minimised pre-judgements from peers and colleagues. This facilitated the ability for participants to dwell deeper into their feelings and emotions.

> **CRN206:** “I actually like this one better I feel like because you know as I said before I see you has lots of big personalities I think it's easier to talk to people you don't know actually yeah because there's no prejudgment.”

Another participant suggested that the technological integration provided her with a sense of protection in comparison to face-to-face sessions, where it can be intimidating.

> **IRN202:** “it's more intimidating, whereas online I feel like you can yeah you're a bit more protected by the video like you're behind the screen.”

This was especially useful for participants who were more introverted or shy. The addition of a facilitator had also provided the comfort for participants by providing equal opportunities to speak.

> **IRN101:** “obviously they can still see you but yeah I find I find in person I'm a bit more shy I guess somewhere is like on the zoom I think the facilitators did a good job in making sure that it like each person had a chance to speak.”

One participant explained that the technological use was also helpful when talking about sensitive and uncomfortable topics. Particularly, the ability to turn off the camera during intense conversations to recenter oneself, which acts as a protection for them.

> **CRN107:** “I think there's some psychology of online that allows people to hide like in face-to-face for debriefing you've got nowhere to hide whereas here if you're online, you’ve got a place to hide, I mean if you’re embarrassed or if you’ve got tears in your eyes, you can turn the camera off but still talk and contribute I think this scope yeah just I think sometimes online protects people a little more in their own head […].”

Another participant explained that the ability to turn off the camera or log-off the platform at completion of the sessions was beneficial as it prevented smaller casual talks, which could be uncomfortable.

> **IRN101:** “you could turn off the video but yeah I don't know I just felt like it was easier to talk about uncomfortable topics via the zoom because you know I think it was also good because you come in and you do the session whereas if you did it and then you go you say bye everyone you don't have to then see them, whereas if you're in person you might have small talk before or after.”

Similarly, the virtual platform impeded external distractions – for example, the ability to answer phone calls by muting oneself.

> **CRN107:** “And I think it allows less interruption like if you’re in a meeting and if someone rings, you can’t just mute it and carry on, it’s an interruption. I didn’t mind the online form.”

One participant suggested that being on the older side, she was initially frightened to use the virtual platform. However, she expressed that the platform was easy to use and was surprised that she was able to utilise the platform without external assistance.

> **CRN208:** “I’m not very technology savy, and so I was kind of afraid when I first saw zoom. But I followed the instructions you gave and found it quite easy to use. I just have to click on the link that is sent to my email. Usually, I’d get my daughter to help […].”

8.8 Implementation

8.8.1 Areas for improvements

The main barriers expressed by participants was the use of journaling, as they felt that it was not relative to them. Some participants explained that it felt repetitive and found themselves reflecting on the same issues every week.

> **IRN301:** “I didn’t really enjoy the journaling as I found myself repeating the same issues every week.”
>
> **CRN305:** “The journaling was the one that I didn’t really like because I didn’t feel it allowed me to encapsulate how useful I found the sessions […].”

Participants in the control group explained that their barriers for the intervention revolved around the lack of strategies to implement.

> **IPS201:** “My least liked experience was the journaling and also the lack of strategies for me to implement.”
>
> **CRN110:** “I think there needs to be more strategies discussed in the sessions, I think this will be beneficial.”

Participants also added that the active control group could benefit with more structure in terms of content being discussed.

> **IRN304:** “Maybe a little more structure and focus on strategies to deal with stress can be something to improve on.”
>
> **CRN106:** “I thought that the program was well designed, but I think having a bit more structure can be good.”

8.8.2 Enabling components

Participants expressed that the ability to form connections and network with other colleagues around Australia and New Zealand was beneficial and found it to be an enabling component in the intervention.

> **IRN014:** “The group bonding and affirmations from the other participants were my favourite part of the intervention. Hearing about their experiences and stories and sharing mine [...]”
>
> **CRN108:** “I really enjoyed networking with other nurses around Australia and New Zealand.”

Participants also suggested that sharing relatable experience was beneficial and described it as an enabling component.

> **CRN110:** “I think the enabling part for me is meeting the other healthcare workers in zoom and sharing relatable experiences.”

> **IRN203:** “Just talking about it (stressors) helps and its probably the best part of the study.”

One participant suggested that sharing the experience with others and hearing different perspectives on a situation was helpful.

> **IRN202:** “Just sharing my experiences with others was great […]”

> **CRN305:** “I really liked the group chats, and hearing others experiences and solutions.”

8.8.3 Recommendations

All participants from the intervention and active control groups expressed that they would recommend this experience to their friends, family and colleagues working within critical care. Two participants explained their reasoning as being a helpful intervention that facilitates feelings of validation.

> **IRN303:** “Its really validating and helpful to have a safe place to express concerns or issues.”

> **CRN108:** “Its helpful to talk to other professionals to understand their challenges and brainstorm.”

Other participants in the intervention group suggested that they would recommend this intervention as it enabled the opportunity to learn new coping strategies.

> **IPS201:** “I’d recommend because it gives an opportunity to learn new coping strategies for stress at work.”

> **IRN103:** “You can learn new ideas […]”

One participant explained that it provided an opportunity to network and meet colleagues from different workplaces.

> **IRN205:** “I would recommend this to my colleagues because as nurses, we don’t often get to network or meet peers from other hospitals […].”

8.9 Chapter Summary

Using a combination of descriptive metrics and thematic analysis, this chapter presented results that answered the primary aim of the pilot RCT. While there was high initial interest in the study (N=112), for a range of pragmatic limitations (i.e. high IES-R scores), the number of participants who commenced the program was lower than anticipated and targeted as per the study sample size calculation (n=110 sample size, n=30 recruited). However, once participants commenced the study, there were strong retention and engagement to the intervention, being stronger within the intervention group. These differences in retention and engagement were explained using qualitative data about the intervention's acceptability, which was illustrated under three main themes: structural integrity, innovative approach, and implementation. The next chapter 9 presented the secondary results on preliminary effectiveness of the IP program.

CHAPTER 9

RESULTS FOR PRELIMINARY EFFECTIVENESS

9.1 Chapter summary

This Chapter 9 will present the secondary findings of the pilot RCT by evaluating the preliminary effectiveness of the IP program. The chapter will demonstrate two-way repeated measures ANOVA and post hoc analysis findings of the psychometric scales from baseline to 3-month follow-up, as specified in the protocol *a priori*. Qualitative data from the feedback interview, feedback questionnaire, and journal entry will be thematically analysed and presented in this chapter.

9.2 Revisiting the secondary aims and objectives

The pilot RCT's secondary aim was to evaluate preliminary effectiveness of the IP program. The secondary aim was answered using the following objectives:

- Determine if IP program had statistically significant effect in achieving improved measures related to well-being and burnout.
- Determine if positive effects of IP program are maintained over time.
- Identify and understand components of the IP program that contributed to the desired outcomes (i.e. statistically significant improvements in well-being and burnout related measures).

Six psychometric questionnaires were analysed: DASS-21, MBI-HSS, PANAS, UWES-SF, TIS, and SPSI-SF. All questionnaires, with the exception of UWES-SF, were reported as sub-scales rather than complete scales. This approach was necessitated by the inherent structure of the scales and the constraints it posed on reporting the overall scale scores.

9.3 Revisiting statistical tests used

IBM SPSS Statistics v. 28 was used for the analysis, with a significance level (α) set at 0.05. The two-way repeated measures ANOVA was used in the statistical analysis of the dataset. The analysis explored statistically significant differences in psychometric questionnaire scores across four timepoints and to determine if these differences were influenced by time or the specific treatments administered. In this analysis, the between-subjects factor was the intervention (treatment) condition, noted as group (i.e. intervention or active control), while the within-subjects factor was the time (i.e. baseline to 1-month follow-up). Statistically significant time findings indicated that the combined group scores differed at each timepoint, whereas statistically significant group findings indicated differences between the intervention and active control group in terms of combined mean scores (of all timepoints - comparing mean scores between the groups). Statistically significant interactions indicated statistically significant differences between the intervention and active control group and across the timepoints. Where there were statistically significant findings, post hoc analysis was conducted to explore specific pairwise comparisons (i.e. group, time, and interactions).

This chapter interchangeably referred baseline as T0 or Timepoint 0, post-intervention as T1 or Timepoint 1, 1-month follow-up as T2 or Timepoint 2, and 3-month follow-up as T3 or Timepoint 3.

9.4 Secondary outcome characteristics

The Consort guidelines recommended reporting participant's baseline data while cautioning against conducting significance testing for baseline differences in RCT (297). Both the intervention group and the active control group comprised 15 participants each. Baseline means and standard deviations for the five secondary outcome measures were provided in Table 34.

Table 34 Mean and standard deviations for all psychometric questionnaire scales

Variable	Baseline		Post-intervention		1-month follow-up		3-month follow-up	
	N	M (SD)	N	M (SD)	N	M (SD)	N	M (SD)
DASS-21								
Depression								
Intervention	15	4.1 (3.3)	14	1.6 (1.4)	12	3.2 (2.6)	12	1.4 (2.2)
Active Control	15	3.6 (2.7)	14	2.1 (1.8)	11	3.4 (2.5)	10	2.4 (2.7)
Anxiety								
Intervention	15	2.6 (1.7)	14	.80 (.92)	12	2.5 (2.5)	12	1.4 (2.3)
Active Control	15	2.6 (2.4)	14	1.3 (1.6)	11	3.3 (1.9)	10	3.7 (1.6)
Stress								
Intervention	15	6.2 (3.5)	14	2.1 (1.7)	12	5.6 (3.7)	12	3.5 (3.8)
Active Control	15	4.8 (1.9)	14	4.8 (3.5)	11	5.7 (3.1)	10	5.7 (1.7)
MBI-HSS								
Emotional exhaustion								
Intervention	15	27.2 (8.4)	14	12.2 (7.6)	12	21.0 (10.0)	12	12.0 (13.1)
Active Control	15	22.4 (6.5)	14	10.5 (10.5)	11	21.0 (6.3)	10	18.9 (10)
Personal Accomplishment								
Intervention	15	36.6 (5.1)	14	45.4 (1.9)	12	38.0 (6.4)	12	42.6 (3.7)
Active Control	15	31.8 (6.8)	14	37.2 (7.3)	11	34.1 (7.6)	10	38.4 (8.4)
Depersonalisation								
Intervention	15	8.8 (8.2)	14	1.0 (1.1)	12	8.1 (7.2)	12	5.0 (6.6)
Active Control	15	7.8 (6.2)	14	8.2 (5.9)	11	8.5 (5.5)	10	7.2 (3.7)
PANAS								
Positive affect								
Intervention	15	27.8 (8.2)	14	45.4 (4.4)	12	33.0 (11.2)	12	40.0 (7.7)
Active Control	15	26.1 (9.5)	14	38.8 (6.5)	11	28.1 (4.9)	10	36.6 (10.2)
Negative affect								
Intervention	15	18.6 (4.7)	14	12.6 (2.9)	12	17.8 (7.8)	12	14.6 (4.9)
Active Control	15	12.6 (5.7)	14	11.2 (2.4)	11	15 (5.4)	10	13.2 (5.4)
UWES-SF								
Vigor								
Intervention	15	11.2 (2.1)	14	8.8 (3.8)	12	12.4 (2.8)	12	14.6 (3.3)
Active Control	15	10.0 (1.6)	14	10.5 (3.8)	11	10.0 (1.5)	10	9.4 (0.7)
Dedication								
Intervention	15	8.9 (2.3)	14	8.2 (5.5)	12	10.2 (4.7)	12	13.6 (4.3)
Active Control	15	10.3 (2.5)	14	9.8 (4.9)	11	9.5 (1.4)	10	9.0 (1.2)
Absorption								
Intervention	15	9.6 (3.3)	14	7.9 (4.1)	12	10.4 (4.9)	12	14.2 (3.7)
Active Control	15	9.8 (2.0)	14	8.6 (3.2)	11	9.6 (1.6)	10	9.6 (1.6)
Complete UWES-SF Scale								
Intervention	15	29.7 (6.8)	14	24.910.8)	12	33.0 (11.8)	12	42.4 (11.1)
Active Control	15	30.3 (5.0)	14	28.9 (9.3)	11	29.1 (4.1)	10	28.0 (3.3)
TIS								
Turnover Intention Scale								
Intervention	15	19.3 (7.8)	14	8.8 (3.3)	12	18.2 (7.1)	12	12.9 (9.3)
Active Control	15	15.7 (5.0)	14	15.3 (5.0)	11	16.8 (5.7)	10	14.2 (4.8)
SPSI-SF								
Avoidant style								
Intervention	14	17.0 (3.2)	14	17.3 (7.3)	12	16.2 (4.7)	12	13.9 (3.7)
Active Control	15	17.4 (3.1)	14	17.5 (6.8)	11	15.7 (2.6)	10	15.6 (1.7)
Rational Problem-Solving								
Intervention	14	25.0 (4.7)	14	28.3	12	27.8 (5.1)	12	29.3 (5.5)
Active Control	15	24.7 (5.7)	14	29.6	11	27.3 (3.8)	10	28.1 (3.6)

Variable	Baseline		Post-intervention		1-month follow-up		3-month follow-up	
	N	M (SD)	N	M (SD)	N	M (SD)	N	M (SD)
Negative Problem Orientation								
Intervention	14	5.4 (1.3)	14	5.3	12	4.5 (1.6)	12	3.2 (1.3)
Active Control	15	4.6 (0.8)	14	5.5	11	4.4 (0.8)	10	3.6 (1.0)
Impulsive/Carelessness								
Intervention	14	14.0 (3.8)	14	16.3	12	15.8 (3.3)	12	16.2 (2.7)
Active Control	15	14.2(3.1)	14	17.6	11	15.5 (2.9)	10	15.0 (2.2)
Positive Problem Orientation								
Intervention	14	16.6(3.8)	14	18.8	12	17.8 (4.4)	12	19.9 (5.3)
Active Control	15	15.1(3.1)	14	19.5	11	17 (4.0)	10	17.4 (2.9)

9.4.1 Descriptive profile of intervention and active control participants

9.4.1.1 Burnout related measures

The participants in the intervention group exhibited slightly higher baseline mean scores for depression (M=4.1, indicating mild[18]) compared to the active control group (M=3.6, indicating normal). Additionally, the intervention group showed a higher baseline mean score for stress (M=6.2, indicating normal) in contrast to the active control group (M=4.8, indicating normal). Both groups displayed a decrease in scores for the depression and stress subscales of the DASS-21 instrument from baseline to the 3-month follow-up, except for the stress sub-scale in the active control group, which increased from 4.8 at baseline to 5.7 at the 3-month follow-up. Similarly, higher baseline scores were observed for emotional exhaustion (M=27.2) and depersonalisation (M=8.8) in the intervention participants compared to the active control participants (M=22.4, M=7.8, respectively). Both groups displayed improvement in scores at the 3-month follow-up, with the exception of the active control group's depersonalisation scores, which remained relatively stable at 7.2. The intervention group also presented higher negative affect scores (M=18.8) compared to the active control group (M=12.6). However, the intervention group showed a decrease in negative affect at the 3-month follow-up (M=14.6), while the active control group indicated an increase in negative affect (M=13.2) over the same period. Baseline turnover intention was higher for the intervention group (M=19.3) than for

[18] The DASS-21 scale indicated scoring information from normal, mild, moderate, severe, to extremely severe. The scale measurement differed for each sub-scale. Other scales such as MBI-HSS, PANAS, and TIS did not indicate scoring information. Instead, higher scores suggest higher levels of the proposed sub-scale.

active control participants (M=15.7), and both groups exhibited a decrease in turnover intention after the 3-month period. Negative problem-solving attributes were similar for both groups, and improvements were observed at the 3-month follow-up, except for the impulsive/carelessness measure, which indicated an increase in both groups at the 3-month follow-up.

9.4.1.1 Well-being related measures

The intervention group displayed higher levels of personal accomplishment (M=36.6) compared to the active control group (M=31.8). Similarly, participants in the intervention group exhibited higher baseline levels of positive affect (M=27.8) and vigor (M=11.2) in comparison to the active control participants (positive affect M=26.1, vigor M=10). Contrastingly, the intervention group showed lower dedication (M=8.9) at baseline when compared to the active control group (M=10.3). Both groups showcased consistent trends of improved personal accomplishment, positive affect, vigor, and dedication by the 3-month follow-up. At baseline, the intervention group also demonstrated lower levels of work engagement (M=29.7) compared to the active control group (M=30.3). However, by the 3-month follow-up, the intervention group exhibited higher work engagement (M=42.4), whereas the active control group indicated reduced work engagement (M=28). Regarding problem-solving attributes, rational problem-solving and positive problem orientation were slightly more pronounced for the intervention participants (M=25, M16.6) than for active control participants (M=24.7, M=15.1), respectively. Both measures exhibited parallel trajectories of enhanced positive problem-solving abilities by the 3-month follow-up for both groups.

9.4.2 Profile of intervention and active control participants at study completion

As summarised in the previous Chapter 8, of the 30 participants recruited 14 participants from each group completed the psychometric questionnaires. At one month, 12 participants from the intervention group completed psychometric questionnaires at 1-month follow-up whilst 11 were completed by active control group participants. At 3-month follow-up, 12 participants

from the intervention group and 10 participants from the active control group completed the psychometric questionnaires.

9.5 Secondary outcome analysis

9.5.1 Two-way repeated measures ANOVA

Table 35 presented two-way repeated measures ANOVA findings of the psychometric questionnaires. It reported on Time, Group, and Time x Group Interactions. Statistically significant Time indicated statistically significant (positive or negative) differences in combined scores (of the intervention and control group) between timepoints (i.e. baseline to post-intervention or from 1-month to 3-month follow-up). A statistically significant Group indicated that the mean scores (all timepoints) for the intervention group differed to the mean scores (all timepoints) of the active control group. An absence in significance for Time or Group indicated no differences between the groups.

The analysis is primarily interested in the group and time interaction, as it not only identified substantial differences between the intervention and active control groups, but also illuminated how these differences evolved over various timepoints. By examining the group and time interaction, it provided deeper understanding of how the intervention's effects unfolded over the course of the study, and whether these effects were consistent across different time intervals.

Table 35 ANOVA findings main effects for time, group, and interaction

Outcome		Sum of Squares	*df*	Mean Square	F-test	η_p^2
DASS-21						
Depression						
	Intercept	594.05	1	594.05	44.90**	.714
	Group	1.80	1	1.80	.14	.008
	Time	60.85	3	20.28	5.50*	.234
	Group x Time	5.90	3	1.97	.53*	.029
	Error	199.25	54	3.69		
Anxiety						
	Intercept	414.050	1	414.050	54.70**	.752
	Group	16.200	1	16.200	2.140	.106
	Time	41.450	3	13.817	5.595*	.237
	Group x Time	14.700	3	4.900	1.984*	.099
	Error	133.350	54	2.469		
Stress						
	Intercept	1843.200	1	1843.20	125.151	.874
	Group	16.200	1	16.20	1.100	.058
	Time	54.300	3	18.10	2.561	.125
	Group x Time	61.500	3	20.50	2.900*	.139
	Error	381.700	54	7.07		
MBI-HSS						
Emotional exhaustion						
	Intercept	26353.800	1	26353.800	374.995	.954
	Group	.200	1	.200	.003	.000
	Time	2117.500	2.109	1003.885	7.725*	.300
	Group x Time	367.500	2.109	174.228	1.341*	.069
	Error	4934.000	37.968	129.953		
Personal accomplishment						
	Intercept	109552.029	1	109552.029	1615.033	.990
	Group	524.450	1	524.450	7.732	.313
	Time	675.075	2.243	300.954	8.024**	.321
	Group x Time	55.918	2.243	24.929	.665*	.038
	Error	1430.267	38.133	37.507		
Depersonalisation						
	Intercept	3528.884	1	3528.884	42.858	.716
	Group	91.937	1	91.937	1.117	.062
	Time	185.898	3	61.966	3.265*	.161
	Group x Time	181.792	3	60.597	3.193*	.158
	Error	967.997	51	18.980		
PANAS						
Positive Affect						
	Intercept	90048.702	1	90048.702	1368.698	.988
	Group	328.071	1	328.071	4.987*	.227
	Time	2734.795	3	911.598	13.574**	.444
	Group x Time	62.584	3	20.861	.311*	.018
	Error	3425.100	51	67.159		

Outcome	Sum of Squares	*df*	Mean Square	F-test	η_p^2
Negative Affect					
Intercept	16939.137	1	16939.137	356.569	.954
Group	68.400	1	68.400	1.440	.078
Time	366.098	2.351	155.742	6.183*	.267
Group x Time	6.519	2.351	2.773	.110*	.006
Error	1006.533	39.961	25.188		
UWES-SF					
Vigor					
Intercept	9439.513	1	9439.513	1842.355	.990
Group	63.013	1	63.013	12.298*	.406
Time	58.938	2.301	25.609	2.498	.122
Group x Time	122.638	2.301	53.288	5.198*	.224
Error	424.675	41.425	10.252		
Dedications					
Intercept	7900.313	1	7900.313	523.151	.967
Group	6.612	1	6.612	.438	.024
Time	57.138	2.131	26.810	1.435	.074
Group x Time	124.238	2.131	58.295	3.119*	.148
Error	716.875	38.361	18.687		
Absorption					
Intercept	7980.013	1	7980.013	1032.454	.983
Group	23.113	1	23.113	2.990	.142
Time	134.238	2.162	62.097	3.914*	.179
Group x Time	89.138	2.162	41.234	2.599	.126
Error	617.375	38.911	15.866		
Complete UWES-SF Scale					
Intercept	75829.613	1	75829.613	1327.078	.987
Group	234.613	1	234.613	4.106*	.186
Time	705.437	2.106	334.906	3.133*	.148
Group x Time	960.038	2.106	455.777	4.264*	.192
Error	4052.775	37.915	106.892		
TIS					
Turnover Intention Scale					
Intercept	17395.389	1	17395.389	394.348	.959
Group	9.284	1	9.284	.210	.012
Time	434.773	3	144.924	4.005*	.191
Group x Time	273.299	3	91.100	2.518*	.129
Error	1845.411	51	36.185		
SPSI-SF					
Avoidant style					
Intercept	21320.450	1	21320.450	479.410	.964
Group	4.050	1	4.050	.091	.005
Time	90.850	1.803	50.380	2.372	.116
Group x Time	12.650	1.803	7.015	.330*	.018
Error	689.500	32.459	21.242		

Outcome	Sum of Squares	*df*	Mean Square	F-test	η_p^2
Rational Problem-Solving					
Intercept	60555.013	1	60555.013	1015.716	.983
Group	.613	1	.613	.010	.001
Time	211.338	3	70.446	5.643*	.239
Group x Time	16.738	3	5.579	.447*	.024
Error	674.175	54	12.485		
Negative Problem Orientation					
Intercept	1665.313	1	1665.313	541.810	.968
Group	.113	1	.113	.037	.002
Time	45.138	2.074	21.767	8.931**	.332
Group x Time	4.138	2.074	1.995	.819*	.044
Error	90.975	37.325	2.437		
Impulsivity/carelessness					
Intercept	19406.450	1	19406.450	892.137	.980
Group	.000	1	.000	.000	.000
Time	81.450	3	27.150	6.907**	.277
Group x Time	16.300	3	5.433	1.382	.071
Error	212.250	54	3.931		
Positive Problem-Solving					
Intercept	25240.513	1	25240.513	930.573	.981
Group	21.013	1	21.013	.775	.041
Time	130.037	3	43.346	3.888*	.178
Group x Time	27.138	3	9.046	.811*	.043
Error	602.075	54	11.150		

Abbreviations: df= degrees of freedom, p= p-value (2-tailed), η_p^2 = Partial Eta Squared (mean of square), * p<.0.05, **p<0.001.

9.5.1 Post hoc analysis

A post hoc analysis was conducted on statistically significant ANOVA findings and reported in the following Tables 36, 37, and 38.

9.5.1.1 Statistically significant time measures

Table 36 presented a post hoc analysis of statistically significant Time. It demonstrated differences across timepoints (baseline, post-intervention, 1-month follow-up, and 3-month follow-up). The intervention and active control group scores were combined at each timepoint and compared.

Table 36 Post hoc analysis of statistically significant timepoint differences

Timepoint (X)	Timepoint (Y)	Mean difference (A-B)	Std. Error	95% Confidence interval for difference	
				Lower bound	Upper bound
DASS-21					
Depression					
Baseline	Post-intervention	2.000*	.665	.031	3.969
Baseline	1-month follow-up	1.950*	.505	.455	3.445
Anxiety					
Baseline	Post-intervention	1.550*	.482	.121	2.979
Post-intervention	1-month follow-up	-1.850*	.495	-3.316	-.384
MBI-HSS					
Emotional Exhaustion					
Baseline	Post-intervention	13.450**	2.732	5.356	21.544
Baseline	3-month follow-up	9.350*	2.408	2.215	16.485
Post-intervention	1-month follow-up	-9.650*	2.357	-16.633	-2.667
Personal Accomplishment					
Baseline	Post-intervention	-7.122*	1.901	-12.794	-1.450
Baseline	3-month follow-up	-6.333*	1.534	-10.911	-1.756
Depersonalisation					
Baseline	Post-intervention	3.689*	1.530	-.877	8.254
PANAS					
Positive Affect					
Baseline	Post-intervention	-15.133**	2.621	-22.954	-7.313
Baseline	3-month follow-up	-11.322*	2.769	-19.585	-3.059
Post-intervention	1-month follow-up	11.533**	2.154	5.106	17.961
Negative Affect					
Baseline	Post-intervention	5.667*	1.485	1.236	10.097
Baseline	3-month follow-up	3.667*	.912	.945	6.389
UWES-SF					
Absorption					
Post-intervention	3-month follow-up	-3.650*	1.113	-6.948	-.352
Overall UWES-SF Scale					
Post-intervention	3-month follow-up	-8.300*	2.785	-16.550	-.050
TIS					
Turnover Intention Scale					
Post-intervention	1-month follow-up	-5.422*	1.610	-10.226	-.619
SPSI-SF					
Rationale Problem-Solving					
Baseline	Post-intervention	-4.100*	1.328	-8.035	-.165
Baseline	3-month follow-up	-3.850*	.978	-6.748	-.952
Negative Problem Orientation					
Baseline	Post-intervention	1.600**	.180	1.068	2.132
Baseline	3-month follow-up	2.000*	.499	.520	3.480
Impulsivity/Carelessness					
Baseline	Post-intervention	-2.850*	.800	-5.221	-.479
Baseline	1-month follow-up	-1.550*	.476	-2.961	-.139
Positive Problem Orientation					
Baseline	3-month follow-up	-3.300*	1.000	-6.263	-.337
Post-intervention	3-month follow-up	-2.800*	.901	-5.469	-.131

Abbreviations: X=first timepoint, Y=second timepoint, *p<0.05, **p<0.01

9.5.1.2 Statistically significant group measures

Table 37 provided post hoc analysis findings for statistically significant Group. It demonstrated differences between the intervention and active control group scores (where each group's scores from timepoints 0 to timepoint 3 were combined and compared).

Table 37 Post hoc analysis of statistically significant group differences

Variables	Mean difference (A-B)	Std. Error	95% Confidence interval for difference	
			Lower bound	Upper bound
MBI-HSS				
Personal Accomplishment	5.261*	1.892	1.269	9.253
PANAS				
Positive Affect	4.161*	1.863	.230	8.093
UWES-SF				
Vigor	1.775*	.506	.712	2.838
Overall UWES-SF Scale	3.425*	1.690	-.126	6.976

Abbreviations: A=Intervention, B=Active Control, *p<0.05.

9.5.1.1 Statistically significant time and group interaction measures (one timepoint)

Table 38 presented post hoc analysis finings for statistically significant Group and Time interaction, where it indicated statistically significant differences between the intervention and active control groups at one single timepoint.

Table 38 Post hoc analysis of statistically significant interaction (one timepoint)

Timepoint	Mean difference (A-B)	Std. Error	95% Confidence interval for difference	
			Lower bound	Upper bound
DASS-21				
Depression				
3-month follow-up	-1.000*	1.099	-3.310	1.310
Anxiety				
3-month follow-up	-2.300*	.885	-4.159	-.441
Stress				
Post-intervention	-2.700*	1.222	-5.268	-.132
MBI-HSS				
Emotional exhaustion				
3-month follow-up	-6.900*	5.199	-17.823	4.023
Personal accomplishment				
Post-intervention	8.178*	2.400	3.114	13.242
Depersonalisation				
Post-intervention	-7.200*	2.005	-11.429	-2.971
PANAS				
Positive Affect				
Post-intervention	6.622*	2.517	1.313	11.932
Negative Affect				
Post-intervention	1.378*	1.221	-1.197	3.953
UWES-SF				
Vigor				
1-month follow-up	2.400*	1.002	.294	4.506
3-month follow-up	5.200**	1.079	2.933	7.467
Dedication				
3-month follow-up	4.600*	1.424	1.609	7.591
Absorption				
3-month follow-up	4.600*	1.274	1.924	7.276
Overall UWES-SF Scale				
3-month follow-up	14.400**	3.670	6.689	22.111
TIS				
Turnover Intention Scale				
Post-intervention	-6.533*	1.922	-10.589	-2.477

Abbreviations: A=Intervention, B=Active Control, *p<0.05, **p<0.01

9.5.1.1 Statistically significant time and group interaction measures (between two timepoints)

Table 39 presented post hoc analysis finings for statistically significant Group and Time interaction, where it indicated statistically significant differences between the intervention and active control groups at two different timepoints.

Table 39 Post hoc analysis of statistically significant interaction (two timepoints)

	Timepoint (X)	Timepoint (Y)	Mean difference (X-Y)	Std. Error	95% Confidence interval for difference	
					Lower bound	Upper bound
DASS-21						
Depression						
(I)	Baseline	3-month follow-up	2.700*	.714	.585	4.815
Anxiety						
(AC)	Post-intervention	3-month follow-up	-2.400*	.763	-4.661	-.139
Stress						
(I)	Baseline	Post-intervention	4.100*	1.123	.774	7.426
(I)	Post-intervention	1-month follow-up	-3.500*	1.134	-6.859	-.141
MBI-HSS						
Emotional exhaustion						
(I)	Baseline	Post-intervention	15.000*	3.864	3.553	26.447
(I)	Baseline	3-month follow-up	15.200*	3.406	5.109	25.291
(AC)	Baseline	Post-intervention	11.900	3.864	.453	23.347
(AC)	Post-intervention	1-month follow-up	-10.500*	3.333	-20.376	-.624
Personal Accomplishment						
(I)	Baseline	Post-intervention	-8.800*	2.616	-16.608	-.992
(AC)	Baseline	3-month follow-up	-6.667*	2.226	-13.309	-.025
Depersonalisation						
(I)	Baseline	Post-intervention	7.778*	2.220	1.154	14.402
PANAS						
Positive Affect						
(I)	Baseline	Post-intervention	-17.600**	3.608	-28.365	-6.835
(I)	Baseline	3-month follow-up	-12.200*	3.812	-23.574	-.826
(I)	Post-intervention	1-month follow-up	12.400*	2.965	3.553	21.247
(AC)	Baseline	Post-intervention	-12.667	3.803	-24.014	-1.319
(AC)	Post-intervention	1-month follow-up	10.667*	3.125	1.341	19.993
Negative Affect						
(I)	Baseline	Post-intervention	6.000*	2.044	-.098	12.098
(I)	Baseline	3-month follow-up	4.000*	1.256	.253	7.747
UWES-SF						
Vigor						
(I)	Baseline	3-month follow-up	-3.400*	1.077	-6.591	-.209
(I)	Post-intervention	3-month follow-up	-5.800*	1.379	-9.887	-1.713

	Timepoint (X)	Timepoint (Y)	Mean difference (X-Y)	Std. Error	95% Confidence interval for difference	
					Lower bound	Upper bound
Dedication						
(I)	Baseline	3-month follow-up	-4.700*	1.291	-8.526	-.874
(I)	Post-intervention	3-month follow-up	-5.400*	1.667	-10.338	-.462
Absorption						
(I)	Baseline	3-month follow-up	-4.600*	1.481	-8.988	-.212
(I)	Post-intervention	3-month follow-up	-6.300*	1.574	-10.964	-1.636
Overall UWES-SF-Scale						
(I)	Post-intervention	1-month follow-up	-12.700*	3.659	-23.541	-1.859
(I)	Post-intervention	3-month follow-up	-17.500*	3.938	-29.167	-5.833
TIS						
Turnover Intension Scale						
(I)	Baseline	Post-intervention	10.500*	2.929	1.760	19.240
(I)	Post-intervention	1-month follow-up	-9.400*	2.216	-16.012	-2.788
SPSI-SF						
Avoidant Problem-Solving						
(I)	Baseline	3-month follow-up	3.100*	.938	.320	5.880
Rational Problem-Solving						
(I)	Baseline	3-month follow-up	-4.300*	1.383	-8.399	-.201
Negative Problem Orientation						
(I)	Baseline	3-months	2.200**	.254	1.448	2.952
(I)	Post-intervention	3-months	2.100*	.706	.007	4.193
(AC)	Baseline	3-months	1.000	.254	.248	1.752
Positive Problem Orientation						
(I)	Baseline	3-month follow-up	-3.300*	1.274	-7.075	.475
(AC)	Baseline	Post-intervention	-4.400*	1.414	-8.590	-.210

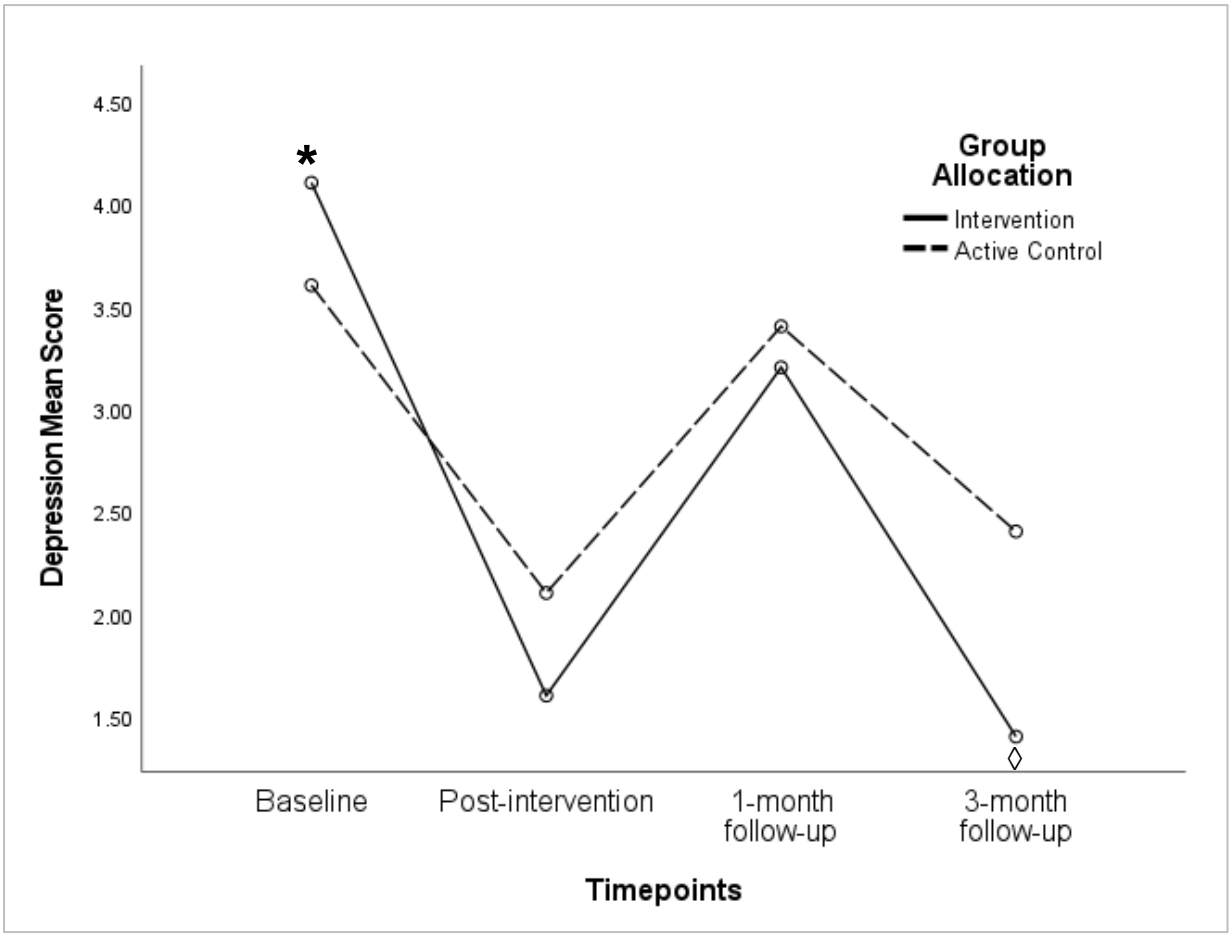
Abbreviations: (I) referred to intervention group, (AC) referred to active control group, X=first timepoint, Y=second timepoint. *p<0.05, **p<0.01

9.6 Depression Anxiety Stress Scale (DASS-21)

DASS-21 was measured as a sub-scale instead of an overall scale due to the nature of the scale (as mentioned in section 9.2). The following sections provided ANOVA findings for depression, anxiety, and stress.

9.6.1 Depression

Figure 26 illustrated the progression of DASS-21 depression mean scores from baseline to the 3-month follow-up. The graph showcased a reduction in depression scores for the intervention group post-intervention, a decrease that was sustained below the scores of the active control group until the 3-month follow-up.

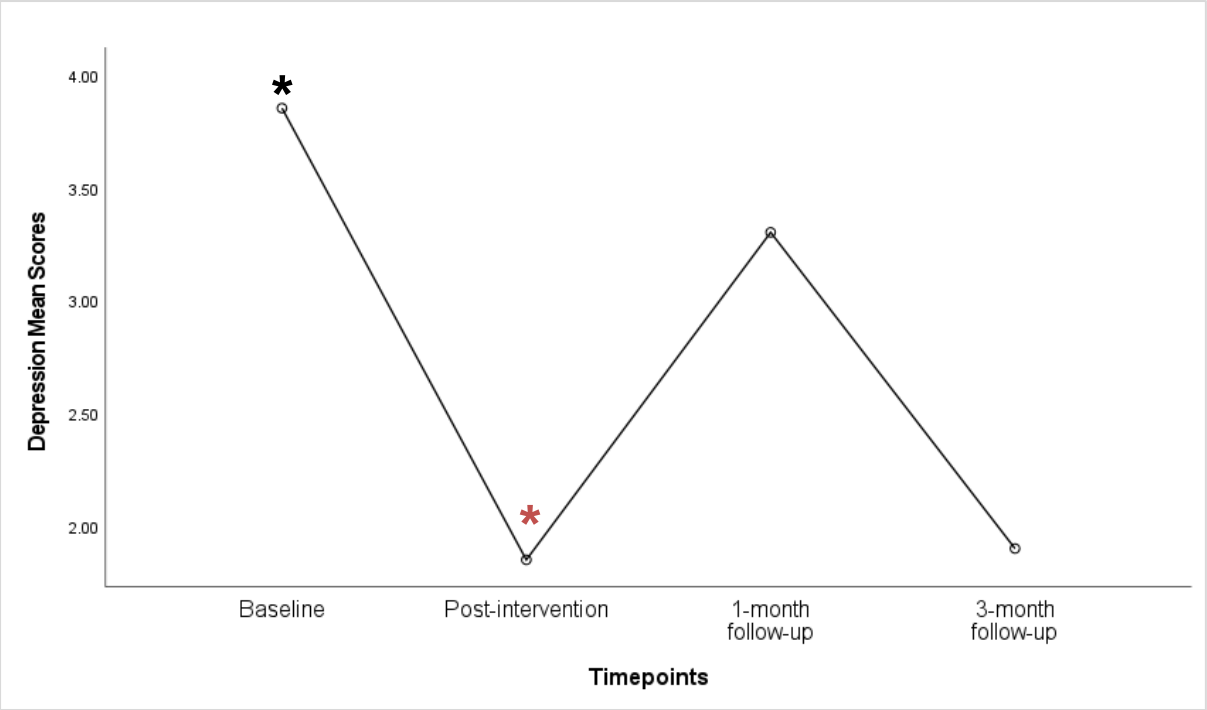


Abbreviations: * indicated statistically significant decrease in depression scores for the intervention group from baseline to 3-month follow-up. ◊ indicated statistically significant differences in mean scores between the groups.

Figure 26 Estimated marginalized mean scores for depression

A two-way repeated measure ANOVA findings indicated statistically significant differences in variance for group and time interactions (F (3, 54) = 0.53, p=.05). Post hoc analysis indicated statistically significant decrease in depression outcomes from baseline to 3-month follow-up (MD=2.7, 95% CI .585 – 4.82, p=.008) for the intervention group. There were no statistically significant differences in variance for the active control group. Findings also indicated differences in variance in mean scores between the groups at 3-month follow-up (MD=-1.00, 95% CI -3.31 – 1.30, p= .048), where lower depression scores were indicated for intervention compared to active control participants (Figure 26). Repeated measure ANOVA findings also indicated statistically significant differences in variance in depression scores for time variable (F (3, 54) = 5.5, p=.002) and no statistically significant differences in variance for group

variable (F (1, 54) = .14, p=.717). Post hoc analysis for time variable indicated statistically significant reduction in mean depression scores from baseline to post-intervention (MD=2.0, 95% CI .031 – 3.97, p=.045), and from baseline to 1-month follow-up (MD=1.95, 95% CI -3.32 - -.38, p=.007) (Figure 27).

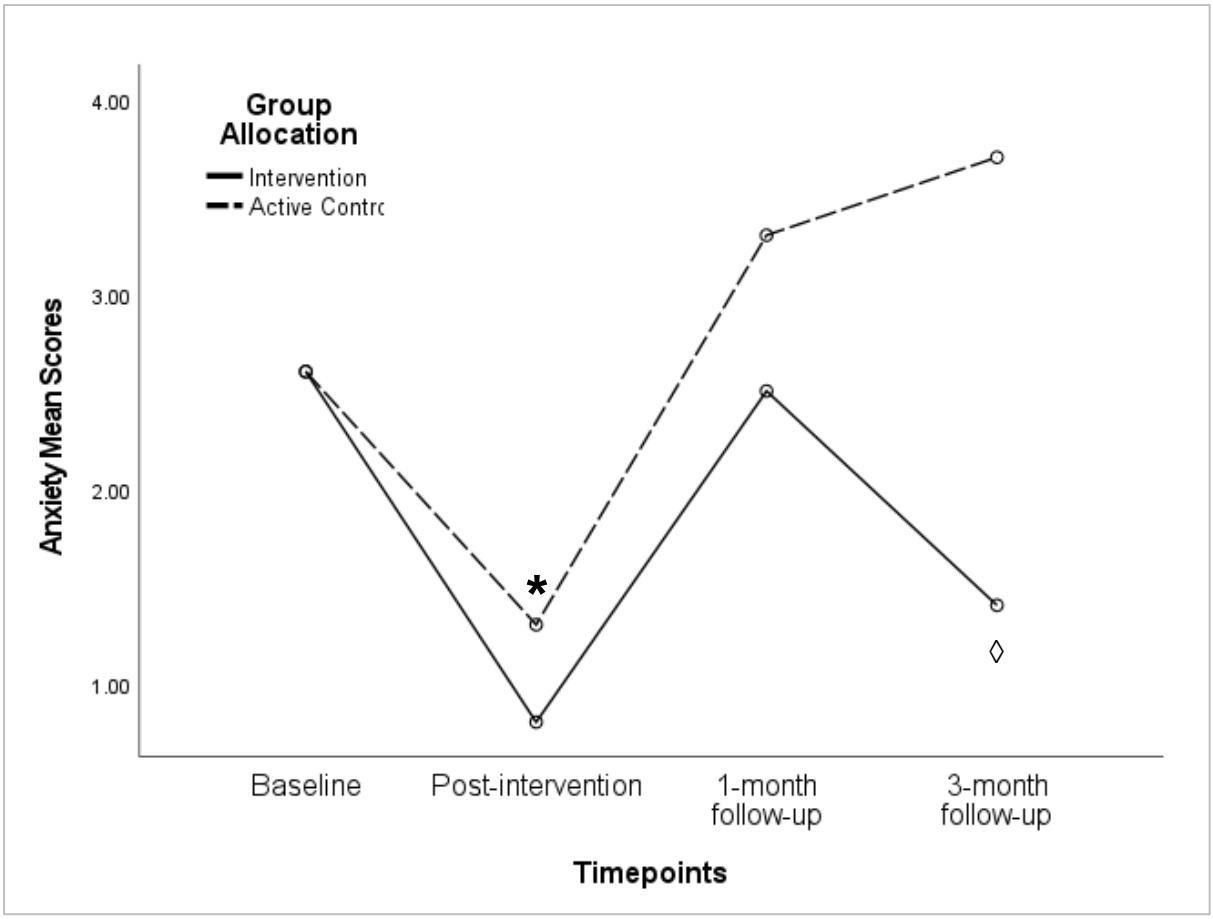


Abbreviations: * indicated statistically significant decrease in depression scores from baseline to post-intervention. * indicated statistically significant increase from post-intervention to 1-month follow-up.

Figure 27 Estimated marginalized mean depression time variable

9.6.2 Anxiety

Figure 28 illustrated the progression of DASS-21 anxiety mean scores from baseline to the 3-month follow-up. The graph showcased a reduction in anxiety scores for the intervention group post-intervention, a decrease that was sustained below the scores of the active control group until the 3-month follow-up.

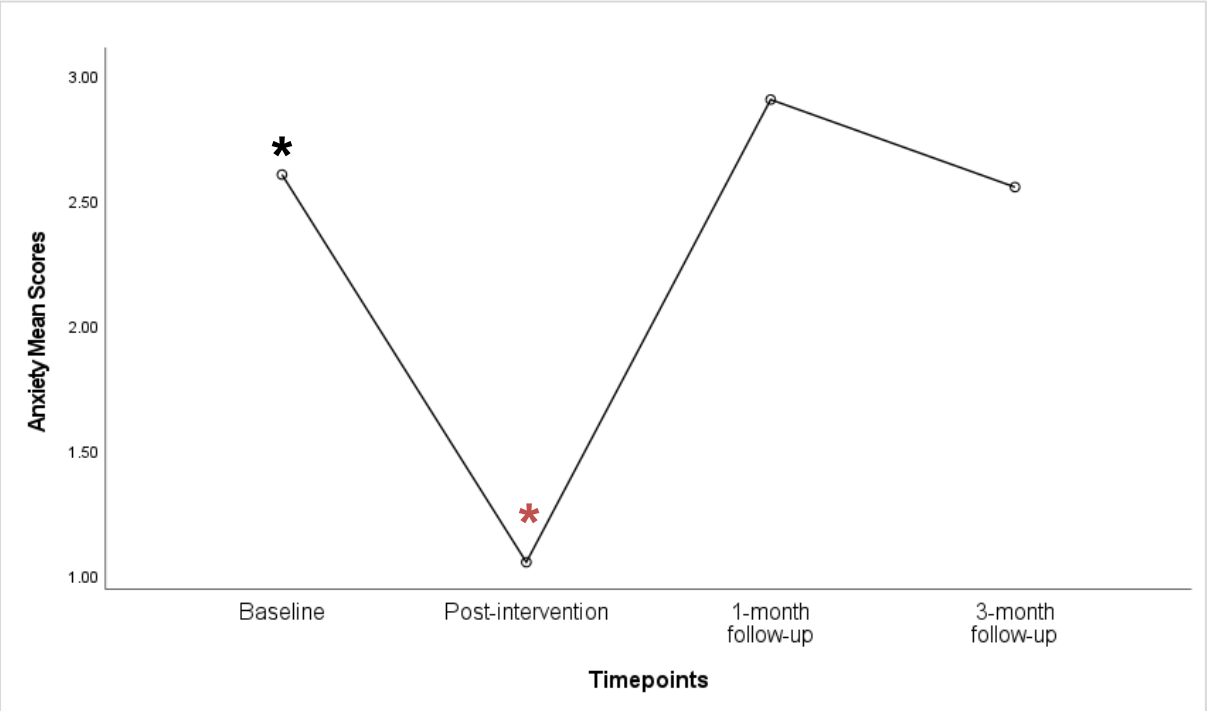


Abbreviations: * indicated statistically significant increase in anxiety scores for the active control group from post-intervention 3-month follow-up. ◊ indicated statistically significant differences in mean scores between the groups.

Figure 28 Estimated marginalized mean scores for anxiety

A two-way repeated measure ANOVA findings indicated statistically significant differences in variance for group and time interactions (F (3, 54) = 1.984, p=.027). Post hoc analysis indicated statistically significant increase in anxiety outcomes from post-intervention to 3-month follow-up (MD=-2.4, 95% CI -4.66 - -.14, p=.008) for the active control group. There were no statistically significant differences in variance for the intervention group. Findings also indicated differences in mean scores between groups at 3-month follow-up (MD=-2.30, 95% CI -4.16 – -.44, p= .018), where lower anxiety scores were indicated for intervention compared to active control participants (Figure 28). ANOVA findings also indicated statistically significant differences in variance in anxiety scores for time variable (F (3, 54) = 5.59, p=.002) and no statistically significant differences in variance for group variable (F (1, 54) = 2.14, p=.161). Post hoc analysis for time variable indicated statistically significant reduction in mean

anxiety scores from baseline to post-intervention (MD=1.55, 95% CI .121 – 2.98, p=.029), and statistically significant increase in anxiety scores from post-intervention to 1-month follow-up (MD=-1.85, 95% CI -3.32 – -.38, p=.009) (Figure 29).

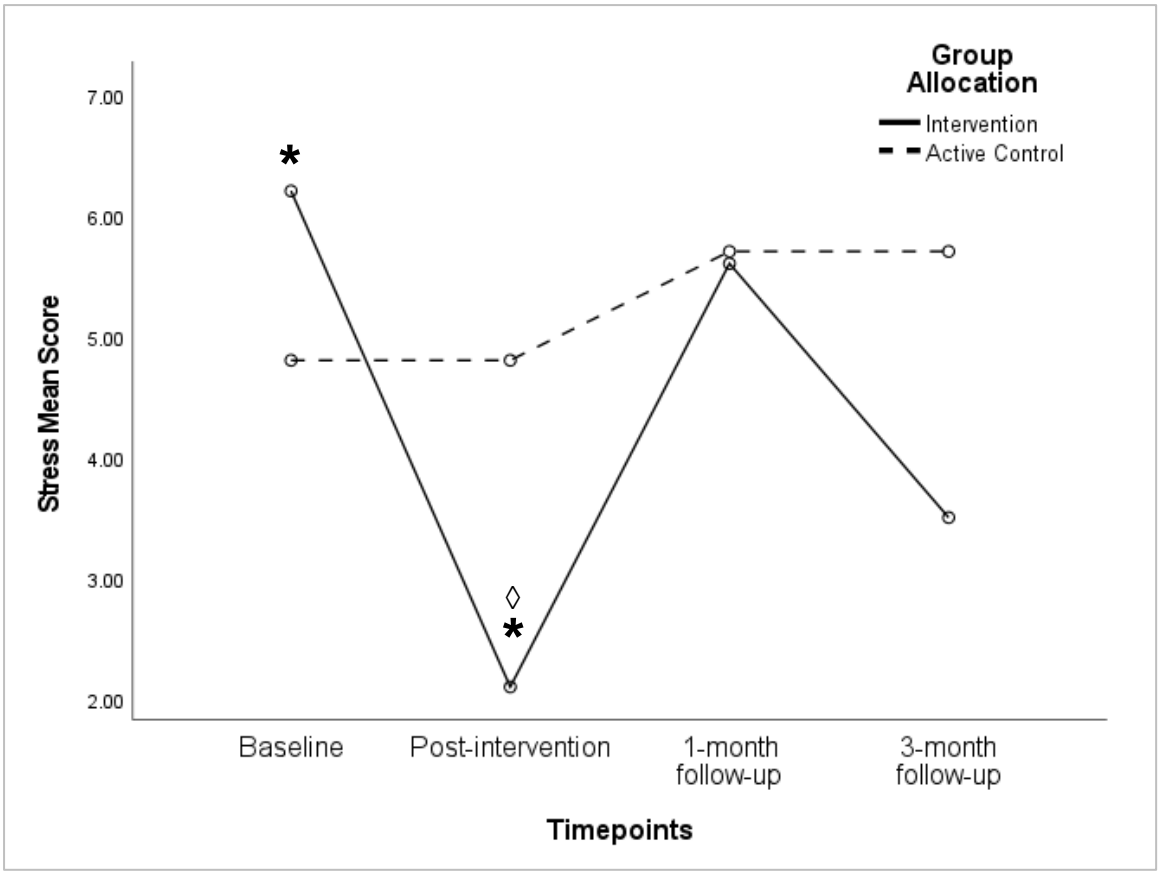


Abbreviations: * indicated statistically significant decrease in anxiety scores from baseline to post-intervention. * indicated statistically significant increase from post-intervention to 1-month follow-up.

Figure 29 Estimated marginalized mean anxiety time variable

9.6.3 Stress

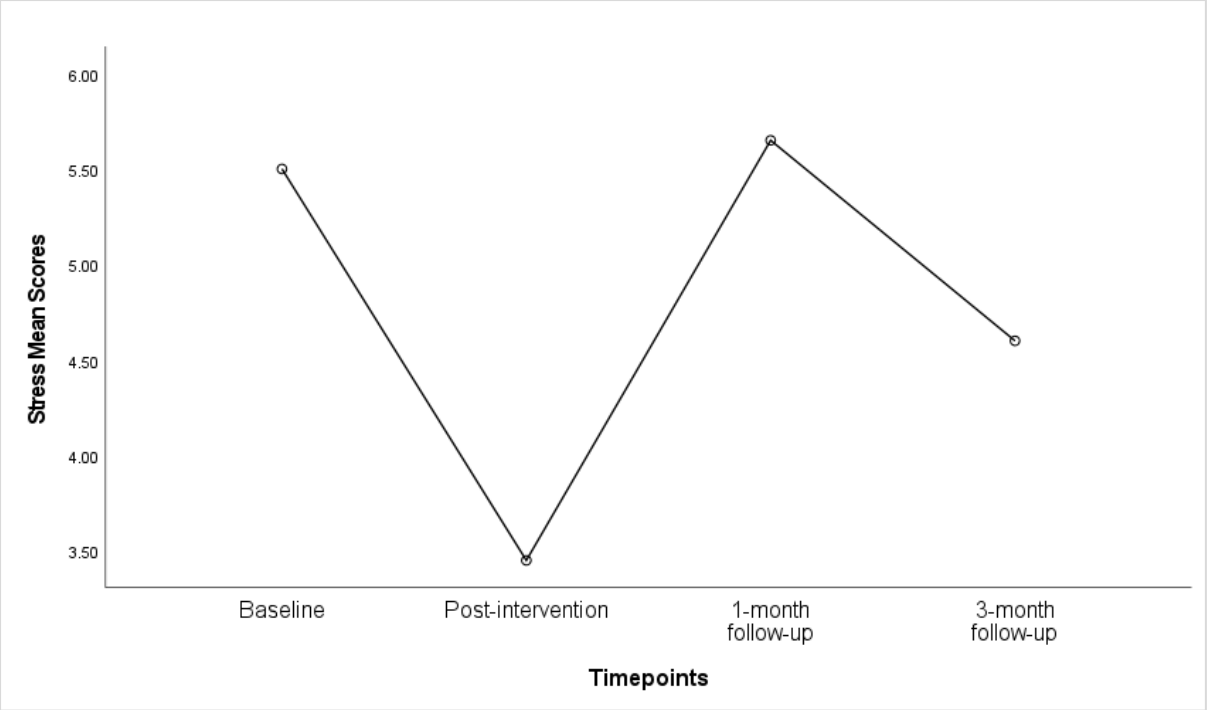
Figure 30 illustrated the progression of DASS-21 stress mean scores from baseline to the 3-month follow-up. The graph showcased a reduction in stress scores for the intervention group post-intervention, a decrease that was sustained below the scores of the active control group until the 3-month follow-up.



Abbreviations: * indicated statistically significant decrease in stress scores for the intervention group from baseline to post-intervention and post-intervention to 1-month follow-up. ◊ indicated statistically significant differences in mean scores between the groups.

Figure 30 Estimated marginalized mean scores for stress

A two-way repeated measure ANOVA findings indicated statistically significant differences in variance for group and time interactions (F (3, 54) = 2.9, p=.043). Post hoc analysis indicated statistically significant decrease in stress outcomes from baseline to post-intervention (MD=-2.40, 95% CI -4.66 – 7.43, p=.011) and from post-intervention to 1-month follow-up (MD=-3.5, 95% CI 1.13 – -6.86, p= .038) for the intervention group (Figure 30). There were no statistically significant differences for the active control group. Findings also indicated differences in mean scores between groups at post-intervention (MD=-7.20, 95% CI -5.27 – -.13, p= .04), where lower stress scores were indicated for intervention compared to active control participants. ANOVA findings indicated no statistically significant differences in variance in stress scores for time variable (F (3, 54) = 2.561, p=.064) (Figure 31) and for group variable (F (1, 54) = 1.100, p=.308).



Abbreviations: There were no statistically significant results for stress time variable.

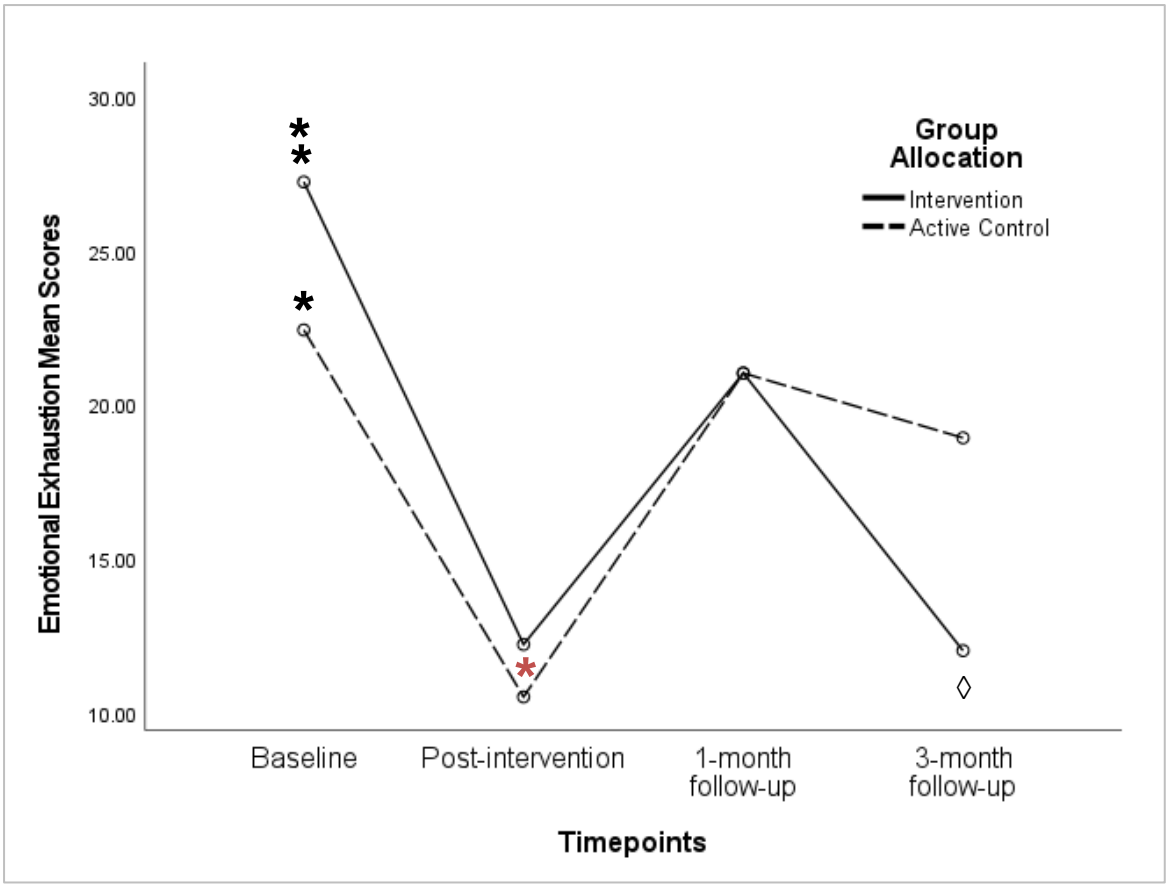
Figure 31 Estimated marginalized mean stress time variable

9.7 Maslach Burnout Inventory (MBI-HSS)

DASS-21 was measured as a sub-scale instead of an overall scale due to the nature of the scale (as mentioned in section 9.2). The following sections provided ANOVA findings for emotional exhaustion, personal accomplishment, and depersonalisation.

9.7.1 Emotional exhaustion

Figure 32 illustrated the progression of MBI-HSS emotional exhaustion mean scores from baseline to the 3-month follow-up. The graph showcased a reduction in emotional exhaustion scores for the intervention group post-intervention and at 3-month follow-up.

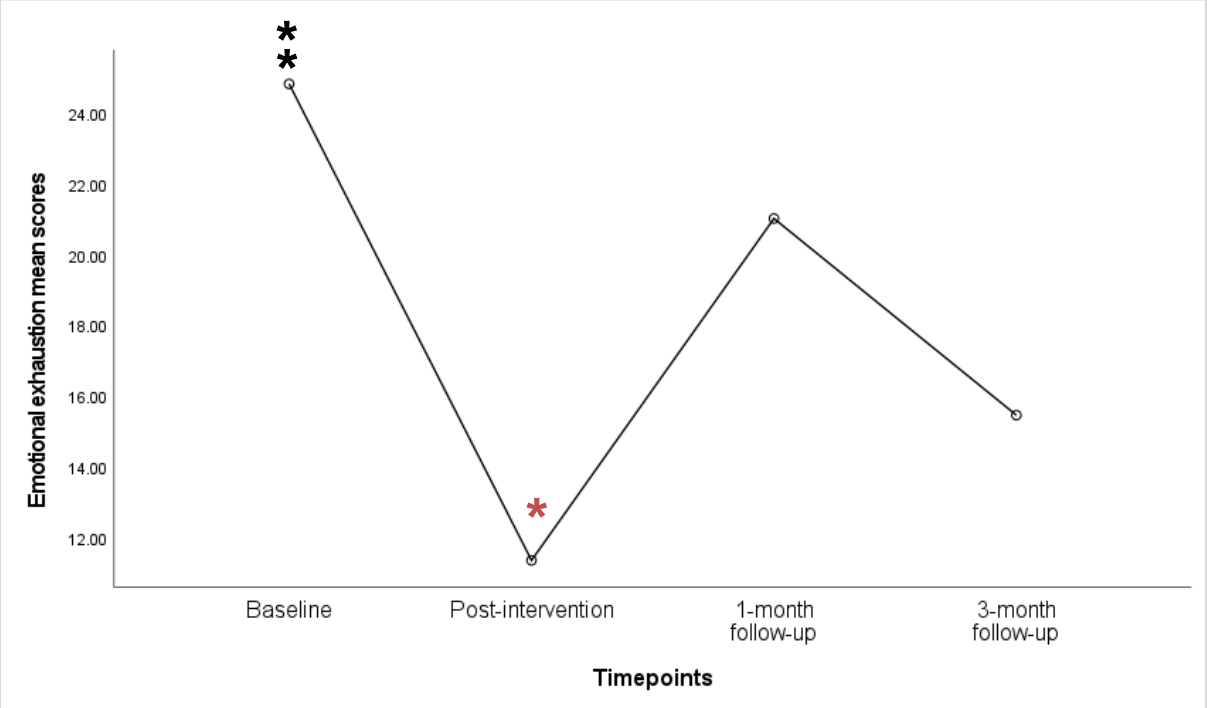


Abbreviations: * indicated statistically significant decrease in emotional exhaustion scores for the intervention group from baseline to post-intervention, baseline to 3-month follow-up, and post-intervention to 1-month follow-up. ◊ indicated statistically significant differences in mean scores between the groups. ◊ indicated statistically significant differences in mean scores between the groups.

Figure 32 Estimated marginalized mean scores for emotional exhaustion

A two-way repeated measure ANOVA findings indicated statistically significant differences in variance for group and time interactions (F (2.243, 38.133) = 8.024, p=<.001). Post hoc analysis indicated statistically significant decrease in emotional exhaustion outcomes from baseline to post-intervention (MD=15, 95% CI 3.55 – 26.45 p= .007) and from baseline to 3-month follow-up (MD=15.2, 95% CI 5.11 – 25.29, p=.002) for the intervention group. The active control group indicated statistically significant decrease in emotional exhaustion from baseline to post-intervention (MD=11.9, 95% CI .45 – 23.35, p=.039) and an increase in emotional exhaustion from post-intervention to 1-month follow-up (MD=-10.5, 95% CI -20.38 – -.62, p=.033). Findings also indicated differences in mean scores between groups at 3-month follow-up (MD=-6.9, 95% CI -17.82 – 4.02, p= .021), where lower emotional exhaustion scores

were indicated for intervention compared to active control participants (Figure 32). ANOVA findings also indicated statistically significant differences in variance in emotional exhaustion scores for time variable (F (2.109, 37.968) = 7.73, p=.001) and no statistically significant differences in variance for group variable (F (1, 37.968) = .003, p=.958). Post hoc analysis for time variable indicated statistically significant reduction in mean emotional exhaustion scores from baseline to post-intervention (MD=13.45, 95% CI 5.36 – 21.54, p=<.001), from baseline to 3-month follow-up (MD=9.35, 95% CI 2.22 – 16.49, p=.007), and an increase in emotional exhaustion from post-intervention to 1-month follow-up (MD=3.69, 965 CI -16.63 – -2.67, p=.004) (Figure 33).



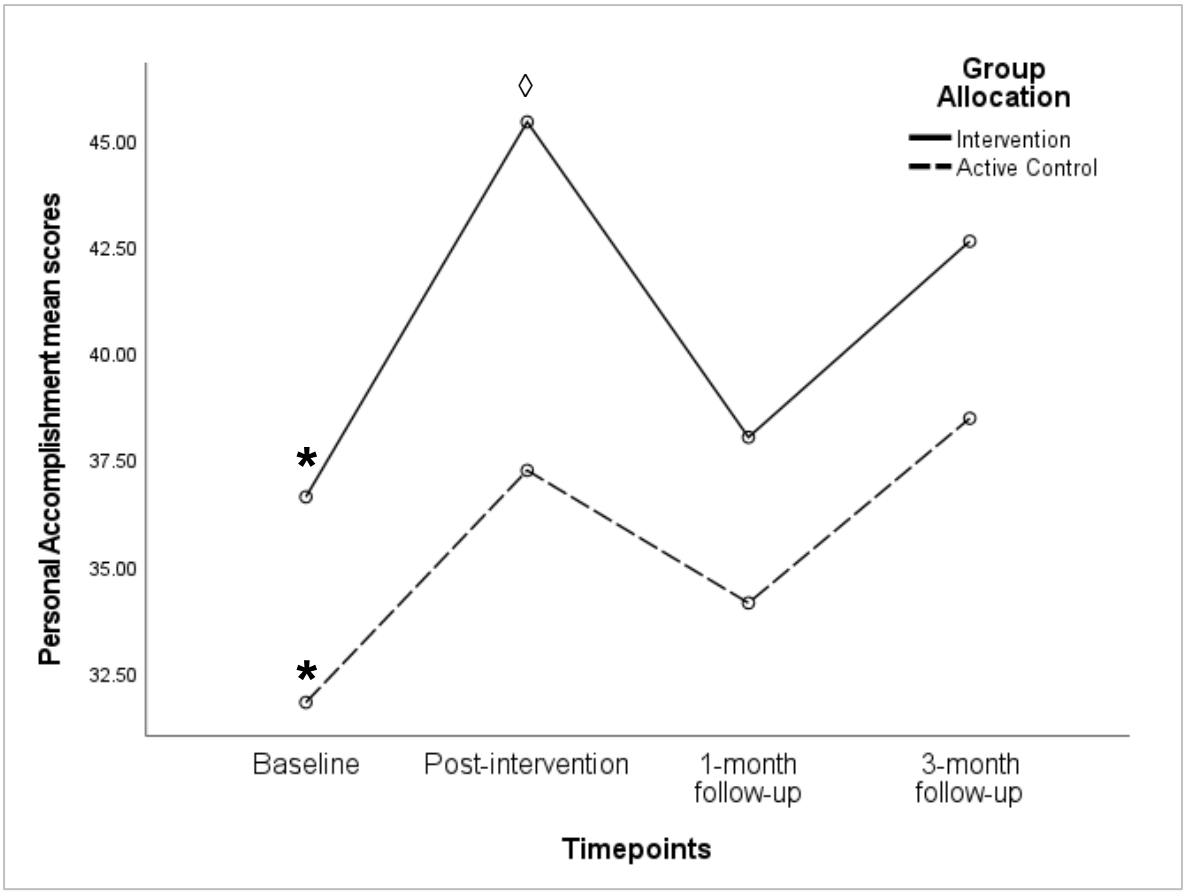
Abbreviations: * indicated statistically significant decrease in emotional exhaustion scores from baseline to post-intervention and baseline to 3-month follow-up. * indicated statistically significant increase from post-intervention to 1-month follow-up.

Figure 33 Estimated marginalized mean emotional exhaustion time variable

9.7.2 Personal accomplishment

Figure 34 illustrated the progression of MBI-HSS personal accomplishment mean scores from baseline to the 3-month follow-up. The graph showcased an increase in personal

accomplishment scores for the intervention group post-intervention, which was sustained up to 3-month follow-up.

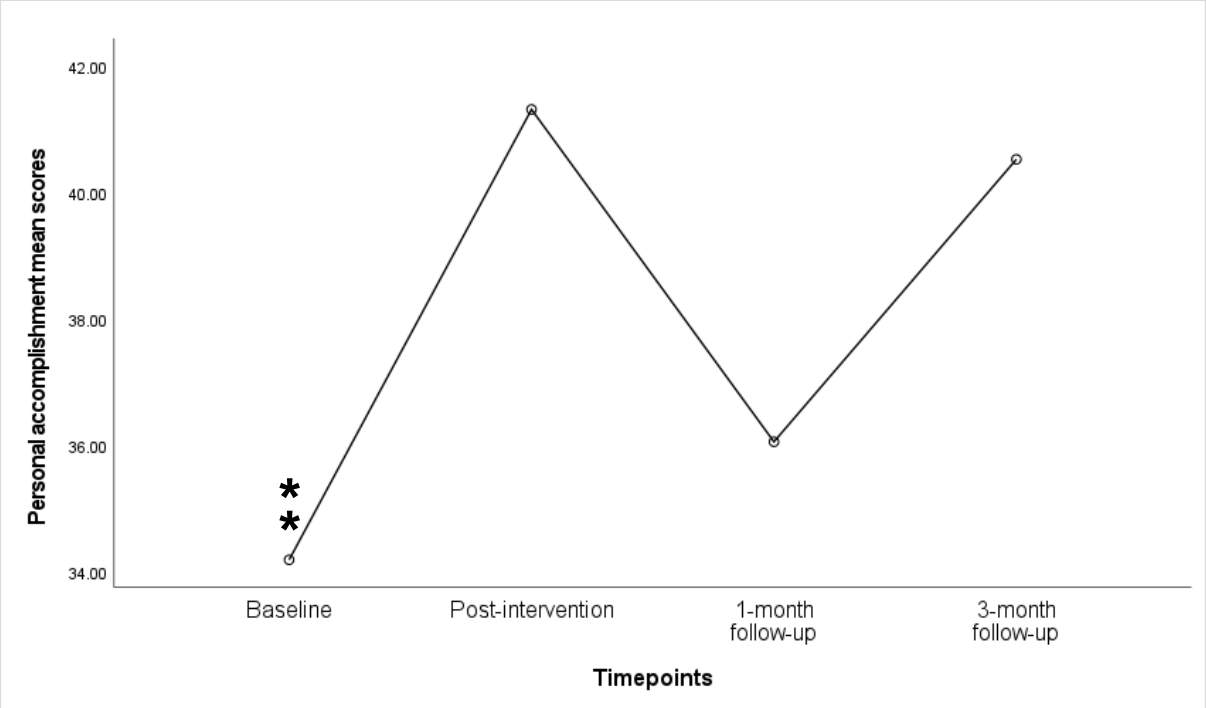


Abbreviations: * indicated statistically significant increase in personal accomplishment scores for the intervention group from baseline to post-intervention and for the active control group from baseline to 3-month follow-up. ◊ indicated statistically significant differences in mean scores between the groups.

Figure 34 Estimated marginalized mean scores for personal accomplishment

A two-way repeated measure ANOVA findings indicated statistically significant differences in variance for group and time interactions (F (2.24, 38.13) = .665, p=.05). Post hoc analysis indicated statistically significant increase in personal accomplishment outcomes from baseline to post-intervention (MD=-8.8, 95% CI -16.61 – -.99 p= .022) for the intervention group. Findings also indicated statistically significant increase in personal accomplishment outcomes for the active control group from baseline to 3-month follow-up (MD=-6.67, 95% CI -13.31 – -.025, p=.049). Findings also indicated differences in mean scores between groups post-intervention (MD=8.18, 95% CI 3.11 – 13.24, p= .003), where higher personal accomplishment

scores were indicated for intervention compared to active control participants (Figure 34). ANOVA findings also indicated statistically significant differences in variance in personal accomplishment scores for time (F (2.243, 38.133) = 8.024, p=<.001) and statistically significant differences in variance for group variable (F (1, 38.13) = 7.73, p=.013). Post hoc analysis for time variable indicated statistically significant increase in mean personal accomplishment scores from baseline to post-intervention (MD=-7.12, 95% CI -12.79 – -1.45, p=.010) and from baseline to 3-month follow-up (MD=-6.33, 95% CI -10.91 – -1.76, p=.004) (Figure 35). Post hoc analysis for group variable indicated statistically significant differences between intervention and active control groups with a mean difference of 5.26 (95% CI 1.27 – 9.25, p=.013).



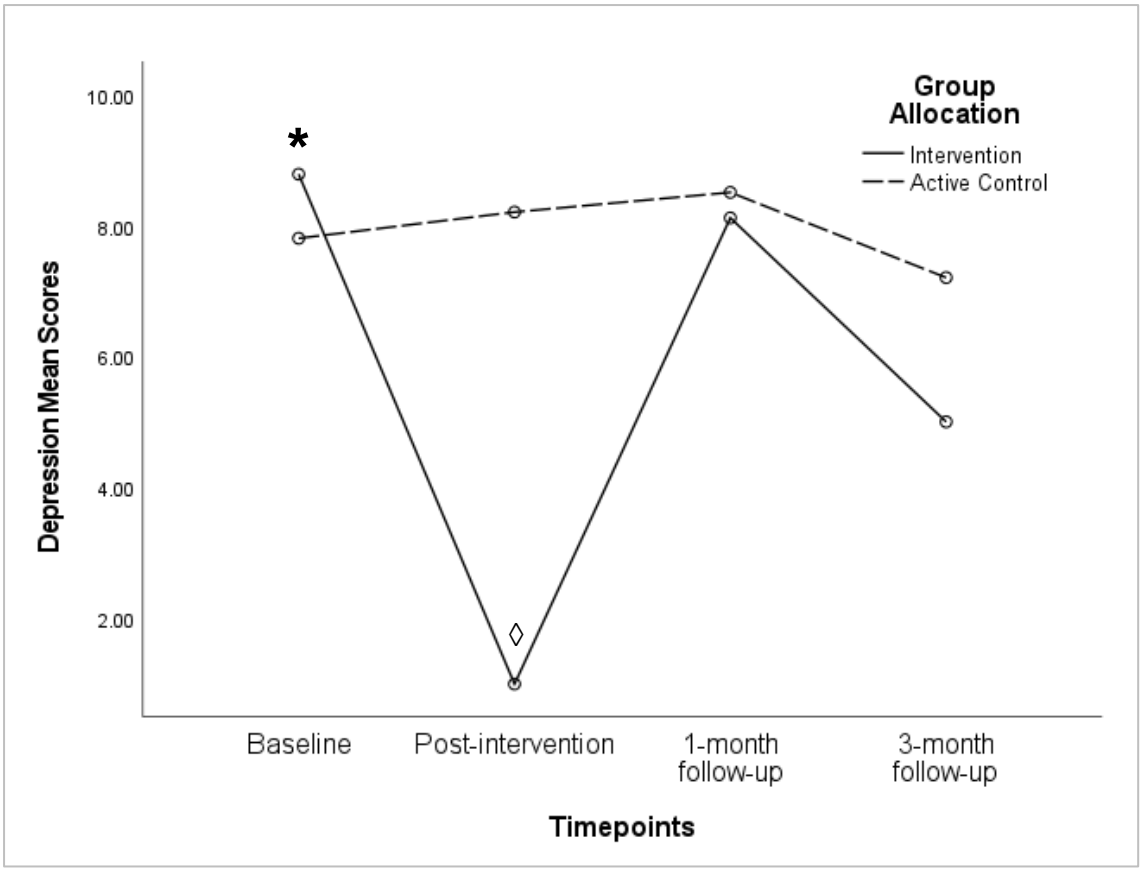
Abbreviations: * indicated statistically significant decrease in personal accomplishment scores from baseline to post-intervention and from baseline to 3-month follow-up.

Figure 35 Estimated marginalized mean personal accomplishment time variable

9.7.3 Depersonalisation

Figure 36 illustrated the progression of MBI-HSS depersonalisation mean scores from baseline to the 3-month follow-up. The graph showcased a reduction in depersonalisation

scores for the intervention group post-intervention, a decrease that was sustained below the scores of the active control group until the 3-month follow-up.

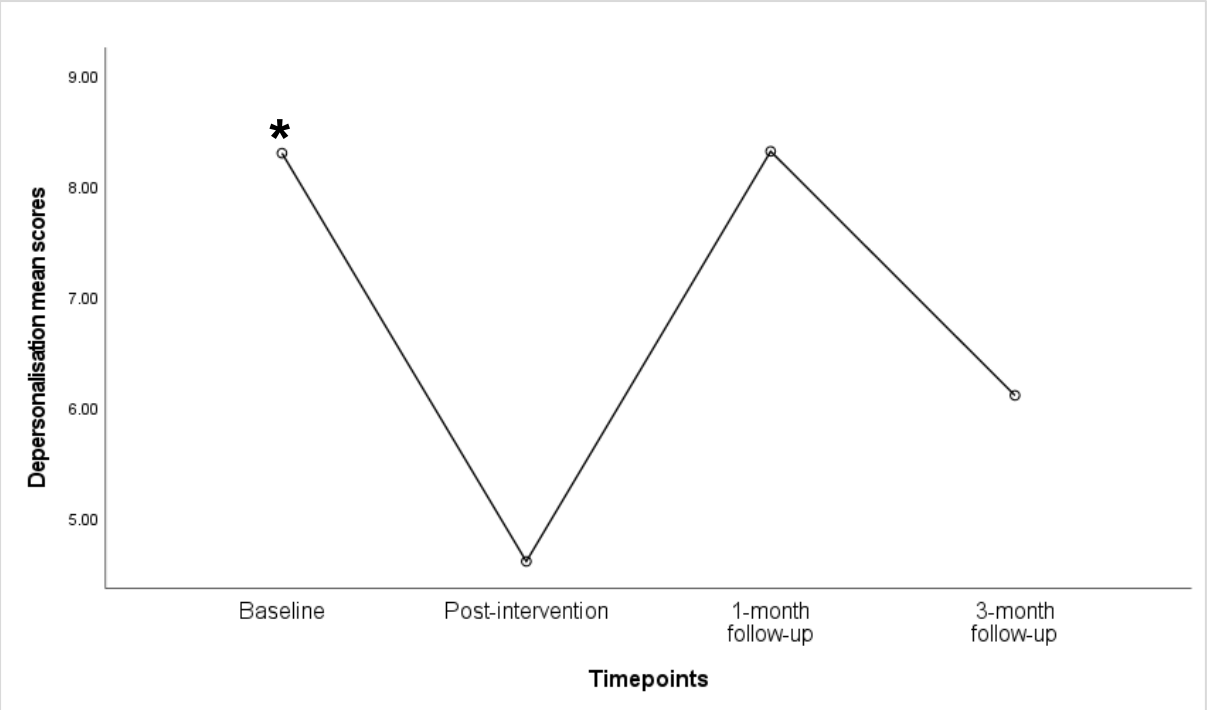


Abbreviations: * indicated statistically significant decrease in depersonalisation scores for the intervention group from baseline to post-intervention. ◊ indicated statistically significant differences in mean scores between the groups.

Figure 36 Estimated marginalized mean scores for depersonalisation

A two-way repeated measure ANOVA findings indicated statistically significant differences in variance for group and time interactions (F (3, 51) = 3.19, p=.031). Post hoc analysis indicated statistically significant decrease in depersonalisation outcomes from baseline to post-intervention (MD=7.78, 95% CI 1.15 – 14.40 p= .016) for the intervention group. There were no statistically significant differences for the active control group. Findings also indicated differences in mean scores between groups post-intervention (MD=-7.20, 95% CI -11.43 – -2.97, p= .002), where lower depersonalisation scores were indicated for intervention compared to active control participants (Figure 36). ANOVA findings also indicated statistically

significant differences in variance in depersonalisation scores for time (F (3, 51) = 3.27, p=.029) and no statistically significant differences in variance for group variable. Post hoc analysis for time variable indicated statistically significant decrease in depersonalisation scores from baseline to post-intervention (MD=3.69, 95% CI -.88 – 8.25, p=.015) (Figure 37).



Abbreviations: * indicated statistically significant decrease in depersonalisation scores from baseline to post-intervention.

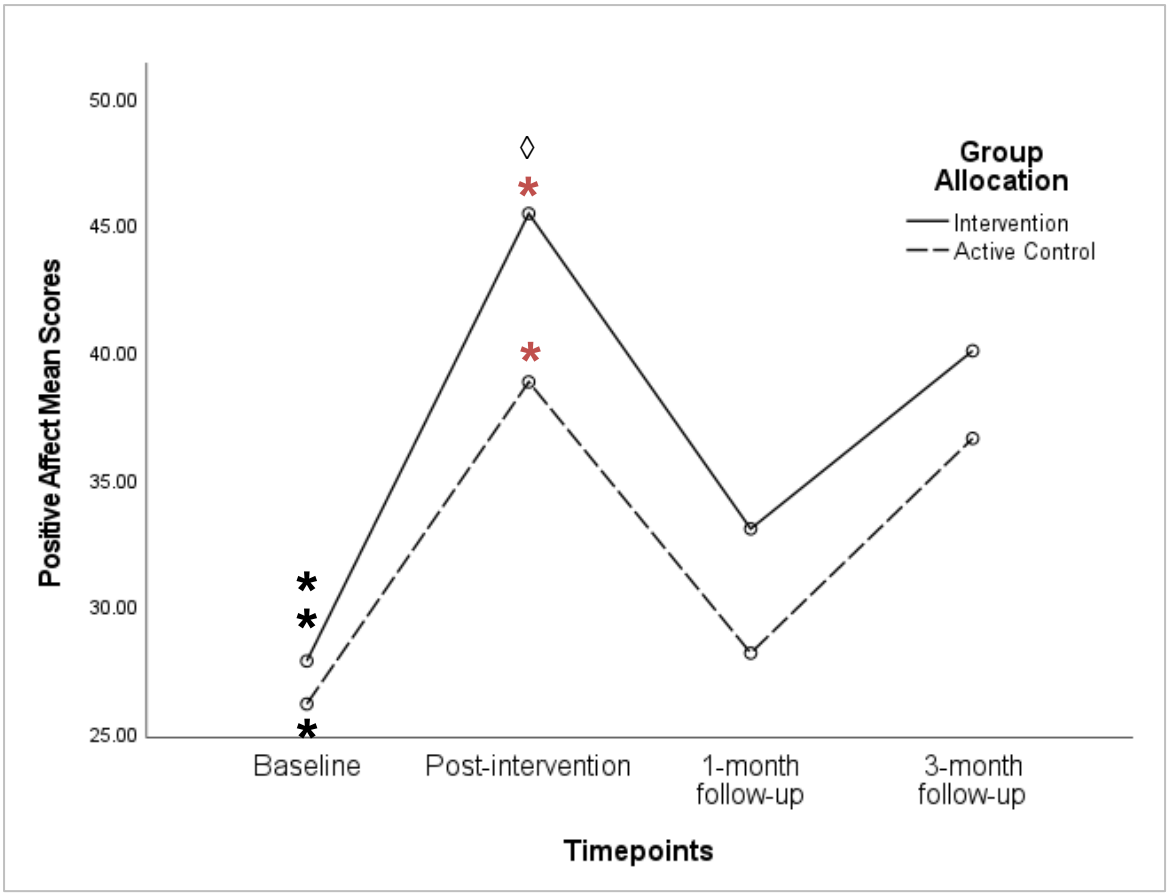
Figure 37 Estimated marginalized mean depersonalisation time variable

9.8 Positive And Negative Affect Scale (PANAS)

PANAS was measured as a sub-scale instead of an overall scale due to the nature of the scale (as mentioned in section 9.2). The following sections provided ANOVA findings for positive affect and negative affect.

9.8.1 Positive affect

Figure 38 illustrated the progression of PANAS positive affect mean scores from baseline to the 3-month follow-up. The graph showcased an increase in positive affect scores for the intervention group post-intervention, which was sustained up to 3-month follow-up.

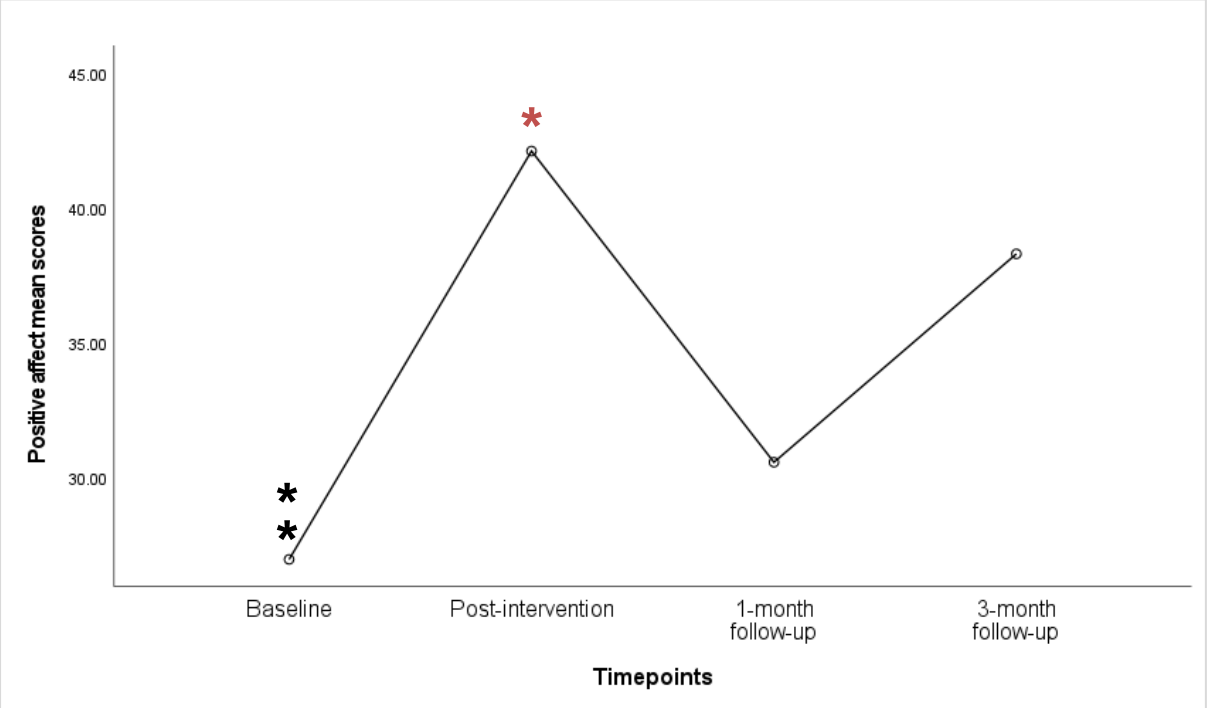


Abbreviations: * indicated statistically significant increase in positive affect scores for the intervention group from baseline to post-intervention, baseline to 3-month follow-up, and post-intervention to 3-month follow-up. * Indicated statistically significant decrease in positive affect for intervention group from post-intervention to 1-month follow-up and decrease in positive affect for active control group from post-intervention to 1-month follow-up. ◊ indicated statistically significant differences in mean scores between the groups.

Figure 38 Estimated marginalized mean scores for positive affect

A two-way repeated measure ANOVA findings indicated statistically significant differences in variance for group and time interactions (F (3, 51) = .311, p=.018). Post hoc analysis indicated statistically significant increase in positive affect outcomes from baseline to post-intervention (MD=-17.6, 95% CI -28.37 – -6.84, p= <.001) and from baseline to 3-months follow-up (MD=-12.2, 95% CI -23.57 – -.83, p=.031) for the intervention group. The intervention group also indicated a statistically significant decrease in positive affect scores from post-intervention to 1-month follow-up (MD=12.4, 95% CI 3.55 – 21.24, p=.004). Moreover, the active control group indicated statistically significant increase in positive affect scores from baseline to 1-month follow-up (MD=-12.67, 95% CI -24.01 – -1.32, p=.024) and decrease in positive affect

scores from post-intervention to 1-month follow-up (MD=0.67, 95% CI 1.34 – 19.99, p=.020). Findings also indicated differences in mean scores between groups post-intervention (MD=6.62, 95% CI 1.31 – 11.93, p= .017), higher positive affect scores were indicated for intervention compared to active control participants (Figure 38). ANOVA findings also indicated statistically significant differences in variance in personal accomplishment scores for time (F (3, 51) = 13.57, p=<.001) and statistically significant differences in variance for group variable (F (1, 51) = 4.99, p=.039). Post hoc analysis for time variable indicated statistically significant increase in positive affect scores from baseline to post-intervention (MD=-15.13, 95% CI -22.95 – -7.31, p=<.001), from baseline to 3-months follow-up (MD=-11.32, 95% CI -19.59 – -3.06, p=.005) and a decrease in positive affect scores from post-intervention to 1-month follow-up (MD=11.53, 95% CI, 5.11 – 17.96, p=<.001) (Figure 39). Post hoc analysis for group variable indicated statistically significant differences between the intervention and active control group with mean difference of 5.26 (95% CI 1.27 – 9.25, p=.039).

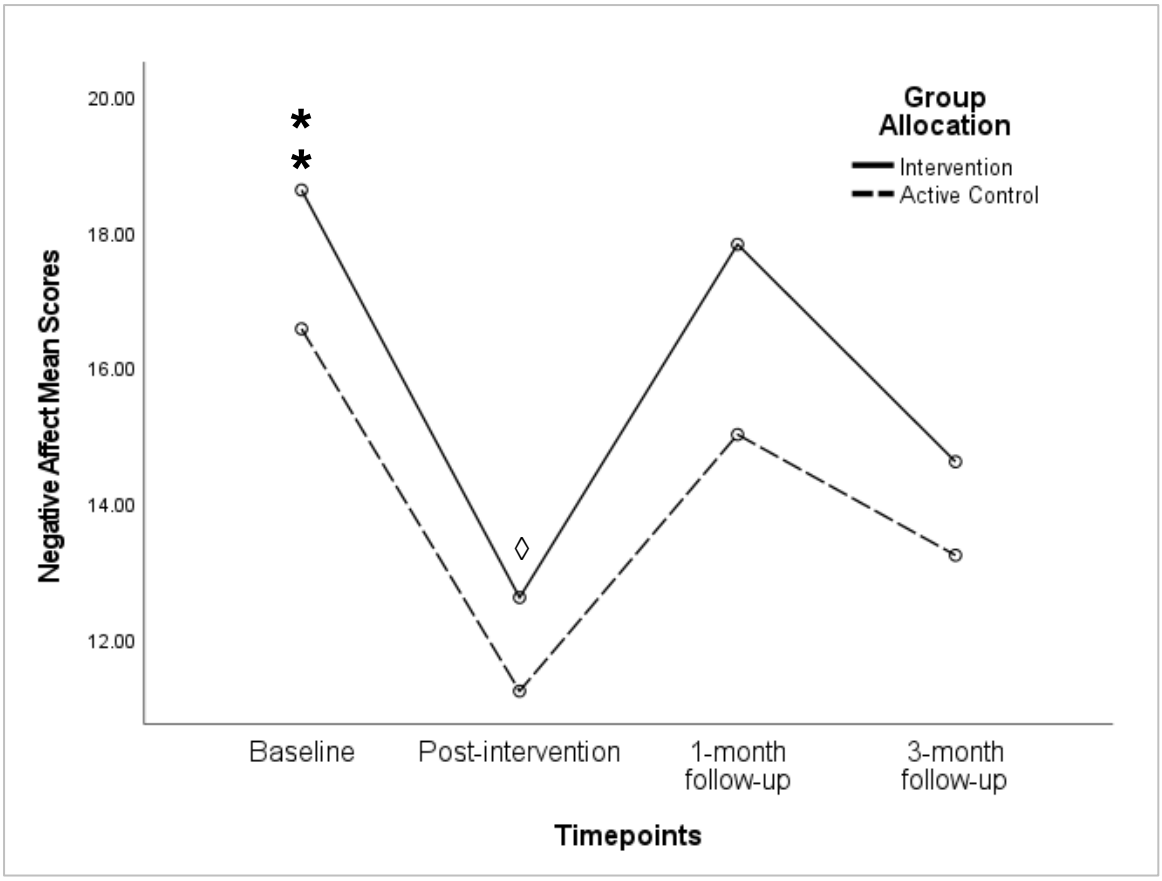


Abbreviations: * indicated statistically significant increase in positive affect scores from baseline to post-intervention, baseline to 3-month follow-up. * indicated statistically significant decrease in positive affect scores from post-intervention to 1-month follow-up.

Figure 39 Estimated marginalized mean positive affect time variable

9.8.2 Negative affect

Figure 40 illustrated the progression of PANAS negative affect mean scores from baseline to the 3-month follow-up. The graph showcased a reduction in negative affect scores for the intervention group post-intervention and until the 3-month follow-up.

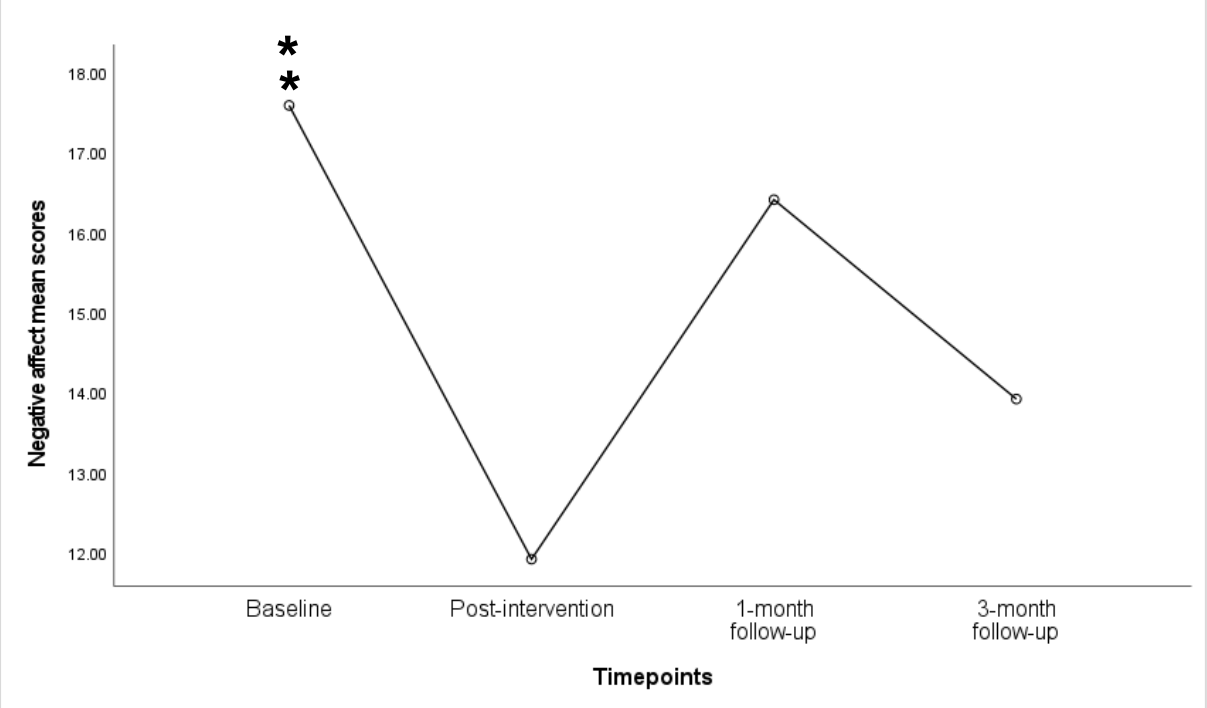


Abbreviations: * indicated statistically significant decrease in negative affect scores for the intervention group from baseline to post-intervention and baseline to 3-month follow-up. ◊ indicated statistically significant differences in mean scores between the groups.

Figure 40 Estimated marginalized mean scores for negative affect

A two-way repeated measure ANOVA findings indicated statistically significant differences in variance for group and time interactions (F (2.35, 39.96) = .110, p=.022). Post hoc analysis indicated statistically significant decrease in negative affect outcomes from baseline to post-intervention (MD=6.0, 95% CI -.10 – 12.10 p= .050), and from baseline to 3-month follow-up (MD=4, 95% CI .25 – 7.75, p=.032) for the intervention group. There were no statistically significant differences for the active control group. Findings also indicated differences in mean

scores between groups post-intervention (MD=1.38, 95% CI -1.20 – 3.95, p= .025), where lower negative affect scores were indicated for intervention compared to active control participants (Figure 40). ANOVA findings also indicated statistically significant differences in variance in negative affect scores for time (F (2.35, 39.96) = 6.18, p=.003) and no statistically significant differences in variance for group variable. Post hoc analysis for time variable indicated statistically significant decrease in negative affect scores from baseline to post-intervention (MD=5.67, 95% CI 1.24 – 10.10, p=.008) and from baseline to 3-month follow-up (MD=3.67, 95% CI .95 – 6.39, p=.005) (Figure 41).



Abbreviations: * indicated statistically significant decrease in negative affect scores from baseline to post-intervention and from baseline to 3-month follow-up.

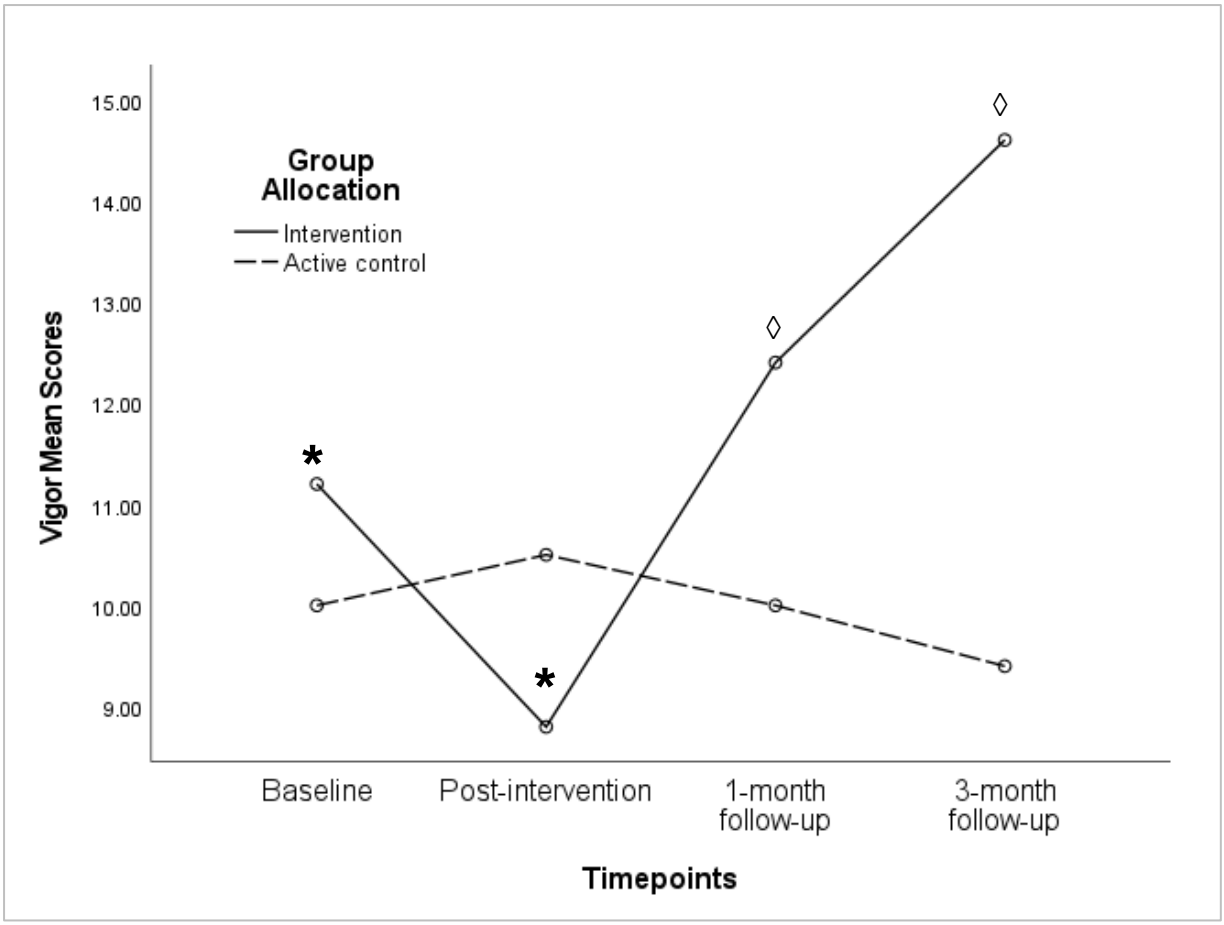
Figure 41 Estimated marginalized mean negative affect time variable

9.9 Utrecht Work Engagement Scale (UWES-SF)

UWES-SF was measured as both an overall scale and sub-scale. The following sections provided ANOVA findings for vigor, dedication, absorption, and overall UWES-SF.

9.9.1 Vigor

Figure 42 illustrated the progression of UWES-SF vigor mean scores from baseline to the 3-month follow-up. The graph showcased a decrease in vigor scores for the intervention group post-intervention, and an increase from post-intervention up to 3-month follow-up.

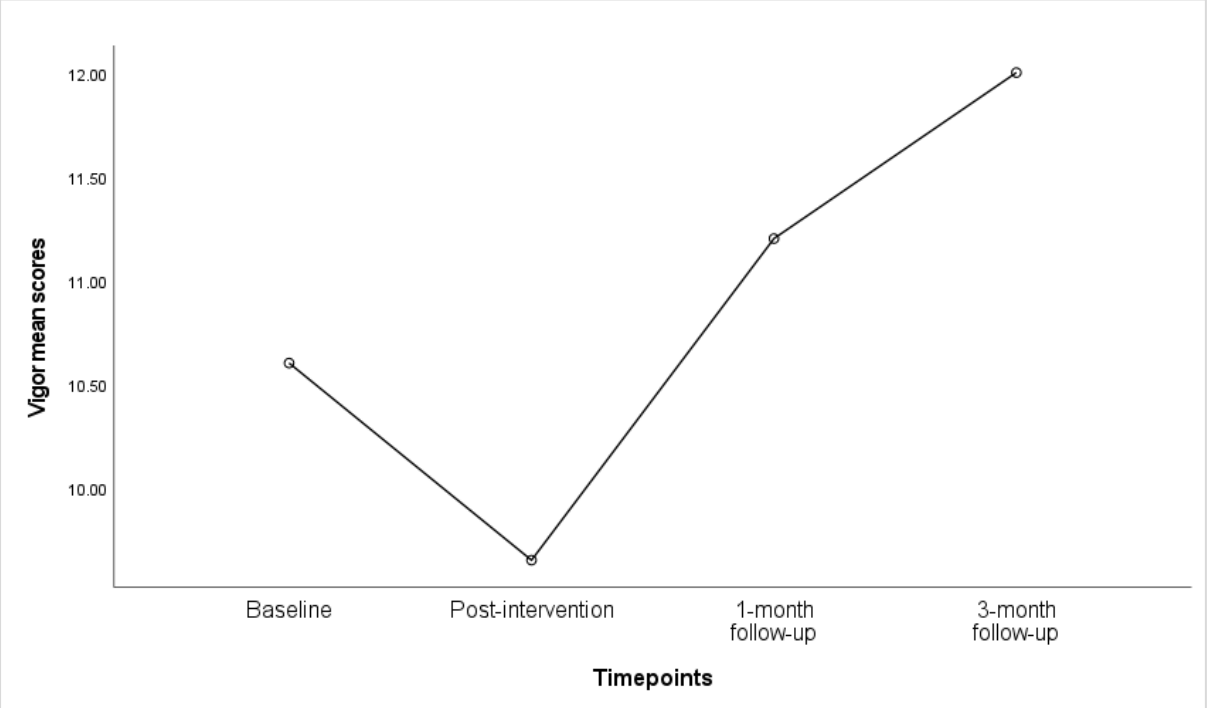


Abbreviations: * indicated statistically significant increase in vigor scores for the intervention group from baseline 3-month follow-up and from post-intervention to 3-month follow-up. ◊ indicated statistically significant differences in mean scores between the groups.

Figure 42 Estimated marginalized mean scores for vigor

A two-way repeated measure ANOVA findings indicated statistically significant differences for group in variance and time interactions (F (2.30, 41.43) = 5.2, p=.007). Post hoc analysis indicated statistically significant increase in vigor outcomes from baseline to 3-month follow-up (MD=-3.4, 95% CI -6.59 – -.21 p= .033), and from post-intervention to 3-month follow-up (MD=-5.8, 95% CI -9.89 – -1.71, p=.003) for the intervention group. There were no statistically

significant differences for the active control group. Findings also indicated differences in mean scores between groups at 1-month follow-up (MD=2.4, 95% CI .29 – 4.51, p= .028) and at 3-months follow-up (MD=5.2, 95% CI 2.9 – 7.47, p=<.001), where higher vigor scores were indicated for intervention compared to active control participants (Figure 42). ANOVA findings also indicated no statistically significant differences in variance for vigor scores for time (F (2.30, 41.43) = 2.5, p=.087) (Figure 43) but statistically significant differences in variance for group variable (F (1, 41.42) = 12.3, p=.003). Post hoc analysis for group variable indicated statistically significant differences in vigor scores between the intervention and active control group with a mean difference of 1.78 (95% CI .71 – 2.84, p=.003).



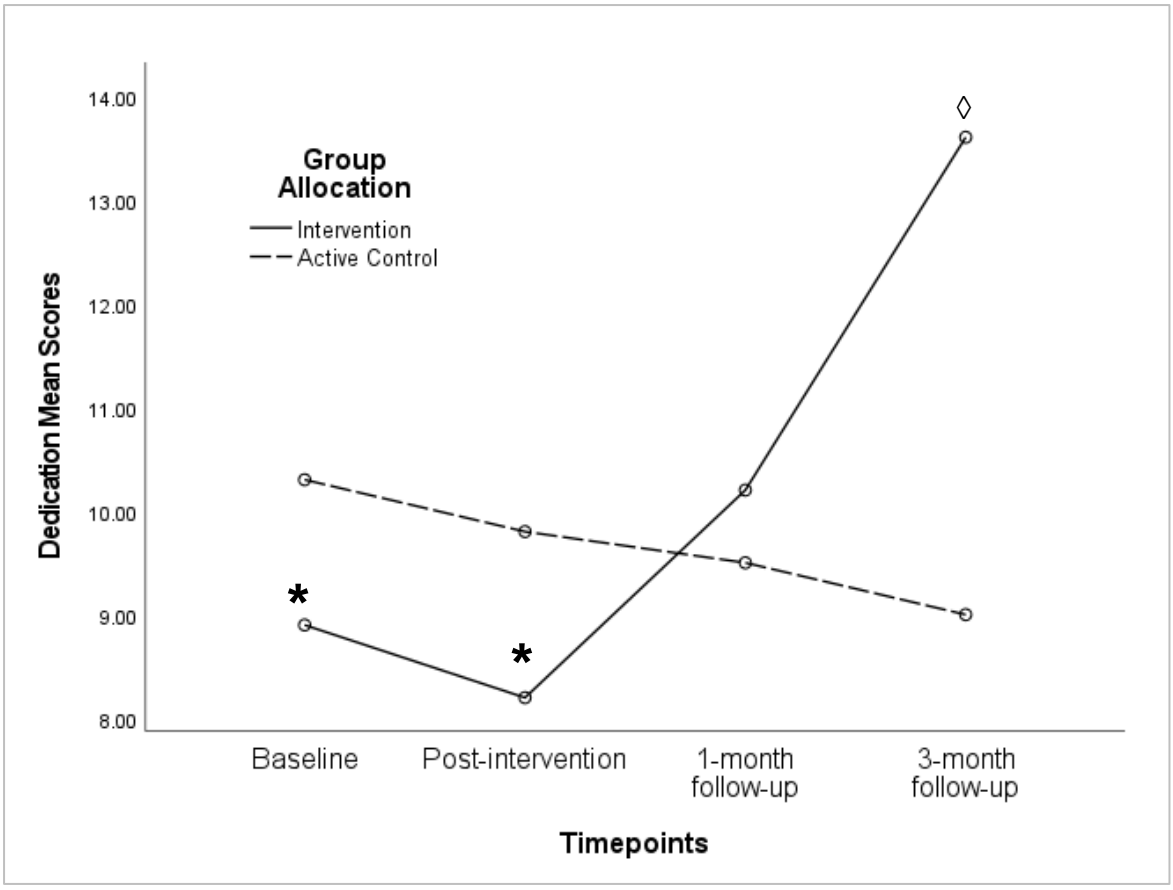
Abbreviations: There were no statistically significant results for vigor for time variable.

Figure 43 Estimated marginalized mean vigor time variable

9.9.2 Dedication

Figure 44 illustrated the progression of UWES-SF dedication mean scores from baseline to the 3-month follow-up. The graph showcased a decrease in dedication scores for the

intervention group post-intervention, and an increase from post-intervention up to 3-month follow-up.

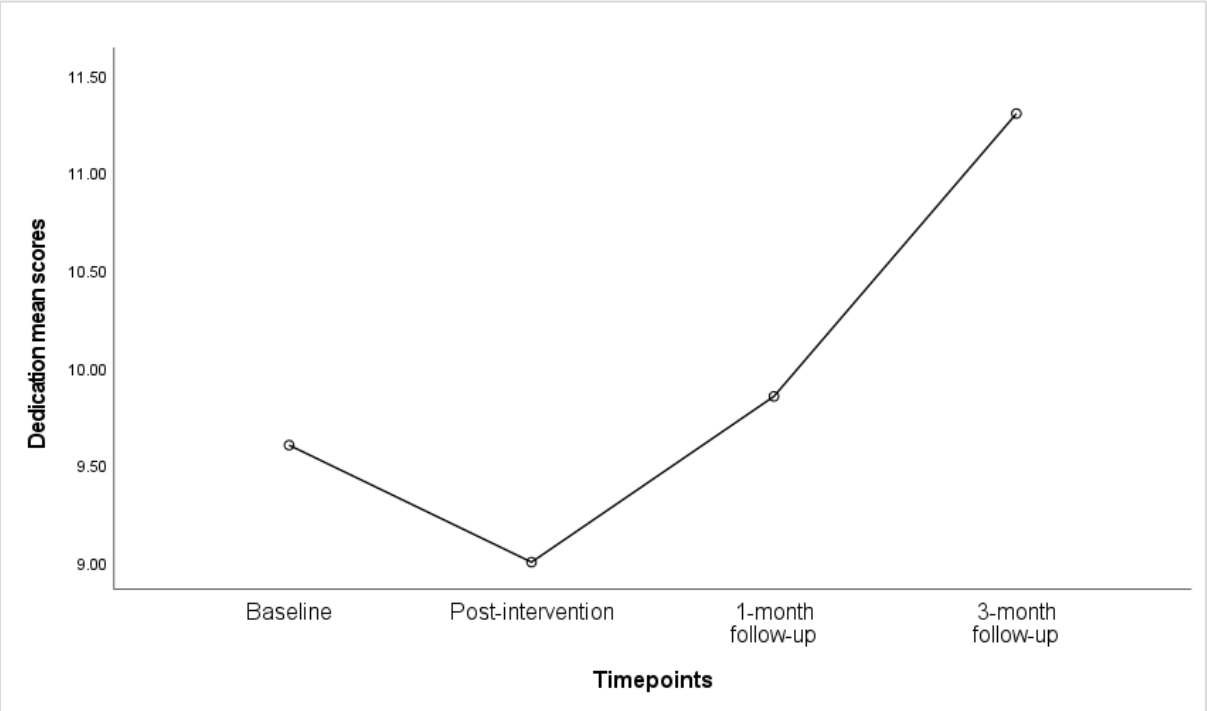


Abbreviations: * indicated statistically significant increase in dedication for the intervention group from baseline 3-month follow-up and from post-intervention to 3-month follow-up. ◊ indicated statistically significant differences in mean scores between the groups.

Figure 44 Estimated marginalized mean scores for dedication

A two-way repeated measure ANOVA findings indicated statistically significant differences in variance for group and time interactions (F (2.13, 38.36) = 3.12, p=.05). Post hoc analysis indicated statistically significant increase in dedication outcomes from baseline to 3-month follow-up (MD=-4.7, 95% CI -8.53 – -.87 p= .011), and from post-intervention to 3-month follow-up (MD=-5.4, 95% CI -10.34 – -.56, p=.027) for the intervention group. There were no statistically significant differences for the active control group. Findings also indicated differences in mean scores between groups at 3-month follow-up (MD=4.6, 95% CI 1.61 – 7.59, p= .005), where higher dedication scores were indicated for intervention compared to

active control participants (Figure 44). ANOVA findings also indicated no statistically significant differences in variance for dedication scores for time F (2.13, 38.36) = 1.44, p=.251) (Figure 45) and for group variable (F (1, 38.36) = .438, p=.517).

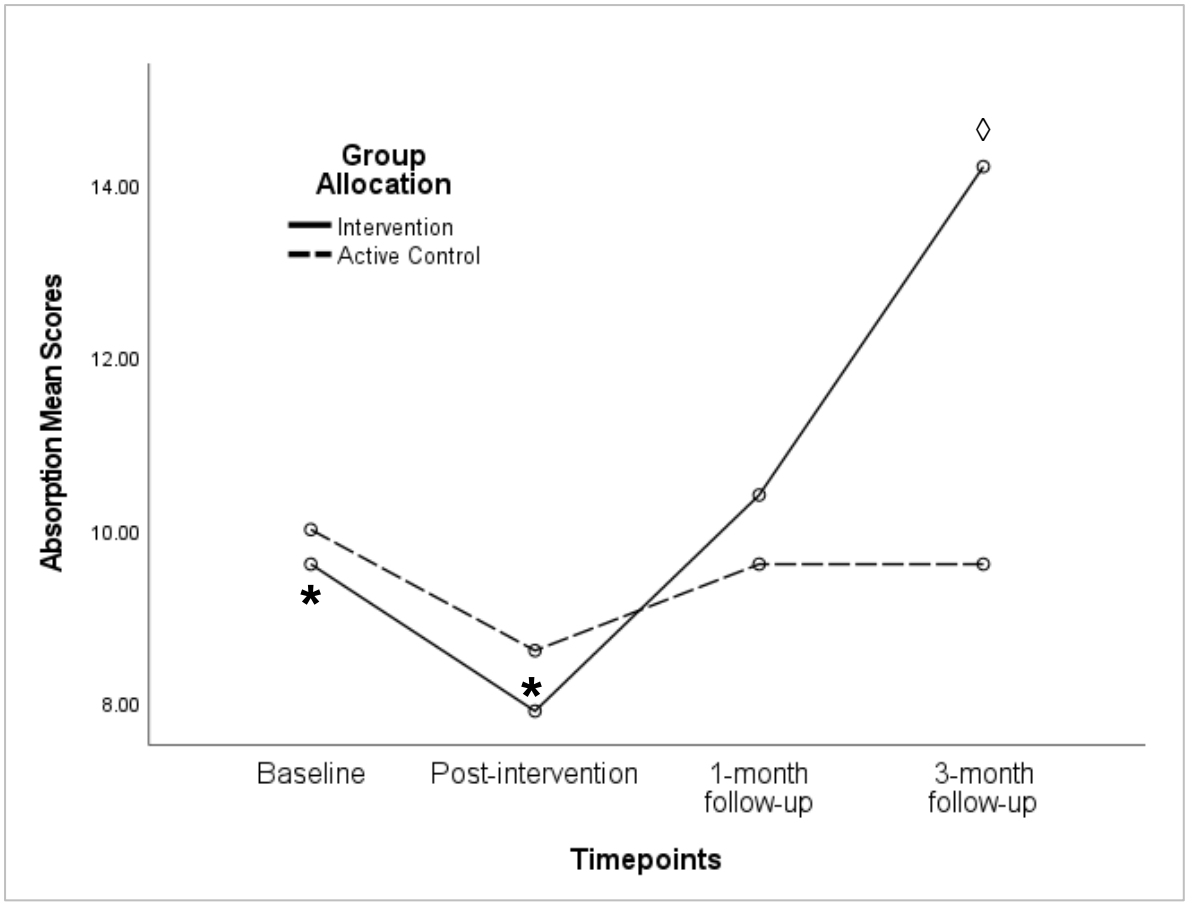


Abbreviations: There were no statistically significant results for dedication time variable.

Figure 45 Estimated marginalized mean dedication time variable

9.9.3 Absorption

Figure 46 illustrated the progression of UWES-SF absorption mean scores from baseline to the 3-month follow-up. The graph showcased a decrease in absorption scores for the intervention group post-intervention, and an increase from post-intervention up to 3-month follow-up, surpassing absorption scores of the active control group.

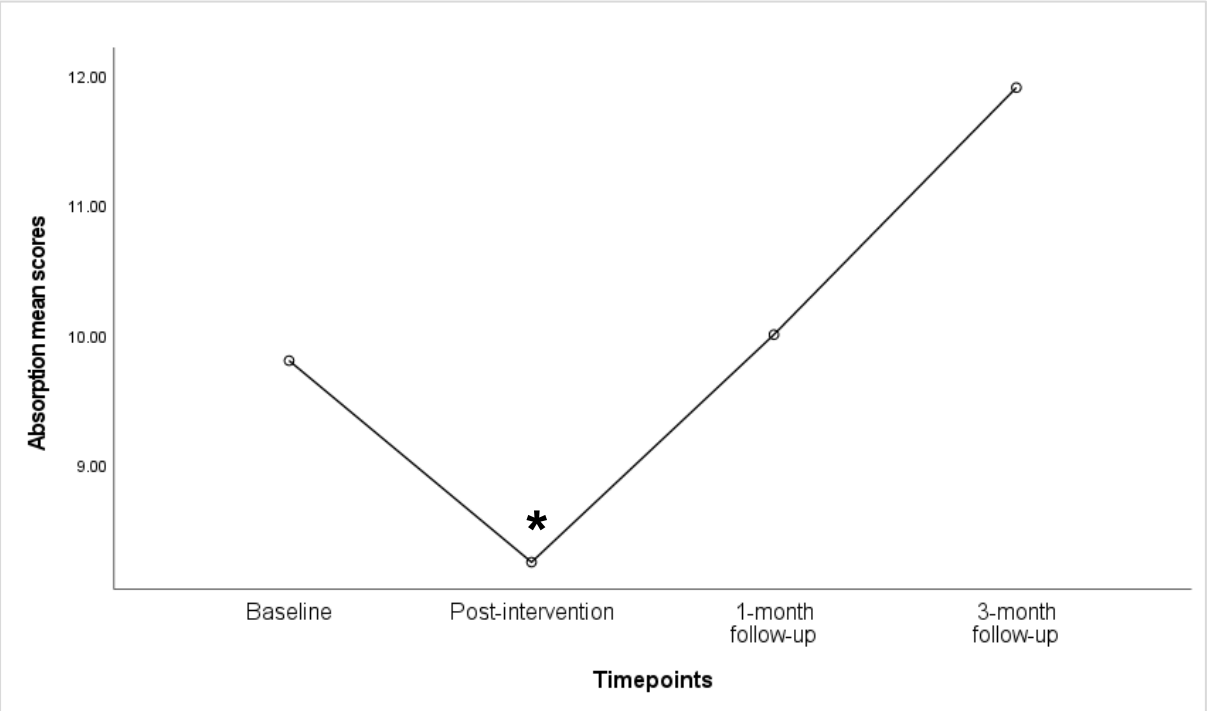


Abbreviations: * indicated statistically significant increase in absorption for the intervention group from baseline 3-month follow-up and from post-intervention to 3-month follow-up. ◊ indicated statistically significant differences in mean scores between the groups.

Figure 46 Estimated marginalized mean scores for absorption

A two-way repeated measure ANOVA findings indicated statistically significant differences in variance for group and time interactions (F (2.16, 38.91) = 2.6, p=.043). Post hoc analysis indicated statistically significant increase in absorption outcomes from baseline to 3-month follow-up (MD=-4.6, 95% CI -8.99 – -.21 p= .037), and from post-intervention to 3-month follow-up (MD=-6.3, 95% CI -10.96 – -1.64, p=.005) for the intervention group. There were no statistically significant differences for the active control group. Findings also indicated differences in mean scores between groups at 3-month follow-up (MD=4.6, 95% CI 1.92 – 7.28, p= .002), where higher absorption scores were indicated for intervention compared to active control participants (Figure 46). ANOVA findings also indicated statistically significant differences in variance for absorption scores for time (F (2.16, 38.91) = 3.91, p=.026) and no statistically significant differences in variance for group variable (F (1, 38.91) = 3.0, p=.101).

Post hoc analysis for time variable indicated statistically significant increase in absorption scores from post-intervention to 3-month follow-up (MD=-3.65, 95% CI -6.95 – -.35, p=.025) (Figure 47).

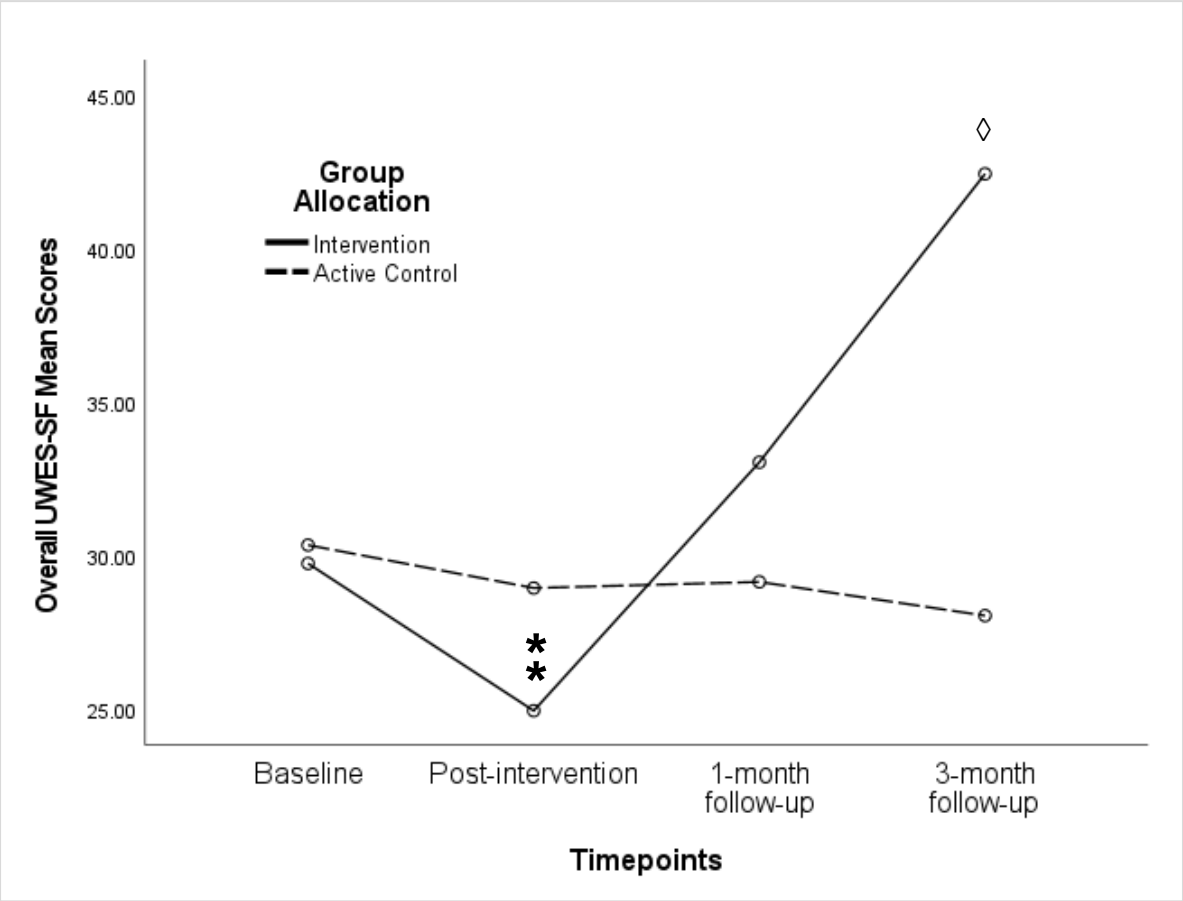


Abbreviations: * indicated statistically significant increase in absorption for time variable.

Figure 47 Estimated marginalized mean dedication time variable

9.9.4 Complete UWES-SF

Figure 48 illustrated the progression of overall UWES-SF scores from baseline to the 3-month follow-up. The graph showcased a decrease in absorption scores for the intervention group post-intervention, and an increase from post-intervention up to 3-month follow-up, surpassing absorption scores of the active control group.

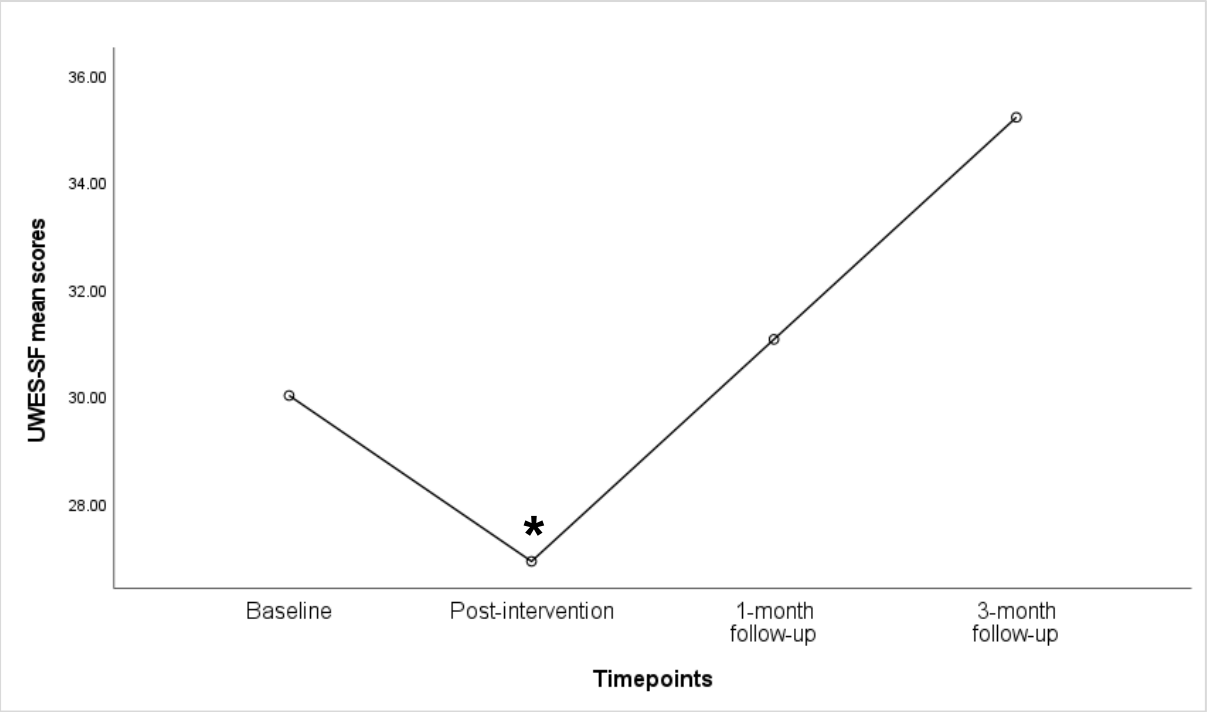


Abbreviations: * indicated statistically significant increase in overall UWES scores for the intervention group from post-intervention to 1-month follow-up and from post-intervention to 3-month follow-up. ◊ indicated statistically significant differences in mean scores between the groups.

Figure 48 Estimated marginalized mean scores for complete UWES-SF

A two-way repeated measure ANOVA findings indicated statistically significant differences in variance for group and time interactions (F (2.11, 37.92) = 4.3, p=.02). Post hoc analysis indicated statistically significant increase in work engagement (UWES-SF) outcomes from post-intervention to 1-month follow-up (MD=-12.7, 95% CI –23.54 – -1.86 p= .016), and from post-intervention to 3-month follow-up (MD=-17.5, 95% CI -29.17 – -5.83, p=.002) for the intervention group. There were no statistically significant differences for the active control group. Findings also indicated differences in mean scores between groups at 3-month follow-up (MD=14.4, 95% CI 6.69 – 22.1, p= <.001), where higher work engagement scores were indicated for intervention compared to active control participants (Figure 48). ANOVA findings also indicated statistically significant differences in variance in work engagement scores for

time (F (2.11, 37.92) = 3.13, p=.05) and statistically significant differences in variance for group variable (F (1, 37.92) = 4.11, p=.05). Post hoc analysis for time variable indicated statistically significant increase in work engagement scores from post-intervention to 3-month follow-up (MD=-8.3, 95% CI -16.55 – -.05, p=.048) (Figure 49). Post hoc analysis for group variable indicated statistically significant differences between intervention and active control groups with a mean difference of 3.43 (95% CI -.13 – 6.98, p=.050).



Abbreviations: * indicated statistically significant increase in complete UWES-SF (work engagement) from post-intervention to 3-month follow-up.

Figure 49 Estimated marginalized mean UWES-SF time variable

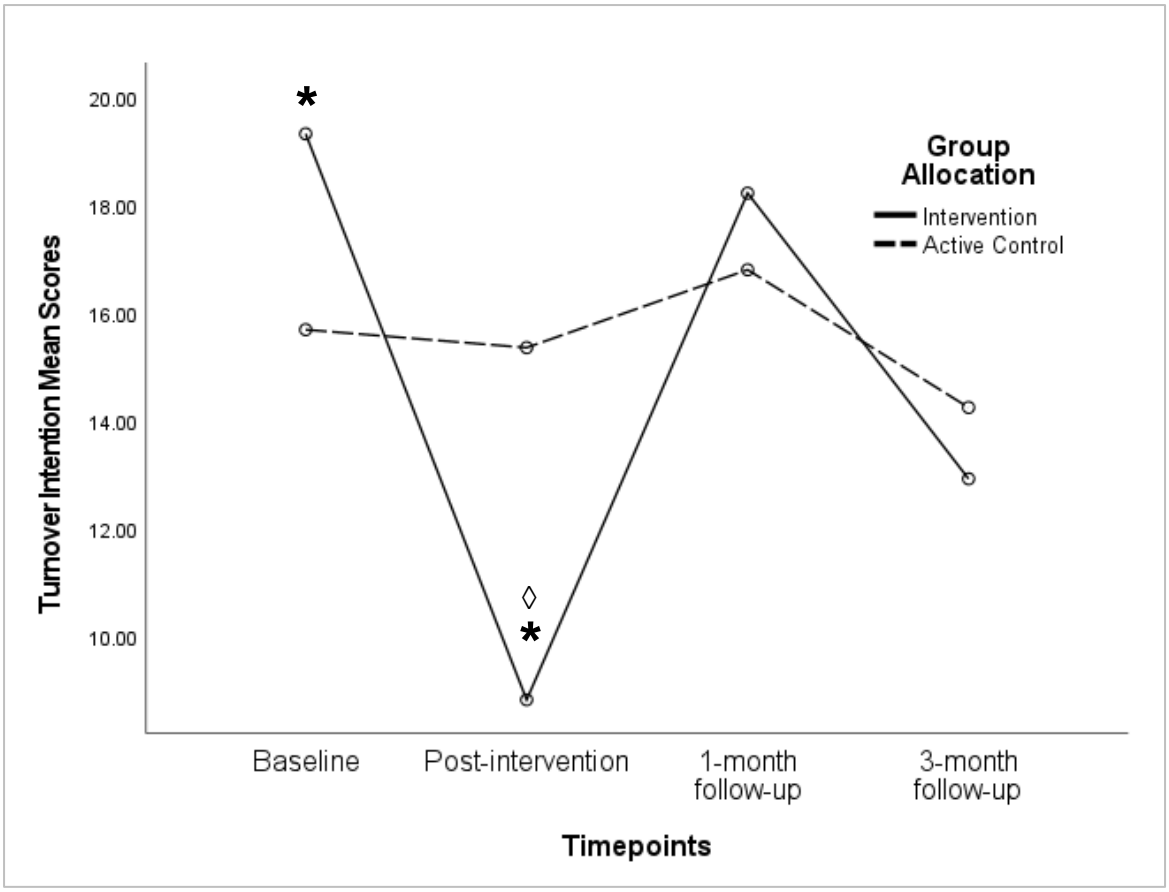
9.10 Turnover Intention Scale (TIS)

TIS was measured as an overall scale. The following sections provided ANOVA findings for turnover intention.

9.10.1 Turnover intention

Figure 50 illustrated the progression of TIS turnover intention mean scores from baseline to the 3-month follow-up. The graph showcased a reduction in depersonalisation scores for the

intervention group post-intervention, a decrease that was sustained until the 3-month follow-up.

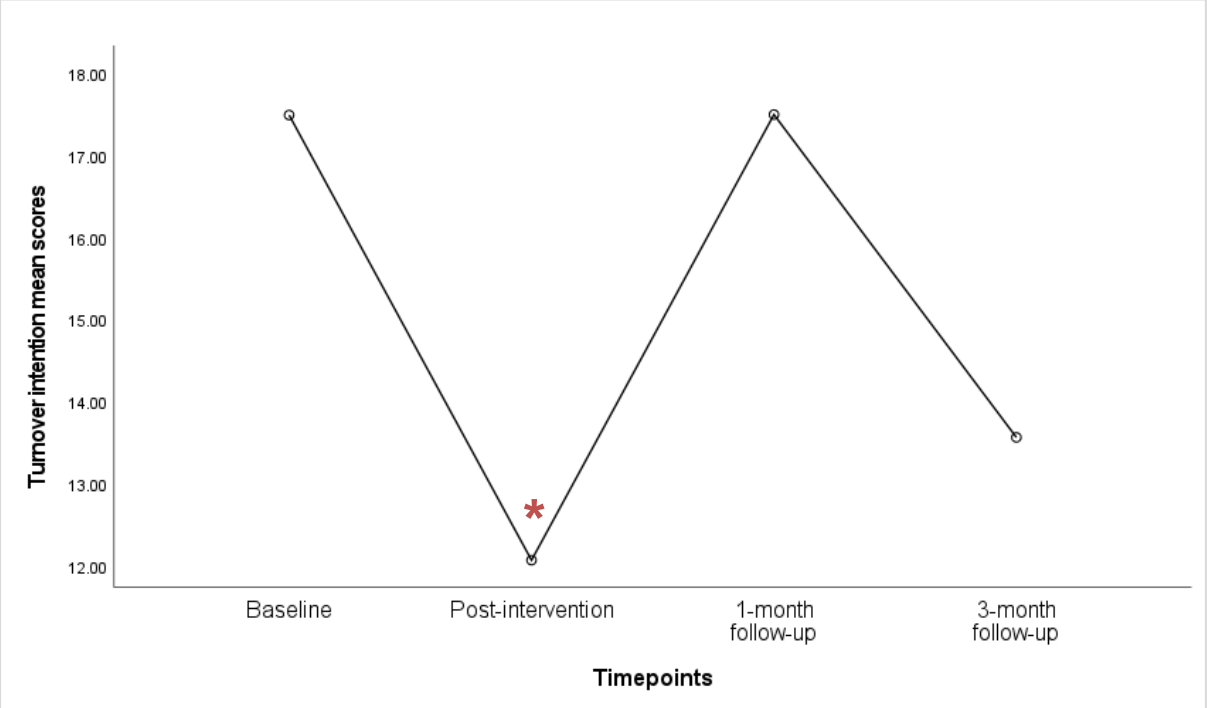


Abbreviations: * indicated statistically significant decrease in turnover intention for the intervention group from baseline to post-intervention and a statistically significant increase in turnover intention from post-intervention to 1-month follow-up. ◊ indicated statistically significant differences in mean scores between the groups.

Figure 50 Turnover intention scores across timepoints

A two-way repeated measure ANOVA findings indicated statistically significant differences in variance for group and time interactions (F (3, 51) = 2.5, p=.048). Post hoc analysis indicated a statistically significant decrease in turnover intention outcomes from baseline to post-intervention (MD=10.5, 95% CI 1.76 – 19.24, p= .014) for the intervention group. Findings also indicated statistically significant increase in turnover intention among intervention group participants from post-intervention to 3-month follow-up (MD=-9.4, 95% CI -16.01 – -2.79, p=.003) for the intervention group. There were no statistically significant differences for the active control group. Findings also indicated statistically significant differences in mean scores

between groups at post-intervention (MD=-6.53, 95% CI -10.59 – -2.48, p= .003), where turnover intention scores were lower for intervention compared to active control participants (Figure 50). ANOVA findings also indicated statistically significant differences in variance for work engagement scores for time (F (3, 51) = 4.01, p=.012) and no statistically significant differences in variance for group variable (F (1, 51) = .21, p=.652). Post hoc analysis for time variable indicated statistically significant increase in turnover intention scores from post-intervention to 1-month follow-up (MD=-5.42, 95% CI -10.23 – -.62, p=.022) (Figure 51).



Abbreviations: * indicated statistically significant increase in turnover intention from post-intervention to 1-month follow-up.

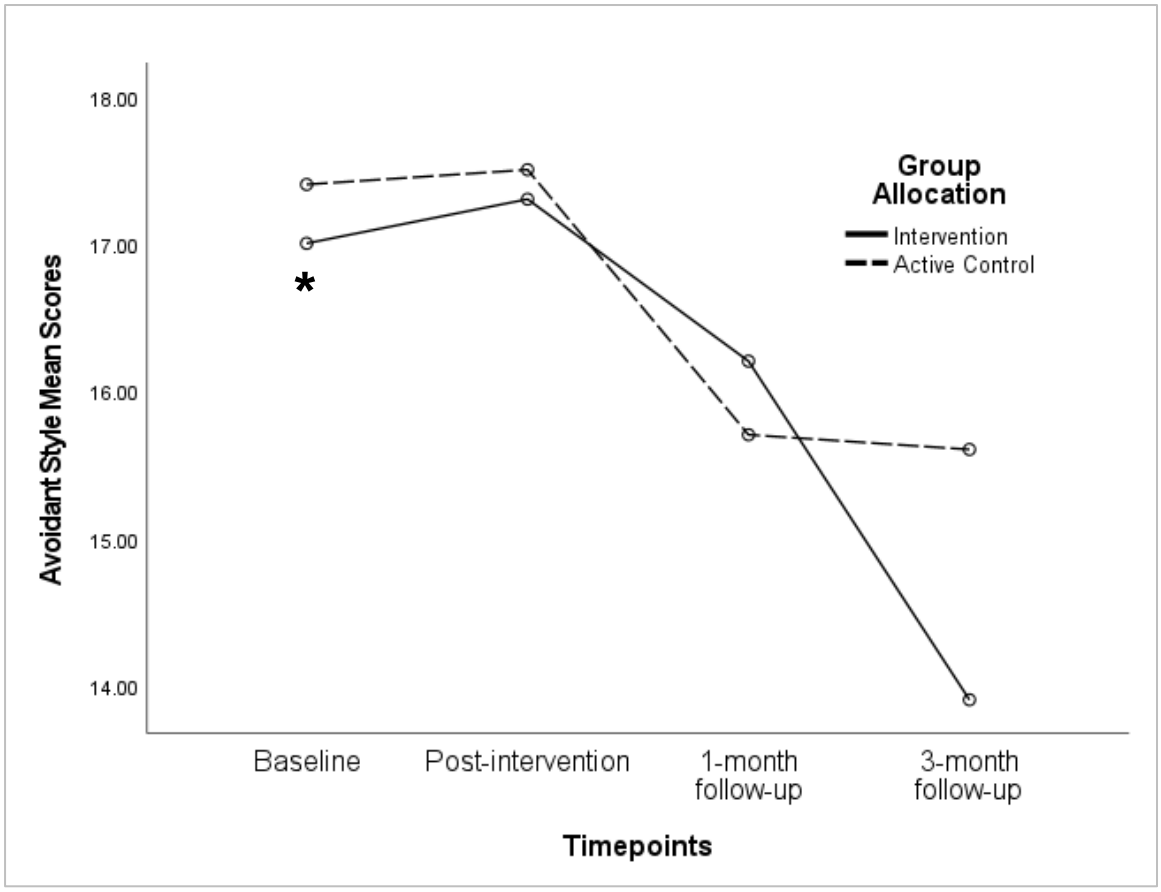
Figure 51 Estimated marginalized mean turnover intention time variable

9.11 Social Problem-Solving Inventory-Short Form (SPSI-SF)

SPSI-SF was measured as a sub-scale instead of an overall scale due to the nature of the scale (as mentioned in section 9.2). The following sections provided ANOVA findings for avoidant problem-solving, rational problem-solving, negative problem orientation, impulsivity/carelessness, and positive problem orientation.

9.11.1 Avoidant problem-solving

Figure 52 illustrated the progression of SPSI-SF avoidant problem-solving mean scores from baseline to the 3-month follow-up. The graph showcased an increase in avoidant problem-solving scores at post-intervention for the intervention group. Avoidant problem-solving scores decreased from post-intervention until 3-month follow-up, which surpassed the active control group.

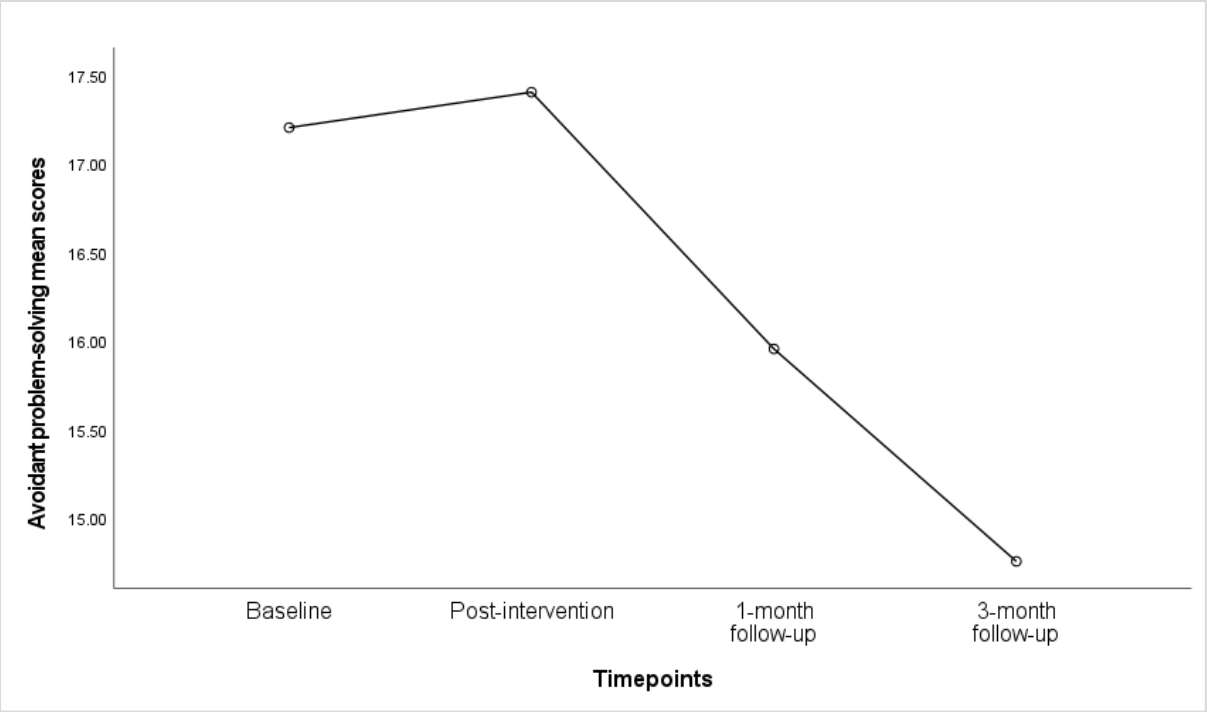


Abbreviations: * indicated statistically decrease in avoidant style for the intervention group from baseline to 3-month follow-up.

Figure 52 Estimated marginalized mean scores for avoidant style

A two-way repeated measure ANOVA findings indicated statistically significant differences in variance for group and time interactions (F (1.80, 36.46) = .33, p=.049). Post hoc analysis indicated a statistically significant decrease in avoidant problem-solving outcomes from baseline to 3-month follow-up (MD=3.1, 95% CI .32 – 5.89, p= .024) for the intervention group.

There were no statistically significant differences for the active control group and there were no statistically significant differences for negative problem orientation scores between the intervention and active control group across the different timepoints (Figure 52). ANOVA findings indicated no statistically significant differences in variance for avoidant problem-solving scores for time (F (1.80, 32.46) = 2.37, p=.114) (Figure 53) and no statistically significant differences in variance for group variable (F (1, 32.46) = .091, p=.766).

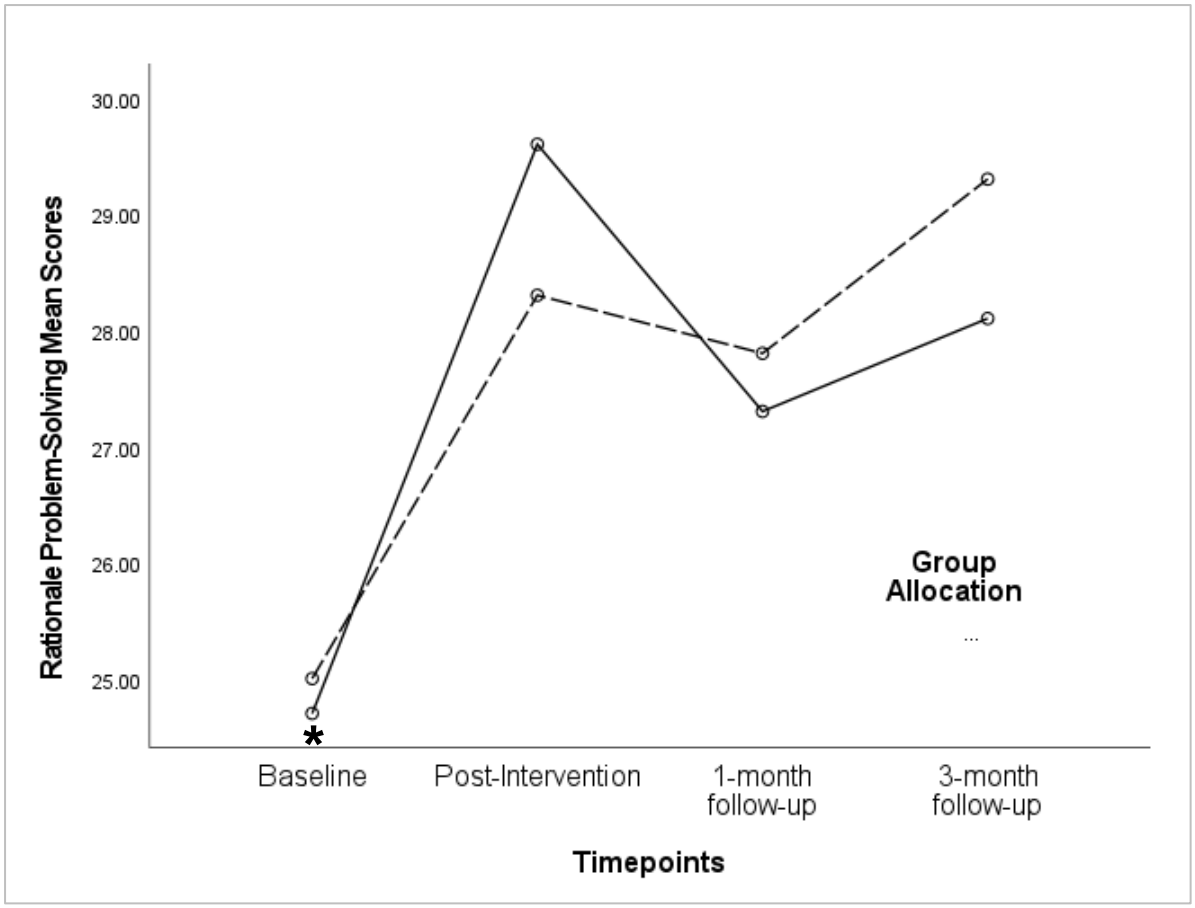


Abbreviations: There were no statistically significant results for avoidant problem-solving time variable.

Figure 53 Estimated marginalized mean avoidant problem-solving time variable

9.11.2 Rational problem-solving

Figure 54 illustrated the progression of SPSI-SF rational problem-solving mean scores from baseline to the 3-month follow-up. The graph showcased an increase in rational problem-solving scores at post-intervention for the intervention group (surpassing the active control group), which sustained at 3-month follow-up.

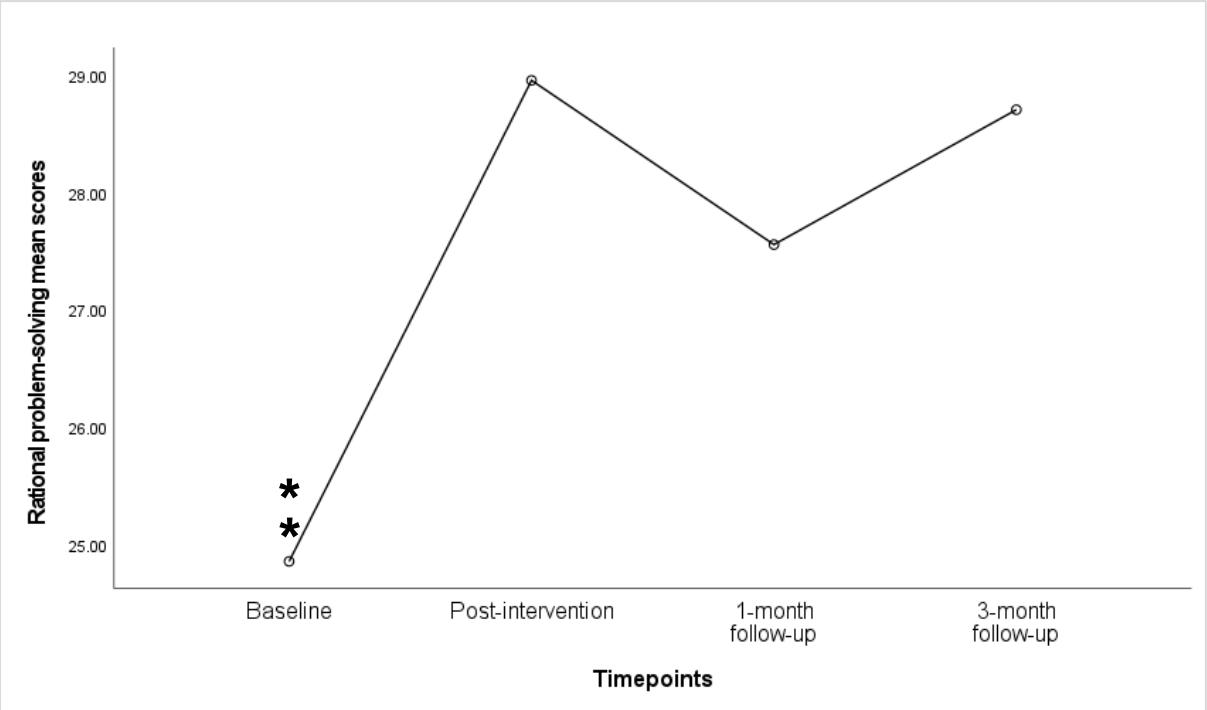


Abbreviations: * indicated statistically significant increase in rational problem-solving for the intervention group from baseline to 3-month follow-up.

Figure 54 Estimated marginalized mean scores for rational problem-solving

A two-way repeated measure ANOVA findings indicated statistically significant differences in variance for group and time interactions (F (3, 54) = .4, p=.021). Post hoc analysis indicated a statistically significant decrease in avoidant problem-solving outcomes from baseline to 3-month follow-up (MD=-4.3, 95% CI -8.40 – -.20, p= .036) for the intervention group. There were no statistically significant differences for the active control group. There were also no statistically significant differences for negative problem orientation scores between the intervention and active control group across the different timepoints (Figure 54). ANOVA findings indicated statistically significant differences in variance for rational problem-solving scores for time (F (3, 54) = 5.6, p=.002) and no statistically significant differences in variance for group variable (F (1, 54) = .010, p=.920). Post hoc analysis for time variable indicated statistically significant increase in rational problem-solving scores from baseline to post-

intervention (MD=-4.1, 95% CI -8.04 – -.17, p=.038) and from baseline to 3-month follow-up (MD=3.85, 95% CI -6.75 – -.95, p=.006) (Figure 55).

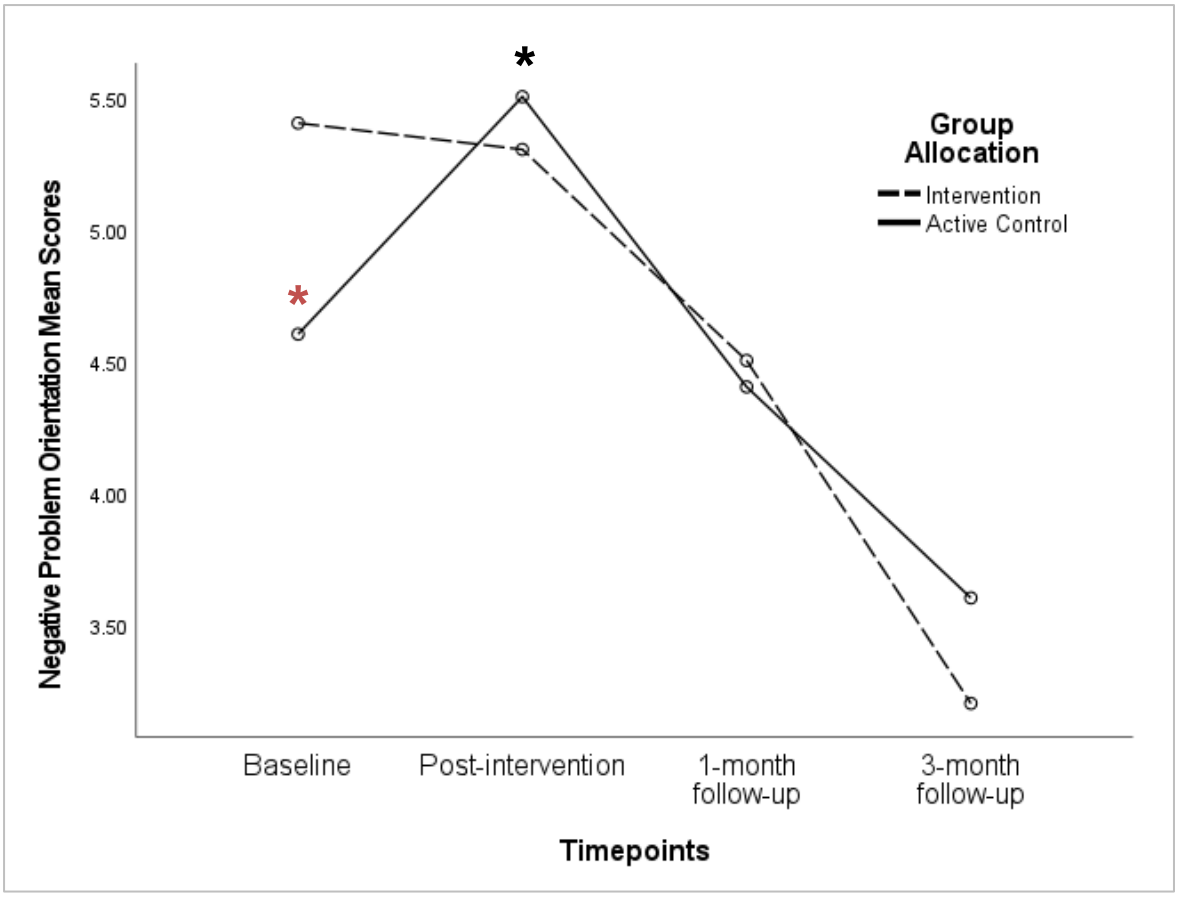


Abbreviations: * indicated statistically significant increase in rational problem-solving scores from baseline to post-intervention and from baseline to 3-month follow-up.

Figure 55 Estimated marginalized mean rational problem-solving time variable

9.11.3 Negative problem orientation

Figure 56 illustrated the progression of SPSI-SF negative problem orientation mean scores from baseline to the 3-month follow-up. The graph showcased an increase in negative problem orientation scores at post-intervention for the intervention group, which surpassed the active control group's scores. Moreover, negative problem orientation scores decreased from post-intervention until 3-month follow-up.

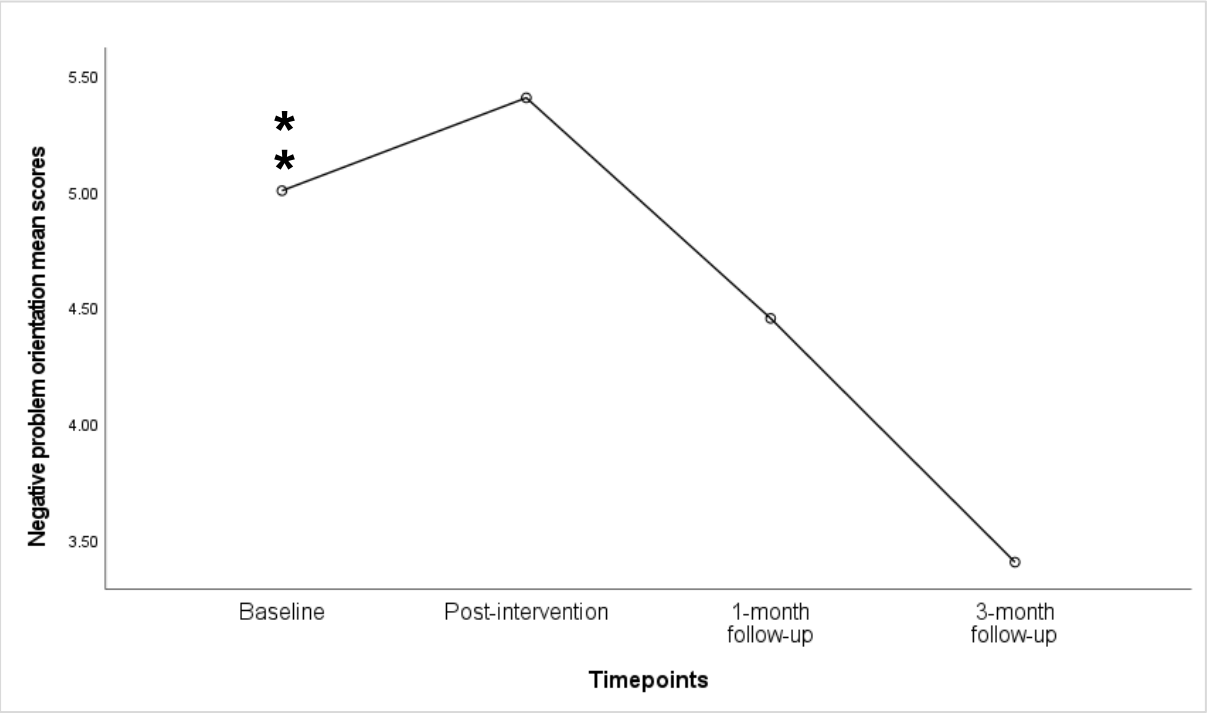


Abbreviations: * indicated statistically significant increase in negative problem orientation for the intervention group from baseline to 3-month follow-up. * indicated statistically significant decrease in negative problem orientation from post-intervention to 3-month follow-up.

Figure 56 Estimated marginalized mean scores for negative problem orientation

A two-way repeated measure ANOVA findings indicated statistically significant differences in variance for group and time interactions (F (2.07, 37.33) = .82, p=.050). Post hoc analysis indicated a statistically significant decrease in negative problem orientation outcomes from baseline to 3-month follow-up (MD=2.2, 95% CI 1.45 – 2.95, p=<.001) and from post-intervention to 3-month follow-up (MD=2.1, 95% CI .01 – 4.19, p=.049) for the intervention group. Findings also indicated statistically significant decrease in negative problem orientation for the active control group from baseline to 3-month follow-up (MD=1, 95% CI .25 – 1.75, p=.006). There were also no statistically significant differences for negative problem orientation scores between the intervention and active control group across the different timepoints (Figure 56). ANOVA findings indicated statistically significant differences in variance for negative problem orientation scores for time (F (2.07, 37.33) = 8.93, p=<.001)

and no statistically significant differences in variance for group variable (F (1, 37.33) = .04, p=.850). Post hoc analysis for time variable indicated statistically significant decrease in negative problem orientation scores from baseline to post-intervention (MD=1.6, 95% CI 1.07 – 2.13, p=<.001) and from baseline to 3-month follow-up (MD=2, 95% CI .52 – 3.48, p=.005) (Figure 57).

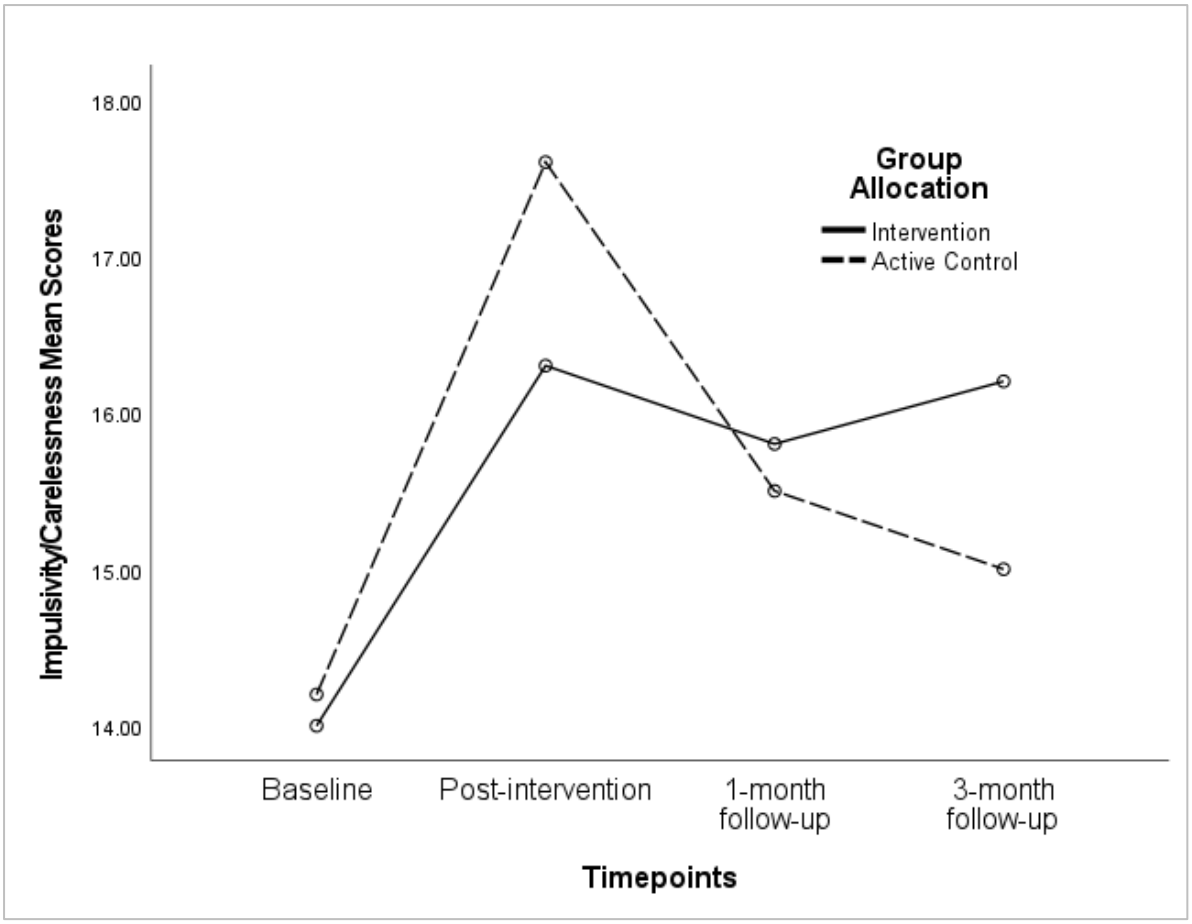


Abbreviations: * indicated statistically significant decrease in negative problem orientation scores from baseline to post-intervention and from baseline to 3-month follow-up.

Figure 57 Estimated marginalized mean negative problem orientation time variable

9.11.4 Impulsivity/carelessness

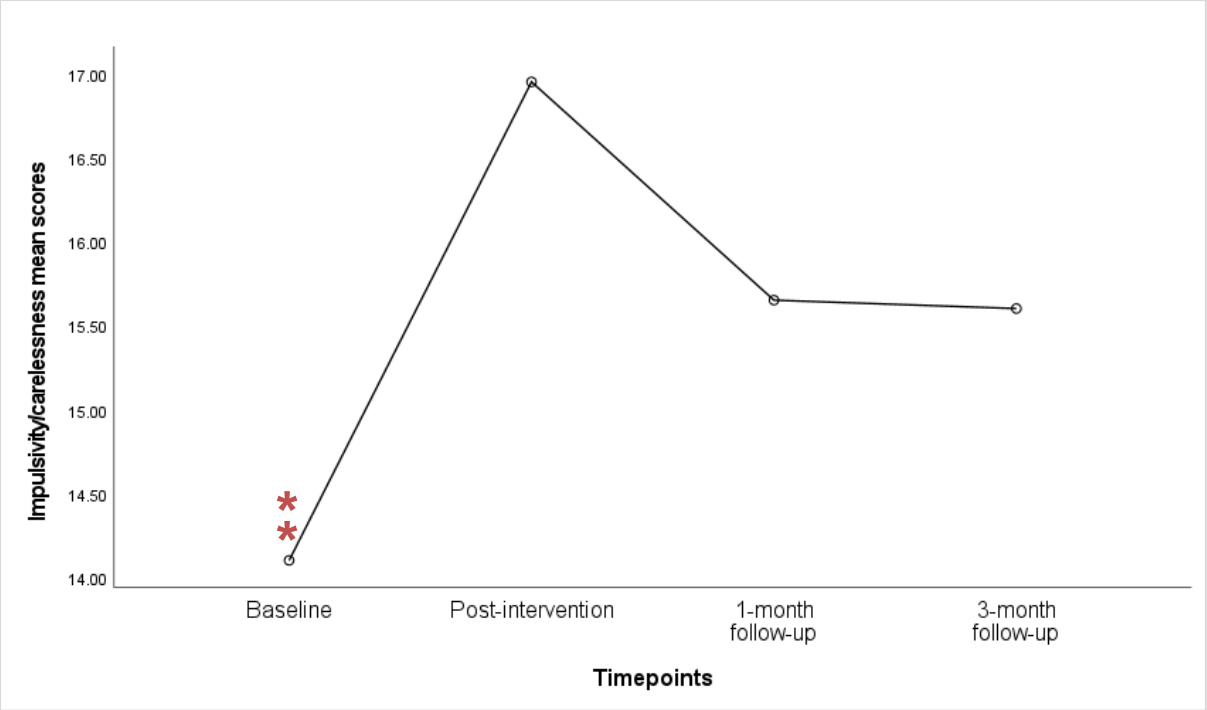
Figure 58 illustrated the progression of SPSI-SF impulsivity/carelessness mean scores from baseline to the 3-month follow-up. The graph showcased an increase in impulsivity/carelessness scores at post-intervention for the intervention group, which were maintained at 3-month follow-up.



Abbreviations: There were no statistically significant results for impulsivity/carelessness for both intervention and active control groups.

Figure 58 Estimated marginalized mean scores for impulsivity/carelessness

A two-way repeated measure ANOVA findings indicated no statistically significant differences in variance for group and time interactions (F (3, 54) = 1.4, p=.258) for impulsivity/carelessness (Figure 52). ANOVA findings indicated, statistically significant differences in variance for time variable (F (3, 54) = 3.89, p=<.001) (Figure 58) and no statistically significant differences in variance for group variable (F (1, 54) = 0, p=1.00). Post hoc analysis for time variable indicated statistically significant decrease in impulsivity/carelessness scores from baseline to post-intervention (MD=-2.85, 95% CI -5.22– -.48, p=.013) and from baseline to 1-month follow-up (MD=-1.55, 95% CI -5.47 – -.13, p=.026) (Figure 59).

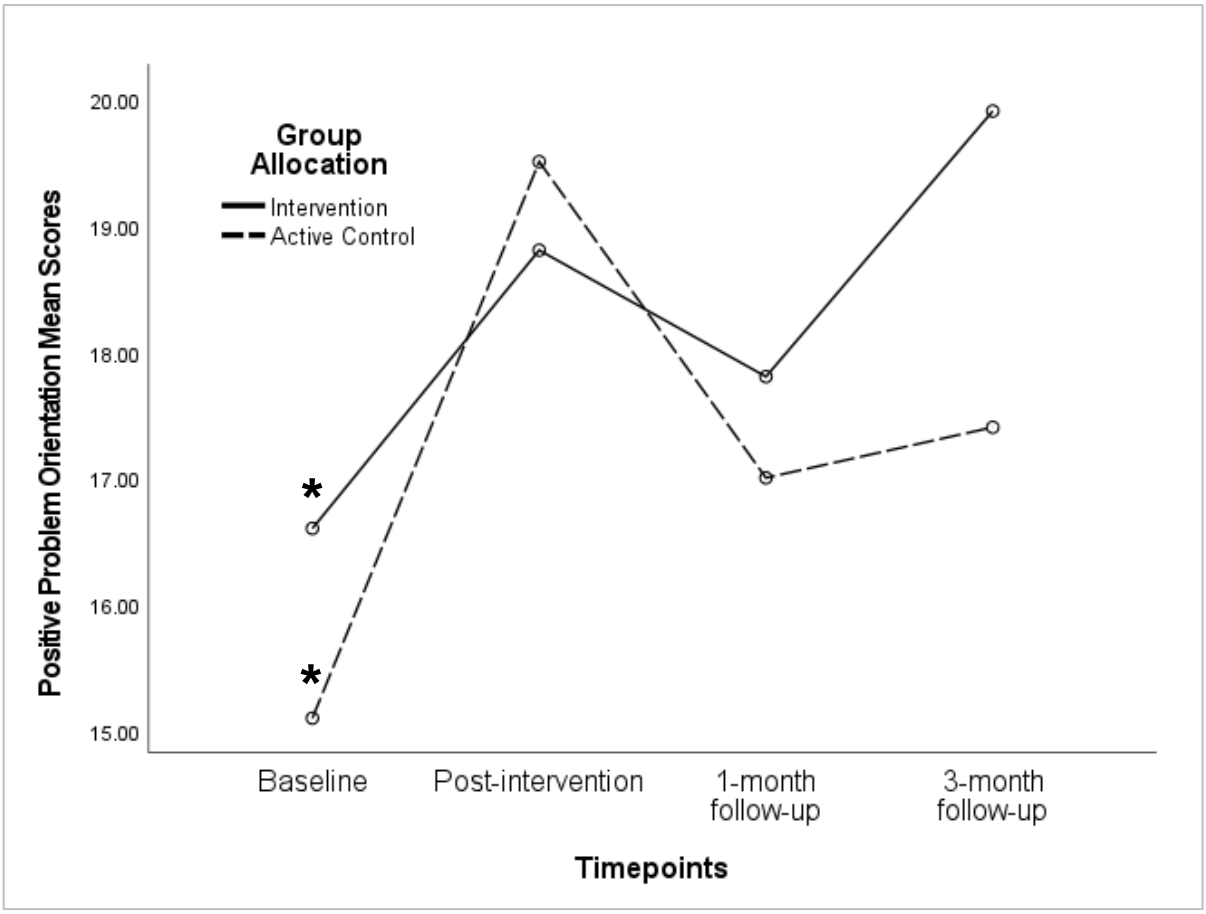


Abbreviations: * indicated statistically significant increase in impulsivity/carelessness scores from baseline to post-intervention and from baseline to 1-month follow-up.

Figure 59 Estimated marginalized mean impulsivity/carelessness time variable

9.11.5 Positive problem orientation

Figure 60 illustrated the progression of SPSI-SF positive problem orientation mean scores from baseline to the 3-month follow-up. The graph showcased an increase in positive problem orientation scores at post-intervention for the intervention group, which was sustained at 3-month follow-up (surpassing the active control group).

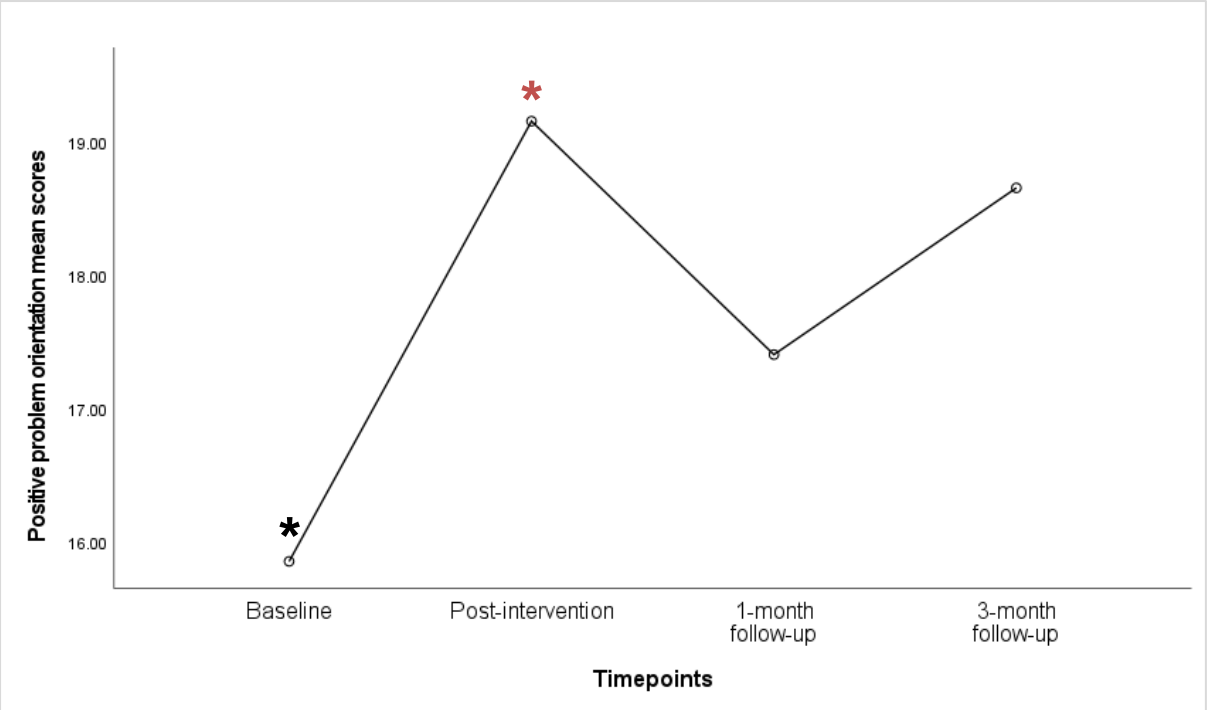


Abbreviations: * indicated statistically significant increase in positive problem orientation for the intervention group from baseline to 3-month follow-up and a statistically significant increase for the active control group from baseline to post-intervention.

Figure 60 Estimated marginalized mean scores for positive problem orientation

A two-way repeated measure ANOVA findings indicated statistically significant differences in variance for group and time interactions (F (3, 54) = .81, p=.043). Post hoc analysis indicated a statistically significant increase in positive problem orientation outcomes from baseline to 3-month follow-up (MD=-3.3, 95% CI -7.08 – -.48, p= .011) for the intervention group. The active control group indicated statistically significant increase in positive problem orientation from baseline to post-intervention (MD=-4.4, 95% CI -8.59 – -.21, p=.036). There were also no statistically significant differences for positive problem orientation scores between the intervention and active control group across the different timepoints (Figure 60). ANOVA findings indicated statistically significant differences in variance for positive problem orientation scores for time variable (F (3, 54) = 3.89, p=.014) and no statistically significant

differences in variance for group variable (F (1, 54) = .775, p=.390). Post hoc analysis for time variable indicated statistically significant increase in positive problem orientation scores from baseline to 1-month follow-up (MD=-3.3, 95% CI -6.26 – -.34, p=.024) and from posit-intervention to 3-month follow-up (MD=-2.8, 95% CI -5.47 – -.13, p=.036) (Figure 61).



Abbreviations: * indicated statistically significant increase in positive problem orientation from baseline to 1-month follow-up. * indicated a decrease in positive problem orientation from post-intervention to 3-month follow-up.

Figure 61 Estimated marginalized mean positive problem orientation time variable

9.12 Themes contributing to preliminary effectiveness

Feedback interviews and questionnaires were conducted with participants at the post-intervention stage to gather their perspectives on the factors that contributed to the effectiveness of the intervention. The data obtained from these feedback sessions underwent a thematic analysis, a qualitative method that identifies common themes and patterns within the data. Two main themes emerged from participants' feedback pertaining to the effectiveness of the intervention: i) Reciprocity and ii) Self-awareness (Figure 62).

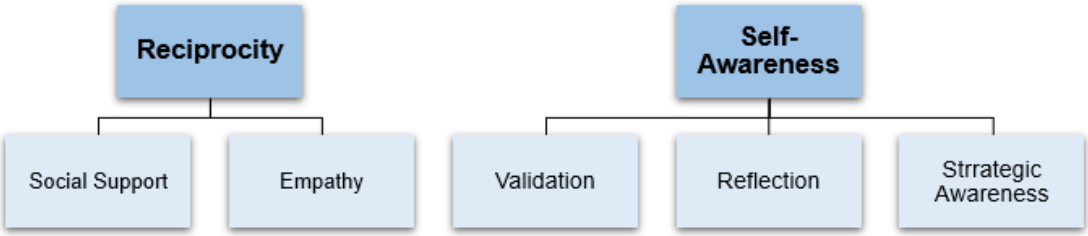


Figure 62 Thematic mapping of preliminary effectiveness outcomes

9.13 Reciprocity

Reciprocity was understood as the practice of offering assistance or performing beneficial actions towards others, expecting a similar kind of support or advantage in return (298). This section was termed 'reciprocity' as it delved into the participants' discussions on how the intervention (both in the intervention and active control groups) empowered them to engage in a reciprocal exchange, granting them the advantages of self-expression, comfort, and reassurance. This section discussed three sub-themes, including (1) social support – having a space to share and (2) empathy – the ability to relate to one another. The same participant allocation reported in Section 8.6, Table 33 was applied to these qualitative sections.

9.13.1 Social support

Participants in both intervention and active control groups acknowledged that critical care workplaces are isolating, and thus, having a platform to build connections with others as a form of social support has been beneficial. One participant described the difficulty of getting together with her colleagues to talk and off load her stressors.

> **IRN102:** "[…] it's just hard to even have a meeting with colleagues nowadays and I think a debrief session with everyone was fantastic."

Other participants also agreed that the workplace environment was isolating and lonely. Two participants described their isolating work environment as normal due to elevated stress and workload and suggested that the debrief sessions gave them a sense of self-awareness.

> **IRN201:** "[...] i'm in my own bubble (at work) sometimes […] it's a normal thing for us […] so it was nice to talk to people that know what I'm talking about"

> **IRN202:** "[…] we get in our little area in our hospital and its very rare that we network. I think we're all just so stress and the workload, it's just too much […] it's just how it is. […] I didn't realise how much I needed to get out of my chest."

All participants also commented that the COVID-19 pandemic had a significant influence in intensifying feelings of isolation and loneliness. One participant commented that the debrief sessions made her realise the need for her to seek longer-term support.

> **IRN102:** "I think that COVID(-19) has sort of closed networks […] we don't even have lunch together at work anymore because number one, busy, and two, we don't use our lunchroom. […] it's not safe because we share with ED so even at lunchtime you don't get the chance to sit and chat with people you work, so, that social interaction has really decreased. I guess the sessions made me realise how much I needed to talk to people, it was really good, I'll probably have to find something similar after this (referring to the completion of the study)."

One participant referenced COVID-19 as a potential reason to his aggravated stress levels and acknowledged that the sessions made him feel happier.

> **IRN301:** "it was just great that I was able to talk to others, it's been really good for my mental health I think […] it's been a while because of COVID(-19), I think not talking to anyone has been hard. I don't have family to talk to either and I don't know where to off load my stress. It builds up like blowing a balloon and I feel that it would just burst one day. But I guess on the bright side, I just feel a lot happier after having gone through the sessions."

Another participant explained that she misses the ability to talk to her colleagues and suggested that the intervention has been helpful for her to re-establish that experience.

> **IRN204:** "[…] you got to talk to your colleagues about work and off load things […] I miss that, so I think the weekly sessions have helped me."

All participants in the intervention and active control group explained that the debriefing was helpful as it enabled them to have a space to vent about their problems, which made the sessions therapeutic.

> **IRN302:** "[…] I had that space to vent (referring to the debrief sessions), which gave me a sense of comfort and support […] I think it was really beneficial."
>
> **CRN109:** "I think the most helpful I found out of that (debrief sessions) was just talking it out."
>
> **CRN106:** "[…] it's sort of therapeutic in a way when you do talk about it so it's not something that you would talk to strangers."

One participant added that the debrief sessions was beneficial as it enabled her to gain confidence in herself.

> **CRN206:** "I found that talking through things is actually way better than bottling it all up yourself or feeling that you're somehow less worthy."

Participants also felt that having the debrief sessions with likeminded individuals (i.e. similar profession and workplace environment) enhanced their experience as they were able to relate with each other. One participant noted that this was the key difference between his experience with the Employee Assistance Program (EAP).

> **IRN302:** "The psychologist in EAP just didn't understand what I'm going through. It's so different to this experience, I feel like everyone understood me and it was just such a nice experience and a relief that I'm not the only one going through this. […] the EAP psychologist dismissed what I have to say, and it just felt like they were undermining my stressors."

Another participant noted that they felt relatable and described it as a positive experience.

> **CRN308:** "Even though everyone were from different countries and states, I felt that they understood what I was talking about and some of them gave me their opinions on what I should do, it was a really good experience."

Findings suggested a relationship between the two sub-themes, social support and empathy – "ability to relate to one another". A small section of empathy was reported in this section to demonstrate the relationship and interconnected components, but are elaborated in the next section as follows.

9.13.2 Empathy

Participants in both intervention and active control groups found it comforting that everyone was able to understand each other's work-related situations. It enabled them to have a greater connection with one another and express a greater sense of empathy, which made it reassuring for the individual that is going through work-related stress. One participant in the intervention group explained her feelings of being reassured.

> **IPS201:** "[…] it was a lot of similarities between us even though we're in different areas and different disciplines. That was reassuring to know that it's not just something we're sort of fighting in our hospital, […] it was a lot of that kind of acknowledgement and knowing about consistency, that actually kind of made it reassuring."

Moreover, two participants from the control group explained their ease in relating to situations that were discussed as they were able to understand the contextual factors.

> **CRN206:** "[…] it's much easier to relate to them. I've seen a lot of like other counsellors and things and its quite hard to relate to people that aren't in the same industry."

> **CRN207:** "I felt like they understood what I was going through because I understood what they were going through. I think it's because we work in similar environments and encounter similar types of patients, so I know what others are going through."

Participants were also surprised that they were able to relate with others from different states and countries. It gave them a sense of awareness that dismissed feelings of loneliness and isolation.

> **IRN101:** "It was nice to see that healthcare professionals from different states and countries also experience the same types of stressors at work […] it was good to know [...] it makes me feel better because now I know I'm not the only one going through this."

> **CRN207:** "It's kind of a relief to know that other people are going through what I'm experiencing […] you know colleagues that work across the other side of the country feeling the same types of pressures and hardships that you know we feel in my big load ICU."

Although participants came from different professions, they were still able to relate to one another. One participant from the intervention group stated her feelings of being accepted and relatable even though she was the only physio during a debrief session.

> **IPS201:** "[…] obviously being the only physio(-therapist) in one session was still beneficial because the nurses that were in there (debrief session) often brought in conversations about their physio(-therapist) which was quite nice."

Most participants stated that they had social support outside of work such as with family and friends. However, some participants explained that the experiences of sharing their stressors with family members and friends were different to the experience in the debrief sessions. Participants felt that family and friends were unable to understand the contextual factors, which often led to unhelpful feedback or dismissal of the stressor.

> **IRN102:** "We do moan and crumble with the friends and stuff like that but that's about it. I don't usually share work stressors with them. They just don't understand and sometimes they can come across as quite dismissive."

> **CRN106:** "I do talk to my friends about some work-related stress, but I don't think they fully understand what I'm talking about, and sometimes they'll give me solutions which are just out of context."

This was particularly significant in participants who lived alone and may not have friends that they could share their stressors. Two participants explained that the debrief sessions were especially useful for them, especially when living alone.

> **CRN108:** "I live alone at home and for some people, debriefing out of work may seem troublesome, but for me, it's actually really helpful. I'm alone and I don't have a husband to talk about my stressors to, so it's actually nice to be able to build connections with others and share my experiences."

> **IRN301:** "I don't really have people that I can talk to, especially about work. It gets tough because I'd like to come home and have a chat about my day with family […] but I live alone and I go home to my pets."

There are other participants in both intervention and active control groups that felt that the support they received from family and friends were therapeutic and helpful.

> **CRN305:** “I have a strong family support. A lot of the time, I’d talk to my husband about stressors at work and once I’ve talked it out, it’s like I’ve relieved a burden from me.”
>
> **IRN302:** “I tend to vent to my colleagues and friends, its over coffee and so all I do is talk about work, […] it’s been really helpful.”

Positive findings were also identified in circumstances where the participant’s family members and friends were in similar professions (i.e. nurses, physiotherapist). Participants felt that they received sufficient support, however, they suggested that the debrief sessions was still beneficial as it provided a different positive experience.

> **CRN108:** “My husband works with me […] and so when we get home, we tend to talk about what happened during the day, especially if he is on the same shift as me. But I felt that the debrief gave a different experience, it was quite refreshing in a way.”

Participants also mentioned that the sessions enabled them to share their perspectives, ideas, and potential solutions.

> **CRN107:** “It’s just nice to be able to bounce an idea and know that there are people that can give the right feedback.”
>
> **IPS201:** “Even though some of the suggestions and things seem little even being able to receive and give some for other people actually has been just as useful.”
>
> **IRN201:** “What I want to do is grab some information from each person and make it my own. I feel like I’ve done that for the last six weeks, I’ve listened to everybody and a piece from here, a piece from there.”

The debrief sessions also provided a space for participants with different levels of experiences and seniority to participate, share, and receive advice.

> **CRN206:** “[…] hearing other people’s stories was really good, like seeing their perspectives on things and […] getting advice from some of the other more senior nurses, yeah, that was really good.”

One participant explained that as a junior nurse, she felt that other participants provided a safe space to share and feel supported.

> **IRN202:** “I felt really protected with them (referring to other participants in the sessions). I was in a really dark place and felt like I wanted to quit, but I’m so glad I attended these sessions. Just having the senior nurses advising me and realising its not just me was very comforting […]”

Those who are experienced in their field also benefitted from the advice they provided. Participants explained it as satisfaction to be able to provide advice and guidance to junior HCP. It also gave them feelings of acknowledgement and validation of their professional journey.

> **IRN301:** “I came into this study not being burnt-out, but I just wanted to help, especially with the more junior staff. I felt that the sessions have been exactly when I was expecting […] it gave me like satisfaction to be able to help the younger ones […] you know, especially with what I’ve been through these years (referring to professional experience).
>
> **CRN107:** “Nurses eating their young is a real thing, so it was nice to give back, especially with […] that was quite upset about her work […]”

9.14 Self-awareness

The term, ‘self-awareness’ was used to describe participant’s conscious awareness of their internal states, relationships, and interactions with other individuals (224). This section discussed two sub-themes including (1) normalising the experience and (2) reflection. This section provided findings for the primary outcome, user-perceived acceptability. Further discussions about reciprocity can be found in the following Chapter 12 – Discussion.

9.14.1 Validation

Participants in both intervention and active control groups suggested that debriefing sessions enabled them to normalise their stressful experience. Some participants suggested that stress and burnout experiences were viewed and translated as incapability and lack of experience. Being able to normalise feelings of stress and burnout in the debrief sessions were noted as beneficial by reliving high work expectations.

> **IRN303:** “It can be quite hard to talk about certain thing to colleagues at work […] when I talk about something being hard or stressful, they tend to think that I can’t do the job. It’s just frustrating. So, it’s nice that the sessions were very open, and everyone didn’t have a judgemental outlook on whatever was talked about.”
>
> **CRN108:** “ […] as a senior, I can’t really complain to anyone at work […] it’s really all expectations that if you’re a senior or hold that leadership position at work, you need to be able to do everything. […] The sessions were good, I just felt that I was able to remove that expectation from myself and just breathe.”

Participants also explained that the debrief sessions helped identify stressful experiences that occur at work and normalise the ability to freely talk and discuss about it.

> **CRN305:** “I felt it would be good to do it more often I can during those periods easier to share those experiences and it helps to I guess normalise your experience.”

In fact, one participant suggested that debriefing sessions should be integrated within critical care settings.

> **CRN207:** “Would just love it to be successful in it and debriefing becomes a normal part of if any critical care environment or any health care environment where you see things that you shouldn't see […] it just becomes part of what we do, looking after each other.”

Participants also suggested that the sessions helped them become collected during or after a stressful day. It helped gather their thoughts and allow them to reset and continue their day with a more positive mindset.

> **IRN201:** “I’ve been really tired, not really anxiety as such, but I’m really at that point where I need to bring myself back, that's been really good and it helps me ground myself and my senses to what you can see, what you can hear, and that kind of stuff…it brought me back to “oh yeah that’s not so bad.”
>
> **CRN206:** “I have in my life, the kids, the work, personal stuff and things like that, it’s just given me that time to kind of bring myself back to where I am….to the place where I should be. And those, it gave me the time to prepare myself again.”

One participant suggested that the debrief sessions allowed her to realise that feelings of stress are normal, and thus, it helps distinguish the differences between stress and feelings of isolation.

> **CRN108:** “Many of these feelings are normal and not isolated. That there is value in group debriefs (if facilitated appropriately).”

One participant described it as validating.

> **IRN102:** “There are so many others in my shoes, and that is validating. I’m not failing because I feel stressed or burnout.”

9.14.2 Reflection

Participants found the debrief sessions to be useful as it enabled them to share their experiences and stories with one another. Two participants noted that ‘telling stories’ was part of the nursing culture, and thus, it provided them a sense of satisfaction.

> **CRN206:** “So it was just sort of sharing stories which I really liked yeah […].”

> **IRN203:** “I think nurses love to tell stories that such a part of our culture and it's such a part of how we deal with things and I know I imagine there's kind of ethical considerations with deidentifying and and that type of stuff but I would love to see that facility for letting the participants tell their story in the journals you know, no identifying markers and just say look this this is what happened to me this is how it is what I need from it yeah.”

Participants also agreed that listening to other participants share their stories and experiences allowed them to reflect on their practices.

> **CRN306:** “I guess that was probably more and regards to self-reflection and more of a critical overview of what's going on in my own environment at this stage.”

Another participant from the intervention group also noted the ability to reflect on themselves and added that such opportunities paved a road for self-improvement.

> **IRN204:** “I think hearing other people’s issues that they're having and then also talking through some of the solutions for them also help me kind of reflect on what I was doing and what I could do a little bit better.”

One participant explained that hearing the experiences of others made her realise the importance of her mental health and the potential implications it may have on people around her and especially with her children.

> **IRN201:** “So I think that it’s just brought to my attention that I sometimes need think about my mental health and everyone around me and especially with my kids and all that.”

Two participants described their experiences as self-realisation, where it enabled them to become aware of aspects that they can control to manage stressful situations. Moreover, they explained the realisation that choice was an important factor that shapes their perceptions of situations.

> **CRN305:** “That I should focus more on what I can control. That critical care nurses are all broadly experiencing the same issues.”

> **IRN202:** “That there is an element of choice, and our perception of it determines how stressful it is. Community and feeling valued really helps prevent burnout.”

Another participant suggested that this was possible due to the probing questions used during the sessions. It enabled them to think about situations from different viewpoints, which allowed them to further explore different discussion topics.

> **IRN103:** “The fact that they had questions to ask that were a little bit different also led us to conversations that we might not have had if we just always discussed were in difficult that week I think it kind of pushed us to think a little bit more widely about different areas of the job and how we cope with it.”

> **CRN107:** “[…] getting us to think a bit more deeply about some of their answers […]”

Participants also noted their ability to better understand their feelings. One participant stated the following.

> **IPS201:** “Acceptance of my own feelings and emotions, made me more aware of my own patterns of behaviour.”

Participants in the intervention group felt that the strategies provided during the debrief sessions were helpful for them in terms of self-improvement. One participant suggested that she values herself more after going through the debrief sessions whilst another participant explained that it provided her with a realisation on the value of her home and social opportunities.

> **IRN303:** “I’m looking after myself at work and outside of work a little more.”
>
> **CRN110:** “I value my home time more and seek social opportunities in and out of work.”

9.14.3 Strategic awareness

One participant from the intervention group suggested that although experiences and strategies were shared during the sessions, it she felt that she did not remember what was discussed. However, when encountered with a situation that matched the topics of discussion, it enabled her to remember, implement and refine the strategies being discussed.

> **IRN301:** “You get in a situation where what you know is not helping or you don't remember. You're not using what you know but to listen to it being reinforced by the people it jobs in memory and remind and can give you strategies to different ones that they were using now.”

One participant also noted that the debrief sessions were helpful in a variety of ways from utilising the strategies discussed to sharing strategies with her colleagues. She further explained that’s these strategies could also be stored and utilised in future stressful situations.

> **IPS201:** “Being able to take some of those little tips in actually use them or even if I can't use them I've now stored them away and can recommend them to others and use them in the future when they sort of become appropriate.”

One participant from the intervention group explained that the providing a reflection on her experiences with the strategies during debrief sessions enabled her to become more accountable of her actions, and thus, facilitated the implementation of strategies.

> **CRN308:** “[…] because they kind of made you accountable as well like you know with the things that we talked about trying to improve them and knowing next week you're going to having to say you know how did you go with that and you would say you know maybe a bit more accountable.”

One participant felt that the strategies were not only beneficial for the workplace, but also for her personal life in terms of recovery after a long and eventful shift.

> **CRN208:** “I feel like I have more coping strategies to keep calm in the moment, and better ways to wind down after a hard shift.”

9.15 Chapter Summary

This chapter focused on secondary findings related to well-being and burnout outcomes. Quantitative analysis was conducted using two-way repeated measures ANOVA to assess differences over time and determine the impact of time and treatments. A post hoc analysis was conducted for significant findings, which reported on specific pairwise comparisons. Qualitative findings explored the effectiveness of the IP program, identified two main themes: reciprocity (with sub-themes: social support and empathy) and self-awareness (with sub-themes: validation, reflection, and strategic awareness).

The next chapter 10 presented an integration chapter of the pilot RCT findings. Qualitative and quantitative data were merged and presented as joint display.

CHAPTER 10

AN AUTOETHNOGRAPHY OF THE PILOT RCT FIDELITY

10.1 Chapter overview

This Chapter 10 will present an autoethnographic account of conducting a pilot Randomised Control Trial (RCT) and explore perspectives on program fidelity. The chapter will firstly define autoethnography and fidelity concepts, followed by reporting the author's personal experiences of conducting the trial.

10.2 Defining autoethnography

Autoethnography used writing techniques, such as reflective and active writing, to explore and understand of social-cultural practices of an event or situation (299). It was used in this Chapter to critically reflect on the researcher's experiences, perspectives, and roles, which enabled the identification and understanding of interactions and interpretations within the research context (299). Reflexivity was employed to recount the researcher's experiences, feelings, thoughts, as well as role, biases assumptions, and positionality, which enabled a rich and engaging exploration of her personal experiences of the trial. Appendix 34 provided an autoethnography of the researcher's experiences in setting up the pilot RCT.

10.3 Defining the components of fidelity

Fidelity assessed the degree of adherence and accuracy of the IP program in relation to a predetermined protocol described in Chapter 7. The researcher investigated two components of fidelity: (a) fidelity to structure and (b) fidelity to process (300).

Fidelity to structured explored the delivery sequence of each research component and fidelity to process investigated the quality of intervention delivery (i.e. quality of debrief sessions) (300). High fidelity to was indicated by greater adherence to the proposed protocol, whereas

low fidelity was indicated by decreased adherence. The assessment of fidelity was imperative in this research as it enhanced the effectiveness of the IP program by ensuring the validity and reliability of research findings.

Observation and fidelity checklists were used to assess fidelity of the pilot RCT's structure and processes. The researcher actively participated as an observer in all pilot RCT activities and recorded fidelity assessments on the pre-defined checklist; designed at the protocol stage of the trial.

10.3.1 Recruitment and retention of participants

I initiated the recruitment process by establishing contact with critical care organisations about five months ahead of the intended recruitment period. This was facilitated by my supervisor's prior connections, streamlining the outreach considerably. The recruitment phase was set to span a month due to the constraints imposed by my PhD candidature. The timing of the trial, which coincided with the year-end holidays, presented challenges as participants expressed a preference to join post-Christmas. However, aligning with this request was impractical due to the study's design – encompassing a 6-week session period and a subsequent 3-month follow-up – which would jeopardise the completion of my results analysis, thesis writing, and submission within stipulated timelines. At the outset of the recruitment, progress was sluggish, attributed to the mode of flyer distribution via social media and organisational websites. However, a surge in registrations followed the switch to email newsletters, emphasising the importance of targeted communication. Notably, participants reached out to express their desire for physical copies of the flyer to display in their clinical settings, indicating diverse preferences for engagement. Interestingly, as the trial unfolded, some participants who initially enrolled opted to withdraw, explaining that their burnout symptoms had subsided within a few days of registration. This highlighted the transient nature of burnout experiences and the evolving mindsets of participants. A strategic decision involved waiting for all participants to register before commencing the trial, to ensure consistent debrief sessions. Consequently,

initiation timelines varied, with some participants waiting days and others waiting weeks to almost a month before beginning the treatment phase. My dedication manifested through daily or bi-daily checks for new registrations, prompt responses to inquiries, and enrolling participants within a maximum of two days after their registration.

10.3.2 Attending consult and debrief sessions

10.3.2.1 Fidelity of session content

As the researcher overseeing the trial, I had attended all consult and debrief sessions to closely monitor the fidelity of the sessions as outlined in the proposed manual. To my relief, the sessions proceeded exceptionally well, and the facilitators skilfully administered the consult and debrief sessions according to the prescribed template. The problem-solving approach was also effectively implemented in line with my expectations and the trial's manual. However, in the initial two weeks, there were some minor hiccups in delivering the problem-solving approach as intended.

To ensure continuous improvement, after every post-debrief session, I engaged in reflective discussions with the facilitators. These post-session reflections proved invaluable as they helped identify any inconsistencies in the session delivery and allowed me to address them promptly. Another beneficial aspect was the involvement of psychology students working with different groups and participants. This facilitated feedback from both the students and participants, providing valuable insights for refinement. For instance, in week two, a student shared their experience, mentioning that in a previous session they conducted, participants had a recap of the strategies implemented and their effectiveness. However, in this particular session, they did not focus on the recap and instead delved into new stressors and corresponding strategies. Such feedback enabled me to adjust certain aspects of the sessions and ensure consistent content delivery to all participants. Since participants had the option to choose their sessions, there were variations in attendance. One participant mentioned feeling more engaged during a specific session with a certain psychology student due to the proposal

of more strategies that felt highly effective and applicable. Understanding the importance of consistency, I made adjustments based on such feedback to ensure all participants received a comparable experience.

By week three, I noticed a significant improvement in the delivery of all IP sessions, with each one adhering to a consistent structure. Although I had designed the templates to be adaptable and cater to different topics discussed based on participants' experiences and emotions at work, some participants felt that occasional topics might have been slightly repetitive. Though the participants were generally understanding about the occasional repetition, I considered incorporating a bit more structure to minimise it further.

10.3.2.2 The fidelity checklist

As the observer, I used this fidelity checklist during the pilot RCT to track the presence or absence of key intervention components across all consult and debrief sessions. The checklist served as a valuable tool to ensure that each session adhered to the intended structure and followed the trial's manual. Throughout the trial, I carefully assessed the delivery of each component, including the introduction and icebreaker, problem-solving approach, goal setting, and reflection. By systematically checking off each component, I could identify any inconsistencies and address them during post-debrief reflection sessions with the facilitators. The fidelity checklist also allowed me to evaluate participant engagement and ensure that the intervention's content remained consistent across different groups. Through continuous observation and self-reflection, I was able to refine and improve the delivery of the intervention, ensuring that all participants received a high-quality and standardised experience. The fidelity checklist from my experience of observation can be seen in the following Table 40 and Table 41.

Table 40 Summary of fidelity checklist for recruitment and retention

Intervention component	Completed	Duration	Notes
Monitoring recruitment	✓	4 weeks	Registrations were closed after four weeks.
Participant enrolment	✓	4 weeks	Enrolled participants during the monitoring process.
Eligibility criteria	✓	NA	We assessed eligibility criteria for participants who registered for the trial.
Addressing potential participants that did not meet inclusion criteria	✓	NA	Those that scored highly on the impact of event scale were on referred to our clinical psychologist
Participant information sheet and Informed consent	✓	NA	Reminder emails were sent to participants until we either received the form or participants withdrew.
Participant randomisation	✓	1 week	This was conducted after all participants have signed the consent form.
Demographic and baseline psychometric questionnaire	✓	1 week	Conducted during the randomisation
Email participants to book into (consult and) debrief sessions	✓	1 week	Conducted during randomisation
Email and text reminders	✓	NA	Automated using www.calandly.com
Assisting participants struggling to use Zoom Meetings Version 5.8.0.	✓	NA	Information guide sent together with email reminders
Running consult and debrief sessions	✓	6 weeks	NA
Journal entry and reminders	✓	NA	Automated using www.calandly.com
Post-intervention psychometric questionnaire	✓	1 week	We sent email and text reminders every 3 days
Semi-structured feedback interview	✓	1 week	Booking using www.calandly.com and automated reminders
Feedback questionnaire	✓	1 week	We sent email and text reminders every 3 days
1-month psychometric questionnaire	✓	1 week	We sent email and text reminders every 3 days
3-month psychometric questionnaire	✓	1 week	We sent email and text reminders every 3 days
Trial components completed in sequence	✓	NA	NA

Abbreviation: NA: Not applicable

Table 41 Summary of fidelity checklist for consult and debrief observation

Intervention component	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6	Notes
Consult session							
Introduction	✓	NA	NA	NA	NA	NA	Clear introduction.
Problem identification	✓	NA	NA	NA	NA	NA	Identified problems among participants.
Goal setting	✓	NA	NA	NA	NA	NA	Conducted for all participants.
Debrief session							
Introduction	✓	✓	✓	✓	✓	✓	Completed as per template (manual).
Recap of previous session	NA	◊	✓	✓	✓	✓	Not needed in the first week, inconsistencies in second week.
Discussion of new stressors	✓	✓	✓	✓	✓	✓	This was done in all groups.
Problem-solving approach	◊	◊	✓	✓	✓	✓	Participants discussed among each other on how to attend to the stressor, which was guided by facilitators. Inconsistent in some groups (session 1 and 2) where some areas were missed).
Strategies and action plan	◊	◊	✓	✓	✓	✓	In consistencies in provision.
Closing remarks and feedback (if there is time)	✓	✓	✓	✓	✓	✓	Consistent throughout.

Abbreviations: ✓: component present and administered as intended, x: component absent or component not administered as intended, ◊: inconsistent between groups.

10.3.3 Safety

The trial progressed smoothly, with no untoward incidents. I attribute this largely to the judicious decision of excluding potential participants exhibiting high IES-R scores. There was a notable instance, though, when one participant exhibited a touch of emotion during our discussion about navigating the challenges of working during the COVID-19 pandemic. She expressed a sense of unfairness as she perceived that her state hadn't been as severely impacted as others, which had borne the brunt of the pandemic[19]. To provide additional context, the larger Australian states were grappling with a significant influx of international patients, and healthcare workers were facing a surge in cases. Patients, once recovered, were then transferred to their home states. However, her feelings were swiftly embraced and alleviated by her fellow participants during the ensuing debrief session. Their collective support transformed her perspective, leaving her feeling appreciative of her circumstances. This episode underscored the sensitivity of discussions and the potential to trigger participants with elevated IES-R scores. Such triggers could lead to adverse events, ultimately exacerbating participant distress. In light of this, I recognise the need for tailored care and investigation for individuals in this cohort, perhaps in the form of specialised consult sessions.

10.4 Chapter summary

This chapter presented an autoethnography of the author's personal experiences and reflections of the pilot RCT. It provided valuable information on trial fidelity in relation to the proposed manual, which contributed to the broader discourse on conducting rigorous and successful pilot RCT. The next Chapter 11 delved into the integration of pilot RCT findings.

[19] We did not note this incident as an adverse event. An adverse event in this study was defined as the unintentional and unfavourable incident that harmed the participant, where the participant was unable to recover from the incident or felt that their mental health deteriorated. In this scenario, psychologists met with the participant after the debrief session to ensure that the participant did not feel worse after the debrief session and did not feel that she was harmed during the session.

CHAPTER 11

INTEGRATION OF PILOT RCT RESULTS

11.1 Chapter overview

This Chapter 11 will describe the integration results of the pilot RCT through a side-by-side joint display. Firstly, the integration methods will be provided, followed by results of primary and secondary outcomes. The primary outcome will present three main measures (recruitment processes, retention rate, data collection procedures) and the secondary outcome will present two main measures (reciprocity, self-awareness).

11.2 Quantitative and qualitative data integration

Fetters et al. (129) suggest three levels for integration, that is through the design, methods, and reporting. As discussed in Chapter 3, the qualitative and quantitative results from this pilot RCT were planned to be merged during this interpretation stage, with a presentation of merged data through a joint display.

Fetters (129) described a joint display of mixed method data as a (301):

> *"…table or matrix depicting how both qualitative and quantitative data collection procedures have been matched to ensure collected data will address related study constructs, or for sequential designs, how the constructs of one type of data collection procedure were used to inform the constructs addressed in the subsequent, other type of data collection."* (p.194)

Fetter (129) described three types of joint displays, namely (1) joint display for representing mixed method findings, (2) joint display analysis, and (3) joint display of integrated data collection planning (301). This pilot RCT adopted the joint display for representing mixed method findings (301). This process demonstrated a juxtaposed visual presentation of qualitative, quantitative, and mixed method findings (301, 302). The portrayal of findings side-

by-side facilitated the process of meta-inference and the obtainment of new insights about the topic (302). This pilot RCT presented the joint display in a table format (302). This type of joint display representation allowed ease in readership and conveyed integrated results to the readers (302).

Guetterman, Fabregues, and Sakakibara (302) defined side-by-side joint display format as:

> *"…represent merging by arraying qualitative and quantitative results next to each other, organised by research questions, results, or a theoretical model. Facilitates comparison. (p.22)"*

In this study, we followed a similar approach to Enggaard et al. (303) by merging both qualitative and quantitative results through a side-by-side joint display. The results of this pilot RCT were compared and assessed using confirmation, expansion, and discordance, allowing for a meta-inference of the mentioned three constructs (129, 303, 304). Confirmation indicated how both qualitative and quantitative analyses supported each other (129, 303, 304). Expansion referred to how both analyses are able to diverge and provide greater insights, describing complementary aspects of the research question (129, 303, 304). Discordance demonstrated conflicting or disagreed findings between the qualitative and quantitative analyses (129, 303). To facilitate the merging of the results, descriptive statistics and qualitative themes were compared using a back-and-forth process, aided by the three constructs (129, 303). The two data types were then integrated using joint display analysis, involving the construction and restructuring of the data to enable a deeper understanding of both (129, 303). The final joint displays are presented in the following sections, accompanied by an integrated narrative about the mixed method inferences (129, 303, 304).

11.3 Determining components for integration

A table was constructed to map the primary and secondary outcomes and to understand the components that could or could not be integrated. Notably, not all feasibility domains can be mixed within mixed method research, and unnecessary mixing of qualitative and quantitative results may complicate the pilot trial, creating a broad and unfocused application of mixed method design (305). Table 42 demonstrated three primary outcome measures used to determine feasibility and acceptability of the IP program. Table 43 demonstrate two outcome measures to determine preliminary effectiveness. There were seven components that were ineligible for integration due to the incompatibility of quantitative and qualitative data. Furthermore, there were two secondary outcome measures with 10 components used to determine the preliminary effectiveness of the IP program. All components were able to integrate qualitative and quantitative findings.

11.4 Questions assisting with integration

Aschbrenner et al. (305) proposed three common reasons for combining qualitative and quantitative methods: triangulation, completeness, and explanation. Triangulation involved corroborating and dissonating data by comparing both data types (305). Completeness aimed to achieve a comprehensive understanding by synthesising information from both qualitative and quantitative data (305). Explanation, sought to provide insights by connecting and explaining results derived from both data types (305).

In the context of this study, explanation was used as the reason for integrating qualitative and quantitative methods. Explanation offered an appropriate approach to addressing the proposed research question, which aimed to understand why certain treatments may or may not work and the underlying factors influencing the efficacy of treatments (305). The explanation process was conducted by formulating questions (see Table 44) that effectively incorporated both types of data, which aligned with the specific purpose of explanation.

Table 42 Assessment of primary outcome (feasibility and acceptability)

Main measures	Measurement components	Extraction		Ability to integrate (Yes/No)
		Quantitative	Qualitative	
Recruitment Processes	Where did participants find the advertisement?	Not applicable	Semi-structured feedback interview/questionnaire	No
	Ease in registration (registration rate)	Study auditing metrics	Semi-structured feedback interview/questionnaire	Yes
	Ability to snowball	Not applicable	Semi-structured feedback interview/questionnaire	No
	Length of time to recruit to target population	Study auditing metrics	Researcher field notes (autoethnography)	Yes
	Feasibility of recruiting the number of participants required within the specified recruitment period (recruitment rate)	Study auditing metrics	Not Applicable	No
	Waiting time before intervention commencement	Study auditing metrics	Semi-structured feedback interview/questionnaire, Researcher field notes (autoethnography)	Yes
Retention rates	Study retention	Study auditing metrics	Researcher field notes (autoethnography)	Yes
	Engagement with self-booking platform and email/text reminders	Not applicable	Semi-structured feedback interview/questionnaire	No
	Set-up and accessing the sessions	Not applicable	Semi-structured feedback interview/questionnaire Researcher field notes (autoethnography)	No
	Likelihood of recommendation	Not applicable	Semi-structured feedback interview/questionnaire	No
	Safety	Study auditing metrics	Semi-structured feedback interview/questionnaire, Researcher field notes (autoethnography)	Yes

Main measures	Measurement components	Extraction		Ability to integrate (Yes/No)
		Quantitative	Qualitative	
Data collection processes	Psychometric questionnaires completion rate	Study auditing metrics	Semi-structured feedback interview/questionnaire, Researcher field notes (autoethnography)	Yes
	Journal entry completion rate	Study auditing metrics	Semi-structured feedback interview/questionnaire, Researcher field notes (autoethnography)	Yes
	Feedback semi-structured interview and questionnaire completion rate	Study auditing metrics	Semi-structured feedback interview/questionnaire, Researcher field notes (autoethnography)	Yes

Table 43 Assessment of secondary outcome (preliminary effectiveness)

Main measures	Measurement components	Extraction		Ability to integrate (Yes/No)
		Quantitative	Qualitative	
Was it effective in decreasing burnout related measures?	Emotional exhaustion	Psychometric questionnaire (MBI-HSS)	Semi-structured feedback interview/ questionnaire	Yes
	Depersonalisation	Psychometric questionnaire (MBI-HSS)	Semi-structured feedback interview/ questionnaire	Yes
	Depression	Psychometric questionnaire (DASS-21)	Semi-structured feedback interview/ questionnaire	Yes
	Anxiety	Psychometric questionnaire (DASS-21)	Semi-structured feedback interview/ questionnaire	Yes
	Stress	Psychometric questionnaire (DASS-21)	Semi-structured feedback interview/ questionnaire	Yes
	Negative Affect	Psychometric questionnaire (PANAS)	Semi-structured feedback interview/ questionnaire	Yes
	Turnover intention	Psychometric questionnaire (TIS)	Semi-structured feedback interview/ questionnaire	Yes
	Avoidant problem-solving	Psychometric questionnaire (SPSI-SF)	Semi-structured feedback interview/ questionnaire	Yes
	Negative problem orientation	Psychometric questionnaire (SPSI-SF)	Semi-structured feedback interview/ questionnaire	Yes
	Impulsivity/carelessness	Psychometric questionnaire (SPSI-SF)	Semi-structured feedback interview/ questionnaire	Yes
Was it effective in increasing well-being related measures?	Work engagement measures	Psychometric questionnaire (UWES-SF)	Semi-structured feedback interview/ questionnaire	Yes
	Positive Affect	Psychometric questionnaire (PANAS)	Semi-structured feedback interview/ questionnaire	Yes
	Personal accomplishment	Psychometric questionnaire (MBI-HSS)	Semi-structured feedback interview/ questionnaire	Yes
	Rational problem-solving	Psychometric questionnaire (SPSI-SF)	Semi-structured feedback interview/ questionnaire	Yes
	Positive problem orientation	Psychometric questionnaire (SPSI-SF)	Semi-structured feedback interview/ questionnaire	Yes

Table 44 Questions to conceptualise reasons for mixing

Main measure	Measure	Conceptual questions
Primary outcome (Feasibility and Acceptability)		
Recruitment process	Ease in registration (registration rate)	What was the registration rate (quantitative question) and why did participants decide to participate in the study (qualitative question)?
	Length of time to recruit to target population	What was the recruitment rate, how long did it take, was it feasible to meet the target population (quantitative question), and what are the barriers and facilitators to recruitment (qualitative question)?
	Waiting time before intervention commencement	What was the duration before treatment was administered to participants (quantitative question) and did the participants feel that the wait time was acceptable (qualitative question)?
Retention rate	Study retention	What was the retention rate to the consult and debrief sessions (quantitative question) and what were the barriers and facilitators to retention (qualitative question)?
	Safety	What was the adverse events rate (quantitative question) and what contributed or impeded these events to occur (qualitative question)?
Data collection processes	Psychometric questionnaire completion rate	How many psychometric questionnaire measures did participants complete, what was the average duration (quantitative question), and did participants find the measures to be acceptable (i.e., ease to complete) (qualitative question)?
	Journal entry completion rate	How many journal entries did participants complete, what was the average duration (quantitative question), and did participants find journal entries to be acceptable (i.e. ease, barriers and enablers) (qualitative question)?
	Feedback semi-structured interview and questionnaire completion rate	How many feedback sessions and questionnaires did participants attend/complete, what was the average duration (quantitative question), and did participants find the feedback sessions acceptable (i.e. ease, barriers, enablers) (qualitative question)?

Main measure	Measure	Conceptual questions
Secondary outcome (Preliminary effectiveness)		
Was it effective in decreasing measures of psychiatric morbidities?	Emotional exhaustion Depersonalisation Depression Anxiety Stress Negative Affect Turnover intention Avoidant problem-solving Negative problem orientation Impulsivity/carelessness	Were there significant improvements post-intervention and at follow-up (quantitative question) and what were the contributing and impeding factors (qualitative question)?
Was it effective in increasing well-being measures?	Work engagement Positive Affect Personal accomplishment Rational problem-solving Positive problem orientation	

11.5 Integration of primary outcomes

The three tables (see Tables 45-47) demonstrated a side-by-side joint display of quantitative results and qualitative themes for each related construct on feasibility and acceptability on the following measures: recruitment processes (Table 45), retention rate (Table 46), and data collection procedures (Table 47). The following sections provided a description of the mixed method inferences derived from these joint displays.

11.6 Main Measure: Recruitment processes

11.6.1 Measure 1: Ease in registration (registration rate)

The quantitative results indicated that the registration rate (N=112) exceeded the target registration (N=110), demonstrating the feasibility of registration over a one-month period. The Impact of Event Scale-Revised revealed that the mean scores for registered participants were 48.5, indicating high levels of affect due to routine life stress, acute stress, and everyday traumas – scores above 36 indicate high levels, potentially suppressing the individual's immune system functioning for up to 10 years post-impact of the event. This finding confirms the high registration rate into the pilot RCT observed among CCHP, which emphasised their appeal for assistance in alleviating the overwhelming stress they may have been experiencing.

Participants were recruited for the study through targeted distribution of study flyers to critical care organisational memberships via email. Prospective participants who expressed interest were directed to the study website, which provided comprehensive information about the study and included a registration link. These findings corroborated participants' suggestions that the study information was accessible, and they found ease in the registration process. Participants who had further inquiries about the study could also access researchers through the website, consistent with the number of inquiries received by the researcher. However, there was discordance with participant understanding the eligibility criteria, as all (n=8) inquiries asked about their suitability for the study despite all actual participants stating a clear presentation of study information. Furthermore, qualitative findings suggested ease in website navigation,

which is consistent with the high registration rate (n=112). The research team's expectation of snowballing effects for recruitment was confirmed, as participants reported asking colleagues to participate in the study and placing the study flyer within their workplace. The effects of snowballing, therefore, expanded on the potential reasons for the high registration rates observed.

11.6.2 Measure 2: Length of time to recruit to target population

The registration rate into the study was excellent (85%), demonstrating the feasibility of recruitment when compared to the target recruitment of 110 participants. The feasibility of recruitment over a 1-month duration aligned with the qualitative findings on the utilisation of critical care organisational membership, the study website, and the expected snowballing approach. The qualitative findings also suggested that the technological use throughout the study (i.e., recruitment, treatment, questionnaires) made the study flexible, which further contributed to the ability to maintain a high registration rate.

The quantitative data indicated a high exclusion rate of 55%, which was in line with the average high IES-R mean scores on screening. Moreover, the attrition rate was 15% (n=17) at registration, conforming with the qualitative findings that participants either had travel commitments and did not want to commit to the study or experienced a subsiding of their feelings of stress and burnout before enrolling in the study. Although attrition rates were low, this finding provided an opportunity for faster treatment administration.

Table 45 Joint display for recruitment processes

Main Measure: Recruitment processes						
Quantitative			**Qualitative**			**Analytical integration**
Variable	**n**	**%**	**Resource**	**Undocumented (summary)**	**Documented (example quotes)**	
Measure 1: Ease in registration (registration rate)						
Target registration	110	NA	Feedback interview	**Theme:** Intention to participate ▲ There were various reasons for participation including feeling burnt-out, building social connections, and altruism. ▲ The website was easy to navigate, information about the study was presented clearly, and option to register for the study was prominent. **Theme:** recommendation ▲Participants asked colleagues to attend the session (snowball effect) ▼All enquires via the website about eligibility was received by the researcher. ◊Designing the website was easy and the researcher ensured that all study information was included.	"I was quite burnt-out, and I thought it was a good idea to join in this study." "It was a good opportunity for me to meet other people and see if it can help me in any way." "I was going through some difficulties and really needed some immediate help." "…just wanted to see as someone who's been working as a nurse for a long time if I can help those who were struggling, especially junior nurses." "I saw the study ad on a critical care email that was sent to me…" "It was easy to register, I just clicked on the website, and everything was there for me to consider before register"	◊**Conformation** The researcher ensured that all information was included in the study website, which was confirmed when participants stated that study information was presented clearly and reported ease in registration. ▲**Expansion** Qualitative results expanded on the high registration rate and high mean IES-R mean score, highlighting that participants were highly 'burnt-out'. Snowballing effect expanded on high registration rate. Easy enquiry about the study expanded on high registration rate. ▼**Discordance** Eligibility criteria may not have been clearly stated, discordant with clear presentation of study information.
Registration rate	112	NA				
Impact of event scale-revised (Mean score of all registered participants 48.5)	112	NA	Field notes			
Enquiries received by researcher from the website	8	NA				

Main Measure: Recruitment processes						
Quantitative			**Qualitative**			
Variable	**n**	**%**	**Resource**	**Undocumented (summary)**	**Documented (example quotes)**	**Analytical integration**
Measure 2: Length of time to recruit to target population						
Target recruitment	110	100	Feedback interview	**Theme:** flexibility ▲ Technology enabled flexibility, especially for participants with family responsibilities or inflexible personal schedules. ▲ Participants were able to choose their participation time and day. ▲Included participant (before consent) withdrew from the study as they noted that their feelings of 'burnout' subsided days/weeks after registration. Some participants were travelling and did not want to commit to the time, whilst there were others that had no response. ◊ Excluded participants with high IES-R. ◊ Study was advertised on critical care website and sent to membership emails. ◊ Researchers expected a snowball effect for recruitment	"[…] if it's in person then you've got to add in the travel time." "If I didn't have childcare, I could still attend because I'm at home with the like daughter, whereas I couldn't have attended in person." "it's a lot more flexible so I could just fit it around my work or my life a lot easier."	◊**Conformation** It was feasible to recruit the target recruitment number within 1 month of recruitment, confirming that it was useful through critical care website, membership emails, and expectations of snowballing. There was high exclusion rate, confirming high IES-R mean scores. There was a presence of attrition, confirming that participant's burnout feelings subsided before enrolment into the study. **▲Expansion** The integration of technology made the treatment flexible, which expands on the maintenance of high registration rate (and the ability to meet expected recruitment numbers). **▼Discordance** Reminders sent to active control, discord in retention.
Recruitment	95	85				
Exclusion	62	55	Field Notes			
Attrition	17	15				
Recruitment duration (1 month)	NA	NA				
Impact of event scale-revised (IES-R) (Mean score of all registered participants 48.5)	112	NA				

Main Measure: Recruitment processes						
Quantitative			**Qualitative**			
Variable	**n**	**%**	**Resource**	**Undocumented (summary)**	**Documented (example quotes)**	**Analytical integration**
Measure 3: Waiting time before intervention commencement						
Average duration before treatment administration (15 days)	NA	NA	Feedback interview	▲ Participant's 'burnout feelings' subsided before treatment commencement	"I signed the consent form, but I did wait quite a bit before we started the study."	◊**Conformation** Waiting to get the 'right' number of participants before treatment administration confirmed the long wait time (average 15 days).
			Field notes	◊Consult/debrief sessions started when there were enough participants. ▲The researcher checked and replied to registrations daily.	"I was feeling burnt-out when I first decide to participate, but it kind of went away and I felt better when I started the study."	▲**Expansion** Long wait time expanded on participant's feeling that their burnout subsided.

Abbreviations: T0=Timepoint 0, T1=Timepoint 1, T2=Timepoint 2, T3=Timepoint 3.

11.6.1 Measure 3: Waiting time before intervention commencement

The quantitative findings suggested that the average duration before the intervention was administered was 15 days – this duration referred to the time from enrolment to treatment administration. This finding was conformed with the qualitative findings, which indicated that researchers waited until enrolment was closed and sufficient numbers were gathered for debrief sessions before proceeding with treatment administration. The relatively long waiting time contributed to the reasons for the observed attrition rate, conforming with the qualitative findings where participants reported that their feelings of 'burnout' subsided before the commencement of the treatment.

11.7 Main Measure: Retention rate

11.7.1 Measure 1: Study retention

The quantitative results indicated that the retention rate for both the intervention and active control groups at the post-intervention stage was excellent, reaching 93%. These high retention rates were conformed with the qualitative findings, which suggested that the treatment was engaging, particularly when participants belonged to the same profession or field of work. Additionally, the findings highlighted that the treatment's flexibility, facilitated by the use of technological advancements, allowed participants to participate more easily, minimising impeding factors such as location, workplace, and familial responsibilities. One participant reported that conducting the study via a virtual platform enabled her to seek help and participate, as the small work environment in her workplace would have made the study infeasible otherwise. The excellent retention rates for both groups also conformed with the study design, where participants received reminders via email and text messages to complete the questionnaires. Despite reminders being sent to participants in both groups, there was a discordance in the retention rate for the active control group. The retention rate at 1-month was 73%, and at 3-months, it decreased to 67%. The quantitative findings suggested that the intervention group had better retention rates at the 1-month and 3-month follow-up compared

to the active control group. Greater retention was observed in the intervention group were attributed to participants' development of accountability skills as suggested by participants. Intervention group participants expressed that the treatment made them feel accountable for their actions, which, in turn, contributed to the improved retention rates.

11.7.1.1 Consult session retention

The consult attendance rate for the intervention group was excellent, reaching 100%. This finding was conformed with the qualitative results, which identified several enabling factors that contributed to the excellent attendance rate. Factors such as having efficient facilitators, employing an individualised approach, and utilising technology were highlighted as key elements influencing participants' high attendance.

Particularly, the use of technology to conduct the consult sessions was viewed as a protective barrier for participants, allowing them to engage more effectively in the consult and creating a safe environment for them to express their emotions openly. However, assessing participants' level of engagement with the consult session proved challenging due to the session being a one-time event. Nevertheless, the qualitative findings expanded on participants' feedback, indicating that some felt there were insufficient strategies discussed during the consult, while others expressed being unaware of the strategies to be implemented. This highlighted a discord between the information provided on the study website, instructions given to the facilitators, and the overall consistency of the consult session.

11.7.1.2 Debrief session retention

The intervention group exhibited a higher percentage of attendance to all six sessions compared to the active control group. The qualitative findings indicated that the high attendance rate for the intervention group was consistent with the use of technology, allowing for flexibility, the integration of a problem-solving approach, and the proposal of preventative strategies during the sessions. These factors facilitated participants' engagement and eagerness to attend the subsequent sessions. Moreover, the low attendance rate for all six

sessions in the active control group was elucidated by the qualitative findings, which suggested a lack of structure in the debrief sessions, leading to reduced participant engagement. The intervention group's use of a problem-solving approach during the debrief sessions conformed findings from the social problem-solving inventory. The intervention group indicated significant differences in most problem-solving sub-scales - avoidant, negative problem-orientation, and impulsive/carelessness. The active control group showed a significant improvement in one sub-scale - avoidant - which aligned with the findings indicating that no problem-solving approaches were integrated into their treatment.

11.7.1 Measure 2: Safety

Throughout the study, there were no adverse events reported in either the intervention or active control groups, which aligned with the expected number of adverse events. The qualitative findings conformed this observation by indicating that excluding participants who scored extremely high on the Impact of Event Scale-Revised (37 or more) minimised the occurrence of adverse events. Additionally, the qualitative findings revealed that the use of technology in the study provided participants with a safe environment, particularly during vulnerable discussions. Participants were able to turn off their cameras and microphones when they felt embarrassed or teary, granting them a sense of comfort and protection from vulnerability. This technological feature played a crucial role in ensuring the absence of adverse events and contributed to the overall safety and well-being of the participants throughout the study.

Table 46 Joint display for retention rate

Main Measure: Retention Rate						
Quantitative			**Qualitative**			**Analytical integration**
Variable	**n**	**%**	**Resource**	**Undocumented (summary)**	**Documented (example quotes)**	
Measure 1: Study retention						
Intervention group Post-intervention	14	93	Feedback interview	**Theme:** debrief ▲Conducting the intervention via a virtual platform provided the opportunity for all healthcare professionals, which is not limited by factors such as location, workplace environment, responsibilities. **Theme:** Strategic awareness ▲The intervention group suggest that the debrief sessions made her feel accountable for her actions **Theme:** Enabling components ◊The ability to engage with others working in the same or similar profession. ▲Participants withdrew as they were travelling/going for a holiday and did not want to think about the study ◊Participants were reminded to complete the follow-up measures (weekly for 3 weeks for non-respondents)	"The group bonding and affirmations from other participants were my favourite part of the intervention." "I think the enabling part for me is meeting the other healthcare workers in zoom and sharing relatable experiences." "My workplace is very small, so it wouldn't work in my workplace environment..." "…because they kind of made you accountable as well like you know with the things, we talked about trying to improve them…"	◊**Conformation** Both groups had high post-intervention retention, confirming engaging treatment that may not be available at work. Intervention group's excellent retention confirmed effective follow-up reminders. ▲**Expansion** Intervention group-maintained retention at 3-month follow-up, expanding the development of accountability skill. Varying treatment start dates expand on enhanced participant retention. ▼**Discordance** Despite reminders, discordance was observed for the active control group in terms of lower retention rates at follow-up.
1-month follow-up	12	80				
3-month follow-up	12	80				
Active control group Post-intervention	14	93				
1-month follow-up	11	73	Field notes			
3-month follow-up	10	67				
Target retention rate for each group	12	80				

Main Measure: Retention Rate						
Quantitative			**Qualitative**			**Analytical integration**
Variable	**n**	**%**	**Resource**	**Undocumented (summary)**	**Documented (example quotes)**	
Consult session retention						
Consult attendance	30	100	Feedback interview Field notes	**Theme:** consult, facilitators ◊Allowed discussion of stressors using a targeted and individualised approach. ▲Insufficient innovative strategies to be implemented ◊ Facilitators were efficient in extracting key ideas and discussion points, which facilitated self-reflection **Theme:** confidence ◊Technological integration created a protective barrier for participants, which allowed them to open-up on their feelings and emotions ▲There were participants that emailed the researcher stating that they did not know about the strategies to be implemented.	"I think the more targeted ones probably wouldn't have come out in the group discussions." "…it was certainly personal and about you." "I don't feel my one-on-one consult really gave me any strategies." "I just feel that another consult can help me gauge between how I was initially and any improvements…" "they (facilitators) helped us think about why we felt that way."	◊**Conformation** The attendance rate was excellent (100%), which confirmed that factors such as efficient facilitators, individualised approaches, and technological integration were enablers. ▲**Expansion** Participants suggested that there were insufficient strategies, which expanded on the potentiality that participants were unaware (consult sessions were unclear) about integrating strategies in their daily life.

Main Measure: Retention Rate						
Quantitative			**Qualitative**			
Variable	**n**	**%**	**Resource**	**Undocumented (summary)**	**Documented (example quotes)**	**Analytical integration**
Debrief session retention						
Intervention group All 6 sessions 3-5 sessions Less than 3 sessions **Active control group** All 6 sessions 3-5 sessions Less than 3 sessions Average group size: Intervention Active control **Social Problem-Solving Inventory (SPSI)** Active control group demonstrated greater social problem skills than the intervention group	 11 3 1 2 6 7 4.5 4 NA	 73 20 7 13 40 47 NA NA NA	Feedback interview

Main Measure: Retention Rate						
Quantitative			**Qualitative**			**Analytical integration**
Variable	**n**	**%**	**Resource**	**Undocumented (summary)**	**Documented (example quotes)**	
Measure 2: Safety						
Adverse events for both intervention and active control groups	0	0	Feedback interview	**Theme:** flexibility, confidence ▲ Technological use created a safe environment for participants to discuss sensitive and uncomfortable topics (i.e. turning camera and microphone off). ▲ Technological use helped shy or introverted participants to become more expressive.	"…I mean if you're embarrassed or if you've got tears in your eyes, you can turn the camera off but still talk and contribute." "…whereas online, I feel like you can, you're a bit more protected by the video like you're behind the screen."	◊**Conformation** There were no adverse events, conforming the researcher's expectations (due to exclusion of high IES-R participants). ▲**Expansion** Technology created a safe environment for participants to feel vulnerable, expanding on the possibility of no adverse events.
Expected adverse events	0	0	Field notes	◊Researchers expected no adverse events as 'high risk' participants were screened and excluded using IES-R.		

Abbreviations: T0=Timepoint 0, T1=Timepoint 1, T2=Timepoint 2, T3=Timepoint 3.

11.8 Main Measure: Data collection procedures

11.8.1 Measure 1: Psychometric questionnaire completion rate

Both the intervention and active control groups exhibited an excellent completion rate for baseline measures (100%) and post-intervention measures (93%). The completion rate for the intervention group remained excellent at 1-month and 3-month follow-up, reaching 80%. However, the completion rates for the active control group decreased to 73% at 1-month and further decreased to 63% at 3-months.

The overall completion rates for both groups demonstrated that the scales used in the study were acceptable and well-received by the participants, affirming the suitability and effectiveness of the measurement tools.

11.8.2 Measure 2: Journal entry completion rate

The completion rate for journal entries was found to be satisfactory in both groups, with 33% of participants in the intervention group and 13% of participants in the active control group completing all 6 entries. The qualitative findings shed light on the reasons for the relatively low completion rates, indicating that participants perceived the journal entries as tools to assist them with their well-being and burnout symptoms rather than as a form of measurement. Participants reported not resonating with the journal entry as a measurement tool, which contributed to the lower completion rates.

To improve the completion rate, the qualitative findings suggested potential strategies, such as changing the questions in the journal to better resonate with participants or considering renaming the term 'journal entry' to clarify that it was a form of measurement rather than an intervention. These suggestions aimed to enhance participant engagement and understanding of the purpose of the journal entries, potentially leading to higher completion rates and more meaningful data collection. The incorporation of these insights from the qualitative findings

could improve the overall data quality and participant compliance with the journal entry task in future studies.

11.8.3 Measure 3: Feedback semi-structured interview and questionnaire completion rate

Both the intervention and active control groups demonstrated a good attendance rate for the feedback interview, with rates of 67% and 53%, respectively. The attendance rate was deemed good, affirming that the use of gift cards served as a motivating factor for participants to attend the feedback sessions.

Contrastingly, the completion rate for the feedback questionnaire was good for the intervention group but poor for the active control group. The qualitative findings supported this observation, indicating that the similarity between the feedback questionnaire and the feedback interview may have contributed to the varying completion rates. Participants in the intervention group exhibited better completion rates, suggesting their engagement with the treatment and their willingness to provide feedback to aid in the improvement of the study.

Table 47 Joint display for data collection procedures

Main Measure: Data Collection Procedures						
Quantitative			**Qualitative**			
Variable	**n**	**%**	**Resource**	**Undocumented (summary)**	**Documented (example quotes)**	**Analytical integration**
Measure 1: Psychometric questionnaire completion rate						
Intervention group			Feedback interview	◊The completion time was acceptable to participants. ◊Questions were repetitive, but participants understood the reason.	"It didn't take me that long to complete the scales." "There were a few questions that were repetitive, but I know you're using those scales and it can sometimes repeat. I thought it was ok overall."	◊**Conformation** Rate of completion was excellent for both groups, confirmed by qualitative findings that the scales were acceptable despite repetitive questions.
Baseline	15	100				
Post-intervention	14	93				
1-month follow-up	12	80				
3-month follow-up	12	80				
Active control group			Field notes	◊Psychometric questionnaire were sent to participants emails and reminders were sent every 2 days until it was completed.		
Baseline	15	100				
Post-intervention	14	93				
1-month follow-up	11	73				
3-month follow-up	11	73				
Measure 2: Journal entry completion rate						
Intervention group			Feedback interview	**Theme:** journal ▲The journal was used as a measurement tool, however, participants felt that it was effective for self-reflection ▲Some participants felt that the journal was ineffective for them when compared to the debrief sessions	"The journaling is good because it lets people who don't talk still be able to talk." "I felt like the journaling didn't relate as much to the debriefing…"	◊**Conformation** Rate of completion for journal entries were low, confirming that most participants did not resonate with the tool as they had thought of it as an intervention. ▲**Expansion** Renaming or changing the questions in the journal expands the possibility for better completion rate.
All 6 entries	5	33				
3-5 entries	6	40				
Less than 3 entries	4	27				
Active control group			Field notes	◊Journal links were sent to participants emails weekly after attending the debrief sessions.		
All 6 entries	2	13				
3-5 entries	11	73				
Less than 3 entries	2	13				

Main Measure: Data Collection Procedures						
Quantitative			**Qualitative**			
Variable	**n**	**%**	**Resource**	**Undocumented (summary)**	**Documented (example quotes)**	**Analytical integration**
Measure 3: Feedback semi-structured interview and questionnaire completion rate						
Feedback interview			Field notes	◊Gift cards were given to participants to attend the feedback interview. ◊Participants felt that the feedback questionnaire was repeating the contents from the feedback semi-structured interview ◊Participants in the intervention group stated that they enjoyed the debrief sessions and wanted to 'give back' to the study by attending the feedback session.	"I'd recommend because it gives an opportunity to learn new coping strategies for stress at work." "I would recommend this to my colleagues because as nurses, we don't often get to network or meet peers from other hospitals." "I really enjoyed the debrief sessions and you know, I wanted to do this feedback because I want it (treatment) to work and progress."	◊**Conformation** The attendance rate for feedback interviews were good for both groups, confirming that the use of gift cards motivated participation. Participants felt that the feedback questionnaires were structured similarly to the feedback interview (conducted first), which confirmed the adequate completion rate for the intervention group and poor completion rate for the active control group.
Intervention	10	67				
Active control	8	60				
Feedback questionnaire						
Intervention	9	53				
Active control	5	33				

Abbreviations: T0=Timepoint 0, T1=Timepoint 1, T2=Timepoint 2, T3=Timepoint 3.

11.9 Integration of secondary outcomes

The two tables (see Tables 48 and 49) demonstrated a side-by-side joint display of quantitative results and qualitative themes for each related construct on preliminary effectiveness. The integration was designed to include two main themes including reciprocity and self-awareness, as identified in the secondary outcome qualitative findings. The following sections provided a description of the mixed method inferences derived from these joint displays.

11.10 Main Measure: Reciprocity

11.10.1 Measure 1: Social support

Qualitative findings indicated that high levels of stress and workload were contributing factors to participants' experiences of isolation. This finding aligned with the quantitative results, which showed decreased levels of isolation in both the intervention and active control groups. Moreover, the qualitative data provided a deeper understanding of the interrelated relationships between isolation, stress, and depression, demonstrating a bidirectional effect. As stress and depression experiences decreased for the intervention group, isolation also decreased, and reciprocally. A discrepancy was observed in the stress levels of the active control group. Despite significant improvements in loneliness, there were no significant differences in stress levels for this group. The findings also indicated that debrief sessions played a crucial role in fostering self-awareness, which was supported by the quantitative results. Significant decreases in emotional exhaustion were observed for both groups, and the intervention group also showed a significant decrease in depersonalisation. While the active control group reported an increase in self-awareness, discordance was identified concerning the lack of significant changes in depersonalisation outcomes (see Table 48).

Table 48 Joint display on reciprocity

Main Measure: Reciprocity					
	Qualitative		Quantitative		
Qualitative theme	**Undocumented (Summary)**	**Documented (example quote(s))**	**Conceptual questions**	**Documented (examples)**	**Analytical integration**
Measure 1: Social support	High stress and workload contributed to feelings of **isolation**	"We get in our little area in our hospital and its very rare that we network…" "I think that COVID has sort of closed networks…"	Did the treatment decrease **stress,** and **depression**?	◊Significant decreased depression in intervention group and active control group ▼Significant decrease in stress for intervention group but not for active control group.	◊**Conformation** Treatment decreased isolation, conforming with quantitative findings (depression) for both groups. ▲**Expansion** Decreased isolation expanded on decreasing depression and stress outcomes (for intervention group). ▼**Discordance** No improvements for stress (active control) despite participants feeling less isolated.
	Debrief sessions provided them with **self-awareness**	"I'm in my own bubble (at work) sometimes…it's a normal thing for us…so it was nice to talk to people that know what I'm talking about."	Are **emotional exhaustion** (EE) and **depersonalisation** levels decreased?	▲Significant decrease for EE for both groups. ▼Decreased depersonalisation for intervention group but not for active control group.	▲**Expansion** The treatment enabled participants to develop self-awareness, which expanded in the significant decrease for EE in both groups. Similarly, depersonalization outcomes for intervention group. ▼**Discordance** Active control group develop self-awareness, but they did not improve in depersonalisation outcomes.
	Ability to talk to other colleagues	"You got to talk to your colleagues about work and off load things…" "The facilitator in EAP just didn't understand what I'm going through…"	No integration	No integration	No integration

Main Measure: Reciprocity					
Qualitative			Quantitative		
Qualitative theme	**Undocumented (Summary)**	**Documented (example quote(s))**	**Conceptual questions**	**Documented (examples)**	**Analytical integration**
Measure 1: Social support (continued.)	Ability to gain confidence	"I found that talking through things is actually way better than bottling it all up yourself or feeling that you're somehow less worthy."	Does it help increase **work engagement (WE)**?	◊Significant improvement for overall WE intervention group. ▼No significant decrease for active control group overall and across all timepoints.	◊**Conformation** Improved confidence conformed with significant improvement for WE (intervention group). ▼**Discordance** No significant decrease for WE (active control) demonstrated discordance with qualitative findings suggesting increased confidence.
Measure 2: Empathy	Ability to give and receive empathy, allowed feeling comforted and reassurance especially for individuals going through work-related stress	"It was a lot of that kind of acknowledgement and knowing about consistency, that actually kind of made it reassuring." "I felt like they understood what I was going through…"	Are **stress, isolation, depression, and depersonalisation** levels decreased?	▼Significant decrease in stress and depersonalisation for intervention group and not for active control group. ◊Significant decrease in loneliness in both groups. ◊Significant decreased depression in intervention group and active control group.	◊**Conformation** Giving and receiving empathy conformed with quantitative results of decreased depersonalisation (intervention group) Reassurance and comfort conformed with decreased loneliness and depression in both groups and stress for intervention group. ▼**Discordance** Empathy was reported for active control but discord with depersonalisation and stress.
	The debrief sessions provided them with a different type of positive experience	"…I felt like they understood what I was talking about and some of them gave me their opinions on what I should do, it was a really good experience."	Did it improve **positive affect**?	◊Significant improvements for positive affect for both intervention and active control groups.	◊**Conformation** The treatment provided participants with a positive experience with conformed with quantitative outcomes of significant levels of positive affect for both groups.

Main Measure: Reciprocity					
Qualitative			Quantitative		Analytical integration
Qualitative theme	**Undocumented (Summary)**	**Documented (example quote(s))**	**Conceptual questions**	**Documented (examples)**	
Measure 2: Empathy (continued.)	Satisfaction to be able to provide advice and guidance to junior healthcare professionals	"I came into this study not being burnt-out, but I just wanted to help, especially with the more junior staff…" "Nurses eating their young is a real thing, so it was nice to give back, especially with one participant who was quite upset about her work."	Did it improve **positive affect**, **personal accomplishment**	◊Significant improvements for positive affect for both intervention and active control groups. ▼Significant improvements for personal accomplishment for intervention group but not for active control group.	◊**Conformation** Participants felt satisfied in being able to 'give back', conforming with improved positive affect for both groups and personal accomplishment for the intervention group. ▼**Discordance** Although participants felt satisfied in giving back, quantitative results demonstrated discordance for personal accomplishment outcomes for the active control group.

Abbreviations: T0=Timepoint 0, T1=Timepoint 1, T2=Timepoint 2, T3=Timepoint 3.

The qualitative findings also suggested that improvements in confidence were consistent with the quantitative findings of improved work engagement for the intervention group. The participants' increased confidence should have been reflected in the quality of work they produced and their ability to engage effectively within the workplace. However, the active control group demonstrated a discrepancy, as work engagement did not show significant improvement despite participants' reports of feeling confident.

11.10.2 Measure 2: Empathy

Participants reported the ability to receive and give empathy during the debrief sessions, which provided them with a sense of reassurance regarding their feelings. The qualitative findings aligned with the quantitative results, indicating a decrease in depersonalisation for the intervention group. However, there was a discrepancy in the findings for the active control group, as participants did not show significant differences in depersonalisation and stress. Furthermore, the findings suggested that feelings of reassurance and comfort were associated with decreased loneliness and depression for both the intervention and active control groups, as well as reduced stress for the intervention group. Participants also reported experiencing "a different type of positive experience" in relation to the treatment they received. When assessed using positive affect measures, the quantitative results supported this notion, showing significant improvements for both groups. Additionally, participants' satisfaction from providing guidance to junior HCP was identified as an enabling aspect of the treatment they received. This finding was consistent with the significant improvements observed in personal accomplishment for the intervention group. However, the active control group's reports of satisfaction did not align with the quantitative findings, which indicated no significant improvements in personal accomplishment for this group.

11.11 Main Measure: Self-awareness

11.11.1 Measure 1: Validation

Participants in both groups reported that the treatments provided allowed them to normalise their feelings of stress, preventing misjudgments of their skills and abilities as HCP. This finding was supported by statistically significant improvements in emotional exhaustion for both groups and work engagement, particularly in the vigor sub-scale for the intervention group. However, a discrepancy was identified for the active control group, where no significant improvements in work engagement were observed for all sub-scales. Additionally, the treatment enabled participants to feel collected, especially after eventful days at work. This finding was in line with significant improvements in both positive and negative affects for both groups and improved anxiety levels for the intervention group. Conversely, discordance was indicated for the active control group's stress levels, as there were no significant improvements at post-intervention (see Table 49).

11.11.2 Measure 2: Reflection

Participants reported a realisation of the importance of their mental health, which aligned with the quantitative findings showing significant improvements in the depression sub-scale for both the intervention and active control groups. Additionally, the ability to develop self-realisation and self-management skills for stress was associated with significant improvements in stress and depersonalisation for the intervention group. However, a discrepancy was observed for the active control group, as there were no significant improvements in both stress and depersonalisation measures.

Table 49 Joint display for self-awareness

Main Measure: Self-awareness					
Qualitative			**Quantitative**		
Qualitative theme	**Undocumented (Summary)**	**Documented (example quotes)**	**Conceptual questions**	**Documented (examples)**	**Analytical integration**
Measure 1: Validation	Normalise stressful experiences, often translated as in-capability and lack of experience	"When I walk about something with my colleagues to work about something being hard or stressful, they tend to think that I can't do the job." "I can't really complain to anyone at work…"	Did it improve **negative affect**, **anxiety** levels, and improve **positive affect**, **personal accomplishment, emotional exhaustion,** and **work engagement**?	◊ Significant improvements for negative affect for intervention group and active control group. ◊ Significant decrease in anxiety levels and improvements in personal accomplishment for intervention group, not for active control. ◊ Significant improvements for positive affect for both intervention and active control groups. ◊ Significant decrease for EE for both groups from T0 to T2. ◊Significant decreased WE subscale vigor for intervention group and no significant decrease for active control group overall and across all timepoints.	◊**Conformation** Participants felt that the treatment enabled them to normalise stress, which conformed with emotional exhaustion for both groups and improved work engagement (vigor) and personal accomplishment for the intervention group. The treatment enabled participants to feel collected, conforming with improved positive and negative affect for both groups and decreased anxiety levels for the intervention group. ▼**Discordance** Although participants were able to normalise stress, there were a discord in work engagement and personal engagement for the active control group. Participants in the active control group was able to feel more collected, however, there was a discord where no significant decrease in anxiety levels were noted.
	Allows them to feel collected and have a more positive mindset.	"…been really good and it helps me ground myself and my senses…" "And those (debrief sessions), it gave me the time to prepare myself again."			

Main Measure: Self-awareness					
	Qualitative		Quantitative		
Qualitative theme	**Undocumented (Summary)**	**Documented (example quotes)**	**Conceptual questions**	**Documented (examples)**	**Analytical integration**
Measure 2: Reflection	Allowed the realisation on the importance of mental health and its implications on people around them	"It's just brought to my attention that I sometimes need to think about my mental health and everyone around me…"	Did it decrease **depression** sub-scale?	◊Significant decreased depression in intervention group and active control group.	◊**Conformation** Participants realised the importance of mental health, which conformed with a decrease in depression sub-scale for both groups.
	Self-realisation and the ability to control and manage stressful situations	"…help me kind of reflect on what I was doing an what I could do a little bit better." "Acceptance of my own feelings and emotions made me more aware of my own patterns of behaviour."	Did it improve **stress** levels and **depersonalisation sub-scale**?	◊Significant decrease in stress and depersonalisation for intervention group ▼No significant improvements for both measures for active control group.	◊**Conformation** The ability to manage stressful situations and develop self-realization conformed with the decreased stress levels in the intervention group. ▼**Discordance** Active control group demonstrated a discord with stress and depersonalisation measures.
Measure 3: Strategic awareness	Use and share strategies with colleagues for immediate or future utilisation	No integration	No integration	No integration	No integration
	Allowed her to become more accountable and recover after a long and eventful shift	"I feel like I have more coping strategies to keep calm in the moment, and better ways to wind down after a hard shift." "…because they made you accountable…"	Participant **turnover** intention	◊Significant decrease in participant turnover intention for intervention group ▼No significant results were identified for active control group.	◊**Conformation** The ability to recover after a shift conformed with a significant decrease in turnover intention for the intervention group. ▼**Discordance** A discord was identified for the active control group despite their ability to recover.

Abbreviations: T0=Timepoint 0, T1=Timepoint 1, T2=Timepoint 2, T3=Timepoint 3.

11.11.3 Measure 3: Strategic awareness

The treatment received by participants enabled them to become more accountable and improved their recovery experiences after stressful and long shifts. When assessed against the turnover intention scale, there was confirmation between recovery and decreased turnover intention for the intervention group. However, discordance was identified for the active control group, as there were no significant decreases in turnover intention. The results suggested that the treatment had a positive impact on the intervention group's recovery experiences, leading to reduced turnover intention. The sense of accountability cultivated through the treatment may have contributed to participants' enhanced ability to cope with stress and recover effectively after demanding shifts. Moreover, the active control group did not demonstrate significant improvements in turnover intention, indicating the need for alternative strategies to address this aspect. Further research and intervention development might be necessary to identify effective approaches for enhancing turnover intention and well-being among HCP in the active control group.

11.12 Context-Mechanism-Outcome Configuration

Six overlapping theoretical prepositions were generated explaining what supported successful implementation and uptake of IP program among CCHP. Six middle-range theories were used during data synthesis, which guided the development of theory prepositions: (1) Engagement theory, (2) Stress-response theory, (3) Theory of moral sentiments, (4) Empowerment theory, (5) Skill acquisition theory, and (6) Theory of adaptation. Descriptions of these theories in conjunction with the presented data/theory prepositions were provided below. Theory Prepositions (TP) developed within the data synthesis are described in Table 50.

Table 50 Theory prepositions refining the existing program theory

Identifier	Theory prepositions using Context-Mechanism-Outcome configuration
TP1	The IP program integrated technology (i.e. virtual) *(C),* which made the program accessible *(M)* and flexible *(C)* for CCHP, enabling them to attend sessions *(O).* This is especially important as CCHPs may encounter conflicting priorities and/or personal barriers (i.e. family commitments) to access *(C)*.
TP2	The IP program was easy to use (i.e. register and book into sessions) *(C),* making the program engaging to participants *(M),* which increased the likelihood of attending (i.e. high retention rate) *(O)*.
TP3	The IP program provided immediate attention to participants *(C),* facilitating accessibility and tailored to when CCHP would need the intervention most (i.e. when they are feeling most stressed) *(M)*. This was reflected in the high registration and retention rate (O) of the study.
TP4	The IP program was facilitated by student psychologists (facilitators) *(C)*, which was acceptable to CCHP *(O)* as they felt the facilitators were able to promote problem-solving knowledge and skills *(M)* that were evidence-based *(M).* Improvements in problem-solving were also noted as a prominent outcome in the trial *(O)*.
TP5	The IP program enabled CCHP to give and receive empathy (reciprocity) *(M),* which was absent within their workplace* due to the isolative environment *(C).* This was reflected in the high retention rate and improved turnover intention and well-being and burnout related measures *(O)*.
TP6	CCHP felt that the IP program facilitated self-awareness *(M),* especially where there lacks burnout recognition and management support within the workplace *(C)*. This was reflected in the high retention rate and improved turnover intention and well-being and burnout related measures *(O)*.

Abbreviations: C; Context, M; Mechanisms, O; Outcomes
*Some participants felt isolative due to workplace and/or lack of support from family and friends.

11.12.1 Middle-range theories facilitating theory prepositions

11.12.1.1 Engagement theory

This theory posits that the integration of user-friendly technology, such as virtual platforms, into programs fosters participant engagement and increases attendance rates (306). The ease of use and accessibility provided by technology leads to greater convenience for participants, making it more likely for them to actively engage with the IP program content (306). The resulting engagement then contributes to higher retention rates and positive outcomes (306).

11.12.1.2 Stress-response theory

This theory suggests that offering immediate attention and tailored interventions during periods of heightened stress is crucial for participant engagement and success (307). When

CCHP receive support precisely when they need it most, such as during times of increased stress, they are more likely to participate actively and benefit from the program's offerings (307). This concept aligns with the idea that timing plays a significant role in the effectiveness of the IP program (307).

11.12.1.3 Theory of moral sentiments

This theory proposes that fostering empathy and providing opportunities for participants to both give and receive empathy can have profound effects on well-being, burnout, and retention (308). In environments where empathy is lacking, a program that promotes empathetic interactions can create a sense of belonging and support (308). This, in turn, leads to improved psychological well-being, reduced burnout, and a higher likelihood of CCHP staying engaged and committed (308).

11.12.1.4 Empowerment theory

This theory suggests that programs that facilitate self-awareness and empowerment address a critical need in environments where recognition and management of burnout are absent (309). By promoting self-awareness, CCHP gain insights into their own well-being and stress levels (309). Empowerment through such insights enables them to take proactive steps to manage stress, which contributes to improved retention rates and overall well-being (309).

11.12.1.5 Skill acquisition theory

This theory emphasizes the role of skilled facilitators in delivering evidence-based knowledge and skills (310). When facilitators possess the ability to effectively convey evidence-based techniques, CCHP acquire problem-solving skills that are both meaningful and applicable (310). The acquisition of these skills contributes to positive outcomes and engagement, reinforcing the importance of evidence-based practices in program design (310).

11.12.1.6 Theory of adaptation

This theory highlights the significance of program flexibility and adaptability to participants' IP program allow CCHP to engage at their own pace, choose session times that suit them, and access content according to their preferences are more likely to retain participants (311). Flexibility caters to the challenges of conflicting priorities and personal barriers, enhancing overall engagement and program success (311).

11.13 IP Program refined program theory

The results of the pilot Randomized Controlled Trial (RCT) have contributed to the enhancement of the current program theory (see Figure 63). These refined insights can be leveraged in future investigations of the Individualized Psychosocial (IP) Program. The pilot trial yielded valuable information regarding contextual factors and mechanisms that enable the effectiveness of the IP program among CCHP. The following sections provided descriptive summaries of the IP program revised program theory.

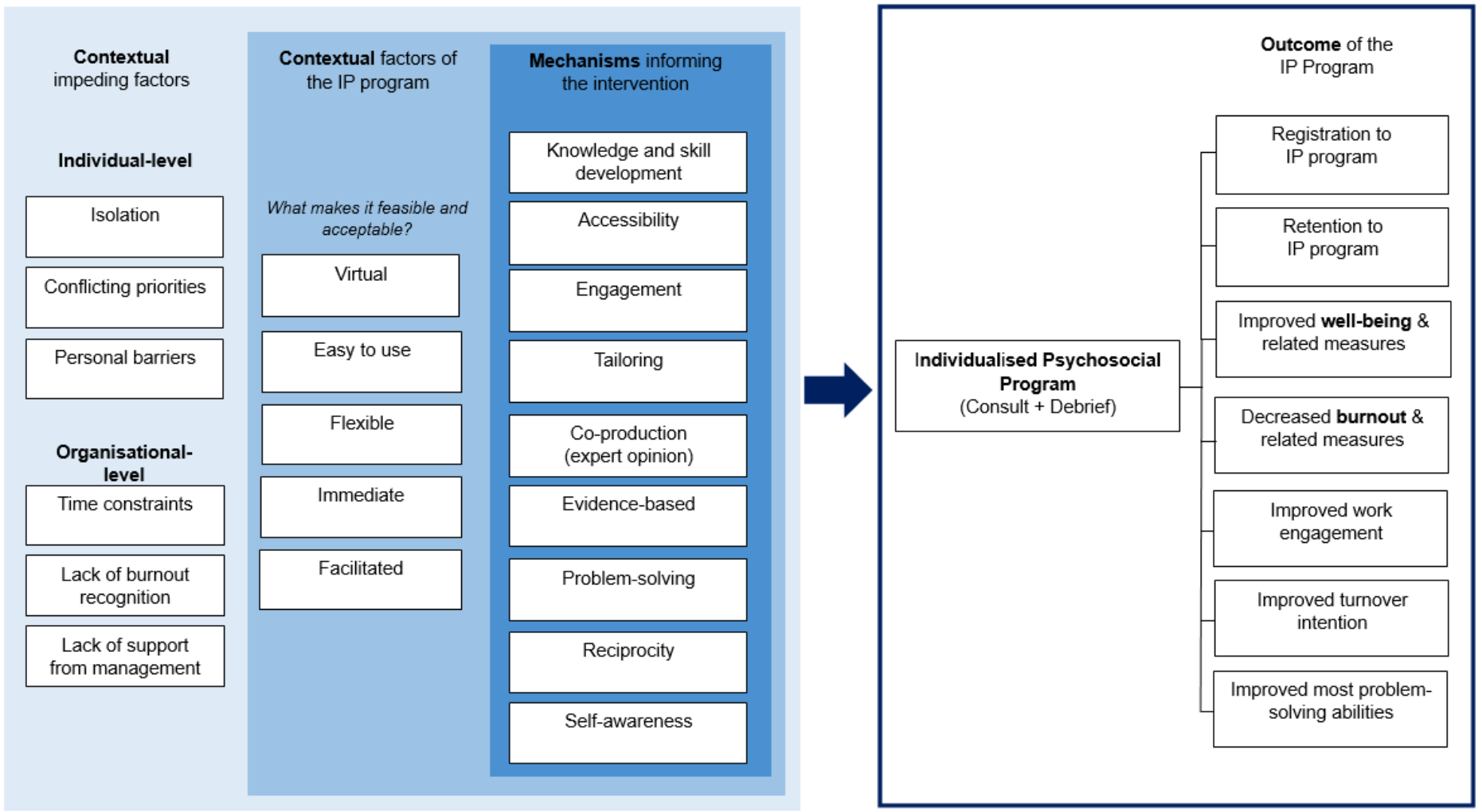


Figure 63 IP program revised program theory

11.13.1 Contextual impeding factors

Contextual factors referred to factors that shaped, influenced, and contributed to how an individual-level intervention (IP program) is delivered and how mechanisms are triggered. Findings from this pilot RCT corroborated with the expert opinion (Chapter 5) findings, which included individual- and organisational- level factors. The individual-level indicated an addition of isolation, which was a prominent component identified by the research team, key stakeholders, and participants within the pilot RCT. The organisational-level factors were refined to include components that would directly influence individual-level intervention utilisation among CCHP. These components included time constraints (referred to insufficient time to apply IP program within the workplace), lack of burnout recognition, and the lack of support from management.

Components including virtual, easy to use, flexible, immediate, and use of facilitator were described were contextual factors of the program (findings of the pilot RCT described in Chapters 8 and 9). Virtual referred to the use of a virtual platform, which facilitated flexibility for participants. Especially where participants have overriding commitments such as conflicting priorities or personal barriers (contextual factors), the IP program can still be facilitated as indicated by the pilot RCT findings. The IP program was also easy to use in terms of registering into the study, booking into consult and debrief sessions, as well as the ability to receive text and email reminders. These components facilitated ease in interacting with the IP program, which promoted engagement among participants. Immediate referred to the immediate availability of the IP program, which allowed participants to seek immediate social support. Participants contrasted the IP program and other support services such as the EAP, where the immediate assistance provided immediate psychological relief through the treatment as opposed to waiting until they felt better before receiving the treatment (discussed above in this Chapter 11). Having the IP program facilitated by student psychologists were also noted as an enabler as facilitators provided guidance to the content discussed and facilitated problem-solving approach through knowledge and skill development.

11.13.2 Mechanisms informing the intervention

Contexts are bounded up with mechanisms through which a program works. It included a combination of resources that justifies enablers and disablers. The majority of mechanisms indicated in the IP revised program theory were the same as indicated in the expert realist opinion (Chapter 4), with the addition of problem-solving, reciprocity, and self-awareness. Problem-solving refined the concept of continuous learning[20] whereas reciprocity and self-awareness were additional components derived from the pilot RCT findings (discussed in Chapter 12).

11.13.3 Outcome of the IP program

The formulation of context and mechanisms enabled the creation of the IP program, which was tested for feasibility, acceptability, and preliminary effectiveness. Findings from the pilot RCT indicated improvements in well-being and burnout and its related measures, work engagement, turnover intention, and improvements in all problem-solving abilities, excluding impulsivity/carelessness. Moreover, the pilot RCT indicated feasibility for registration and retention.

11.14 Chapter summary

This chapter presented the integration of the pilot RCT qualitative and quantitative findings in relation to primary and secondary outcomes. It provided a side-by-side joint display of qualitative and quantitative findings, which was used to inform the discussion (Chapter 12). The chapter indicated three main measures that addressed the primary outcomes (recruitment processes, retention rate, and data collection procedures) and two main measures that addressed secondary outcome measures (reciprocity, self-awareness). The findings enabled extraction of context, mechanisms, and outcome configurations and subsequent refinement of the existing program theory. Six theory prepositions were developed through this process:

[20] Reason for including problem-solving was discussed in Chapter 6

TP1- technology, TP2 – engagement, TP3 – tailoring, TP4 – facilitating problem-solving, TP5 – reciprocity, and TP6 – self-awareness.

The next chapter presented discussion of the pilot RCT findings in relation to the newly refined program theory.

CHAPTER 12

DISCUSSION OF THE PILOT RCT

12.1 Chapter overview

This Chapter 12 will present a discussion of the pilot RCT findings. The Chapter will discuss the feasibility and acceptability of the IP program using process evaluation, which will be informed using three main functions: i) implementation, ii) mechanisms of impact, and iii) context (enablers and barriers). Preliminary effectiveness will also be discussed in relation to existing literature. It will provide an in-depth analysis of the reasons behind the success or failure of the IP program, shedding light on its efficacy and impact.

12.2 Process evaluation of feasibility and acceptability

The MRC Framework recommended process evaluation to assess feasibility and acceptability of the IP program. The evaluation method aimed to understand the implementation process of the IP program, the mechanisms through which it impacts outcomes, and the contextual factors that influence its feasibility and acceptability. The use of sub-headings on Implementation, Mechanisms of Impact, and Context was used to provide clarity within the process evaluation components. Figure 64 provided a recollection of the MRC framework phases and highlighted the current phase in relation to this thesis (Chapter 12).

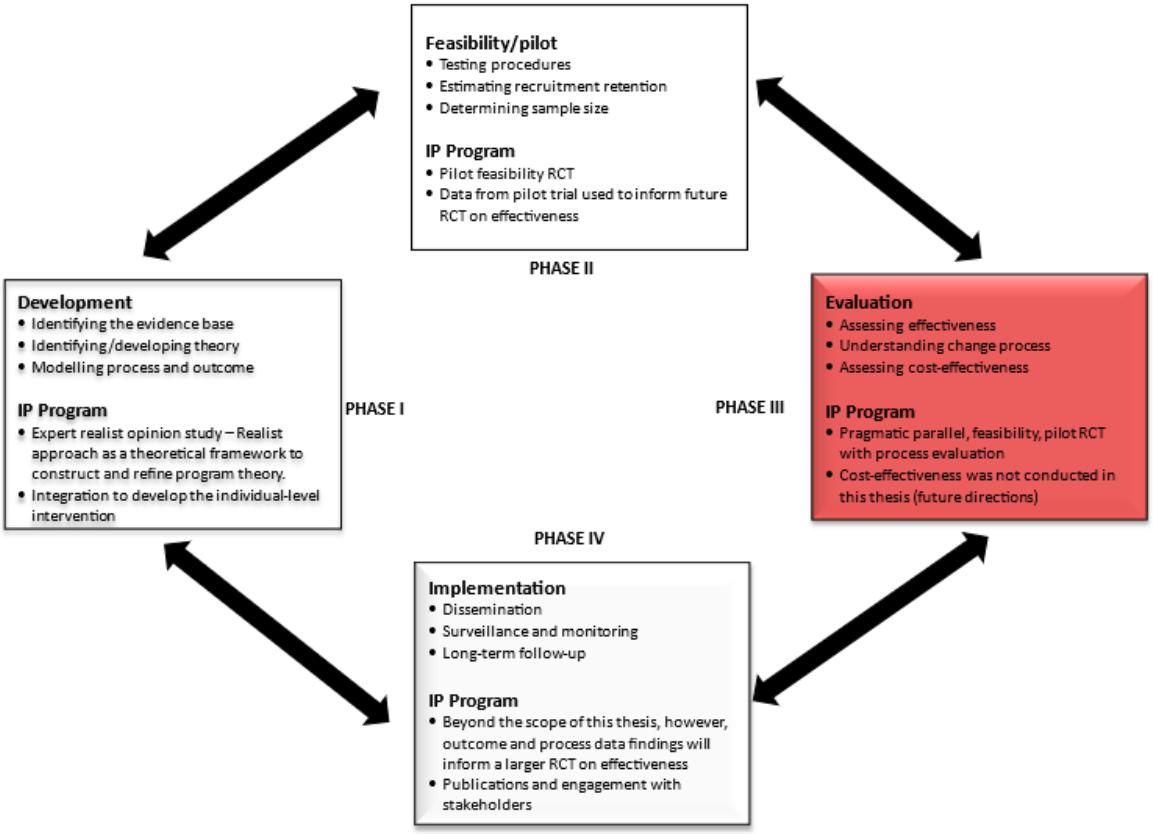


Figure 64 MRC Framework Phase III

12.3 Amalgamation of the refined program theory

The refinement of the program theory took place in the preceding Chapter 11. Within this chapter, the pilot RCT findings were explored using a process evaluation approach, which comprehensively examined the context, mechanisms, and outcomes of the refined program theory. To structure Chapter 11 (informed by the process evaluation), key headings were introduced, including Implementation, Mechanisms of Impact, Context, and Outcome of Preliminary Effectiveness. Figure 65 visually illustrated the interrelation between the Chapter 11 structure and the revised program theory components. The coloured sections (implementation, mechanisms of impact, outcomes of preliminary effectiveness) represented the main headings for discussion and demonstrates how the refined program theory (greyscale) was discussed in conjunction to the process evaluation.

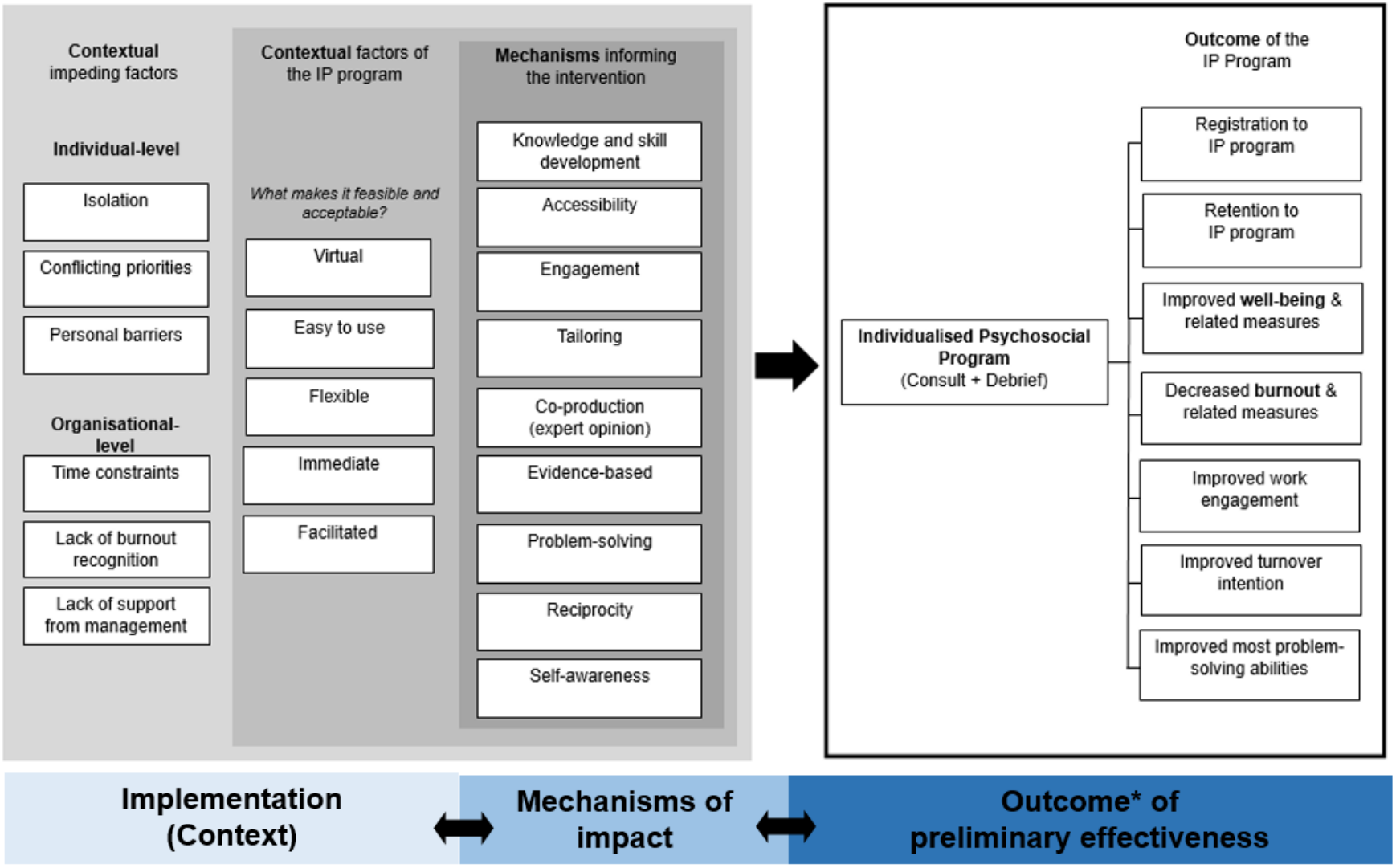


Figure 65 Discussion of program theory within process evaluation

Implementation was considered based upon factors that influenced the implementation of the intervention – for example, the relationship between flexibility and recruitment. It included four areas of discussion including i) recruitment process, ii) sample size and recruitment, iii) dose delivered, and iv) fidelity. Mechanisms of impact considered reasons and reactions of agents and included two areas of discussion i) acceptability and ii) adoption and sustainability. Context was included under implementation in Figure 65 due to its interrelated concepts and was discussed as i) enablers to implementation and ii) barriers to implementation. The outcome of preliminary effectiveness considered key findings from the intervention and included four areas of discussion including i) social interaction, ii) workplace loneliness, iii) mitigating stigma, and iv) strategic awareness through problem-solving.

In this illustration, the implementation aspect corresponded to the context, the mechanisms of impact aligned with mechanisms, and the outcome of preliminary effectiveness correlated with outcome. Notably, the outcome of preliminary effectiveness was marked with an asterisk (*), indicating that within the implementation and mechanisms of impact discussions, there was also an exploration of the pilot RCT's outcomes, particularly focusing on feasibility and acceptability aspects.

Additionally, it was not possible to address and delve into each section (such as implementation, impact mechanisms, and preliminary effectiveness outcomes) separately without blending other components of the CMOC (Context-Mechanism-Outcome-Configuration) model. Consequently, each section predominantly focused on its designated subject (context, mechanism, or outcome). When necessary, other configuration components were merged and collectively examined (noted in Figure 65 as black right and left arrows).

12.4 Implementation

This section provided a discussion on feasibility and acceptability through investigating the delivery process of the IP program, achievements of program delivery, and fidelity of the

program. Four sub-sections were discussed: i) recruitment processes, ii) retention rate, iii) dose delivered (included data collection measure), and v) fidelity.

12.4.1 Recruitment processes

The pilot RCT demonstrated excellent registration over a 1-month recruitment duration, with 112 potential participants registered for the study. Participants highlighted that they felt highly burnt-out at the time of registration and were seeking immediate coping resources. This was correlated with a high mean score of 48.5 on the IES-R across all registered potential participants, indicating high distress caused by traumatic life events (312).

Dobson et al. (313) conducted a cross-sectional study (N=406) measuring IES-R on Australian HCP during the COVID-19 pandemic and noted that frontline (i.e. CCHP) HCP demonstrated high severe scores (i.e. 37 or more) on the IES-R when compared to second-line professionals (313). The study also found that IES-R scores for frontline HCP ranged between mild (55.5%) to moderate (33.3%)[21], with only 11.1% of the participants showing severe scores (313). When compared to the results of this study, it was observed that 55% of potential participants were excluded due to severe (37 or more) IES-R scores. The variations in population, such as the distinction between HCP in general and CCHP, could explain this disparity. Alternatively, as proposed by Hill et al. (299), the lower prevalence of IES-R scores (noted in Dobson's et al. (313) study) during the COVID-19 pandemic could signify assessments of PTSD during the early stages of the crisis (314).

The findings of this study also identified differences in gender representation, with 85% of participants being female and 15% being male. One explanation for the higher representation of females in the study could be attributed to the significant enrolment of nurses (80%), considering literature's explanation that nursing is viewed as a "women-dominated profession" (315, 316). Another explanation is the representation of higher burnout experiences among

[21] Mild = scores of 24 or more, moderate include 33 or more, and severe include 37 or more.

female HCP (317). Prasad et al. (318) conducted a national cross-sectional survey (N=20,947) of HCP, which determined that 50% of females experienced burnout compared to 37% of males (318). Factors such as having children and work-life integration contributed to higher burnout rates among females, leading to an increasing likelihood of reducing work hours to manage caregiving responsibilities (317). This supports our findings that indicated that the majority of registered participants lived with a partner and dependent (50%, n=50) or partner only (27%, n=8), which may increase the likelihood of greater burnout experiences reflected in the IES-R. However, one study by Bellanti et al. (2021) suggested that living with other people may decrease emotional exhaustion; for example, living with family may facilitate emotional support and assist in counteracting emotional exhaustion and other burnout dimensions (319, 320).

Moreno, Velasco, and García also suggested that an educational level at a master's or doctoral degree among nurses increased the likelihood of emotional exhaustion due to their attribution to increased duties at work that involve responsibility (319). When comparing to the results of this study, 87% (n=26) of participants enrolled reported having additional qualifications (more than a bachelor's degree). As such, these factors may support high IES-R scores and increased demands for coping resources (i.e., IP program), as reflected by the high registration rate over a short recruitment duration.

The substantial registration rates can also be attributed to qualitative findings indicating participants' keen interest in debriefing. Participants explained that having colleagues in the same professional field, such as the ICU, enabled them to establish connections and provide mutual support. Shah et al. (321) affirmed that support groups like debriefing have a positive impact by creating an environment where emotional aspects of work can be openly discussed, fostering a sense of "shared understanding". Given that limited or ineffective communication among colleagues and superiors commonly contributes to burnout, support groups serve as spaces for individuals to share their stressors, acknowledge mistakes, express doubts, enhance self-awareness, regulate emotions, and cultivate empathy (322). Maresca et al. (322)

suggested that support groups would enable individuals to feel accompanied and not "alone" in managing stressful situations. Such literature supports our findings of isolation and loneliness in critical care workplaces, where participants explained that the elevated stress and workload had placed them in 'their own bubble,' where they had very little time to network with colleagues. Lawson et al. (323) suggested that professional isolation harms well-being and recommended coffee breaks and 'door wedges' as beneficial for HCP. However, this was not necessarily possible for CCHP due to the high demands and isolative restrictions of the COVID-19 pandemic. Participants explained that the COVID-19 pandemic had closed networks for them by implementing restrictions on having lunch together, resulting in an inability to interact with colleagues, as well as restrictions on the use of lunchrooms.

12.4.2 Sample size and recruitment

The study had proposed a target sample size of 110 to address the secondary aims of preliminary effectiveness. Previous studies conducted by Billingham, Whitehead, and Julious (324) and Lewis et al. (325) had indicated a lack of consensus on sample size requirements for pilot and feasibility studies (324, 325). Moore et al. (326) had highlighted that it was common for pilot and feasibility study proposals to include statements such as "No sample size justification is needed because of the pilot nature of the proposed study". However, it had been evident from the Consolidated Standards of Reporting Trials (CONSORT) statements that pilot trials were not exempted from the requirement of having clear rationales for the number of participants to be included (324). Instead, sample sizes had been determined based on the study's objectives, which may have involved assessing feasibility parameters, clinical scale evaluations, or effect sizes, as demonstrated in this study (325). Although some guidelines had offered rules of thumb for pilot and feasibility study sample sizes, such as Julios et al. (327) recommending a minimum of 12 participants per treatment arm (24 for this study - 2 treatment arms) and Browne's et al. (328) flat rule suggesting at least 30 participants to estimate a parameter.

In comparison to the proposed sample size for this study (n=110), significant differences had been noted between the study's sample size and the sample size recommendations found in the current literature. Billingham, Whitehead, and Julious (324) had supported the literature with a study audit, suggesting an approximate sample size for pilot and feasibility studies ranging between 30 to 36 participants. The discussion on sample size had led to the assessment of recruitment feasibility.

Although the study had demonstrated high feasibility in terms of registration, it had indicated a low recruitment rate of 27%, considering the eligibility criteria (55% did not meet the eligibility criteria due to high IES-R scores) and attrition rate (15%). Given that the proposed sample size had been tailored to the secondary objectives of preliminary effectiveness, adopting the literature's recommended sample size might have yielded different and more meaningful findings. For instance, applying Browne's et al. (328) rule of thumb would have indicated a recruitment rate of 100% for this study, while Julious et al. (327) would have suggested a highly feasible recruitment rate of 125%.

Moreover, it is also important to consider that a total of 112 registered for the study and 62 were excluded due to high IES-R scores. This demonstrates that a large number of participants were interested in the intervention and were seeking well-being support. The number of total registered participants met the sample size of 110, which also indicated that the study was attractive and highly feasible in terms of recruitment. However, it denotes that there are a large number of CCHP that require more specialised and focused support for their mental health, considering 55% were excluded due to high IES-R scores.

One factor to consider when evaluating the feasibility of recruitment had been the duration or time taken to recruit participants. In this study, the recruitment duration had been influenced by the author's candidature, providing a one-month recruitment period. Avery et al. (329) had suggested that the recruitment duration for pilot and feasibility studies ranged between five months to over two years, indicating a short recruitment period for this study. However,

Matthew et al. (330) had reported recruitment feasibility in his study, where 42 nurses were recruited over a three-month period from one hospital. The recruitment rate for that study had been 14 participants per month (330), which had appeared lower when compared to this study, which had recruited 30 participants in one month. Another similar feasibility study published by Steward et al. (331) on virtual Acceptance and Commitment Therapy for HCP during the COVID-19 pandemic had recruited 10 participants over a one-week duration using convenience and snowball sampling. Unlike this study, all participants who had volunteered to participate in that study had met the eligibility criteria and had been enrolled in the study (331).

12.4.2.1 Instruments

An influencing factor for recruitment feasibility included the process undertaken and instruments used for recruitment. Manohar et al. (332) suggested that recruitment should be conducted by identifying, targeting, enlisting potential participants, and providing them with study information to generate interest in the study. In this study, the population of interest (critical care) was identified, and recruitment was targeted by collaborating with critical care organisations – ACCCN and ANZICS – and distributing flyers on their websites, social media, and newsletters. The flyer contained a link to the study's website, where interested potential participants could find additional information about the study and access the registration link. Technological innovations, as highlighted by Darko, Kleib, and Olson (333), offered opportunities for health researchers to utilise digital platforms such as web applications, the internet, social media, multimedia, and smartphones to effectively engage participants for research recruitment, given their capacity for establishing efficient and widespread communication (333). This aspect proved particularly valuable for this research, considering that the recruitment process occurred during the peak of the COVID-19 pandemic. Leveraging social media and organisational membership newsletters facilitated access to critical care populations, a finding consistent with other studies such as Ward et al. (334) and Guthrie et al. (335). Ward et al. (334) successfully collected 1,254 urine samples in three months across

50 United States by employing social media-based recruitment and crowdsourcing during the pandemic to test for bladder pain syndrome (334). Likewise, Guthrie et al. (335) recruited post-menopausal women for a pilot RCT through recruitment letters and Facebook advertisements, successfully enrolling 25 participants within a period of 28 and 15 days (335). Social media platforms offered the advantage of tailoring advertisements to reach or attract specific target populations, as exemplified in this study's approach of collaborating with specialised critical care membership organisations (335).

Challenges associated with social media-based recruitment, as pointed out by Ward et al. (334), included the need to prepare user-friendly study materials, such as study advertisements and websites. To address these concerns, this study developed a study website to enable potential participants to access study information, learn about the investigators involved, and centralise data handling for participant registration (334). The website also featured a 'Frequently Asked Questions' section and a download page for study materials (such as the protocol and informed consent documents), promoting transparency and trust (336-338). According to Paul, Seib, and Prescott (339), these sections provided participants with answers to common questions about the study protocol, and downloadable materials facilitated study distribution, reaching individuals without regular or sufficient internet access, and assisting in snowball recruitment.

It was worth considering that older participants might encounter challenges in accessing the website to download resources, read the study protocol, and register for the study due to lower levels of digital inclusion (340). However, as suggested by Cruickshank and MacIntyre (341), confidence in using technology might vary among working-age adults, who tended to exhibit higher levels of confidence in accessing the internet. Additionally, Barchielli et al. (342) proposed that HCP were frequently expected to familiarise themselves with technological innovations in all aspects of their profession. In line with existing literature, the study findings revealed that participants initially expressed intimidation regarding the inclusion of technology, such as the Zoom Meetings Version 5.8.0 platform for debrief sessions but gained confidence

through clear instructions on how to access and use the application. This observation indicated participants' overall confidence in utilising technology to register for the study, irrespective of their age.

12.4.3 Dose delivered

The term ‘dose delivered’ referred to the actual amount of intervention administered to participants. It evaluated the intended administration of the IP program and its compliance with the prescribed manual. This section provided an in-depth discussion of dose delivery in terms of i) retention, ii) duration, group-size, and content, and iii) facilitator.

12.4.3.1 Innovative technologies to promote retention

Factors that influenced retention in this pilot RCT included the use of reminders for participants to attend the IP program components (i.e., consult sessions, completing the psychometric questionnaire) and tools used for data collection (343). The pilot RCT utilised a digital software (www.calendly.com) to set automated email and text reminders for participants to attend the IP program components (i.e., consult, debrief) and complete outcome measures, including journal entries and psychometric questionnaires. Text messaging reminder systems had been suggested as a viable method for behaviour change in clinical settings, offering benefits such as user-friendly interfaces, cost-effectiveness, and prompt automated message delivery (344).

Kulhánek et al. (345) conducted an RCT comparing text messaging and email to improve adherence to an electronic health program and determined that both were equally effective in providing reminders and encouraging participation and retention. Another study investigating the effectiveness of text messaging to improve retention indicated a significant reduction in no-show rates (individuals not attending the scheduled appointment) of 17.7% when compared to 24.8% without text messaging (p-value .05) over a 6-month duration (346). The literature supported the quantitative findings of excellent retention rates to the consult sessions (100%, n=15) and debrief sessions (73%, n=11 for all six sessions for the intervention group) and qualitative findings, with participants highlighting the convenience of features like emails

and text messaging in improving IP program retention. Although high retention rates were observed for the intervention group, the control group indicated lower retention to all six debrief sessions (13%, n=2) despite the use of email and text messaging reminders. Sekhon, Cartwright, and Francis (347) suggested that perceptions of appropriateness about the intervention influenced retention to the intervention, which also influenced participants' willingness to participate. Winter et al. (348) further added that engagement leads to increased retention to an intervention, which explained the lack of engagement in the active control group. Participants in the active control group reported that although the intervention was engaging, the topics discussed during the debrief sessions tended to become repetitive due to the lack of structure, whereby, topics discussed were relative to what participants had experienced during the week. To provide further context, the researcher noted that the same types of stressors, including COVID-19, the lack of support from high authorities, workload, and workplace environment, were the main categories of topics discussed. For instance, one participant would discuss their stressor, which would inform the topic for that session. However, it may sometimes lead to the lack of engagement in other participants who were not experiencing the particular stress. The researcher's observations aligned with qualitative findings where participants in the active control group felt that the topics discussed were sometimes underwhelming.

Hooft and Hooff (349) indicated that in such circumstances when individuals feel bored, being within a low-autonomy condition, and feeling controlled by the environment are associated with a lack of understanding of other people's feelings. For instance, individuals may attend a mandatory lecture (i.e., low autonomy) that they perceive as irrelevant to their goal achievement (349). This perception often leads to a sense of time being wasted and the possibility of utilising that time for more meaningful activities that would further their goals (349). This can be further explained using the self-determination theory, explaining the psychological energy to reach a particular goal (350). It emphasises the importance of autonomous self-regulation for a behaviour to allow increased autonomously-regulated

individuals, reflecting greater effort, persistency, stability, and engagement (350). Such literature can also be used to explain the lower completion rates of psychometric questionnaire (67%, n=10 at 3 months), journal entries (13%, n=2 for all six journal entries), feedback questionnaire (33%, n=5 completion rate), and feedback semi-structured interviews (60%, n=9 attendance rate) for the active control group.

Although text messaging and email reminders were effective for the intervention group in promoting retention to the consult (100%, n=15) and debrief (73%, n=11 completion for all six sessions) sessions, the completion rates for questionnaires and interviews were average – excluding the completion rate for the psychometric questionnaires (80%, n=12). The completion rate for all six journal entries was 33% (n=5), the feedback questionnaire was 53% (n=8), and attendance at the feedback interview was 67% (n=10). Participants reported their perception of journal entries as an intervention rather than a measure and did not feel engaged when completing it, which can be explained using the self-determination theory. Contrastingly, findings from an RCT using an online Positive Affect Journal to improve mental distress and improve well-being in medical patients indicated that the intervention was effective and suggest potential integration to improve the quality of life (351). However, the study's trend of journal completion was similar to this study, where the journal entries decreased over time (351). Smyth et al. (351) proposed several reasons, including decreased enthusiasm and increased fatigue. The feedback questionnaires were also depicted as having an average completion rate despite email and text messaging reminders. The research team expected an average to low completion rate since the semi-structured feedback interviews were conducted during the same time points. Bureau et al. (352) also conducted a feasibility study and used surveys and semi-structured phone interviews to gain feedback about the intervention and received similar completion for both methods (70%). The semi-structured interview presented with greater depth of data being collected as it allowed the exploration of participant's feelings, thoughts, and beliefs (206). The same or similar findings were found in both the feedback

questionnaire and interviews, where semi-structured interviews provided more depth on IP program feedback.

12.4.3.2 Program duration, group-size, and content

All participants found the six-week duration of the debriefing sessions and the 60-minute duration per session to be acceptable. Other similar studies had conducted debriefing sessions with varying durations, ranging from as short as 10 minutes to more than one hour (353, 354). Holmes and Mellanby (355) had suggested that self-debriefing, where participants engaged in discussions without a facilitator, typically lasted for five to ten minutes. Contrastingly, facilitator-led debriefing, as proposed by authors like Abulebda et al. (356), could span up to 120 minutes. Literature demonstrated differences in duration depending on the type of debriefing method and content discussed. Participants in this study had suggested that longer debriefing sessions would be disengaging, while shorter sessions might not allow for in-depth reflection on the administered sessions. Participants also noted that debriefing duration and the number of participants were correlated factors, and thus, a 60-minute duration was proposed for a group size of approximately five to eight participants. When the debriefing sessions involved fewer than four participants, the duration of the sessions was approximately 35 to 40 minutes. Participants in these sessions had found the shorter duration to be appropriate for smaller group sizes, considering factors such as having a positive week, not feeling the need to discuss stressors, or perceiving a limited number of topics to discuss during the session.

Farrington et al. (357) had conducted weekly clinical debrief in a 'small' group, case-based, classroom setting, for third- and fifth-year medical program for a duration of two hours and 15 minutes, which included a 15-minute coffee break. Participants in the study had expressed their sense of safety within a small group size, where they felt that they were "able to let their guard down" (357). Furthermore, Tosterud et al. (358) had compared between small and large debrief groups amongst nursing students and found similarities with Farrington's et al. (357)

study suggesting smaller group provided safety, security, and the best learning conditions (357, 358). Larger groups provided a different type of environment, with a typical lecture-style education, which was attributed to more frequent and repeated training to achieve the proposed goals (358). The outcomes from this study had also correlated with literature findings, suggesting that participants reported experiencing a sense of safety, comfort, and non-judgmental environment during both the debrief and consult sessions in smaller group sizes of three to eight participants per group. Although there were no specific definitions for a 'small' group size, Coggins et al. (359) had proposed that debriefing often occurred in small groups, where they defined small groups as having at least three participants per group.

The participants in this study had expressed satisfaction with the content discussed during the sessions, finding it relevant, engaging, and helpful. Edwards, Wexner, and Nichols (360) had recommended that debriefing content should consist of purposeful and directed conversations that facilitate the acquisition of skills and knowledge. Specifically, the problem-solving approaches employed in the intervention group had enabled participants to develop coping strategies to address encountered stressors. In a similar study, Song and Lim (361) had discovered that structured debriefing was suitable for promoting self-reflection and cultivating critical thinking and problem-solving skills, which equipped participants to make sound decisions in clinical situations. Problem-solving abilities could also encourage effective leadership through the development of logical and critical decision-making within various situations (362). Participants in the active control group had expressed the need for additional structure in their sessions. They had emphasised the importance of having specific discussion topics and setting goals, as opposed to engaging in conversations without reaching a clear resolution.

A comparative study conducted by Fariduddin et al. (363) had examined the effectiveness of structured DIAMOND debriefing in comparison to unstructured debriefing. The unstructured debriefing format had followed the same overall structure as this study, whereby facilitators were provided with a format consisting of three main phases that adhered to standard

debriefing practices (363). Participants in the study had indicated a more favourable and satisfying learning experience using DIAMOND debriefing in comparison to unstructured debriefing (363). Another study by Meyers et al. (364) had also indicated that although unstructured debriefing was emotionally enriching, it presented with increased negative self-assessments amongst students when compared to structured debriefing. Therefore, the findings from this study, in conjunction with existing literature, had suggested that structured approaches to debriefing were generally more well-received and led to more positive outcomes when compared to unstructured "ad hoc" style debriefs (363-365).

12.4.3.3 Facilitators

Student psychologists were used as debrief and consult facilitators in the study. Facilitators in the intervention group provided problem-solving-based content, while the active control group's facilitator provided semi-structured debriefing content that did not include problem-solving approaches. Similar studies on debriefing had suggested that skilled facilitators enhanced the debriefing experience by providing meaningful, dialogical engagement, assisting in navigating diverse perspectives, and facilitating the connection of theory into practice (366). Watson et al. (367) had highlighted that psychologists frequently voiced apprehensions about telepsychology as a delivery method due to its potential shortcomings in capturing vital data observed during face-to-face sessions, such as client appearance, behaviour, subtle speech modulation, and eye contact. However, the COVID-19 pandemic had necessitated the widespread adoption of telepsychology as the primary mode of practice, compelling psychologists to enhance and refine the technological components to address these concerns (367). In this study, utilising final year psychologists (who were awaiting registration with the Australian Health Practitioner Regulation Agency) as facilitators had proven to be advantageous, as they possessed numerous potential benefits, including recent training and familiarity with telepsychology acquired during their university education.

Furthermore, participants had felt that the facilitators were acceptable for the debrief sessions, suggesting that they were trained to deal with many complex traumas and were able to pick up on subtle cues.

Wahass (368) had suggested that psychologists played a crucial role in comprehending the impact of biological, behavioural, and social factors on health and illness. They possessed the necessary training, skills, and knowledge to understand fundamental cognitive and behavioural processes and utilised various psychological, psychodiagnostics, and psychotherapeutic techniques to aid individuals in functioning effectively in different settings and roles (368). Participants had expressed that they experienced a sense of support from them, despite occasionally feeling that psychologists were unable to fully relate to them or understand their situation. Participants in this study had highlighted that the facilitators (student psychologist) involved offered the necessary support, in contrast to the psychologists in the EAP who lacked relatability. This finding was supported by Matthews, Gerald, and Jessup (369), who identified distrust as a barrier to accessing the EAP. The presence of other CCHP in the debrief sessions was able to explain, relate, and empathise, which played a significant role in creating this positive experience. This environment had facilitated meaningful collaboration in addressing problems, resolving issues, and capitalising on opportunities by incorporating diverse perspectives and divergent thoughts, which were essential for achieving effective outcomes (370).

12.4.4 Fidelity

The MRC guidance had recognised the challenges involved in maintaining fidelity while allowing for flexibility and tailoring in the evaluation of complex interventions within multi-site trials (268). The guidance emphasised the importance of monitoring and understanding adaptations made to interventions in different contexts and assessing their impact on intervention effectiveness (268).

The trial debrief facilitators exhibited high level program fidelity. They received training on the application of a problem-solving approach and the use of telepsychology during their bachelor's degree, which was further guided by a senior clinical psychologist. The initial orientation, regular pre-program meetings, and the provided manual ensured consistent adherence to standards across different sessions and with diverse participants. To maintain program structure and content delivery fidelity, the author attended all consult and debrief sessions. Additionally, post-debrief meetings were conducted to reflect on the discussed content, monitor fidelity to the program's content, and provide feedback as necessary. The fidelity checklist indicated variations in session duration, group size, and the topics addressed during the debrief sessions. The topics discussed during the debrief sessions were in line with the expectations and guidelines outlined in the manual and protocol. However, certain aspects such as group size and session duration were occasionally observed to deviate from the prescribed protocol. In instances where group size or attendance was low, sessions tended to be shorter, potentially due to limited opportunities for in-depth peer discussion and learning. Conversely, groups characterised by positive dynamics and interaction often led to more extensive and enriching discussions.

An advantage of the IP program included the use of professionals as facilitators for both consult and debrief sessions. By employing their clinical expertise, psychologists could adapt and tailor the intervention to effectively address participants' specific needs in a group-based setting, enhancing the overall outcomes of the program. Moreover, professional knowledge and skills could be applied alongside clinical reasoning to address the unique needs of the group as well as attend to issues that may arise during the program. While these queries or issues may not have been explicitly covered in the facilitator manual or program content, they were relevant to self-management and activity participation. For example, it was evident from researcher observation that sensitive topics were facilitated effectively to minimise and prevent potential adverse events. Furthermore, the psychologists had vast knowledge of strategies that were suggested and tailored to the individual or the group. Lastly, in relation to

fidelity, program factors such as the availability of resources and materials were abundant, feasible, and accessible. The researcher, as part of the Research Student Maintenance Fund, had prepared, organised, and funded the necessary resources and materials. Facilitators involved in the study provided positive feedback on the program resources, acknowledging their benefit in enhancing the delivery of the program. These resources played a supportive role in maintaining fidelity to the program and ensuring its effective implementation.

12.5 Mechanisms of impact

In the qualitative process evaluation, the mechanisms of impact in the IP program were examined, focusing on the processes through which change was generated. Participants, facilitators, and the research team considered two crucial components as essential mechanisms of change: acceptability and adoption and sustainability. Acceptability included sub-sections of i) reciprocity and ii) self-awareness, while adoption and sustainability included the sub-component of innovative approach. These aspects were perceived as vital in understanding how the IP program brought about change, which is important for the ability to replicate the effects of the intervention (268).

12.5.1 Acceptability

12.5.1.1 Reciprocity

Participants felt that the intervention was effective as it facilitated an environment where they felt socially supported by colleagues working within similar departments (i.e. ICU). Participants also explained that the workplace environment can be isolating, especially during the COVID-19 pandemic where social distancing and isolative restrictions were enforced. Montgomery et al. (371) suggested that CCHP felt physically and socially isolated from other parts of the hospital due to infection control precautions and the redeployment of staff from their workplaces. This was particularly prominent for staff who worked night shifts, who felt forgotten and felt the lack of visibility of senior managers (371). HCP also reported increased loneliness within the workplace setting, influenced by both the pandemic and workplace environment –

for example, increased workload and nature of isolative work environment (372). Sasidharan and Dhillon (372) recommended the combination of communication with colleagues and problem-focused coping for front line HCP to ensure maintenance of well-being. Bry and Wigert (373) also suggested the importance to allow coping with workplace demands, especially for experiences of emotional distress. Participants living alone found the IP program particularly beneficial, as it provided them with an opportunity to engage in meaningful conversations and express their thoughts and feelings. Living alone often resulted in a sense of isolation, and the program offered a supportive space where they could connect with others and share their experiences. Participants expressed that friends and family were often not viable options for seeking support, as they either lacked understanding of the situation or were not actively engaged in the conversation. Olds and Schwartz (374) indicated that certain issues are not appropriate to discuss with a friend, as they require the formal confidentiality and neutrality that a therapist can provide. Additionally, some problems can be effectively addressed and treated through specific brief psychotherapeutic approaches (374).

Participants also suggested that the ability to give and receive empathy enabled feelings of reassurance and acknowledged. Laimani et al. (375) explained that empathy enhances job satisfaction and has the ability to improve moral resilience. The study indicated that CCHP may become reluctant to demonstrate empathy as they perceive it as a risk factor for emotional distress and instead, engage in activities with minimal emotional investment (375, 376). According to Jimenez et al. (376), workplaces characterised by high workload, time pressures, and high job demands often lack empathy, leading to an increased risk of developing secondary traumatic stress. The absence of empathy can affect the relationships among colleagues, particularly in the context of increased job demands and daily exhaustion (376). This lack of empathy in the workplace highlighted the importance of having an outlet (i.e. IP program) where empathy is both given and received, contributing to a sense of satisfaction and well-being. Lamiani et al. (375) agreed that the presence of empathy in the workplace is crucial for addressing alexithymic traits. Alexithymic traits encompassed

difficulties in identifying and regulating emotions, and they are associated with various challenges, including self-regulation problems, emotional exhaustion, detachment, and a diminished sense of accomplishment (375). Receiving and demonstrating empathy can alleviate these traits by providing individuals with the understanding, support, and emotional connection they need to navigate and regulate their emotions effectively (375).

12.5.1.2 Normalising burnout experiences

Both groups expressed a shared sentiment that the debrief sessions provided them with an opportunity to normalise their experiences of burnout and cope with the daily challenges arising from high work expectations. By engaging in open and supportive discussions, participants found solace in realising that they were not alone in their struggles and that their experiences were shared by others. This normalisation of experiences validated their feelings and provided a sense of relief and understanding within the group setting. Søvold et al. (377) suggested that engaging in open and normalised discussions about mental health amongst HCP contributed to reduced stigma associated with mental health issues, such as burnout and post-traumatic stress disorders. By openly addressing and acknowledging the challenges and struggles, the perception of seeking help for mental health concerns can be transformed from a sign of weakness to a proactive and necessary step towards self-care and well-being (376-378). Normalising these discussions fosters an environment of support, empathy, and understanding, encouraging individuals to seek help when needed (376, 378). Furthermore, this may promote the culture of mental health awareness and self-care within the critical care workforce (376, 378). Amati et al. (379) suggest having a greater number of trusted individuals with whom individuals can share their thoughts and problems positively influenced levels of well-being. Conversely, well-being tended to decrease when excess presence of casual acquaintances or strangers within one's social network (379, 380). This highlighted the importance of the quality and depth of relationships in promoting well-being, rather than the mere quantity of connections (379). It aligns with the experiences of participants in the IP

program, as they were able to build meaningful relationships and relate to one another, contributing to their overall well-being.

12.5.1.3 Self-reflection

Participants found the IP program allowed them to engage in self-reflection by sharing experiences with others. Wharton, Kotera, and Brennan (381) suggest that peer-reflective discussion is valuable to foster shared learning and practice improvement. It allowed individuals to delve deeper into their experiences, thoughts, and behaviours, whether positive or negative, and transform these experiences into future resources that may contribute to their professional growth (381). This process of professional reflective practice enabled HCP to connect with their "professional self" and engage in self-reflection to enhance their skills, interpersonal qualities, self-awareness, and overall well-being (381). Reflection promoted self-care and cultivated positive mindset and compassion (381).

Kotera, Green, and Sheffield (382) suggest that the incorporation of mindfulness – involved being fully present in the moment without judgement or distraction – can enhance reflective processes. It facilitated the ability to self-soothe, reframe negative thoughts in a positive light, and enhance compassion for themselves and others (382). Moreover, these concepts can be linked to the mechanisms of reciprocity. When CCHP actively engage in self-reflection, self-awareness, self-care, and mindfulness practices, it increased well-being, which can be reciprocated to others within the group through the cultivation of compassion for themselves and others. Additionally, it contributed to creating a positive and supportive environment where everyone can thrive and the development of collective resilience. This dynamic cycle of reciprocity created mutually beneficial and empowering space for growth, healing, and professional development within the debrief group.

Participants in the study emphasised the importance of storytelling as a significant aspect of the "nursing culture" that facilitated their self-reflection. By sharing their stories and experiences, participants were able to engage in meaningful self-reflection and gain insights

into their own thoughts, feelings, and behaviours. Storytelling allowed them to connect with others, validate their experiences, and gain a deeper understanding of themselves as professionals. Jun, Siegrist, and Weinshenker (383) indicated that storytelling served multiple purposes in personal and professional contexts. In the professional context, storytelling expressed human agency, self-identification, and motivation for action (383). By sharing their stories, HCP can convey their experiences and perspectives, which can inspire and influence others (383). Additionally, it has therapeutic benefits and can contribute to healing processes by allowing both the storyteller and the listeners to make sense of their own experiences, foster a sense of connectedness and promote personal resilience and coping (383). By sharing and listening to stories, participants can find validation, support, and recognition for their experiences and challenges within the IP program.

12.5.2 Adoption and sustainability

12.5.2.1 Confidentiality

Participants in the study expressed their acknowledgement and appreciation for the confidentiality provided during the intervention, as it created a safe space for open and honest discussions about sensitive topics. They recognised that discussing and admitting mistakes with colleagues can be challenging due to the vulnerability and willingness required to acknowledge fallibility. However, participants found value in seeking support and sharing experiences with individuals from different workplace settings, as it offered them a sense of anonymity and allowed for open dialogue. According to Løvseth et al. (384), HCP often face challenges when seeking social support from their professional and personal networks, and patient confidentiality is a common barrier to seeking such support. The ethical obligation to protect patient privacy and maintain confidentiality created difficulties in openly discussing work-related challenges and seeking support from others (384). This barrier restricted professionals' ability to share their experiences, seek guidance, or receive emotional support, leading to a sense of isolation in both their professional and personal lives (384). The concern

about confidentiality and trust among healthcare professionals was also influenced by the fear of stigma. Professionals may fear that a breach in confidentiality could lead to the disclosure of sensitive information, resulting in potential stigma and embarrassment if their peers or family members were to find out (385, 386). This fear of being judged or stigmatised acted as a significant barrier to seeking social support, as professionals may hesitate to share their challenges or seek assistance due to the potential negative consequences associated with disclosure (385, 386). The desire to protect their reputation and maintain a sense of privacy further contributes to the reluctance in reaching out for support within the workplace (385).

12.5.2.2 Comfort

Participants found that the virtual platform provided them with a sense of control over their visibility and engagement, allowing them to minimise feelings of vulnerability. They could easily turn off their cameras or mute themselves when they felt vulnerable or teary, giving them the ability to manage their emotional expressions. Joining the session from their personal spaces also created a sense of detachment from the physical presence of others, which made it easier for them to express their emotions and thoughts. This combination of detachment, control, and privacy contributed to the creation of a confidential and supportive space. The experiences shared by participants align with the findings of Hosszu et al. (387-389), who observed that some students appreciated the autonomy of being able to turn their cameras off, as it allowed them to maintain their private space. This aspect becomes particularly relevant when considering cultural inclusivity. Cultural factors influence the permissibility of sharing emotional vulnerability, as suggested by literature (390). For example, Chen, Cheng, and Gong (391) noted that certain cultures consider it shameful to disclose mental health problems to family members or doctors due to the tradition of presenting a positive self-image. The ability to make autonomous decisions regarding privacy and visibility plays a crucial role in facilitating a supportive environment. It respects individuals' boundaries and cultural norms while creating space for emotional expression. Understanding the interplay between cultural factors and the willingness to share vulnerability in online settings can lead to more inclusive

virtual platforms. Thus, the virtual platform allows participants to control their level of visibility and engagement, reducing feelings of vulnerability. The detachment from physical surroundings and the ability to manage privacy contribute to the creation of a confidential and supportive space.

12.5.2.3 Flexibility

Participants in the study highly valued the flexibility afforded by the intervention's delivery through technology. This flexibility proved especially advantageous for individuals with family and other dependent commitments, as it eliminated the need for disruptions to their routines or additional arrangements for childcare, which would have been necessary in traditional face-to-face debriefing settings. These findings align with existing literature on work flexibility and its positive impact on work-related well-being. Ray and Cryan (392) emphasised the significance of flexibility in allowing employees to allocate their resources according to their preferences, leading to reduced conflicts and improved work-life balance. Flexible work arrangements, including adjustable schedules and remote work options, have been shown to enhance job control, engagement, and job satisfaction (392). Additionally, the participants' desire for flexibility in addressing personal and family needs, such as childcare, eldercare, schooling, and healthcare, corresponds to the broader demand for work flexibility documented in the literature (392). By applying technology in the context of debriefing sessions, the concept of flexibility is manifested, as participants have the freedom to choose when and where they engage in the intervention. Conducting debriefing sessions virtually from the comfort of their own homes enables participants to seamlessly integrate the sessions into their schedules, removing logistical barriers to participation. The concept of flexibility also extends to the realm of online learning, where innovative and flexible options are increasingly provided to students (393). In these online environments, students have the freedom to learn and interact with instructors and peers from anywhere, further enhancing the flexibility and accessibility of the learning experience (393).

12.6 Context

This section explored the impact of contextual factors on the implementation of the IP program. It discusses three key enablers including i) role of facilitators, ii) role of moderators, and iii) structured content and two barriers including i) technological barriers to engagement and ii) technological barriers to confidentiality.

12.6.1 Enablers to implementation

12.6.1.1 Presence of facilitators

The facilitator in a debrief session played a crucial role in creating a safe and supportive environment for participants (360). They actively monitored the discussion to identify any signs of discomfort or blaming among participants and intervene when necessary to address these issues (360). They ensured that each person who wishes to speak has the opportunity to do so, facilitating equal participation and respectful communication (360). The absence of adverse events during the consult and debrief sessions could be attributed to the effective facilitation and moderation provided during these sessions. The facilitator's role in maintaining the overall well-being of the participants and creating a space for open dialogue and reflection may contribute to a more positive and productive experience. Participants may feel more comfortable sharing their thoughts, concerns, and experiences, leading to a deeper and more meaningful engagement during the sessions (360). In situations where the severity of the incident or emotions involved are high, the facilitator played a crucial role in guiding the experience (360). They provided guidance on how to navigate sensitive topics, manage intense emotions, and promote constructive dialogue (360). Additionally, the facilitator was attentive to the participants' well-being and recognised the need for breaks if emotions became overwhelming or if individuals required time to process their thoughts and feelings (360). This study included student psychologists as consult and debrief facilitators. Their involvement was valuable as the facilitators brought valuable expertise to the role as they possessed the knowledge and skills necessary for assessing, diagnosing, and treating psychological

problems and behavioural dysfunctions associated with physical and mental health (368). Their specialised training equipped them to contribute and improve health outcomes by understanding and addressing both health-promoting and health-damaging behaviours (394). In a study conducted by Watson et al. (367), psychologists were found to be capable of addressing technological issues, compromised quality of care, privacy concerns, reimbursement limitations, inadequate training, and ethical and safety concerns. However, the study highlighted that older psychologists, who had more experience and an established caseload, may have received training that better equipped them to navigate these barriers (367). It is worth noting that the study involved student psychologists from different age ranges, but the quality of psychological administration was overseen by a highly experienced clinical psychologist who provided guidance and oversight on content, skills, and knowledge aspects of the psychologists' work.

12.6.1.2 Moderation using co-facilitator

Participants in the study expressed positive feedback regarding the use of the chat function on the Zoom Meetings Version 5.8.0 platform during debrief and consult sessions. The chat feature provided a valuable platform for individuals who were shy or hesitant to actively participate in larger group discussions. To ensure effective moderation of the chat, a second facilitator or co-facilitator was responsible for attending to the chat function and addressing any messages or questions. This setup allowed the main facilitator to concentrate on facilitating the active debriefing discussion without distraction. Literature suggested that the presence of co-facilitators can contribute to increased accountability within the group and the facilitation team (395, 396). Co-facilitators play a crucial role in addressing unequal power dynamics that may exist among participants, ensuring that everyone's voice is heard and valued (395, 396). They also hold the team accountable for various aspects of the facilitation process, including planning, debriefing, evaluating, and learning from collective experiences (395, 396). This shared responsibility promotes a collaborative approach to facilitation and

facilitates continuous improvement to enhance the overall effectiveness of the facilitation team (395, 396).

12.6.1.3 Structured and goal-oriented content

Participants in the IP program expressed that the inclusion of structured content in both consult and debrief sessions was highly beneficial. They noted that having a structured framework minimised repetition over the six-week intervention period and made the sessions more focused, goal-oriented, and purposeful. The structured content provided a clear roadmap and direction for the discussions, enhancing the overall effectiveness of the intervention. The social cognitive theory suggested that goal orientation played a crucial role, particularly in individual cognitive factors, as it provides guidance for behaviour (397). Goal orientation refers to an individual's preferences for goals within an achievement setting, which are influenced by their personal needs, values, and beliefs (397). By employing goal orientation, it may be possible to explain why some employees are more innovative than others (397).

The concepts of goal orientation and innovation in employees are closely related to psychological states such as self-efficacy, resilience, optimism, and hope (397). These psychological factors contribute to an individual's ability to set and pursue goals, overcome challenges, and maintain a positive outlook in the workplace (397). Naidoo et al. (398) suggest that burnout can be attributed to frustrated goal striving and dispositional goal orientation. When individuals consistently face obstacles or challenges that hinder their progress towards achieving their goals, it can lead to a sense of frustration and demotivation (398). Thus, implementing structured and goal-directed content in debrief sessions can be seen as an effective innovation. By incorporating a problem-solving approach, participants were provided with a clear framework and direction for addressing their challenges and finding solutions (399). Utilising a problem-solving approach, participants were encouraged to actively engage in the debriefing process and work towards resolving issues or achieving specific objectives

(399). This approach allows for a systematic analysis of the problems or experiences at hand and facilitates the development of practical strategies and action plans (399).

The structured and goal-directed nature of the debrief sessions can contribute to increased effectiveness and efficiency in addressing issues, as participants are guided towards finding solutions and making progress (399). It also fosters a sense of purpose and accomplishment, as participants can see tangible outcomes and improvements resulting from their efforts (399). According to Wang (400), individuals with a high learning goal orientation hold the belief that abilities can be enhanced through learning. They have the mindset that with perseverance and effort, anyone can overcome challenges, develop their skills, and achieve greater success in future tasks (400). These individuals are less concerned about the negative impact of failure and instead focus on improving their abilities (400). As a result, those with a high learning goal orientation are more inclined to persist in learning even after experiencing setbacks, putting in continued hard work, reflecting on their experiences to further enhance their abilities, and ultimately attaining future improvements (400).

12.6.2 Barriers to implementation

12.6.2.1 Technological barriers to engagement

It is important to acknowledge that distance debriefing has its limitations, and the use of online platforms may increase the risk of disengagement among participants (401). Educators play a crucial role in actively participating in discussions to encourage engagement and maintain a sense of presence (401). Disengagement was primarily observed in debrief groups with a low number of participants, particularly those with less than three participants. This issue often arose due to last-minute cancellations of sessions or when most participants chose to keep their cameras turned off, despite the initial briefing requesting cameras and microphones to be turned on. In line with the concept of teaching, the level of teaching presence is closely linked to the level of learner social presence. This suggests that educators who demonstrated strong social presence can positively influence the engagement of learners (401).

In this study, the presence of debrief facilitators effectively minimised these barriers and helped to maintain participant engagement. Thus, debrief facilitators play a critical role in modelling active participation and fostering a supportive and engaging online environment during distance debriefing sessions. Being aware of these potential challenges and employing facilitators can enhance the overall effectiveness of the debriefing process, even in a remote setting (401). By being aware of the potential challenges of disengagement and employing skilled debrief facilitators, the study was able to address these issues and mitigate the risk of participant disengagement during distance debriefing sessions. This highlights the importance of facilitators in creating a supportive and engaging online environment, ultimately enhancing the overall effectiveness of the debriefing process (401). In distance debriefing sessions, it is important for educators to maintain balanced participation and prevent certain individuals from dominating the discussion. When there is a lack of overall participation, the few vocal participants may feel compelled to fill the gaps, resulting in an imbalanced conversation. Additionally, the presence of a particularly talkative participant can also disrupt the equitable distribution of participation. Thus, facilitators can implement strategies to promote balanced participation.

One effective approach is to conduct an orientation at the beginning of the debriefing session, where participants are introduced to various engagement options provided by the platform tools. By familiarising participants with these tools, the educator encouraged alternative paths for engagement beyond verbal contributions. Throughout the session, it was essential for the educator to actively use and encourage the utilisation of these engagement options. This created an environment where all participants felt empowered to contribute and reduces the reliance on a single mode of participation. By incorporating diverse forms of engagement such as chat functions, polls, or breakout groups, educators can foster a more inclusive and participatory debriefing experience. By being mindful of unintentionally encouraging excessive participation and implementing strategies to foster balanced engagement, educators can

create an atmosphere where all participants have an equal opportunity to contribute and share their perspectives during distance debriefing sessions.

12.6.2.2 Technological barriers to fostering a welcoming atmosphere

In distance debriefing sessions, creating a welcoming atmosphere is crucial for fostering engagement among participants. One potential barrier to engagement was the virtual atmosphere itself. In face-to-face settings, the physical presence of all participants contributed to a warm and inclusive environment that supports psychological safety. However, in the online setting, participants interact through screens, which can sometimes feel impersonal and detached (401, 402). To overcome this barrier, Mosher et al. (401) suggested that facilitators should ensure that each individual feels acknowledged and valued as a "real" person behind the screen. Acknowledging the unique dynamics of the distance setting and actively addressing potential barriers to engagement are essential steps. Since facilitators play a vital role in creating a welcoming and engaging environment for all participants, an effective strategy to employ can include the use of "transparent participation" (401, 402). By openly discussing their own perceived difficulties with engagement when using online platforms, facilitators can create a safe space for participants to share their own challenges and concerns (401, 402). This approach normalised the struggles associated with online interactions and fosters empathy and understanding within the group (401). When facilitators share their experiences, it demonstrates that they too face challenges in the online setting, which helps participants feel more comfortable expressing their own difficulties (401). This sense of shared experience encourages participants to engage in meaningful discussions (401, 402). Establishing a supportive atmosphere contributes to the overall success and effectiveness of distance debriefing sessions, which can promote authenticity and foster a sense of belonging among participants (401, 402).

12.6.2.3 Technological barriers to confidentiality

Creating a psychologically safe environment in distance debriefing sessions is undoubtedly crucial, but it can be challenging to maintain control over external factors that may impact privacy and psychological safety (391, 401). In the online setting, participants join the sessions from their own personal spaces, which introduced potential distractions and privacy concerns that are beyond the facilitator's control (401). Background visuals and random passers-by within the video camera view are examples of external factors that can disrupt the sense of privacy and psychological safety (391). In an in-person setting, the physical environment can be managed to create a controlled and confidential space for discussions (391). However, in the online setting, participants have varying degrees of control over their surroundings, which may affect privacy and introduce potential distractions (391). Privacy concerns can significantly impact open communication and emotional expression in virtual environments (391). Participants may feel hesitant to freely express their thoughts, opinions, or emotions if they are concerned about their privacy being compromised (391). The lack of physical separation between participants in online settings can contribute to these concerns (391).

To address these challenges, the research team provided guidance and recommendations to participants (403, 404). Suggestions include choosing a quiet and secluded space, adjusting the camera angle to minimise distractions, and using virtual backgrounds or privacy screens (403, 404). These measures aim to create a suitable and private environment for participants during their virtual debriefing sessions (403, 404). Facilitators also play a crucial role in setting clear expectations regarding confidentiality and privacy at the beginning of the session (403, 404). Emphasising the importance of respecting each other's privacy and reminding participants to ensure their surroundings are appropriate can help create a safer environment (403, 404). By establishing these guidelines, facilitators can promote a sense of psychological safety and create a space where participants feel more comfortable sharing their thoughts and emotions (403, 404). It is essential for facilitators to recognise that despite their best efforts, there may still be limitations in controlling external factors that impact privacy and

psychological safety (403, 404). In such cases, open communication and ongoing dialogue with participants can help address concerns and find appropriate solutions (403, 404). Flexibility and understanding are key in adapting to the unique challenges of the online setting (403, 404). Thus, while it is important to establish and maintain a psychologically safe environment in distance debriefing sessions, there are challenges related to external factors that are beyond the facilitator's control (403, 404). Privacy concerns can impact open communication and emotional expression (403, 404). By providing guidance, setting clear expectations, and fostering open communication, facilitators were able to create a safer environment where participants felt more comfortable sharing and engaging in discussions despite the limitations of the virtual setting (403, 404).

12.7 Outcome of preliminary effectiveness

The pilot RCT investigated the preliminary effectiveness of the IP program in increasing well-being and decreasing burnout related measures for CCHP across Australia and New Zealand. The following sections provided an in-depth discussion on the integrated results for IP preliminary effectiveness.

12.7.1 Social interaction

Peer support is a valuable resource in the workplace, particularly in high-stress environments like ICUs. It provided several benefits for employees facing challenges, including emotional support, information sharing, validation of experiences, and access to coping strategies (405). The IP program was designed to facilitate peer support for CCHP, with a focus on addressing stressors through problem-solving approaches. This program encouraged open discussions and dialogue among colleagues, fostering connections and enabling the sharing of experiences and coping strategies. Effective peer support, as explained by Farfan et al. (406), involved individuals who provide emotional comfort, address inappropriate behaviour in a friendly manner, offer technical support in work-related areas, present challenges that promote personal growth, actively listen, and share similar values, beliefs, and perceptions of reality.

In line with these findings, participants in the IP program reported that engaging in discussions and reflecting on their feelings led to a deeper understanding of their emotional states. This increased self-awareness, which effectively addressed participant's stressors and encouraged proactive measures through problem-solving. A systematic reviews on peer support highlighted the role of peers in increasing awareness of an individual's suffering and advocating for appropriate interventions (407). Peer support programs demonstrated unique understanding and empathy towards individuals experiencing challenges or hardships, thereby amplifying the recognition of their distress and the need for support (407). This validation is essential as it helps individuals realise that they are not alone in their experiences and that their emotions and difficulties are valid and acknowledged. By witnessing others who have successfully navigated similar challenges, individuals gain hope and a renewed sense of agency in seeking interventions or support.

The positive experiences reported by participants in the IP program are not only supported by qualitative accounts but also by quantitative findings. The program's effectiveness is evident through significant reductions in stress, anxiety, and depression levels among IP program participants. Interestingly, these findings align with those from another pilot study conducted during the COVID-19 pandemic, which implemented a virtual, group-based peer support intervention for emergency physicians (407). This study also reported high receptivity among participants towards the peer support sessions and suggested preliminary effectiveness in alleviating symptoms of depression, anxiety, and distress (407). The reported benefits of peer support in both studies were diverse, showcasing the multifaceted nature of its impact (407). Participants highlighted the ability to learn from others, feeling supported by peers, and the opportunity to process thoughts and feelings (407). These findings indicated that peer support created a nurturing space for reflection and emotional processing, enhancing individuals' overall well-being (407).

12.7.2 Workplace loneliness

Loneliness emerged as a prevalent issue within critical care workplaces, as emphasised by trial participants in this study. The demanding nature of the work and the additional challenges posed by the COVID-19 pandemic contributed to feelings of loneliness among HCP, including family doctors and ICU nurses. Extensive research demonstrated that loneliness can have detrimental effects on their mental health and overall well-being (408, 409). In the critical care setting, factors such as the intense work environment, long working hours, and limited opportunities for social interaction contribute to feelings of loneliness. Karcz et al. (259) highlighted that individuals who reported higher levels of loneliness were more likely to exhibit signs of burnout. Loneliness intensified the feelings of exhaustion and detachment experienced by HCP, which are central components of burnout. The IP program was designed to address loneliness and promote social interaction. Karcz et al. (259) emphasised the significance of constructive communication and the expression of dissatisfaction or "complaining" to others as a mechanism for experiencing relief and ameliorating unpleasant emotional states (409).

The findings of the present study were consistent with prior research that highlighted the substantial influence of perceiving support and appreciation from colleagues on work attitudes and heightened levels of work engagement. When individuals perceived a sense of support and validation from their colleagues, it exerted a positive impact on their overall work experience, leading to enhanced engagement in their job tasks. The findings of improved turnover intention among participants who received the IP program aligned with existing literature that consistently demonstrated a positive relationship between perceived support from colleagues, work engagement, and employee turnover. A supportive work environment fostered a sense of belonging, satisfaction, and commitment, which in turn enhances employees' intention to stay with the organisation (259, 409).

12.7.3 Mitigating stigma

The trial participants reported that their involvement in the IP program fostered a sense of confidence by normalising their experiences of stress. Engaging in peer support sessions allowed them to recognise that their experiences and challenges were shared by others, creating a sense of validation and reassurance (410). This normalisation process contributed to an increased sense of confidence in navigating and managing the stressful aspects of their work. Livingstone and Boyd (410) conducted a study highlighting the challenges faced by individuals who experience self-stigma, which can have adverse effects on their mental well-being, self-esteem, and social interactions. These individuals may encounter difficulties in various areas of their lives due to the negative beliefs and perceptions they hold about themselves (410). It can also create a burden on individuals, impacting their overall quality of life and potentially hindering their ability to seek necessary support and treatment (410). In line with these findings, May et al. (411) found that decreased perceptions of burnout stigma were associated with positive affect, including a reduction in symptoms of depression, anxiety, and stress. The results of this trial align with these findings, demonstrating a significant improvement in positive affect measures and a decrease in negative affect measures following the implementation of the Interactive Peer Intervention (IP) program. The positive affect improvement observed in this trial can be attributed to the supportive and validating environment provided by the IP program. By engaging in peer support sessions, participants receive essential emotional validation, encouragement, and practical advice from peers who understand the unique challenges of their work. This support plays a crucial role in alleviating the stigma often associated with seeking help or expressing vulnerability in this demanding field.

12.7.4 Strategic awareness through problem-solving

Ebrahimi et al. (412) emphasised the importance of training individuals in problem-solving skills to help them define problems, generate solutions, and make effective decisions (412). This becomes especially crucial during stressful situations, as stress can interfere with one's ability to think clearly. Participants in this study reported that the intervention's effectiveness was linked to their use of positive problem-solving strategies to address the root causes of stress. By actively engaging in problem-solving, individuals felt more in control and capable of finding practical solutions, which reduced their stress levels. The findings of this trial are consistent with the study conducted by Moattari et al. (413), which showed that training students in problem-solving skills led to a decrease in stress and an increase in self-confidence. Problem-solving skills act as a protective barrier in challenging situations, enabling individuals to handle problems more effectively. Furthermore, Shewchuk et al. (414) found that individuals who demonstrate more accurate and mature problem-solving skills tend to experience less stress due to their better understanding of the problems they encounter. The effectiveness of the IP program in enhancing problem-solving skills was further supported by the results from the Social Problem-Solving Inventory-Short Form (SPSI-SF). Participants in the IP program demonstrated significant improvements across all five subscales of the SPSI, indicating an overall enhancement in their problem-solving abilities. Specifically, two sub-scales related to problem orientation showed significant improvements, while one sub-scale related to rational problem-solving showed a significant worsening in the active control group. These findings suggest that the IP program effectively enhanced participants' problem-solving attitudes and approaches, contributing to the reduction of stress. The findings of this study align *with the relational/problem-solving model of stress and well-being*, which highlights the significance of social problem-solving as a cognitive appraisal and coping process (415). According to this model, social problem-solving acts as a moderator and mediator in the relationship between stressful life events and individual adjustment (415). Several previous studies have provided support for the notion that social problem-solving ability plays a significant moderating role in the relationship between major negative life events and internalising symptoms, such as depression and anxiety (415, 416).

12.8 Chapter summary

The pilot RCT was discussed, encompassing a comprehensive process evaluation to evaluate the feasibility and acceptability of the IP program. Detailed discussion was presented, exploring the preliminary effectiveness of the IP program based on the study's findings. The next Chapter 13 provided recommendations for future research on the IP program, addressing the implementation phase within the MRC framework.

CHAPTER 13

CONCLUSION AND RESEARCH IMPLICATIONS

13.1 Chapter overview

This Chapter 13 will provide a conclusion to the thesis by presenting valuable insights into the research implications. It will discuss comprehensive evaluation of the study's strengths and limitations and delved into the practical implications for CCHP, unit managers and supervisors, professional societies, key stakeholders, and policy makers. It will highlight the relevance and applicability of the research findings in real-world context. Additionally, the chapter will explore future directions on the prospect of conducting a full-scale RCT to ascertain the effectiveness of the interventions and validate the program theory. The chapter culminates with a conclusive section that succinctly summarises the key findings and draws the thesis to a closure.

13.2 Answering the thesis' research objectives

Objective 1: Investigate existing knowledge on the types of individual-level interventions and what works for CCHPS and HCP.

Answer: The research undertaken encompassed an umbrella realist review within the framework of the literature review for this study. This comprehensive examination delved into various individual-level interventions geared towards HCP, subsequently unveiling research gaps related to comparable interventions for CCHP. Notably, the scope of such interventions for CCHP was somewhat limited, with only a solitary study addressing this area. The examination summarized a comprehensive total of 82 distinct individual-level interventions, deriving from a selection of 19 systematic reviews. This summation was reached subsequent to an updated search conducted in August 2023, thus ensuring the most current and relevant information was considered. These individual-level interventions were thoughtfully categorized into several groups: (1) Mindfulness and Cognitive Training, (2) Self-Care, (3) Self-Improvement, (4) Low-Intensity Exercise, (5) Social Support, (6) Mixed Interventions, and (7)

Miscellaneous Uncategorised Interventions. This meticulous categorization facilitates a clearer understanding of the diverse strategies employed within these interventions, contributing to a more insightful assessment of their potential effectiveness and implications.

Objective 2: Develop a program theory using middle-range theories and to refine using findings from the umbrella realist review and realist expert opinion studies.

Answer: The process of refining the program theory encompassed the utilization of both an umbrella realist review and a realist expert opinion. The outcome was a meticulously honed program theory comprising eight distinct theoretical propositions, each serving as a foundational element to guide the program's design and implementation. These theory prepositions are as follows: Knowledge and Skill Development (TP1), Evidence-Based Intervention (TP2), Accessible and Inclusive (TP3), Co-Production (TP4), Learning (TP5), Engagement (TP6), Maintaining the Quality of Interventions (TP7), and Tailored (TP8). The resultant refined program theory is systematically elaborated upon in Chapter 5, providing a comprehensive framework that guides the subsequent phases of the program's development and implementation.

Objective 3: Develop an individual-level intervention and pilot test for feasibility, acceptability, and preliminary effectiveness.

Answer: The refined program theory played an integral role in guiding the formulation and advancement of the IP program. This program underwent pilot testing to ascertain its feasibility, acceptability, and preliminary effectiveness. The trial exhibited a notable level of engagement, as evidenced by a substantial registration of potential participants (112 individuals) in comparison to the initially calculated sample size of 110. Following meticulous inclusion assessments, a cohort of 30 participants was successfully recruited for the trial, with the allocation randomized through a balanced 1:1 ratio between the intervention arm (IP program) and the active control arm (peer debrief). The trial exhibited a remarkable 100% retention rate for the consult sessions among IP program participants. Moreover, an enhanced

retention rate of 80% was observed within the IP program participants, in contrast to the active control group's rate of 67%. These findings were indicative of the IP program's capacity to stimulate heightened engagement among participants, a phenomenon attributed to its adaptable nature, user-friendly interface, and the prompt resolution of stressors experienced by participants. In addition to its engagement advantages, the study unveiled promising outcomes in terms of the IP program's effectiveness for CCHP. Specifically, the IP program showcased the ability to enhance well-being-related measures while concurrently reducing burnout-related measures. Participant feedback highlighted two pivotal factors underpinning the program's efficacy: reciprocity and the cultivation of self-awareness.

The insights garnered from this pilot Randomized Controlled Trial (RCT) served to further refine the extant program theory tailored to the IP program's specific application among CCHP. The comprehensive elaboration of these findings can be found in Chapter 11, contributing to a more nuanced comprehension of the program's mechanisms and its potential impact.

13.3 Strengths of this thesis

13.3.1 MRC Framework

This thesis focused on developing and evaluating the IP program to improve well-being and reduce burnout among CCHP. The MRC Framework was employed, which provided significant advantages in this process. The framework offered a structured approach, ensuring all essential components of the intervention were considered (39). By following the MRC Framework, key elements, processes, and outcomes necessary for the success of the IP program were identified (39). This increased the study's rigor and reliability, enhancing the credibility and validity of the findings. The MRC Framework also facilitated a rigorous development process (39). By utilising a realist approach and basing the intervention on the revised program theory, the researcher gained a clear understanding of the intervention's underlying mechanisms and expected outcomes (39, 41). Moreover, drawing on existing evidence ensured that the IP program was grounded in prior research and best practices (39).

This evidence-based approach increased the chances of developing an effective intervention. Additionally, the MRC Framework guided the evaluation of the IP program's effectiveness (39). It provided guidance on study designs, outcome measures, and contextual considerations. By adhering to these guidelines, a robust evaluation was conducted, examining the feasibility, user-perceived acceptability, and preliminary effectiveness of the IP program (39). Overall, the integration of the MRC Framework was a notable strength of this thesis as it enhanced the development and evaluation of the IP program, ensuring it was evidence-based, systematic, rigorous, and relevant for CCHP, establishing a strong foundation for future research in improving well-being and reducing burnout in this population.

13.3.2 Theoretical perspective of realism

An additional strength of this thesis was the incorporation of a realist approach as a theoretical perspective that informed the individual studies and the development of the IP program (417). The realist approach, deeply rooted in philosophy and the social sciences, offers a "logic of enquiry" rather than a rigid formula or method (417). This characteristic makes the approach inclusive and adaptable, providing explanations regarding what works, for whom, under what conditions, and in what aspects (417). By adopting a realist approach, the thesis embraced the complexities of real-world implementation rather than attempting to control or manipulate real-life events (417). This flexibility allowed for an equal focus on both successful and unsuccessful aspects of the intervention (417). It enabled researchers to learn from failures and capitalise on lessons across policy, disciplinary, and organisational boundaries within the IP program (417). Moreover, the realist approach facilitated the development of the intervention by actively engaging stakeholders (417). It inherently recognised the importance of multiple perspectives, ensuring that the voices and insights of various stakeholders are included in the process (417). This stakeholder-driven approach enhanced the relevance, acceptability, and potential impact of the IP program (417). Thus, the incorporation of the realist approach as a theoretical perspective in this thesis strengthened the research by providing a framework that embraces the complexities of real-world implementation (417). It

facilitated comprehensive understanding of what works, encouraged learning from failures, and promoted stakeholder engagement in the development of the IP program (417). By employing the realist approach, this thesis demonstrates a nuanced and inclusive approach to research and intervention development.

13.3.3 Mixed-method design

The utilisation of a mixed-method research design in this thesis demonstrated a strength in the choice of study design. The mixed-method design enabled the exploration of research questions from multiple perspectives, contributing to a more comprehensive understanding of the phenomenon under investigation (418). By incorporating both qualitative and quantitative components, the thesis gained a holistic view of the research topic (418, 419). Qualitative studies, such as expert opinions, offered valuable insights and perspectives that help enriched the understanding of the IP program. These qualitative findings provided an in-depth description, contextual information, and nuanced interpretations that enhanced the overall understanding of the intervention's intricacies. Additionally, the quantitative study component of the mixed-method design allowed for the assessment of feasibility and preliminary effectiveness (418). Through quantitative analysis, the thesis was ablet to examine the statistical significance and magnitude of the intervention's impact on relevant outcomes (418). This quantitative data provided empirical evidence and numerical indicators that contribute to the evaluation of the intervention's potential efficacy (418, 419). Moreover, the inclusion of a RCT within the quantitative component added further strength to the study design (418, 419). RCTs are considered the gold standard in clinical research as they provide a robust method for evaluating the effectiveness of interventions (418, 419). By randomising participants into different groups, the RCT minimises bias and confounding factors, allowing for a more accurate assessment of the intervention's impact (418, 419). The RCT design also enabled the control of variables and the comparison of outcomes between the intervention group and the control group (418, 419). This facilitated the identification of causal relationships and the determination of the intervention's effectiveness (418, 419). The rigorous and controlled nature

of RCTs enhanced the internal validity of the study, providing more reliable evidence on the effectiveness of the IP program (418, 419). By incorporating the RCT design within the mixed-method research design, the thesis benefits from the strengths of both qualitative and quantitative approaches (418, 419). The qualitative component provides rich insights into the intervention's mechanisms and contextual factors, while the RCT added rigor and control to assess the intervention's effectiveness (418, 419). Thus, the utilisation of a mixed-method research design that includes an RCT component in this thesis demonstrates a strength in study design.

13.3.4 Longitudinal assessment

The inclusion of follow-up measures in the pilot RCT evaluating the IP program had significant strengths in research design and evaluation (420). It allowed longitudinal examination of the intervention's impact beyond short-term outcomes (420). This approach assisted researchers to understand the sustainability and durability of initial positive changes, providing insights into the intervention's long-term potential (420). Follow-up measures also assessed the preliminary effectiveness of the IP program by tracking outcome data at different time points (420). This data offered preliminary evidence on whether the program achieved desired outcomes. Additionally, repeated assessments over time help identify trends, delays, and cumulative effects, refining outcome measures for future evaluations. It adopted a robust and comprehensive approach, offering valuable insights for program refinement, future research, and evidence-based decision-making.

13.3.5 Integrating technology for ease in access and measures

The utilisation of technology for intervention delivery and data collection in both expert opinion and pilot RCT studies represented a significant strength in this thesis. By incorporating technology, the research took advantage of an efficient alternative to traditional methods of service delivery and data measures (403, 421). In this Chapter 12, the benefits of using technology for intervention delivery were discussed in detail. However, the advantages of

technology for data collection also deserved attention. One notable advantage is the ability to conduct remote data collection, which offered convenience and ease for participants in completing questionnaires (421). With remote data collection, participants could engage in the study at their own convenience, eliminating the need for physical presence at a specific location (421). This flexibility can result in increased participant engagement and higher response rates. Furthermore, the literature suggested that technology-based data collection procedures offered several additional benefits (421). One such benefit is faster turnaround time (403, 421). With online questionnaires or digital data collection tools, researchers can receive responses almost instantaneously, eliminating the time-consuming process of manual data entry and processing (403, 421). This expedited the data collection process and allowed for more timely analysis and reporting of results (403, 421).

Moreover, technology-based data collection procedures enhanced precision and accuracy (403, 421). Automated data capture reduced the risk of human error that may occur during manual data entry (421). Electronic forms and online surveys provide built-in validation checks and prompt participants to provide complete and accurate responses, minimising missing data and ensuring data quality (421). Thus, it provides an efficient and convenient alternative to traditional methods, allowing for remote data collection and enhancing participant engagement (421). By leveraging technology, this study embraced innovative approaches to intervention delivery and data collection, optimising the research process and generating valuable insights (421).

13.4 Limitations of this thesis

13.4.1 Recruitment duration

While the short duration of participant recruitment in the pilot RCT study is acknowledged as a limitation, it is important to recognise the practical constraints that influenced this timeframe. The study's recruitment was conducted over a one-month duration, which may have impacted the sample size and generalisability of the findings. However, it is worth noting that there were

additional potential participants interested in participating, but their availability was affected by pre-planned holidays during the predefined start date. The attrition rate of the study also indicated that travel plans were the primary reason for participant withdrawal. To address this limitation in future research, implementing multiple start dates or adopting an ongoing intervention approach could enhance participant flexibility and increase recruitment and retention rates (422). Employing strategies like snowball sampling may also help reach CCHP who initially missed the recruitment window (422). Interpreting the study results with caution, considering this limitation and its potential impact on generalisability is paramount (422). Future research endeavours should aim to extend the recruitment period to ensure a more diverse and representative sample, ultimately strengthening the generalisability of the findings (422).

13.4.2 Active control group in the pilot RCT

Absence of a control group in a RCT and instead opting for an active control group introduces certain limitations (306). One limitation is the lack of a true comparison to assess the effectiveness of the intervention (306). Without a control group, it becomes challenging to determine whether the observed outcomes are a result of the active intervention or simply the natural course of events or other factors (306). The absence of a control group makes it difficult to establish a causal relationship between the intervention and the outcomes observed (306). Another limitation is the potential for confounding variables or biases to influence the results (306). In the absence of a control group, there is a higher risk of selection bias or other types of bias that can impact the study findings (306). It becomes harder to account for factors that may be influencing the outcomes besides the active intervention being evaluated (306). The absence of a control group also limits the ability to assess the specific effects of the intervention compared to alternative treatments or standard care (306). Without a control group for comparison, it becomes challenging to determine the relative effectiveness or superiority of the active intervention over other approaches (306).

13.4.3 Fidelity measurement

Another limitation of the process evaluation is the reliance solely on self-report fidelity tool (observer fidelity checklist), without the incorporation of methods such as observation or recording by an external researcher to monitor fidelity, which stemmed from resource constraints (300, 423). This approach may have introduced researcher bias and the reliance on the researcher may have contributed to missing important nuances or deviations from the intended intervention protocol/manual (300, 423). A second independent observer could have provided more objective data on the actual implementation of the intervention, allowing for a more comprehensive assessment of fidelity (300, 423). Despite these limitations, the decision to use self-report fidelity tools was driven by practical considerations (300, 423). It is important to acknowledge these limitations when interpreting the results of the process evaluation and consider additional fidelity measurement methods in future evaluations to enhance the accuracy and reliability of fidelity assessment.

13.4.4 Presence of researcher during debrief sessions

The presence of a researcher during debrief sessions for the purpose of data collection – which often is unavoidable in qualitative research – can present limitations in terms of affecting participant's responses. It may impact participant's behaviours and what may be known theoretically. Future research may benefit from having supplemental survey questions that ask participants about how they felt about the presence of a researcher during the sessions and how this may have influenced the way they answered or opened up to the debrief facilitator.

13.4.5 Sample size

The sample size, as discussed in the previous Chapter 12, served as a measure of feasibility outcomes, indicating the intervention's feasibility for a pilot RCT. However, it is crucial to emphasise that the study's sample size of 30, especially in assessing the intervention's effectiveness, does not represent the entirety of CCHP in Australia and New Zealand. The

study recognises that the use of a small sample size results in insufficient power to generalise the statistical analysis outcomes to the broader population of CCHP, thereby compromising both the internal and external validity of the study. This limitation arises from the increased likelihood of accepting a false premise as true when working with a smaller sample. As a result, the study presents its effectiveness findings as preliminary, emphasising the need for further research to comprehensively understand the extent of the intervention's effectiveness.

13.4.1 Conflation of disparate concepts

While this study provides important insights into how stress, emotions, coping, and relationships are connected in the program theory, it has some limitations. Firstly, the potential for conflation of disparate concepts in the initial program theory raises concerns about the introduction of bias to the synthesis. Moreover, the chosen method's susceptibility to such conflation is a point of vulnerability that should be transparently discussed. Additionally, the focus on individual-level interventions may present a limitation, particularly when addressing burnout within the broader context of system, organisation-related, and social aspects. The study recognises the need for a more comprehensive exploration of interventions that extend beyond the individual level to effectively address the multifaceted nature of burnout in various settings. Despite these limitations, the findings contribute valuable perspectives to the ongoing discourse on mitigating burnout and highlights the importance of nuanced considerations in program development and implementation.

13.5 Implications on research

The thesis research on the development and evaluation of the IP program has effectively addressed significant gaps in the existing literature concerning individual-level interventions for CCHP. Prior to this research, there was a notable lack of targeted studies focusing solely on critical care professionals, despite a growing body of literature on burnout interventions in healthcare settings. This gap was successfully filled by the development of the IP program, specifically designed to address the unique needs and challenges faced by CCHP. Through

the pilot RCT and the evaluation of the program's feasibility, acceptability, and preliminary effectiveness, valuable insights were gained regarding the implementation and potential benefits of the IP program for this specific professional group.

Additionally, the research identified another significant gap in the literature, namely the lack of theoretical underpinnings regarding the effectiveness of individual-level interventions for CCHP. To address this gap, the research adopted a realist approach and conducted expert interviews to develop a refined program theory for the IP program. This theoretical framework not only strengthened the design and implementation of the program but also contributed to a deeper understanding of the mechanisms and contextual factors that influence the effectiveness of individual-level interventions in the critical care context. Consequently, the research provided valuable knowledge on what works, why it works, and under what conditions individual-level interventions are effective in enhancing well-being and managing burnout among critical care professionals. This theoretical underpinning has implications not only for the IP program but also for future research and the development of similar interventions aimed at improving the well-being of CCHP.

Moreover, this research has made a valuable contribution to the field of intervention research by utilising the MRC framework as a guiding framework for the evaluation of the IP program. The MRC framework provided a structured approach that facilitated the development and evaluation of the intervention, ensuring that all stages were adequately addressed. By following this framework, the research built upon prior studies and leveraged their findings to inform the design and implementation of the current trial. The use of the MRC framework also guided the process evaluation shed light on various aspects related to the implementation of the IP program. It identified challenges in recruitment and highlighted the barriers and enablers to the delivery of the program within the context of CCHP in Australia and New Zealand. This process evaluation provided valuable insights into the real-world implementation of the intervention, allowing for a comprehensive understanding of its feasibility and acceptability for the critical care population.

13.6 Implications on practice

13.6.1 Critical care healthcare professionals

Implementing the IP program for CCHP has important practical implications. The program's virtual debriefing and problem-solving components offer accessible and practical support for professionals. The virtual nature of the program allows professionals to access support and resources conveniently, regardless of their location or shift schedules, which is especially beneficial in the demanding context of critical care work. Engaging in virtual debriefing sessions enables CCHP to share experiences, seek support, and collaborate on problem-solving, leading to increased well-being and reduced burnout. Through peer debriefing, professionals can learn from each other's perspectives and gain valuable insights into managing stressful situations. This collaborative learning environment helped CCHPs develop and refine coping strategies, enhancing their ability to navigate the challenges of their work. The program's emphasis on problem-solving equiped professionals with practical tools and strategies to address complex situations. By working together to analyse and find solutions to real-life scenarios, CCHPs improved their problem-solving skills and expanded their coping strategies. This not only enhanced their ability to handle immediate challenges but also increased their overall resilience and adaptability in the face of ongoing stressors. Implementing the IP program fostered a culture of continuous learning and professional development in critical care settings. By providing opportunities for peer support, sharing experiences, and collaborative problem-solving, the program enhanced the collective knowledge and expertise of professionals. This, in turn, positively impacted their ability to deliver high-quality care, improve patient outcomes, and contribute to a more supportive work environment. Therefore, the implementation of the IP program offers practical benefited CCHPs. Through virtual debriefing using problem-solving approach, CCHPs can access support and resources conveniently, leading to increased well-being and reduced burnout. The program's focus on peer collaboration and problem-solving contributed to professional growth and resilience. By fostering a culture of continuous learning and support and

organisations can enhance the effectiveness and well-being of critical care professionals in delivering high-quality care.

13.6.2 Managers of critical care unit

Managers in critical care settings have an important role to play in supporting the work-life balance of HCP and facilitating the successful implementation of the IP program. By working together with professionals, managers can help find suitable times and locations for participating in the program, showing their commitment to employee well-being and promoting a healthier balance between work and personal life. Furthermore, managers can raise awareness about burnout and the importance of well-being by advocating for the IP program within the workplace. They can highlight the benefits of participating in the program and create a culture that prioritises mental health and resilience. This increased awareness can encourage more professionals to take part in the program, benefiting the overall well-being of the team. Moreover, managers can provide the necessary support for implementing IP program strategies in the workplace. They can allocate resources such as dedicated time and appropriate spaces for professionals to engage in peer debriefing and problem-solving sessions. By creating a safe and supportive environment, managers fostered open communication and the sharing of experiences among professionals. This strengthens team dynamics and builds a strong support network. It promoted collaboration and boosts morale, job satisfaction, and overall well-being. By collaborating with professionals, supporting work-life balance, and promoting the implementation of the IP program, managers contribute to a positive and supportive work environment. Their actions help raise awareness about burnout and well-being, creating a culture that values the mental health and resilience of critical care professionals. Ultimately, this led to improved job satisfaction, reduced burnout, and better outcomes for both CCHPs and patients.

13.6.3 Policy makers

Policy makers have a crucial role in supporting the well-being of CCHP. They can achieve this by incorporating programs like the IP program into policy frameworks. This demonstrated a commitment to addressing burnout and promoting well-being. Policy makers should allocate resources and funding to support program implementation and collaborate with healthcare institutions to develop integration guidelines. Advocating for the recognition of the IP program within broader healthcare policies is essential. Highlighting its evidence-based effectiveness and positive impact on mental health and job satisfaction reinforces its importance. By prioritising such programs in policy discussions, policy makers influence organisational practices and foster a culture that values HCP's well-being. Systemic factors contributing to burnout and workplace stress should also be addressed. Policy makers can implement regulations on workload, staffing levels, and rest periods. Creating supportive work environments and removing organisational barriers are vital steps toward reducing burnout and improving critical care services. Collaboration with professional organisations and stakeholders is crucial. Policy makers can work together to develop guidelines and best practices for implementing peer debriefing and problem-solving programs like the IP program. This collaboration ensures knowledge exchange, consistent program implementation, and successful strategies across different healthcare settings. By providing resources, advocating for change, addressing systemic factors, and collaborating with stakeholders, policy makers can create a healthier and more supportive work environment. This ultimately enhances the quality of care, improves patient outcomes, and establishes a sustainable healthcare system.

13.7 Future Directions

13.7.1 Full-size RCT

The IP program had undergone preliminary evaluation, demonstrating its feasibility, acceptability, and potential effectiveness in improving the well-being and burnout related measures among CCHPs in Australia and New Zealand. Conducting a full-size RCT based

on the insights gained from previous evaluations can further strengthen the evidence base and provide a more rigorous assessment of the intervention's effectiveness. In designing the full-size RCT, researchers can draw upon the experiences and lessons learned from previous studies to refine the intervention and address any limitations identified. This included optimising the program's content, duration, and delivery methods based on participant feedback and engagement. The control group can be carefully designed to ensure a valid comparison, such as receiving usual care or an alternative intervention that closely matches the time and attention provided in the IP program. The outcome measures used in previous evaluations of the IP program can be utilised in the full-size RCT to assess the intervention's impact on well-being, resilience, burnout, job satisfaction, and other relevant outcomes. This consistency in outcome measures enables comparisons across studies and facilitates the accumulation of evidence regarding the program's effectiveness. Additionally, the challenges encountered during recruitment and retention in previous evaluations can inform strategies to improve participant engagement and retention in the full-size RCT. Researchers can implement lessons learned to optimise communication, address logistical considerations, and employ effective recruitment strategies to ensure an adequate sample size and minimise attrition rates. Finally, the full-size RCT can consider potential contextual adaptations to accommodate variations in critical care settings. By understanding the unique characteristics, staffing models, and challenges of different settings, researchers can adapt the program to suit the specific needs and contexts of the participating HCP. This contextual adaptation can enhance the program's relevance and applicability, increasing its potential for positive outcomes.

13.7.2 Validation of program theory

The validation of the program theory that informed the development of the IP program is a crucial step in evaluating the effectiveness and understanding the underlying mechanisms of the intervention. It involves refining or validating the refined program theory using an evaluation tool to assess how well the intervention program aligns with its intended goals and

objectives. To validate the program theory, researchers can employ various evaluation tools and methodologies. One commonly used tool is the logic model or theory of change framework. This framework outlined the program's activities, expected outcomes, and the underlying assumptions and causal pathways that connect them. By systematically assessing each component of the logic model and examining the evidence supporting the assumptions, researchers can evaluate the validity and coherence of the program theory. Through the evaluation process, researchers can assess the extent to which the intervention program aligns with the program theory, identify areas of success or improvement, and refine the program theory accordingly. By gathering evidence and analysing data, researchers can make informed decisions about the program's effectiveness, identify any gaps or areas for enhancement, and optimise the intervention program to better achieve its goals.

13.7.3 Implementation

Phase IV of the MRC framework holds great significance for the long-term dissemination, surveillance, monitoring, and application of the IP program in real-life contexts. This phase aims to evaluate the implementation of research findings and the translation of the IP program, which has demonstrated efficacy in controlled research settings, into routine care within healthcare systems. During Phase IV, the focus shifts from the controlled environment of research studies to the broader healthcare system, encompassing diverse clinical settings and organisational contexts. The primary objective is to assess how well the IP program is adopted, integrated, and sustained in real-world practice. This phase recognises the potential challenges and complexities that may arise when implementing interventions in complex healthcare systems. The activities during Phase IV for the IP program involve disseminating information about the program and its research findings to relevant stakeholders, including HCP, administrators, and policymakers. This facilitates the sharing of evidence and promotes awareness and understanding of the intervention's benefits and potential impact on the well-being and resilience of CCHP. Surveillance and monitoring play a vital role in Phase IV, allowing for ongoing evaluation of the implementation process and outcomes of the IP

program. This includes assessing the fidelity of program delivery, monitoring participant engagement and satisfaction, and tracking key outcomes such as burnout levels, job satisfaction, and mental health indicators. Through continuous monitoring, any barriers or challenges that may impede the successful implementation of the IP program can be identified and addressed in a timely manner, ensuring its effectiveness, and optimising its impact. By actively promoting the IP program, monitoring its implementation, and evaluating its outcomes, Phase IV contributes to the long-term sustainability and integration of the intervention into routine care. It serves as a bridge between research and practice, facilitating the adoption and utilisation of the IP program as a standard approach to supporting CCHP's well-being. While Phase IV of the MRC framework is beyond the scope of the current study, it presents an important direction for future research endeavours. Understanding how the IP program performs in real-world healthcare settings, assessing its long-term impact, and addressing any implementation challenges are crucial for maximising its effectiveness and ensuring its continued benefit for critical care professionals. This knowledge can inform policy and practice, leading to improved well-being, decreased burnout, and enhanced quality of care in critical care settings. Recommendations for future implementation can be found in Appendix 35 and budget considerations in Appendix 36.

13.7.4 Concluding statements

This thesis has made significant contributions to the field of CCHPs well-being and burnout research. Through the development and evaluation of the IP program, important insights have been gained regarding the effectiveness, feasibility, and acceptability of individual-level interventions tailored specifically for this professional group. The thesis research began by identifying gaps in the existing literature, particularly the lack of research on individual-level interventions for CCHP. By addressing this gap, the development of the IP program provided a targeted approach to addressing the unique needs and challenges faced by critical care professionals in maintaining their well-being and resilience. The research employed a rigorous methodology, including a pilot RCT, to evaluate the effectiveness of the IP program. The

findings demonstrated promising results, showing improvements in key outcomes such as burnout levels, job satisfaction, and mental health indicators. These findings not only validate the value of the IP program but also emphasise the importance of addressing individual well-being in critical care settings. Additionally, the thesis research delved into the theoretical underpinnings of the IP program, using a realist approach and expert interviews to refine the program theory. This theoretical foundation enhances our understanding of why and how the program works and provides valuable insights for future research and the development of similar interventions. Furthermore, the thesis research highlights the role of managers and supervisors in supporting the implementation of the IP program. Collaborating with managers to create a supportive work environment and considering flexible options for participation can significantly enhance the program's impact and promote a healthier work-life balance for critical care professionals. The thesis also emphasises the need for policy makers to recognise the importance of supporting the well-being and resilience of CCHP. By incorporating interventions like the IP program into healthcare policies, allocating resources, and addressing systemic factors, policy makers can contribute to reducing burnout and creating a more supportive work environment. While this thesis has provided valuable insights and evidence regarding the effectiveness of the IP program, it is important to acknowledge the limitations. The research was conducted within a specific context, and further studies in different settings and populations are needed to enhance generalisability. Additionally, the long-term sustainability and impact of the program require further evaluation, highlighting the importance of Phase IV of the MRC framework for future research endeavours. In conclusion, the thesis research has significantly advanced our understanding of individual-level interventions for CCHP' well-being and burnout. The IP program has demonstrated promise in addressing the unique challenges faced by critical care professionals, and its implementation can contribute to a healthier and more resilient workforce. By building upon these findings, future research and the continued dissemination and application of the IP program can positively impact the well-being of CCHPs and ultimately improve the quality of care provided in critical care settings.

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APPENDICIES

Appendix 1 Umbrella realist review publication

Open access Original research

BMJ Open

What are the solutions for well-being and burn-out for healthcare professionals? An umbrella realist review of learnings of individual-focused interventions for critical care

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To cite: Adnan NBB, Dafny HA, Baldwin C, *et al*. What are the solutions for well-being and burn-out for healthcare professionals? An umbrella realist review of learnings of individual-focused interventions for critical care. *BMJ Open* 2022;**12**:e060973. doi:10.1136/bmjopen-2022-060973

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (http://dx.doi.org/10.1136/bmjopen-2022-060973).

Received 13 January 2022
Accepted 18 August 2022

Check for updates

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ABSTRACT

Objective To determine what, how, for whom and under what conditions individual-focused interventions are effective to improve well-being and decrease burn-out among critical care healthcare professionals.

Design This study is an umbrella review that used the realist approach, using Realist and Meta-narrative Evidence Synthesis: Evolving Standards guidelines. PsycINFO, Web of Science, CINAHL, MEDLINE, Scopus, ClinicalTrials.gov and ISRCTN databases were searched for published and unpublished systematic reviews and meta-analyses literature between 2016 and 2020. The team appraised and extracted data and identified relationships between content, mechanism and outcomes (CMOs). Theory prepositions were developed using CMOs and were used to refine the existing programme.

Results A total of 81 interventions from 17 reviews were mapped, including mindfulness interventions, cognitive–behavioural therapy, self-care and coping strategies. The revised programme theory determined that contextual factors such as ethnicity, workload, and work schedules play a crucial role in determining the effectiveness of interventions. Mechanisms including the interventions' interests, acceptance, and receptivity are also influential in determining engagement and adherence to the intervention. Findings suggest that the solution for burn-out is complex. However, it offers an optimistic view of tailoring and customising one or a combination of interventions, integrating structured education and components of emotional intelligence. Self-care, social support, awareness or mindfulness and self-efficacy are prime components to improve emotional intelligence and resilience for critical care healthcare professionals to improve well-being and decrease burn-out experience.

Conclusions These findings provide realistic and reliable reporting of outcomes to better support implementation within the 'real world'. Future research such as seeking validation using expert opinions can provide further in depth understanding of hidden contextual factors, mechanisms and their interactions to provide a greater depth of knowledge ready for application with the critical care population.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Applying the principles of realist approach is paramount to understand individual-level interventions in improving well-being and decreasing burn-out experiences among critical care healthcare professionals.
⇒ This paper was able to expand the search to include both critical care and general healthcare professionals; and although contextual factors such as work environment and experiences are different between the two groups, there is a similarity in the experiences of burn-out which provides an estimated picture of the context, mechanisms and outcomes that critical care healthcare professionals may experience.
⇒ The one study that focused on critical care healthcare professionals were compared with other similar research to extrapolate contextual factors, which can be used in future research.
⇒ The combination of contextual factors and inconsistent outcome measures and intervention measures (ie, intensity, duration) made it difficult to conduct a meta-analysis of interventions. Instead, using the realist approach was beneficial for this review as it facilitated a platform to showcase the complexity of interventions using theory prepositions and programme theory.
⇒ The programme theory developed in this review can be used in other similar research that investigates solution for the burn-out endemic among healthcare professionals.

INTRODUCTION

Defining well-being, vitality and burn-out

WHO defines well-being as a state of mental, physical and social state, and not simply the absence of infirmity or disease.[1] It is the ability to flourish—promoting a 'good' life where individuals are healthy, happy, capable and engaged.[2] Positive mental health includes emotional, psychological and social

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well-being.[3] It is characterised by a person's ability to fulfil several essential functions and activities, including the ability to learn, feel, express and manage a range of positive and negative emotions, and form and maintain good relationships with others.[3–5] Conversely, poor mental health may be related to rapid social change, stressful work conditions, gender discrimination, social exclusion, unhealthy lifestyle, physical ill health and human rights violations, where specific psychological and personality factors can make people vulnerable to mental health problems.[6–8] Applied to the workplace context, poor mental health includes stress, anxiety and depression, and syndromes such as burn-out and compassion fatigue.[9–11]

Acquiring well-being enables individuals to possess lifelong health and healthy ageing, whereas contrasting outcomes contribute to disease and mental disorders.[12] In general, well-being refers to the cognitive process of contentment, happiness and satisfaction.[12] Well-being can be classified into two categories of subjective and objective.[12] Subjective characteristics include components of well-being, for example, 'satisfied with life' and 'having a good feeling', whereas objective well-being includes economic, social and environmental factors.[12] Subjective well-being follows two schools of thought, hedonic and eudemonic.[12] Hedonic belief aims to reduce pain and maximise happiness by attaining satisfaction and pleasure when achieving a goal.[12] Eudemonic belief aims to attain both pleasant feelings and to pursue meaning and purpose.[12] Eudemonism follows the ethical theory pathway (living in accordance to their true self) and strives to actively contribute in life by giving rather than receiving and enjoying.[12]

Vitality refers to the psychological experience of spirit and enthusiasm.[13] The level of vitality is different among individuals because of changes within the environment such as feeling fatigued, having an illness, being loved.[13] When external controls do not burden a person, they will experience high vitality, which is accompanied by experiences of self-actualisation, autonomy and integration.[13] Vitality also demonstrates the highest level of sustainable work performance (highly vital employees), which reflects on positive employee health and well-being, leading to long-term productivity and viability.[14–16] van Mol *et al* also describe that factors including resilience, job satisfaction and vitality are characteristics that counterbalance work stressors. Therefore, vitality potentially represents an important indicator of well-being.[13 17]

Burn-out, according to Maslach, Jackson and Leiter, is defined as a psychological syndrome consisting of three dimensions: emotional exhaustion, depersonalisation and reduced personal accomplishment.[18 19] Burn-out takes place when individuals encounter chronic stress within the healthcare practice.[20] The foundation of emotional exhaustion stems from the depletion of emotional resources, which forces employees to feel that they cannot cope at a psychological level.[21] Depersonalisation refers to pessimistic, cynical and dehumanised perceptions and attitudes about the client, leading to the notion that clients are deserving of their (employee) troubles.[21] Reduced personal accomplishment includes the negative evaluation of oneself, especially concerning work.[21] Burn-out poses a risk to the physiological, behavioural and psychological well-being of employees but is a conceptually different variable from well-being.[22 23]

Well-being among healthcare professionals has been of great interest within the last ten years.[23 24] It has the potential to deliver various benefits, including improvements in organisational culture, healthcare finances and workforce sustainability.[23 24] Positive psychology suggest that well-being within the workforce increases productivity and optimal functionality, professional satisfaction, organisational resilience, patient safety and the quality of healthcare delivered (at lower costs).[25 26] Nevertheless, maintaining well-being among healthcare professionals has been a challenging task, with the critical care workforce being particularly susceptible to a myriad of chronic occupational stressors.[27–29] These relate to the high patient acuity, increased sense of responsibility, caring for families in crisis, working with advanced technologies, and involvement with morally distressing situations in the critical care environment.[29] Chronic occupational stressors are complex due to the interplay between workload and job demands, lack of resources, control, flexibility, meaning, values, social support and work–life integration.[30]

The COVID-19 pandemic has also played a role in the physical and mental fatigue of Critical Care Healthcare Professionals (CCHP), exacerbating an already high prevalence of burn-out.[27 28 31] Anxiety and depression rates were identified as the highest among physicians and nurses during the first coronavirus wave, which most likely exacerbated burn-out.[31] Another European-wide study demonstrated higher self-reported burn-out of 51% among intensive care unit (ICU—specialised treatment for patients requiring critical medical care) employees during the pandemic[32] compared with pre-COVID-19 burn-out rates (25%–30%).[33–37] The results of burn-out can be severe for CCHP in terms of more severe types of psychological distress, manifested in various ways from normal emotional responses, to a greater intensity of developing post-traumatic stress disorder, depression, suicidal ideations and suicide.[38]

Coping and interventions to improve and prevent well-being and burn-out

Coping is a vital component in dealing with stress and burn-out as the lack of sufficient coping resources leads to increased psychological vulnerability to the situation or threat.[39] Various emotions are seen as a natural response when working in ICU settings, ranging from feelings of guilt, anger, grief, sadness to emotional exhaustion and depersonalisation.[38] From this perspective, burn-out can be conceptualised as progressively developed resulting from ineffective coping strategies that professionals attempt to protect themselves from work stressors.[39] Preventative interventions seek to decrease the likelihood

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of adverse outcomes by increasing protective factors and reduce risk factors.[40] Preventative approaches may be most effective when there is a collaboration between risk reduction and efforts to increase resources that build on an individual's strength.[40] This paper aimed to conduct an umbrella review on individually focused interventions for the promotion of CCHP's well-being and the prevention of burn-out. The review objectives were the following:

1. Conduct a realist synthesis analysing what, why and how interventions (such as mindfulness and cognitive training, self-care intervention, self-improvement, low-intensity exercise, social support, mixed interventions and miscellaneous uncategorised interventions) are effective for burn-out management and prevention; and produce actionable theory.
2. How context may affect the mechanisms to achieve an outcome.
3. How tailoring or modifying interventions can impact on the functioning of interventions.
4. Produce recommendations that support the tailoring, implementation, monitoring and evaluation of contextually sensitive strategies to improve well-being and prevent burn-out.

METHODS

Patient and public involvement

No patient involved.

Study design

This realist umbrella review was conducted according to the RAMESES II reporting standards for realist evaluations and prospectively registered on PROSPERO (Registration No. CRD42020155386). The study was conducted in five phases described in detail and summarised in online supplemental file 1. It was identified early at the stage of search piloting that there was likely very little systematic review literature that specifically focused on CCHP. The decision was made to broaden the eligibility criteria to all health professionals (other variations at the conclusion of full-text review are later described). The realist approach allows gaps in knowledge to be bridged (such as between critical care and other health professionals) about 'what works, for whom, under what circumstances and how?'.[41] Briefly, this methodology synthesises evidence and interrogates data sources (in this case systematic review findings) to develop, refine and test what is known as context–mechanism–outcome configurations (CMOC).[41] CMOCs are then consolidated and configured to both develop and build a theoretical explanation or programme theory (PT) of the intervention's function regarding the circumstances.[42] This umbrella review fills the gap in the literature as there is minimal evidence and a lack of solid research to contribute to the effectiveness of individual interventions for CCHP. The initial PT (phase 1) is described in online supplemental file 2, which provides an explanation of the initial PT (figure 1).

PHASES OF THE REVIEW

Phase 2: search methods

A search strategy (online supplemental file 3) was refined and administered in the PsycINFO, Web of Science, CINAHL, MEDLINE, Scopus, ClinicalTrials.gov and ISRCTN databases, augmented by reviewing eligible article's reference lists and performing further citation searches on Google Scholar and Web of Science. Study citations were imported to Endnote V.X9,[43] and duplicates were removed, before upload of search results into Covidence.[44] Initial screening of titles and abstracts was performed against the originally described (a priori) eligibility criteria, except for population, where modified criteria were used by independent authors in duplicate (NBBA, DeC, LT, SJ, CC, DiC, HAD, MM). Study full texts were then screened, using the same process. At both title/abstract and full-test screening stages, studies that had disputes (ie, disagreement to include/exclude the study) were resolved by discussion between the authors and an external author was prepared to be the mediator but was not required.

At the conclusion of full-text screening (and prior to data extraction), it was identified that there was an abundance of literature from systematic reviews, such that data extraction could be limited to this study design. Similarly, there was a large body of literature relating to organisational and practice environment interventions (n=18 reviews), at which time it was decided to exclude those from the present analysis, and instead focus on individual interventions. At the same time, the year of publication was limited to the last 5 years due to repetition of primary studies within the systematic reviews (ie, the same RCT among different systematic reviews), causing bias and weakening the validity of the review's outcome.[45] The last 5 years demonstrated the least number of duplicate publication when reviews were compared and were of the latest evidence.

Phase 3: selection criteria

The a priori and modified eligibility criteria are outlined in table 1. The results of the search strategy reflect studies in which (1) participants were adult healthcare professionals (as defined by the WHO),[46] (2) interventions were initiated for the individual healthcare worker, (3) a comparison group was included and (4) an objective measure of well-being or burn-out was reported.

More specifically, the definition of individual-focused interventions included self-care interventions, coping strategies, well-being interventions and supplemental nutrients. Self-care was defined as an intrinsic and continuous (self-) practice to ensure positive mental, physical, emotional and social well-being, that may be used as both a preventative and therapeutic intervention to ensure a sustainable and healthy work–life

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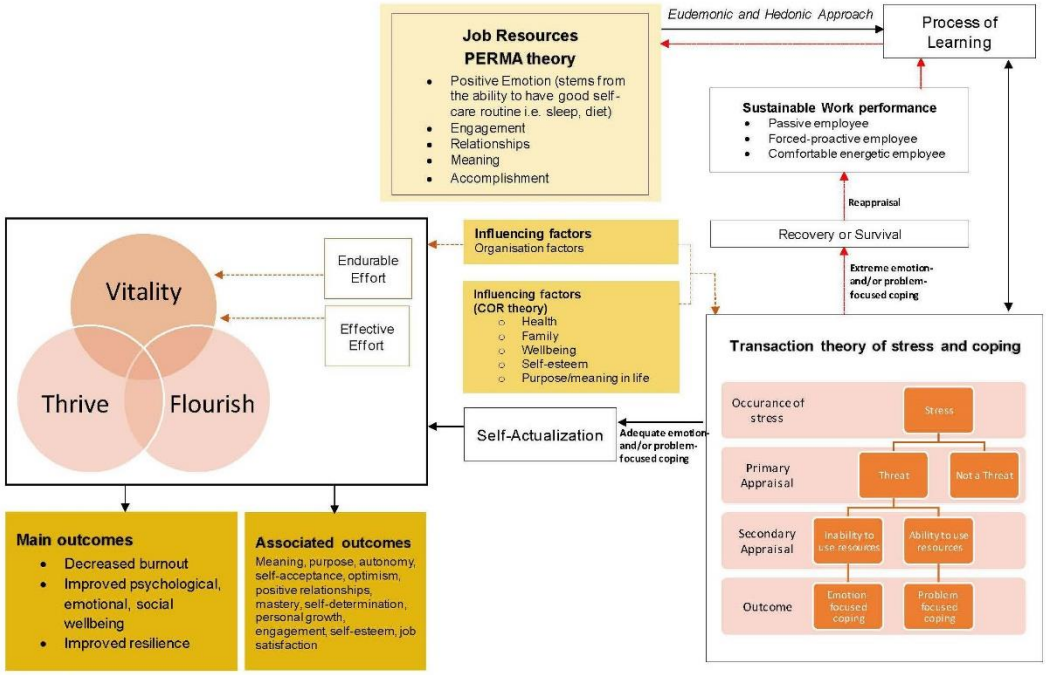


Figure 1 Overview of the initial programme theory. PERMA, Positive Emotion, Engagement, Relationships, Meaning, Accomplishment.

balance.[47 48] Self-care examples include the practice of a healthy lifestyle (exercise, nutrition, sleeping habits) and coping strategies (psychological and behavioural counselling).[47] Interventions for well-being activities that promoted the experience of challenge, meaning and personal expressiveness to improve mental, physical, social and integrated (eudaimonic, life satisfaction, spiritual and overall quality of life) well-being and self-care were also included.[49 50] The comparison group included usual practice, no intervention or comparison between interventions.

In terms of outcomes, this review considered primary outcome measures of well-being and ill-being. Well-being outcomes refer to positive psychological components of health, characterised by positive feelings and functioning. Examples can include quality of life, resilience, mindfulness, positive mood, compassion and satisfaction.[51] Conversely, ill-being is described as pervasive negative feelings and poor functioning of life characterised by factors such as burn-out, violence, anger and coping.[51 52] To be eligible for inclusion, the above constructs needed to have been reported from an objective measure of health (eg, heart rate variability, blood pressure) or a validated psychological instrument (eg, Maslach Burnout Inventory). Secondary outcomes included measures of compassion satisfaction, mindfulness and resilience.

Quality assessment

Quality appraisal was conducted in this review to 'illuminate the richest picture' and to warrant the reliability, verifiability and validity of findings as demonstrate in online supplemental file 5).[53] The full texts of included studies were appraised for quality using the Revised-Assessing the Methodological Quality of Systematic Reviews (R-AMSTAR) tool.[54] The R-AMSTAR tool documents assessed risk of bias at the review level to quantitatively measure the methodological quality of included systematic reviews by assessing the presence of 11 domains.[54] One reviewer (NBBA) conducted quality assessment of each full-text, and quality ratings were checked by a second expert reviewer (DeC). The publications not fulfilling the R-AMSTAR tool domains three (comprehensive literature search) and six (characteristics of the included studies) were excluded from this review. Meeting criteria 3 and 6 were essential as the inability to assess study characteristics meant no transparency in identifying individual interventions, participants, methods and outcomes of studies. This would make it difficult to map out individual interventions and their effectiveness implicating the inability to produce detailed findings in this review. One study by Stanulewicz *et al* met the inclusion criteria (population, intervention, comparator, outcome, time) of this study but did not meet domain six in the R-AMSTAR

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Table 1 Inclusion criteria, according to population, intervention, comparator, outcome, time period, (PICOT) types of studies, other

PICOT	A priori criteria		Modified criteria	Rationale for modification
	Inclusion criteria	Exclusion criteria		
Population	Critical care healthcare professionals defined by the American Association of Critical Care Nurses (definition provided in online supplemental file 4).[96]	Healthcare professionals who do not practice in a critical care environment	Included all healthcare professionals defined by the WHO including student healthcare professionals (online supplemental file 4).[46]	There were insufficient studies (n=1 study) focusing on only critical care healthcare professionals. Students are also predisposed to high stress especially intensified during clinical years of training.[26]
Intervention	Individual- focused interventions (self-care interventions, coping strategies, well-being interventions, supplemental nutrients), Organisational interventions	Studies that do not have or did not report the intervention	Included individual-interventions only (excluded organisational interventions)	Healthcare is complex in nature. Combining both of individual and organisational interventions would impede quality of the review.
Comparator	Usual practice, no interventions, comparison between interventions. Included one or more experimental arms	Not applicable	No modifications made	Not applicable
Outcome	Well-being, compassion satisfaction, mindfulness, resilience, coping, burn-out, violence, self-care indicators, practice environment, work force retention and recruitment.	Review does not address well-being, ill-being and/or any type of modulating factor outcomes	Included well-being, compassion satisfaction mindfulness, resilience, coping, burn-out, and self-care indicators.	Workplace violence, practice environment, workforce retention and recruitment were excluded as these are outcome measures for organisational interventions.
Time period	No date restriction	Not applicable	Date restriction 2016 – 2020	Extensive no of reviews to analyse—date restrictions provided latest evidence.
Types of Studies	Systematic review (in well published interventions) or randomised control trials (where there are no systematic reviews) or cohort studies if not randomised controlled trials.	Before- and after- studies, non-systematic literature, and scoping reviews	Systematic reviews only	Not applicable
Other	Excluded studies that did not meet criteria domains three and six of the R-AMSTAR tool	Not applicable	Not Applicable	Not applicable

R-AMSTAR, Revised-Assessing the Methodological Quality of Systematic Reviews.

tool—that is, the absence of an included studies table. This has resulted in exclusion from the study.[55] Although this study was excluded, the study characteristics were still reported in the included studies of this review to demonstrate transparency.

Phase 4: data extraction

A customised version of the 'Data collection form for intervention review' of The Cochrane Collaboration was developed by the authors in Microsoft Excel to facilitate later categorisation of interventions, context and mechanisms for the realist approach. The form was trialled on three studies from the review to ensure inclusion of all required data. Independent reviewers (NBBA and LT) completed data extraction, which was compared with ensure the rigour of the extraction process. Final data extraction columns included:

- Study details (date form completed, name of person extracting data).
- Author's details (study title, year, country, sponsorship source).
- Methods (aims/objectives, methodology, inclusion and exclusion criteria, outcome measure).
- Population (profession, context/setting, design, data source, sample size, follow-up length).
- Intervention (type of intervention, frequency, duration, delivery, resources, economic, engagement).
- Outcomes (description of outcome, scales, power, effect size, assumed risk estimates, mean difference, heterogeneity, narrative reporting).
- Other (funding, conflicts of interests, theories or mechanisms).

Phase 5: data synthesis

Choosing middle-range theories to create CMOC

Each study was analysed for CMOC, interactions and theory informing each intervention.[56] To do this, authors assumed that each study design was informed by a middle-range theory, which authors had implicitly or explicitly stated. Authors discussed, reflected and extracted hidden data from all included studies, and sometimes used extracts of narratives to foster the reflection process. When discussing and reflecting, authors used the following analytical thinking process:

- Juxtaposition of the data sources—it aligns the sources to clarify and/or build on each other.

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- Reconciling data discrepancies—explores reasons and rationales for data disparities.
- Adjudication of data—considers the relevance and trustworthiness (data quality).
- Consolidation of data—inference of mechanisms for outcomes.
- Situation of evidence—considers the setting of intervention.

Identifying the theories assisted the process of understanding how interventions may work to generate a specific outcome. The next stage identified common themes across the included studies. Using a narrative and interpretative approach, authors discussed and synthesised initial conclusions that was used to refine or refute the candidate theories. This process of synthesis was chosen in preference to a meta-analysis given the diversity in interventions, populations and outcomes.[57 58] All data were then categorised into context, mechanism and outcome table, where each intervention was examined based on for[42]: what were the effects of well-being and self-care interventions (outcomes) when implemented to health professionals (context)? What caused these effects (mechanisms) and were there internal and external influences (context) that facilitated such outcomes? 'Context' can be understood as external influencing factors on the mechanisms, whereas 'mechanisms' are the context-sensitive and hidden forces that create the 'outcome'.[42] The final synthesis was agreed on by all authors.

Using CMOC to create theory prepositions and develop revised program theory

To integrate theories into different levels of social structures (micropertaining to individual and macropertaining to social),[56] authors appraised theories in accordance with four criteria (online supplemental file 6). It was important to note that this review did not focus on macrosystem as it describes organisational components, which were excluded from this review.

Theory prepositions (TPs) was developed by connecting underlying causal processes to CMOC concepts.[56] This was done by iteratively hypothesising how an outcome is achieved based on the understanding of (1) retroduction—how it was achieved in other circumstances and (2) abduction—development of a new hypothesis based on data. This process enabled the development of TPs.[56] The next step was to draw on connections and relationships between TPs.[56] Theories were positioned within a web of causations, which enabled the development of a rich picture.[56] Gaps identified within the overall theory enabled the formation of hypotheses using abductive and retroductive inferences—the same process forming original prepositions.[56] The TPs were then used to develop the revised PT (figure 2). The revised PT is explained in online supplemental file 7.

RESULTS

Study characteristics and design

The database search strategy yielded n=4467 records, and n=189 duplicates were removed. After screening the titles

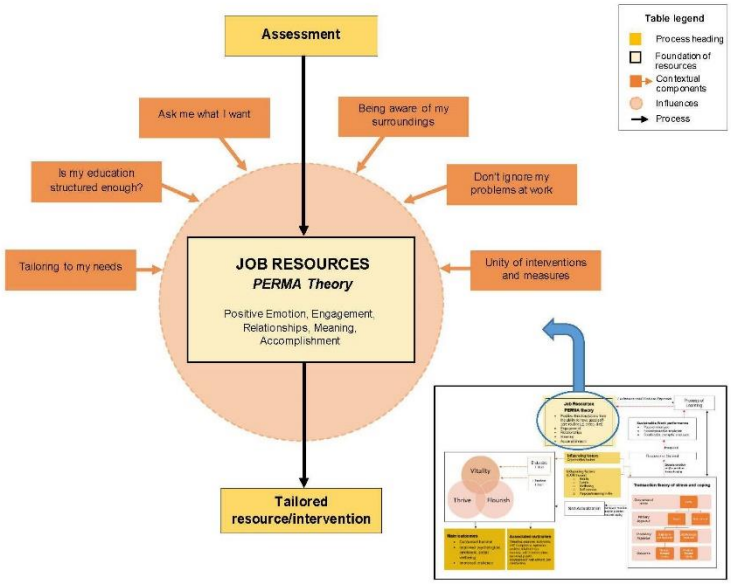


Figure 2 Revised programme theory.

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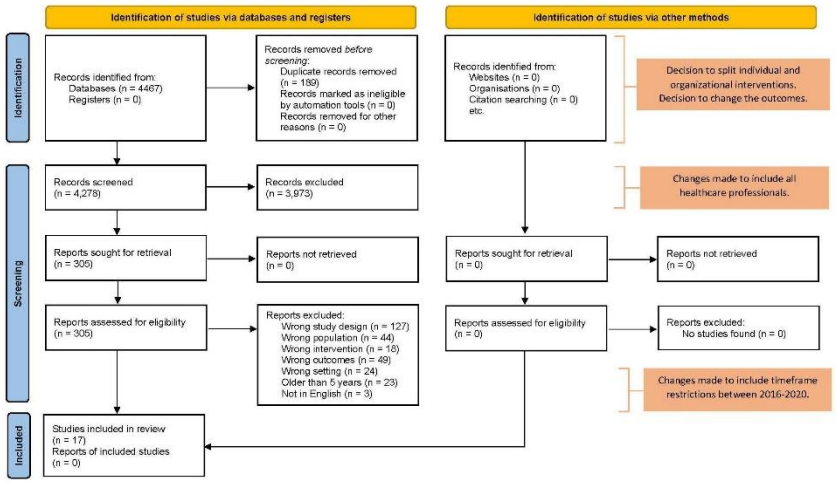


Figure 3 PRISMA 2020 flow diagram. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

and abstracts, the authors excluded 3678 studies. The remaining 3982 studies were retrieved for full-text assessment. A total of 287 studies were excluded as they did not meet the inclusion criteria. Finally, a total of 17 studies met the inclusion criteria. The process of including and excluding studies is reported on the PRISMA flow diagram (figure 3). Included studies were reported in characteristics of included studies (online supplemental file 8) and excluded studies reported in an excluded table with the rationale for exclusion. Included articles spanned a 5-year period (2016–2020), which incorporated the compilation of systematic reviews (n=17). The articles were derived from a range of countries, including UK (n=4), USA (n=3), Canada (n=2), Ireland (n=2), Malaysia (n=2), Australia (n=1), China (n=1), Germany (n=1) and Taiwan (n=1). Only one article by Alkhawaldeh *et al* specifically focused on the population of CCHP in comparison to all other 16 articles focusing on general healthcare professionals.[59]

A total of n=81 interventions were identified from n=17 systematic reviews. Data collected from each of the 17 included systematic reviews incorporated (1) specific programme context that may influence programme outcomes, (2) processes of programme implementation, (3) how contexts may shape specific mechanisms creating change and (4) programme impacts.[60] Variations of interventions included is summarised below:

- Mindfulness and cognitive training (n=37) (mindfulness (n=22), acceptance and commitment therapy (n=1) cognitive–behavioural therapy (n=1), emotional intelligence (n=5), resilience (n=1), self-management and recovery training (n=1), Balint group (n=1), neurolinguistic programming (n=1), resilience (n=1), Relaxation Response Resiliency Programme for Palliative Care Clinicians (n=1), Background Affect Trouble Handling and Empathy (n=1), Activities Contributing Comparisons Emotions Pushing Away Thoughts Sensations (n=1)).
- Self-care intervention (n=16) (self-compassion (n=2), massage (n=2), aromatherapy (n=4), breathing (n=1), relaxation (n=1), narrative (n=2), knitting (n=1), music (n=2), art (n=1).
- Self-improvement (n=9) (education/workshop (n=4), self-reflection (n=1), career training (n=1), mental practice session (n=1), micro-task (n=1), adaptation practice (n=1)).
- Low-intensity exercise (n=5) (yoga (n=2), Qigong (n=1), Tai chi (n=1), Physical exercise ((non-) workplace based, individually designed (n=1)).
- Social support (n=5) (counselling (n=1), support group (n=2), debriefing (n=2)).
- Mixed interventions (n=5) (education on CBT (n=1), job awareness with assertive training and time management (n=1), massage and aromatherapy (n=1), biofeedback relaxation and workshop (n=1), mindfulness and communication and self-awareness workshop (n=1).
- Miscellaneous uncategorised interventions (n=4) (heart touch (n=1), auriculotherapy (n=1), Didactic or interactive instruction in biopsychosocial approach (n=1), respiratory one (n=1)).

Context-mechanism-outcome configurations

This section presents findings on the effectiveness of interventions and how context may affect the mechanisms to achieve an outcome, that is, the interaction to yield CMOC. Six 'plausible hypothesis' was identified by drawing on the Locus of Control theory, Job-Demand-Resources Model, and Self-Regulation Theory. The TP is postulated in table 2.

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Table 2 Six plausible hypothesis

Identifier	Plausible hypothesis
TP1	Healthcare professionals are more likely to engage with resources if they are personalised to their needs, considering that resources should cover two adaptive self-regulation strategies of recovery and job crafting.[97] The adaptive strategies modify the stressor or stress-response, which often result in new personal (individual) and job resources.
TP2	Structured education is relative to intervention engagement as it teaches the process of 'how to cope'.
TP3	Potential solution for preventing or decreasing burn-out experiences and improving well-being within healthcare workforces are influenced by the ability to engage with the intervention. Being engaged enables individuals to adhere to the intervention through self-initiated practices. The influences of contextual factors are equally as important to consider, for example, personality traits, ethnicity, workload and work schedule.
TP4	Awareness is an important personal resource as it enables healthcare professionals to regulate feelings of stress and fatigue. Absence of awareness can aggravate the stressor or problem, resulting in increased daily job demands and decreased job and personal resources.[97]
TP5	Having organisational resources is equally as important as it can offer right challenges and resources to employees. For example, training and hiring healthcare professionals that can be healthy and transformational leaders.
TP6	If measures are unified, it is possible to determine the effectiveness of interventions and comprehensively understand why some interventions may or may not work for healthcare professionals.

Recovery pertains to decreasing personal stress levels during and employee's off-job time, whereas job crafting is to adjust relationships, tasks or their job demands and job resources to optimise the work environment.
TP1, theory proposition 1.

Theory proposition 1 (TP1): tailoring (tailoring to my needs)

Tailoring or modifying interventions can be observed across all included studies given that contextual factors such as ethnicity, work schedules, personality traits (ie, perfectionists) and unique environments and responsibilities can impact on the functioning of interventions.[61–63] Ghawadra *et al* found that adapting interventions to cater to specific populations is essential as it met their needs to facilitate effective delivery of interventions. For example, Malaysian participants found that a customised Mindfulness-Gym Programme was effective as it met the requirements of their multiethnic community.[61] Similarly, participants working with heavier work schedules, such as nurses, required shorter mindfulness programmes to enable them to attend the full-course of the intervention.[61] Chesak *et al* found that nurses used various holistic intervention to support healthful behavioural patterns and self-care to deliver high quality care.[64] The method of delivery such as the use of technology (ie, telephones, smartphones) is also promising as it is enables a greater sense of personalisation in terms of being less time consuming, cost-effective, and more suitable and easier to access for individuals with heavier workloads.[61]

TP 2 (TP2): structured education (is my education structured enough?)

Alkhawaldeh *et al* suggested that integrating structured education within interventions is essential as it emphasises on the notion of how to cope with stressful events.[59] For example, stress management trainings that incorporated structured emotional intelligence education demonstrated improvements in the Expended Nursing Stress Scale (evaluates nurses' work-related stress) scores, 136.6 (SD=24.6, p=0.001) and 113.02 (SD=16.2, p=0.001) preintervention and postintervention accordingly. The structured education comprised of teaching the 5 major elements and 15 subscales of emotional intelligence.[59] This is further supported by other included studies that had also implicitly or explicitly included education and learning as the foundations of interventions. For example, Chesak *et al* reported mindfulness education programmes and communication training,[64] Clough *et al* reported on education intervention for cognitive–behavioural therapy,[62] and Venegas *et al* reported on adaptation practices that involves learning how to cope with anxiety, depression and stress.[65] Most interventions were modelled in a way that education is administered by teaching the intervention.[66 62 64 65]

TP 3 (TP3): engagement (ASK me what I want)

Studies highlighted that 'engaging with the intervention' is essential to maximise intervention usage and prevent from avoidance practices.[67] Rudaz *et al* suggest that mental health professionals and trainees should engage with their own self-care, described as self-initiated practices, to enable positive well-being and improved health outcomes.[68] Interventions such as Acceptance and Commitment Therapy is promising to enhance psychological flexibility, which is used to engage individuals with meaningful patterns of activity while considering acceptance and mindfulness of arising issues.[68] Lee *et al* suggested that the use of frequent problem-focused coping can enable individuals to face crisis and engage themselves to solve problems and stressors, which leads to improvements in personal accomplishment.[67] Thus, the lack of intervention engagement can impede uptake of intervention and result to low adherence.[62] This is particularly important considering the contextual factors may impede intervention engagement, such as workload, shift work,and lack of support.[62]

TP 4 (TP4): quiet mental space and awareness (being aware of my surroundings)

Incorporating interventions that facilitate a quiet mental space enables the mind to relax.[69] It allows agency and promote awareness of the situation, encompassing

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understanding and acceptance of oneself and others.[70 71 69] Lamothe *et al* proposed that mindfulness interventions are particularly useful as it creates curiosity and acceptance of emotions without attempts to change the experience or perceived judgements.[72] Accepting emotions enables individuals to 'let go' of aspects of work which they were unable to do.[69] This is likely due to the inability to detect and name the emotion, leading to feelings of distress.[72] Hunter *et al* found that healthcare professionals who can practice acceptance are likely to provide enhanced care to patients and become more attentive towards both colleagues and patients.[73]

TP 5 (TP5): individual-focused interventions should not replace work stressors (do not ignore my problems at work)

Two studies reported that although individual-focused interventions exist to address stress and burn-out, interventions to improve work conditions should not be overlooked. Lomas *et al* emphasised that addressing underlying structural causes is crucial to enhance the effects of individual-focused interventions.[63] This is especially profound considering that healthcare sectors are overworked and practice is becoming more acute in nature.[63 74]

TP 6 (TP6): unity of interventions and measures

Eight studies did not recommend a specific intervention to manage and/or prevent stress and burn-out. Influences of contextual factors such as having same interventions trial among different populations was prominent issue that led to the lack of consensus.[55 61–64 69 75 76] Since healthcare professionals work in different settings and encounter different types of workload, it makes their experiences of stress and challenges unique to the individual.[61 76] Three studies reported that the lack of focused measurements including intensity, duration, mode of delivery and outcome measures created a gap in determining the effectiveness of interventions.[61 64 77] Li *et al* proposed that rather, both subjective and objective data of the intervention should be considered to fully understand the mechanisms of why and how an intervention works and produce an outcome.[77]

DISCUSSION

This umbrella realist review provided guidance to key stakeholders on the types of interventions that are effective to improve well-being and decrease burn-out among healthcare professionals. It provided practical guidance by showing the importance of contextual factors exemplified by healthcare professionals to achieve well-being beyond the simple acquisition of interventions. The realist approach enabled the understanding of what is effective, how, and under what conditions as presented in online supplemental file 9.

Tailoring interventions

Tailoring the intervention can cater to contextual factors and mechanisms (TP1). This can be done by addressing the individual's characteristics such as goals, personality factors, preferences, needs and resources, and tailor one or a combination of interventions to suit the individual.[78] For example, Conrod *et al* identified personality traits as a risk factor for alcohol abuse among adolescents.[79] Personality-focused interventions such as psychoeducation and behavioural/cognitive coping skills training were then used to target specific personality dimensions.[79] Tailoring adds meaning into the intervention through integrating unique characteristics of the individual—based on data collected about the individual.[80] Likewise in digital media, tailoring of content is used by collecting the user's personal information and/or behaviour and thereafter personalising the content based on the user's interest—for example, greeting users by name at login.[81] Tailoring and customisation is viewed by computer scientists as a way to close the gap between user and computer by increasing personal relevance and prioritises the user's control and involvement.[81 82] Essentially, the same technique can be considered when designing a tailored or customised intervention for well-being and burn-out.[81 82] Perhaps, efforts to tailor, customise and personalise interventions have been initiated, but there remains a gap in determining the 'right' and most effective process/framework to uniformly design the intervention to ensure consistency of intervention design, duration, intensity and mode of delivery (TP6).

Intervention-engagement is the time actively used in participating in the intervention (TP3).[83] The extent of intervention-engagement is influenced by contextual factors such as personality traits, interests and whether interventions are tailored to the individual.[83] Ruiter *et al* found in a randomised controlled trial that individually tailored health messages received more attention than non-tailored counterparts.[84] Essentially, recipients of the tailored message felt higher personal relevance, which led to an increase in engagement to the intervention.[84] There is a positive linear relationship between engagement and intervention effectiveness, where highly engaged individuals will experience greater treatment effects in comparison with lower engagement.[83]

Learning process

A key concept when designing the intervention is to integrate a structured education programme (TP2) as it not only increases knowledge on the subject matter, but also develops reasoning, problem-solving skills and awareness of one's emotions and others such as emotional intelligence.[85] Education is often used subconsciously within well-being and burn-out interventions.[86] For example, clinical debriefing in critical care, operating theatres and resuscitation was found to improve learning/education, staff performance, patient outcomes and team efficiency and dynamic.[86] Mindfulness interventions also use structured experiential learning to train attitudes and awareness.[87] Learning may have its drawbacks due to contextual factors of the learning environment. van Vendeloo *et al* demonstrated that complex constructs such as formal and

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informal aspects of training programmes, atmosphere and organisational factors play a key role in the type of education received.[88] In fact, the learning environment may be a crucial component of burn-out.[88] Contextual factors such as 'hidden curriculum' is also widely known to take place outside the clinical setting, which fosters competitiveness and performance above collaboration.[89] Hidden curriculums erode professional behaviour and decreases compassion, empathy and increases cynicism and burn-out among healthcare professionals.[89–91] Essentially, authors can hypothesise the reason (mechanism) to why this review's findings suggests using emotional intelligence components, such as awareness (TP4), to structure the learning process.[59]

Application to CCHPs

This review was unable to analyse what interventions work, under what circumstances, to achieve what outcomes for CCHP. However, authors were able to extract contextual factors that may be beneficial for future research. Interventions for CCHP focused on cognitive–behavioural therapy, mindfulness, massage, yoga and aromatherapy.[59] Alkhawaldeh *et al* suggested that cognitive–behavioural therapy and mindfulness interventions were effective for occupational stress, anxiety and depression.[59] These interventions teaches individuals to develop cognitive flexibility and reframe experiences or perspectives, which facilitates the development of resilience and improved well-being.[92] Resilience lowers levels of neuroticism by instilling protective factors such as emotional stability, openness, agreeableness, extraversion and conscientiousness.[93] This is necessary for CCHP as working environments can amplify emotional impact by perpetuating feelings of isolation.[38] Systems to support collaboration within critical care workplace are limited, where practices primarily occur within silos.[38] Although the Critical Care team provide care through a diverse interprofessional team, the absence of a community affects the ability to manage emotions (ie, managing symptoms of psychological stress).[38] Costa and Moss suggest individual interventions should thus focus on self-care, self-awareness and mindfulness for CCHP.[38]

Similar contextual factors between findings from general healthcare professionals and CCHP include customisation of interventions (ie, on-the-job mindfulness) and education using emotional intelligence components.[59] Interventions also targeted lifestyle improvements, such as stress management education programme that uses physical coping methods and practices.[59] Essentially, negative coping techniques such as escape-avoidance behaviours often develop sedentary lifestyles.[94 95] Jordan *et al* suggest that the combination of having high self-efficacy and social support can facilitate healthier coping behaviours and lifestyle for employees within highly stressful professions.[94]

FUTURE DIRECTIONS

This paper was able to expand the search to include both critical care and general healthcare professionals; and although contextual factors such as work environment and experiences are different between the two groups, there is a similarity in the experiences of burn-out which provides an estimated picture of the CMOs that CCHPs may experience. Moreover, the combination of contextual factors and inconsistent outcome measures and intervention measures (ie, intensity, duration) made it difficult to conduct a meta-analysis of interventions. Instead, using the realist approach was beneficial for this review as it facilitated a platform to showcase the complexity of interventions using TPs and PT. Based on the realist approach, findings suggested that tailoring of individual-interventions and the integration of structured education led to effective intervention outcomes for healthcare professionals. The Positive Emotion, Engagement, Relationships, Meaning, Accomplishment theory components are recommended criteria for interventions–interventions that do not meet these criteria should be reconsidered. Contextual factors such as personal and organisational influences should also be considered when tailoring an intervention. As previously discussed, examples such as personality traits, ethnicity, workload and work schedule influence the interaction between the individual and intervention.[6–8] Specifically CCHP, the balance between self-care, social support, awareness/mindfulness and self-efficacy may also be prime components to improve emotional intelligence and resilience—which are essential components to improve well-being and decrease burn-out.[38] Future research, such as seeking validation through expert opinion, would help to further understand hidden contextual factors, mechanisms and their interactions to provide a greater depth of knowledge ready for application with the critical care population. Understanding contextual factors and mechanisms should facilitate the development of interventions that are catered for CCHP, providing realistic and reliable reporting of outcomes that can be easily implemented within the 'real-world' setting.

Acknowledgements The authors are grateful to Professor Desley Hegney, Professor Marion Mitchell, Mr Chris Crawford and Dr Lilly Tsai for reviewing this manuscript.

Contributors Content Guarantor, NBBA, HAD, CB, DiC; Conceptualisation, all authors (NBBA, HAD, CB, SJ, DeC, AMAA, DiC); Methodology, NBBA, DiC, HAD, CB; Validation, all authors; Formal Analysis, NBBA, DeC, HAD, CB; Writing—original draft preparation, NBBA; Writing—review and editing, all authors; Visualisation, all authors. All authors have read and agreed to the published version of the manuscript.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement All data relevant to the study are included in the article or uploaded as online supplemental information. All evidence cited in this review is available in the public domain.

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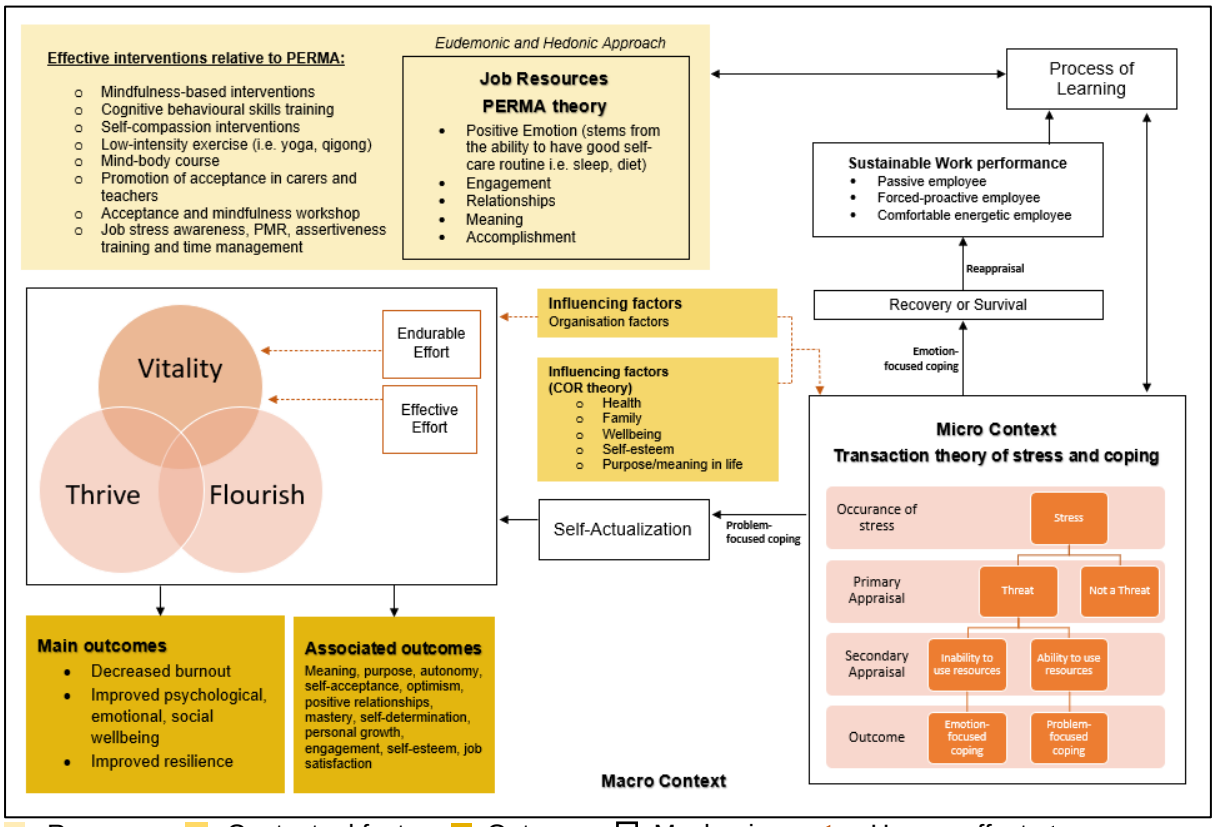
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Appendix 2 Explanation of theories used for the initial program theory



=Resources, =Contextual factors, =Outcomes, =Mechanisms, =Has an effect, = process

Final Explanatory Framework (Program Theory)

The organization and theming method generated the formation of explanatory theories, which captured and articulated the general and underlying logic of processes that create an outcome. Each theory was supported by evidence-based explanations in the context of how it was derived and the interactions between theories. Each explanatory theory was further refined to produce the final explanatory framework (program theory) demonstrated in the diagram above.

Theory 1. *Acquiring, learning, and retaining resources is paramount to achieve self-actualization of individual's potentials.*

The JD-R model proposes that the reciprocal of an employee's well-being are decreased job demands and increased job resources (139). The ability to possess job resources is a motivational aspect of the workforce as it buffers the impact of job demands on stress-reactions, and fosters employee engagement, especially when job demands are high (139).

For example, Bakker et al. (37) demonstrated that emotional and physical demands, work overload, and work-home interferences did not result in increased levels of burnout when individuals received sufficient job resources such as feedback, access to social support, job autonomy, and high-quality relationships with supervisors (37). Job resources can diminish links between job burnout and demands as it can facilitate healthy and efficient coping strategies (37). Relatively, this also includes personal resources such as improving one's resilience, self-efficacy, and optimism. This is because it (positively) addresses the individual's perceptions and beliefs in the ability to control oneself and the work environment (37). Job resources should include the overarching factors of physical (skill variety, performance feedback), social (team environment), psychological (co-worker and supervisor support), and organizational (job security, salary, role clarity) considerations (146). Guiding the job resources, PERMA (positive emotion, engagement, relationships, meaning, and accomplishment) well-being theory was utilised to inform types of interventions that should be included within job resources. The PERMA well-being theory is noted to comprise of eudemonic and hedonic well-being components, which is paramount to achieve flourishing (424). Relatively, it is not sufficient that the required resources are presented, instead, it needs to be recognized, found, and applied effectively. Where in trivial cases, it is then necessary to utilise the resources and problem-solve using cognitive competence (i.e. intelligence, knowledge, creativity) (425). Notably, research has demonstrated that job resources are an essential aspect of an individual's ability to learn (146). The learning culture should be synced through an integrated approach with the aims and values of the macro environment (146). Particularly, learning (i.e. developing new knowledge and skills) should be lifelong as it is a core competency amongst healthcare professionals' development. Individuals who are lifelong learners tend to be adaptive in their approach, enabling positive attributes such as increased productivity, resources, leadership, determination, and enables transformational changes (141). The lack of transformational changes can be drastic as individuals are likely to dwell in the past, remain in a plateau, which results to feelings of loss, unhappiness, and self-doubt (141). It is also important to note that lifelong learning is a key concept of thriving within the

workplace, which ultimately leads to self-actualization – a growth dimension of flourishing and psychological well-being (146, 147).

Theory 2. *The ability to cope with stressors will determine the outcome of achieving self-actualisation.*

The ability to cope with stressors is relative to the concept of self-actualisation. According to the TTSC theory, stress is a complex transactional system influenced by personal and contextual factors such as resources, skills, abilities, capacities, constraints, and norms (426). When an individual is faced with a challenge, they primarily appraise the challenge as either a threat or not a threat, and secondary appraisal on their ability to utilise resources to respond or cope with the challenge (142). Essentially, research agrees that the main function of coping is the ability to adapt to the situation's requirement (427). Where individuals are able to cope with the stressor, they are able to utilise problem-focused coping (active) to flourish and thrive (positive affect). Alternatively, individuals who may not effectively respond to the challenge would experience emotion-focused coping responses such as distancing, wishful thinking, or emphasizing the positive (142). Emotion-focused coping outcomes demonstrates the need for reappraisal to alter strategies and thus, stress outcomes (428). For example, an individual can learn new or improved reappraisal tactics aimed at changing perceptions and response to the stressor (428). The outcome is dependent on the way resource is utilised (425). Essentially, Dorenbosh et al. (144) proposed in his sustainable work performance framework that individuals who experience emotion-focused coping are likely to become passive, forced proactive, and comfortable employee. Passive employees include those with low levels of energy, disengaged in proactive behaviours, and are unable to adapt to their work situation (144). Similarly, forced proactive includes experiences of strong decline in energy levels (restored by making proactive changes),whereas comfortable energetic employees are energized but do not invest much efforts in proactive behaviours (144).

Fundamentally, it is important to consider the Conservation of Resources (COR) theory, which describes an individual's efforts to obtain, retain, protect, and foster resources that they value (424). Such resources are valuable to the individual as it encourages them to portray positive behaviours (424). The conservation of resources theory posits that the inability to cope with stress is initiated when (1) a key or central resource is threatened with loss, (2) when key or central resources are lost, or (3) when an individual fails to gain key or central resources following significant efforts (429) Thus, such motivational theory explains the human behaviour based on the foundation of evolutionary requirements to acquire and conserve resources to survive – central to the concept of human behavioural genetics (429). Nevertheless, humans can create complex tools for survival, where they can employ such resources not only to respond to stressful events, but to build a reservoir of sustainable resources to be utilised at times of future needs (429). Amongst the valued resources, COR theory proposed that health, family, well-being, self-esteem, and purpose or meaning in life were described as key components (429). Even though these components may be expressed, practiced, or appraised differently based on cultures, the core elements remain consistent (429).

Theory 3. *The concept of self-actualization is a result of problem-oriented coping*

The concept of self-actualization pertains to an individual's realization of their potential and self – vital key component of success (148). Such attributes enable individuals to have balanced views of themselves, have self-esteem and self-confidence (148). Phycologists believes that individuals who possess self-actualization are often satisfied with their life (148). This is because individuals can utilise one's creativity, talent, and potentials to become capable of controlling their environment, their life, grow forward and develop emotional stability (148). Maslow further emphasized that such individuals have the tendency to become self-fulfilled from exceeding limits and accomplishing more than required (148). Notably, self-actualization is related to the concept of problem-solving and self-expression (425). In a study by Dowlatabadi and colleagues, findings demonstrated positive and significant relationships ($P<0.01$) between self-actualization ($r=0.35$), self-efficacy ($r=0.42$), and problem-oriented

coping strategy (430). Relatively, significant negative relationship (P<0.01) between self-actualization (r=-.28), self-efficacy (r=-.21), and emotion-oriented coping strategy (430). It is vital to understand that self-actualization requires a foundation of lifelong learning due to its ability in developing maturity in individuals (431). Importantly, the environment (contextual factor) must also be accommodating to enable self-actualisation – which may take years (431). To attain self-actualisation, individuals must first meet the lower needs, which includes physiological needs, safety, belongingness and love, and self-esteem (431). Thus, relative to the requirements of the PT, problem-solving (through characteristics of autonomy, solitude, and continued freshness of appreciation) and lifelong learning can enable individuals to achieve the attribute of self-actualisation (431, 432). However, it is important to also note that other contextual factors such as spontaneity and having peak experiences are characteristics that may play a role in the achievement of self-actualisation (432). Realistically, there are imperfections in the characteristics of individuals and thus effecting one's ability to achieve and maintain self-actualisation (433). Self-actualization does not focus on the direction of human perfection, rather, Maslow identified these residual imperfections to be comforting (433). Self-actualization facilitates the journey of an individual to move towards the direction of perfection, enabling feelings of fulfilment as the individual continually exceed and strive towards a goal (148, 433).

Theory 4. *Thriving and flourishing produces and facilitates the concept of vitality*

Thriving within the workplace is considered as a competitive advantage for the workforce as it contributes to organizational success (424). This is because it facilitates for an environment where employees can perform better, stay healthy, promotes self-learning, proactive, career-oriented, and encourage high disbursement of attention towards organizational goals (424). Moreover, from an individual perspective, thriving is associated with increased positive association with job satisfaction, health, citizenship behaviours, self-development, commitment, task- and creative- performances, as well as negative affiliations with turnover intention and burnout (424). Relatively, flourishing is viewed as the a complete state of mental

health (high levels of emotional, social, and psychological well-being) (147). Keyes et al. (147) suggests that if individuals are unable to flourish, it implied an impairment and burden to the individual and society, which includes workplaces. Thus, for employees to thrive within workplaces, possessing high levels of flourishing is vital (147). Research demonstrates that there is some conceptual overlap between both concepts of flourishing and thriving as they are both defined as psychological states that includes dimensions of personal growth and energy (147). However, both concepts are proposed as two separate constructs – although the relationship between both constructs have not been thoroughly investigated within empirical studies (147).

Research demonstrated that thriving and flourishing is affiliated with the ability to learn and possess vitality (424). Vitality is defined as the sense of being alive and having positive energy, whereas learning is described as the utilization of knowledge and skills to build upon confidence and capability (424). The concept of vitality also extends to its relationship with sustainable work performances, which engulfs the components of employee health, well-being, performances and its relativeness to long-term productivity and viability (144). An employee's vitality is often measured using Shirom's concept and measure of vigour and Schaufeli and colleagues' work engagement (144). The concept of vigour is described as an employee's feelings of emotional energy, liveliness, and physical health, characterised by high levels of mental resilience at work, energy, willingness to invest in one's work, and persistence when faced with difficulties (144). Similarly, work engagement demonstrates an individual's fulfilling and positive work-related state of mind that is characterised by dedication, vigour, and absorption (144). Thus, organizations and management strive to achieve vital health workers as it produces sustainable performance at work, which maximizes employee's performance, health, and well-being (144). It is important to note that 'vital vitality' needs to be achieved to produce such outcomes. This is because Dorenbosch et al. (144) proposed in his conceptual framework on sustainable work performance that high vital employees possess high levels of resilience, energy, and proactivity.

Effective effort and endurable efforts are two key concepts required in the consideration when building an employee vitality (434). The dynamic efforts contributing to employee vitality thus allows for the bridging between employee health and employee performance literature (434). Effective discretionary effort is paramount to the ability to produce active contextual performances (434). This includes the ability to solve operations and process inefficiencies, which in turns saves time and improves task performance – as such, employees do not need to compete with time restrictions (434). It can also be argued that upgrading one's skills and knowledge can also enhance proactivity through reducing extra time and energy in attending to difficult task performances (434). Relatively, endurable effort is referred as ensuring 'work effort's' expenditure do not deplete resources required for future effort expenditure (434). Since task and contextual performances require high effort of expenditure, high energy is also needed to cope with performance demands (434). Initiatives to extensity energy, recovery time such as on-the-job breaks and off-the job recovery time are paramount in sustaining employee energy – preventing energy drainage and negative consequences whilst also encouraging energy to expend (434).

Theory 5. *Organizational factors play a role in the ability to thrive, flourish, and develop vitality.*

Empirical studies have demonstrated that the concept of thriving is a predictor of organizational support for job satisfaction, life satisfaction, happiness, and innovation (424). Relational characteristics such as co-worker workplace support, supervisor workplace support, and workplace civility were identified as key components for thriving (424). Although there exist limited studies investigating on the predictors of flourishing, studies such as Janse van Rensburg et al. (424) explained that supportive supervision are paramount to enabling flourishing and Imran et al. (424) affirmed job crafting facilitates such outcomes. When investigating such relationships, the organizational support theory proposes the use of reciprocity norm, which recommends that individuals with high perceived organizational support tended to give back to their organization in the form of thriving, flourishing, and engaging in their work (424). Thus, when organizations are perceived as being more fulfilling,

supportive, and attends to their socio-emotional needs (i.e. self-esteem, affiliations, appreciation, and approval), employees would demonstrate increased engagement towards their work, become more energetic, and are motivated to learn new skills and knowledge (424).

Appendix 3 Umbrella realist review keywords and search strategy

Population	Intervention	Outcomes
Healthcare Professionals	**Self-care**	Fatigue
Critical care	Exercise	Burnout
Nurse	Healthy nutrition	Stress
Doctor	Adequate rest	Compassion Exhaustion
Allied health intensivist	**Supplemental nutrients**	Resilience
Trainee	Vitamin D	Violence
Medical specialist	Adaptens	Self-efficacy
Trauma	Probiotics	Mindfulness
Emergency department	**Coping strategies**	Organisational
Acute care	Mindfulness	environment
	Resilience	
	Organisational	
	Ethical management principles	
	Violence protection	
	Workforce provision	

Refined search strategy

Keywords

(TITLE-ABS-KEY (fatigue) OR TITLE-ABS-KEY (burnout) OR TITLE-ABS-KEY (stress) OR TITLE-ABS-KEY (compassion) OR TITLE-ABS-KEY (exhaustion) OR TITLE- ABS-KEY (resilience) OR TITLE-ABS-KEY (violence) OR TITLE-ABS- KEY (self AND efficacy) OR TITLE-ABS-KEY (mindfulness) OR TITLE-ABS- KEY (organisational) OR TITLE-ABS-KEY (environment) OR (TITLE-ABS-KEY (rhodiola)) + vitamin D + probiotics + adaptogens + coping + professional quality of life + positive affect + negative affect AND TITLE-ABS-KEY (critical) OR TITLE-ABS-KEY (intensive AND care) AND TITLE-ABS- KEY (systematic AND review) AND TITLE-ABS-KEY (doctors) OR TITLE-ABS-KEY (nurses) OR TITLE-ABS-KEY (allied AND health))

Broad Search

((TITLE-ABS-KEY (intervention) AND TITLE-ABS-KEY (stress) OR TITLE-ABS-KEY (wellbeing) AND TITLE-ABS-KEY (workforce)

Appendix 4 Table of excluded studies

[First Author, Date]	Review Title	Reason for exclusion
Abhicharttibutra, 2019	Association of structural and psychological empowerment with depersonalization and personal accomplishment among nurses: a systematic review	Wrong outcomes
Adams, 2019	The perceived and experienced role of the nurse unit manager in supporting the wellbeing of intensive care unit nurses: an integrative literature review	Wrong outcomes
Aggarwal, 2017	Resident wellness: an intervention to decrease burnout and increase resiliency and happiness	Wrong study design
Aggarwal, 2019	Implementing organizational strategies for resident well-being: practical tips	Wrong study design
Aguglia, 2019	Workplace violence and burnout among mental health workers	Wrong study design
Ahmad, 2015	Diet, exercise and metal-wellbeing of healthcare professionals (doctors, dentists and nurses) in Pakistan	Wrong study design
Alexandrova-Karamanova, 2016	Burnout and health behaviors in health professionals from seven European countries	Wrong study design
Al-Ghabeesh, 2019	Workplace bullying and its preventative measures and productivity among emergency department nurses	Wrong study design
Alharbi, 2019	Personal characteristics, coping strategies, and resilience impact on compassion fatigue in critical care nurses: a cross-sectional study	Organisational

Allen, 2017	Minimising compassion fatigue in obstetrics/gynaecology doctors: exploring an intervention for an occupational hazard	Wrong patient population
Allen, 2020	Designing meditation for doctors well-being: can 'om' help obstetrics and gynaecology doctors?	Wrong patient outcomes
Amoafo, 2015	What are the significant factors associated with burnout in doctors?	Wrong study design
Andersen, 2013	Understanding significant processes during work environment interventions to alleviate time pressure and associated sick leave of home care workers—a case study	Wrong study design
Anderson, 2018	Impact of magnet hospital designation on nursing culture: an integrative review	Wrong study design
Antao, 2020	Workplace violence in healthcare: a single-center study on causes, consequences and prevention strategies	Wrong study design
Antoniou, 1999	Personal traits and professional burnout in health professionals	Wrong study design
Appelbaum, 2019	Surgical resident burnout and job satisfaction: the role of workplace climate and perceived support	Wring study design
Arafa, 2003	Predictors of psychological well-being of nurses in Alexandria, Egypt	Wrong study design
Armstrong, 2018	Management of nursing workplace incivility in the health care setting: a systematic review	Organisational
Awa, 2010	Burnout prevention: a review of intervention programs	Older than 5 years
Axisa, 2019	Psychiatric morbidity, burnout and distress in Australian physician trainees	No intervention
Axisa, 2019	Burnout and distress in Australian Physician trainees: evaluation of a wellbeing workshop	Wrong study design

Aysola, 2018	Perceptions of factors associated with inclusive work and learning environments in health care organizations: a qualitative narrative analysis	Wrong study design
Barattucci, 2019	Mindfulness-based IARA model® proves effective to reduce stress and anxiety in health care professionals. A six month follow-up study	Wrong study design
Berkland, 2017	A worksite wellness intervention: improving happiness, life satisfaction, and gratitude in health care workers	Wrong study design
Bhui, 2012	A synthesis of the evidence for managing stress at work: a review of the reviews reporting on anxiety, depression, and absenteeism	Wrong study design
Bialek, 2019	Level of stress and strategies used to cope with stress by physicians working in intensive care units	Wrong outcomes
Blake, 2013	Five-year workplace wellness intervention in the NHS	Wrong study design
Blake, 2016	Workplace wellness using online learning tools in a healthcare setting	Wrong study design
Bormann, 2019	Evaluation of the mantram repetition program for health care providers	Wrong outcomes
Botha, 2015	The effectiveness of mindfulness based programs in reducing stress experienced by nurses in adult hospital settings: a systematic review of quantitative evidence protocol	Wrong study design
Bourbonnais, 2006	Effectiveness of a participative intervention on psychosocial work factors to prevent mental health problems in a hospital setting	Wrong study design
Bourbonnais, 2011	Long-term effects of an intervention on psychosocial work factors among healthcare professionals in a hospital setting	Older than 5-years

Brand, 2017	Whole-system approaches to improving the health and wellbeing of healthcare workers: a systematic review	Organisational
Bronkhorst, 2015	Organizational climate and employee mental health outcomes a systematic review of studies in health care organizations	Older than 5-years
Brooker, 2018	Individual vulnerable to insomnia, excessive sleepiness and shift work disorder amongst healthcare shift workers a systematic review	Wrong outcomes
Brooks, 2018	A systematic, thematic review of social and occupational factors associated with psychological outcomes in healthcare employees during an infectious disease outbreak	Wrong outcomes
Brown, 2018	The impact of resiliency on nurse burnout: an integrative literature review	Wrong intervention
Brunero, 2008	Reducing emotional distress in nurses using cognitive behavioural therapy: a preliminary program evaluation	Older than 5-years
Bu, 2019	Mindfulness intervention for foundation year doctors: a feasibility study	Wrong study design
Budhrani-shani, 2016	Mind-body exercise for nurses with chronic low back pain: an evidence-based review	Wrong study design
Budziński, 2018	The system of values and styles of success in the medical career: a longitudinal study	Wrong study design
Bueno, 2019	Coping with complexity in intensive care units: a systematic literature review of improvement interventions	Wrong patient population
Bullock, 2013	Transition in medicine: trainee doctor stress and support mechanisms	Wrong study design

Burston, 2013	Moral distress in nursing: contributing factors, outcomes and interventions	Wrong outcomes
Burton, 2017	How effective are mindfulness-based interventions for reducing stress among healthcare professionals? A systematic review and meta-analysis	Wrong outcomes
Cameron, 2004	Healthy doctors, healthy community	Wrong study design, older than 5-years
Chan, 2012	Lifestyle health promotion interventions for the nursing workforce: a systematic review	Wrong outcomes
Clark, 2009	Teamwork: building healthier workplaces and providing safer patient care	Wrong study design
Cleary, 2018	The effectiveness of interventions to improve resilience among health pro0fessionals: a systematic review	Wrong outcomes
Cohen, 2005	Communication, stress and distress: evolution of an individual support programme for medical students and doctors	Wrong outcomes
Coneo, 2020	The outcome of a training programme (respect) on staff's attitude towards causes and management of aggression in a regional referral hospital of northern Uganda	Wrong study design
Conn, 2009	Meta-analysis of workplace physical activity interventions	Older than 5-years
Contreras, 2020	Could personal resources influence work engagement and burnout? A study in a group of nursing staff	Wrong study design
Coutinho, 2019	Work-related determinants of psychosocial risk factors among employees in the hospital setting	Wrong study design
Cowden, 2011	Leadership practices and staff nurses' intent to stay: a systematic review	Older than 5-years

Cramer, 2019	Relationship between working conditions and emotional wellbeing in midwives	Organisational
Cramer, 2019	Coping, mental health, and subjective well-being among mental health staff working in secure forensic psychiatric settings: results from a workplace health assessment	Wrong study design
Crawford, 2019	An integrative review of nurse-to-nurse incivility, hostility, and workplace violence: a gps for nurse leaders	Wrong patient population
Cummings, 2018	Leadership styles and outcome patterns for the nursing workforce and work environment: a systematic review	Organisational
Dackert, 2010	The impact of team climate for innovative on well-being and stress in elderly care	Wrong patient population
Davidson, 2017	Code lavender: cultivating intentional acts of kindness in response to stressful work situations	Wrong study design
Delgado, 2017	Nurses' resilience and the emotional labour of nursing work: an integrative review of empirical literature	Wrong patient population
Delgado, 2020	Workplace resilience and emotional labour of Australian mental health nurses: results of a national survey	Wrong study design
deMoura, 2017	Leadership and nursing ork satisfaction: an integrative review	Wrong intervention
deOliveira, 2015	Self-care in nursing: an integrative review	Wring patient population
Deroy, 2019	Factors supporting retention of aboriginal health and wellbeing staff in Aboriginal health services: a comprehensive review of the literature	Wrong patient populations

Dobie, 2016	Preliminary evaluation of brief mindfulness-based stress reduction intervention for mental health professionals	Wrong patient population
Domagala, 2018	Factors associated with satisfaction of hospital physicians: a systematic review of European data	Wrong patient population
Doran, 2014	Nurses' expert opinions of workplace interventions for a healthy working environment: a delphi survey	Wrong study design
Dryden-Palmer, 2018	Care for dying children and their families in the PICU: promoting clinician education, support, and resilience	Wrong outcomes
Duprez, 2017	The effectiveness of interventions to enhance self-management support competencies in the nursing profession: a systematic review	Wrong outcomes
Eddy, 2018	A systematic review and meta-analysis of the effort-reward imbalance model of workplace stress and hypothalamic-pituitary-adrenal axis measures of stress	Organisational
Edward, 2017	Emotional labour in mental health nursing: an integrative systematic review	Wring intervention
Edwards, 2003	A systematic review of stress and stress management interventions for mental health nurses	Older than 5-years
Elbarazi, 2017	Prevalence of and factors associated with burnout among health care professionals in Arab countries: a systematic review	Wrong outcomes
El-Shafei, 2018	Professional quality of life, wellness education, and coping strategies among emergency physicians	Wrong study design
Epp, 2012	Burnout in critical care nurses: a literature review	Wrong study design
Escuriex, 2011	Health care providers' mindfulness and treatment outcomes: a critical review of the literature	Older than 5-years

Esposito, 2018	A professionalism and mentoring curriculum for pathology residents in training	Wrong outcomes
Ettienne-Gittens, 2-12	What about health educators? Nutrition education for allied health professionals: a review of the literature	Wrong outcomes
Facey, 2015	Understanding and reducing work-related psychological distress in interns: a systematic review	Older than 5-years
Firth-Cozens, 2001	Interventions to improve physicians' well-being and patient care	Wrong study design
Fischer, 2000	Objectifying psychomental stress in workplace--an example	Wrong study design
Flannery, 2012	The impact of the worksite heart health improvement project on work ability: a pilot study	Wrong study outcomes
Flannery, 2016	End-of-life decisions in the intensive care unit (icu) – exploring the experiences of icu nurses and doctors – a critical literature review	Wrong intervention
Floriana, 2019	Effectiveness of a short-term psychotherapeutic group for doctors and nurses in a hospice in southern Europe	Wrong intervention
Forbes, 2020	Resilience on the run: an evaluation of a well-being programme for medical interns	Wrong study design
Foster, 2018	On par: a feasibility study of the promoting adult resilience programme with mental health nurses	Wrong study design
Foster, 2019	Resilience and mental health nursing: an integrative review of international literature	Wrong intervention
Frajerman, 2020	Which interventions improve the well-being of medical students? A review of the literature	Non-English

Freeman, 2019	Promoting spiritual healing by stress reduction through meditation for employees at a veterans hospital: a cdc framework-based program valuation	Wrong study design
Freitas, 2014	Impact of a physical activity program on the anxiety, depression, occupational stress and burnout syndrome of nursing professionals	Older than 5-years
Friganovic, 2017	Healthy settings in hospital – how to prevent burnout syndrome in nurses: literature review	Wrong study design
Friganovic, 2019	Stress and burnout syndrome and their associations with coping and job satisfaction in critical care nurses: a literature review	Wrong study design
Galvin, 2018	Humanization of critical care – psychological effects on healthcare professionals and relatives: a systematic review	Wrong outcomes
Garcia-Sierra, 2016	Work engagement in nursing: an integrative review of the literature	Wrong study design
Gardiner, 2006	Impact of support initiatives on retaining rural general practitioners	Wrong study design
Gardiner, 2013	Effectiveness of cognitive behavioural coaching in improving the well-being and retention of rural general practitioners	Wring study design
Garelick, 2007	Which doctors and with what problems contact a specialist service for doctors? A cross sectional investigation	Wrong intervention
Gayed, 2018	Effectiveness of training workplace managers to understand and support the mental health needs of employees: a systematic review and meta-analysis	Not specific to HCP

Gershon, 2007	Organizational climate and nurse health outcomes in the united states: a systematic review	Wrong intervention
Ghiyasvandian, 2014	Coping work strategies and job satisfaction among Iranian nurses	Older than 5-years
GilinOore, 2010	When respect deteriorates: incivility as a moderator of the stressor-strain relationship among hospital workers	Wrong study design
Gillen, 2017	Interventions for prevention of bullying in the workplace	Organisational
Goodman, 2012	A mindfulness course decreases burnout and improves well-being among healthcare providers	Older than 5-years
Gorgas, 2015	Teaching emotional intelligence: a control group study of a brief educational intervention for emergency medicine residents	Wrong outcomes
Grace, 2002	The junior in distress: the role of a medical education officer at the individual level	Wrong study design
GraciaGozalo, 2019	Application of a mindfulness program among healthcare professionals in an intensive care unit: effect on burnout empathy and self-compassion	Wrong study design
Graham, 2019	Testing of a caregiver support team	Wrong study design
Gray, 2019	Workplace-based organisational interventions promoting mental health and happiness among healthcare workers: a realist review	Wrong patient population
Gregory, 2018	An organisational intervention to reduce physician burnout	Organisational
Gridchik, 2009	The burnout syndrome in the medical personal o anaesthesiology and intensive care units (according to the literature data)	Wrong study design

Guest, 2011	Cancer surgeons' distress and well-being, ii: modifiable factors and the potential for organizational interventions	Wrong study esign
Guglielmi, 2017	Assessment of organizational well-being in an Italian general hospital after an organizational change	Wrong patient population
Guilaumie, 2017	A mixed-methods systematic review of the effects of mindfulness on nurses	Wrong outcomes
Gunasingam, 2015	Reducing stress and burnout in junior doctors: the impact of debriefing sessions	Older than 5-years
Gurkova, 2014	Job satisfaction and subjective well-being among Czech nurses	Wrong study design
Haggman-Laitila, 2018	Outcomes of interventions for nurse leaders' well-being at work: a quantitative systematic review	Organisational
Hall, 2018	Prevalence of medical workplace violence and the shortage of secondary and tertiary interventions among healthcare workers in china	Wrong study design
Hall, 2018	Strategies to improve general practioner well-being: findings from a focus group study	Wrong study design
Halliday, 2017	Grit an burnout in uk doctors: a cross-sectional study across specialties and stages of training	Wrong study design
Halm, 2017	The role of mindfulness in enhancing self-care for nurses	Wrong study design
Hamama, 2019	Burnout and perceived social support: the medicating role of secondary traumatization in nurses vs. physicians	Wrong study design
Hamilton-West, 2018	Does a modified mindfulness-based cognitive therapy (mbct) course have the potential to reduce stress and burnout in nhs gps? Feasibility study	Wrong study design

Hanson-Englis, 2015	Considering mindfulness practice as a primary intervention for bullying and burnout of nurses	Wrong study design
Haraway, 2005	Analysis of the effect of conflict-management and resolution training on employee stress at a healthcare organization	Wrong patient population
Harb, 2019	The relationship between workplace bullying and positive mental health among registered nurses	Wrong study design
Harris, 2006	Stress and psychological well-being among allied health professionals	Wrong study design
Hart, 2014	Resilience in nurses: an integrative review	Wrong study design
Hasan, 2019	The correlation between occupational stress, coping strategies, and the levels of psychological distress among nurses working in mental health hospital in Jordan	Wrong study design
He, 2018	Assessing stress, protective factors and psychological well-being among undergraduate nursing students	Wrong study design
Healy, 2013	Importance of debriefing following critical incidents	Wrong study design
Hegney, 2015	Work and personal well-being of nurses in Queensland: does rurality make a difference?	Wrong study design
Henwood, 2012	What makes a healthier nurse, workplace or leisure physical activity? Informed by the Australian and New Zealand e-cohort study	Wrong study design
Hill, 2016	Improving the wellbeing of staff who work in palliative care settings: a systematic review of psychosocial interventions	Organisational

Hills, 2016	Associations between Australian clinical medical practitioner exposure to workplace aggression and workforce participation intentions	Wrong study design
Hirayama, 2018	Organtisational barriers to and facilitations for female surgeons' career progression: a systematic review	Wrong outcomes
Hoff, 2015	Understanding us physician satisfaction: state of the evidence and future directions	Wrong outcomes
Hoff, 2019	Satisfaction, burnout and turnover among nurse practitioners and physician assistants: a review of the empirical literature	Wrong patient population
Holland, 2018	What nurses and midwives want: findings from the national survey on workplace climate and well-being	Wrong study design
Holly, 2019	Barriers and facilitators of midwives' physical activity behaviour in hospital and community contexts in Scotland	Wrong study design
Holm, 2010	Self-development groups reduce medical school stress: a controlled intervention study	Wrong study design
Hope, 1998	Lifestyle practices and the health promoting environment of hospital nurses	Wrong study design
Hotchkiss, 2009	The differences in keeping both male and female physicians healthy	Wrong study design
Howard, 2008	Managing stress or enhancing wellbeing? Positive psychology's contributions to clinical supervision	Wrong study design
Howard, 2019	Personal resilience in psychiatrists: systematic review	Wrong patient population
Hultman, 2017	Wellness and burnout in burn care providers: professionalism, the social covenant, and the 7 habit of highly effective teams	Wrong study design

Hunt, 2017	Review: nurses' perceived stress and compassion following a mindfulness meditation and self compassion training	Wrong patient population
Huyghebaert, 2017	Examining the effect of affective commitment to the supervisor on nurses' psychological health as a function of internal locus of control	Wrong study design
IsakssonRø, 2008	Counselling for burnout in Norwegian doctors: one year cohort study	Wrong study design
Itzhaki, 2015	Exposure of mental health nurses to violence associated with job stress, life satisfaction, staff resilience, and post-traumatic growth	Wrong study design
Ivandic, 2017	A systematic review of brief mental health and well-being interventions in organizational settings	Organisational
Jackson, 2016	Review: the influence of authentic leadership and supportive professional practice environments on new graduate nurses' job satisfaction	Wrong study design
Jackson-Koku, 2019	Emotion regulation and burnout in doctors: a systematic review	Wrong outcomes
Jacobs, 2018	Managing workplace stress in community pharmacy organisations: lessons from a review of the wider stress management and prevention literature	Wrong setting
Jarden, 2020	Intensive care nurses' well-being: a systematic review	Wrong outcomes
Jarosova, 2017	Job satisfaction and subjective well-being among midwives: analysis of a multinational cross-sectional survey	Wrong study design

Jasperson, 2010	Radrurg wellness program: improving the work environment and the workforce team	Wrong study design
Karanikola, 2015	Dysfunctional psychological responses among intensive care unit nurses: a systematic review of the literature	Older than 5-years
Khamisa, 2013	Burnout in relation to specific contributing factors and health outcomes among nurses: a systematic review	No intervention
Knight, 2017	Building work engagement: a systematic review and meta-analysis investigating the effectiveness of work engagement interventions	Organisational
Knight, 2019	Work engagement interventions can be effective: a systematic review	Not specific to HCP
Lai, 2018	Factors affecting the retention of indigenous Australians in the health workforce: a systematic review	No intervention
Lall, 2019	Assessment of physician well-being, part two: beyond burnout	No intervention
Lamontagne, 2007	A systematic review of the job-stress intervention evaluation literature, 1990-2005	Not specific to HCP
Letvak, 2013	We cannot ignore nurses' health anymore	Wrong outcomes
Li, 2018	Relationship between nurse psychological empowerment and job satisfaction: a systematic review and meta-analysis	Wrong intervention
Lilly, 2019	Battling intensivist burnout: a role for workload management	Wrong outcomes
Lim, 2010	Stress and coping in Australian nurses: a systematic review	Wrong intervention

Lim, 2013	Evaluation of meditation programmes used by nurses to reduce stress: a literature review	Wrong outcomes
Locke, 2020	A literature review of interventions to reduce stress in doctors	Wrong outcomes
Loiselle, 2012	A pre-post evaluation of the Alder/Sheiner Programme (ASP): a nursing informational programme to support families and nurses in an intensive care unit (icu)	Older than 5-years
Lomas, 2017	A systematic review of the impact of mindfulness on the well-being of healthcare professionals	Duplicate
Lorrain, 2016	Reflective peer consultation as an intervention for staff support in the nicu	Wrong study design
MacHe, 2012	Coping with job stress by hospital doctors: a comparative study	Wrong study design
Mache, 2016	Evaluation of self-care skills training and solution-focused counselling for health professionals in psychiatric medicine: a pilot study	Wrong study design
Mache, 2017	A pilot study evaluation of psychosocial competency training for junior physicians working in oncology and haematology	Wrong study design
Maddocks, 2000	Occupational health. Working wounded	Wrong intervention
Manser, 2011	Managing the aftermath of critical incidents: meeting the needs of health-care providers and patient	Wrong outcomes
Marshall, 2018	Evaluation of a tai chi intervention to promote well-being in healthcare staff: a pilot study	Wrong outcomes
McDonald, 2012	A work-based educational intervention to support the development of personal resilience in nurses and midwives	Wrong study design
McDonald, 2013	Personal resilience in nurses and midwives: effects of a work-based educational intervention	Wrong study design

McKinley, 2019	Resilience in medical doctors: a systematic review	Wrong outcomes
McKinnon, 2017	Review: retention of early career registered nurses: the influence of self-concept, practice environment and resilience in the first five years post-graduation	Wrong study design
Mealer, 2017	Designing a resilience program for critical care nurses	Wrong study design
Medland, 2004	Fostering psychosocial wellness in oncology nurses: addressing burnout and social support in the workplace	Wrong study design
Meng, 2018	The effect of an emotional intelligence intervention on reducing stress and improving communication skills of nursing students	Wrong outcomes
Michalsen, 2002	Smoking cessation for hospital staff. A controlled intervention study	Non-English
Mimura, 2003	The effectiveness of current approaches to workplace stress management in the nursing profession: an evidence based literature review	Older than 5-years
Minnie, 2015	Exposure to daily trauma: the experiences and coping mechanism of emergency medical personnel. A cross-sectional study	Wring study design
Misfeldt, 2014	Incentives for improving human resources outcomes in health care: overview of reviews	Wrong outcomes
Mohamed, 2014	Belongingness in the workplace: a study of Malaysian nurses' experiences	Wrong study design
Molero, 2018	Analysis of the mediating role of self-efficacy and self-esteem on the effect of workload on burnout's influence on nurses' plans to work together	Wrong study design

Morrow, 2016	Speaking up behaviours (safety voices) of healthcare workers: a metasynthesis of qualitative research studies	Wrong patient population
Morrow, 2018	Focus on the quadruple aim: development of a resiliency center to promote faculty and staff wellness initiatives	Wrong study design
Munir, 2012	Medicating the effects of work-life conflict between transformational leadership and health-care workers' job satisfaction and psychological wellbeing	Wrong patient population
Nadi, 2014	The relationship between dimensions of religiosity/spirituality with mental health and hope for future between staff of public hospitals in shiraz	Wrong study design
Nakamura, 2017	Development and evaluation of a modified brief assertiveness training for nurses in the workplace: a single-group feasibility study	Wrong study design
Naser, 2016	Programs for encouraging physical activity and coping with obesity among hospital personnel	Wrong outcomes
NavarroMoya, 2017	Psychosocial risk and protective factors for the health and well-being od professionals working in emergency and non-emergency medical transport services, identified via questionnaires	Wrong study design
Newton, 2016	Emotional intelligence as a buffer of occupational stress	Wrong study design
Nhiwatiwa, 2003	The effects of single session education in reducing symptoms of distress following patient assault in nurses working in medium secure settings	Wrong setting
Nicholls, 2017	Barriers and facilitators to healthy eating for nurses in the workplace: an integrative review	Wrong outcomes

Nizamuddin, 2019	Intensivist staffing and outcome in the icu: daytime, nighttime, 24/7?	Wrong outcomes
Nowrouzi, 2015	Occupational stress management and burnout interventions in nursing and their implications for health work environments: a literature review	Wrong patient population
Nowrouzi, 2016	The quality of work life of registered nurses in Canada and the united states: a comprehensive literature review	Wrong study design
O'Callaghan, 2020	Compassion satisfaction and compassion fatigue in Australian emergency nurses: a descriptive cross-sectional study	Wrong study design
O'Connell, 2013	Team clinical supervision in acute hospital wards: a feasibility study	Wrong patient population
O'Dowd, 2018	Stress, coping, and psychological resilience among physicians	Wrong study design
O'Riordan, 2019	Interventions to improve wellbeing among obstetricians and midwives at Cork University Maternity Hospital	Wrong patient population
Oates, 2018	What keeps nurses happy? Implications for workforce well-being strategies	Wrong study design
Orellana-Rios, 2017	Mindfulness and compassion-oriented practices at work reduce distress and enhance self-care of palliative care teams: a mixed-method evaluation of an "on the job" program	Wrong study design
Orlowski, 1986	Critical care stress and burnout	Wrong study design
Ospina, 2008	Clinical trails of meditation practices in health care: characteristics and quality	Wrong patient population
Paice, 2002	Stressful incidents, stress and coping strategies in the pre-registration house officer year	Wring study design

PaiCole, 2019	Burnout prevention and resilience training for critical care trainees	Wrong study design
Pan, 2017	The work environment of junior doctors: their perspectives and coping strategies	Wrong study design
Pan, 2019	Mindfulness-based intervention for nurses in aids care in china: a pilot study	Wrong study design
Pedrazza, 2015	Nurses' comfort with tough and workplace well-being	Wrong study design
Peplonska, 2019	The association between night shift work and nutrition patters among nurses: a literature review	Wrong outcomes
Pereira, 2019	Institutional strategies to prevent violence in nursing work: an integrative review	Wrong setting
Pieper, 2019	Evidence of workplace interventions – a systematic review of systematic reviews	Not specific to HCP
Poscia, 2016	Workplace health promotion for older workers: a systematic literature review	Not specific to HCP
Pospos, 2018	Web-based tools and mobile applications to mitigate burnout, depression, and suicidality among healthcare students and professionals: a systematic review	Wrong study outcome measures
Powell, 2016	Supporting community health workers after a disaster: findings from a mixed-methods pilot evaluation study of a psychoeducational intervention	Wrong patient population
Rittenmeyer, 2009	How professional nurses working in hospital environments experience moral distress: a systematic review	Older than 5-years
Rogers, 2016	Which educational interventions improve healthcare professionals' resilience?	Wrong outcomes
Romppanen, 2017	Interventions for nurses' well-being at work: a quantitative systematic review	Organisational

Rothenberger, 2017	Physician burnout and well-being: a systematic review and framework for action	Organisational
Ruotsalainen, 2008	Systematic review of interventions for reducing occupational stress in health care workers	Older than 5-years
Russell, 2009	Can the use of behavioural intervention studies support change in professional practice behaviours? A literature review	Wrong study design
Sarris, 2007	Herbal medicines in the treatment of psychiatric disorders: A systematic review	Not specific to HCP
Schalk, 2010	Interventions aimed at improving the nursing work environment: a systematic review	Older than 5-years
Schneider, 2018	Association between psychosocial work factors and provider mental well-being in emergency departments: a systematic review	Organisational
Seo, 2019	Effect of autogenic training for stress response: a systematic review and meta-analysis	Other than English
Shimp, 2017	Systematic review of turnover/retention and staff perception of staffing and resource adequacy related to staffing	Organisational
Shoji, 2016	Associations between job burnout and self-efficacy: a meta-analysis	Not specific to HCP
Sibeoni, 2019	Physicians' perspectives about burnout: a systematic review and meta synthesis	No intervention
Skagen, 2016	The consequences of sickness presenteeism on health and wellbeing over time: a systematic review	Not specific to HCP
Skamagki, 2018	A systematic review on workplace interventions to manage chronic musculoskeletal conditions	Wrong outcomes

Slemp, 2018	Leader autonomy support in the workplace: a meta-analytic review	Not specific to HCP
Stagg, 2010	Effectiveness of bullying and violence prevention programs: a systematic review	Not specific to HCP
Stewart, 2014	Reducing burnout in nurses and care workers in secure settings	Older than 5-years
Stillwell, 2017	Interventions to reduce perceived stress among graduate students: a systematic review with implications for evidence-based practice	Wrong setting
Suhonen, 2011	Organisational ethics: a literature review	No intervention
Tang, 2014	A reciprocal interplay between psychosocial job stressors and worker well-being? A systematic review of the “reversed” effect	Not specific to HCP
Tanja-Dijkstra, 2010	Psychologically mediated effects of the physical healthcare environment on work-related outcomes of healthcare personnel	Wrong intervention
Taylor, 2018	Can schwartz center rounds support healthcare staff with emotional challenges at work, and how do they compare with other interventions aimed at providing similar support? A systematic review and scoping reviews	Organisational
Thomsen, 1998	Predictors of a healthy workplace for Swedish and English psychiatrists	Wrong study design
Torquati, 2017	Promoting diet and physical activity in nurses: a systematic review	Wrong outcomes
Torquati, 2018	Changing diet and physical activity in nurses: a pilot study and process evaluation highlighting challenges in workplace health promotion	Wrong outcomes

Tran, 2018	The impacts of the high-quality workplace relationships on job performance: a perspective on staff nurses in Vietnam	Wrong study design
Trowbridge, 2017	Preliminary investigation of workplace-provided compressed mindfulness-based stress reduction with paediatric medical social workers	Wrong study design
Trus, 2012	Work-related empowerment of nurse managers: a systematic review	Wrong patient population
Tully, 2019	Ce: original research: work-related stress and positive thinking among acute care nurses: a cross-sectional survey	Wrong study design
Tummers, 2006	Organizational characteristics as predictors of nurses' psychological work reactions	Wrong study design
Ulrich, 2019	Critical care nurse work environments 2018: findings and implications	Wrong outcomes
VanEerd, 2016	Effectiveness of workplace interventions in the prevention of upper extremity musculoskeletal disorders and symptoms: an update of the evidence	Wrong study design
vanHoof, 2018	The efficacy of interventions for low back pain in nurses: a systematic review	Wrong outcomes
VanMol, 2015	The prevalence of compassion fatigue and burnout among healthcare professionals in intensive care units: a systematic review	No intervention
vanWyk, 2010	Preventative staff-support interventions for health workers	Older than 5-years
Velando-Soriano, 2020	Impact of social support in preventing burnout syndrome in nurses: a systematic review	Wrong outcomes

Verweij, 2016	Mindfulness-based stress reduction for GPs: results of a controlled mixed methods pilot study in Dutch primary care	Wrong study design
Vesel, 2015	Psychosocial support and resilience building among health workers in Sierra Leon: interrelations between coping skills, stress levels, and interpersonal relationships	Older than 5-years
vonVultée, 2004	The impact of management programs on physicians' work environment and health: a prospective, controlled study comparing different interventions	Wrong study design
Waddimba, 2016	Resilience among employed physicians and mid-level practitioners in upstate new york	Wrong study design
Wagner, 2010	The relationship between structural empowerment and psychological empowerment for nurses: a systematic review	Wrong patient population
Wallbank, 2010	Effectiveness of individual clinical supervision for midwives and doctors in stress reduction: findings from a pilot study	Wrong study design
Walsh, 2019	Interventions to prevent and reduce burnout among undergraduate and graduate medical education trainees: a systematic review	Wrong outcomes
Werneburg, 2018	Improving resiliency in healthcare employees	Wrong study design
West, 2017	Interventions to prevent and reduce physician burnout: a systematic review and meta-analysis	Organisational
Westermann, 2014	Burnout intervention studies for inpatient elderly care nursing staff: systematic literature review	Older than 5-years

Wittenberg-Lyles, 2014	Perceived benefits and challenges of an oncology nurse support group	Wrong outcomes
Wright, 2017	Methods for alleviating stress and increasing resilience in the midwifery community: a scoping review of the literature	Wrong study design
Wu, 2012	The mediating and moderating role of personal strain and coping resources in the relationship between work stressor and quality of life among Chinese nurses	Wrong study design
Wyatt, 2015	Understanding how health workplaces are created: implications for developing a national health service healthy workplace program	Wrong outcomes
Ylitormanen, 2018	Job satisfaction among registered nurses in two Scandinavian acute care hospitals	Wrong study design
Yoshida, 2016	Effect of a “like!” seal on the stress reactions of nurses in a hospital	Wrong patient population
Yu, 2019	Personal and work-related factors associated with nurse resilience: a systematic review	Wrong patient population

Appendix 5 Table of excluded studies for updated search

[First Author, Date]	Review Title	Reason for exclusion
Zenani et al. (2022)	Strategies to enhance resilience to cope with workplace adversities post-COVID-19 among ICU nurses.	Did not meet quality standards for systematic review
Tamminga et al. (2023)	Individual-level interventions for reducing occupational stress in healthcare workers (review)	Wrong study design (systematic review of systematic reviews)
Henrichs et al. (2022)	"We're not broken. We're human." A qualitative meta-synthesis of health-care providers' experiences participating in well-being programs	Did not report on individual-interventions
Imbulana et al. (2021)	Interventions to reduce moral distress in clinicians working in intensive care: A systematic review	Did not have the right outcomes
Unjai et al. (2022)	Compassion satisfaction, resilience and passion for work among nurses and physicians working in intensive care units: A mixed method systematic review	Did not report on individual-level interventions
Maresca et al. (2022)	Coping Strategies of Healthcare Professional with Burnout Syndrome: A Systematic Review	Did not report on individual-level interventions
Hobby et al. (2022)	Effectiveness of interventions to improve health behaviours of health professionals: a systematic review	Focused on health behaviours
Imbulana et al. (2021)	Interventions to reduce moral distress in clinicians working in intensive care: a systematic review	Did not have the right outcomes

Appendix 6 Expert opinion publication

frontiers | Frontiers in Psychology

TYPE Original Research
PUBLISHED 28 September 2022
DOI 10.3389/fpsyg.2022.991946

Check for updates

OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to Positive Psychology, a section of the journal Frontiers in Psychology

RECEIVED 12 July 2022
ACCEPTED 06 September 2022
PUBLISHED 28 September 2022

CITATION
Adnan NBB, Baldwin C, Dafny HA and Chamberlain D (2022) What are the essential components to implement individual-focused interventions for well-being and burnout in critical care healthcare professionals? A realist expert opinion.
Front. Psychol. 13:991946.
doi: 10.3389/fpsyg.2022.991946

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What are the essential components to implement individual-focused interventions for well-being and burnout in critical care healthcare professionals? A realist expert opinion

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Background: This study aimed to determine what, how, and under what circumstances individual-focused interventions improve well-being and decrease burnout for critical care healthcare professionals.

Method: This realist approach, expert opinion interview, was guided by the Realist And Meta-narrative Evidence Synthesis: Evolving Standards II (RAMESES II) guidelines. Semi-structured interviews with critical care experts were conducted to ascertain current and nuanced information on a set of pre-defined individual interventions summarized from a previous umbrella review. The data were appraised, and relationships between context, mechanisms, and outcomes were extracted, which created theory prepositions that refined the initial program theory.

Results: A total of 21 critical care experts were individually interviewed. By understanding the complex interplay between organizational and personal factors that influenced intervention uptake, it was possible to decipher the most likely implementable intervention for critical care healthcare professionals. The expert recommendation suggested that interventions should be evidence-based, accessible, inclusive, and collaborative, and promote knowledge and skill development. Unique mechanisms were also required to achieve the positive effects of the intervention due to the presence of contextual factors within critical care settings. Mechanisms identified in this study included the facilitation of self-awareness, self-regulation, autonomy, collaboration, acceptance, and inclusion (to enable a larger reach to different social groups).

Conclusion: This validation of a theoretical understanding of intervention that addressed well-being and burnout in critical care healthcare professionals by expert opinion demonstrated essential mechanisms and contextual factors

to consider when designing and implementing interventions. Future research would benefit by piloting individual interventions and integrating these new theoretical findings to understand better their effectiveness for future translation into the "real-world" setting.

KEYWORDS

critical care, healthcare professionals, well-being (I31), burnout—professional, individual interventions

Introduction

Workload and work-life balance are central to well-being, alongside the experiences of workplace support, respect, and feeling valued (Jarden et al., 2019). Well-being can be conceptualized as a spectrum, where high well-being denotes happiness and flourishing (Hall et al., 2016). Conversely, low well-being encompasses components of increase anxiety and depression (Hall et al., 2016). The concept of well-being has two facets—hedonic and eudaimonic well-being (Keyes, 2002). Hedonic well-being encompasses emotional components such as life satisfaction, happiness, and balance between positive and negative affect (Keyes, 2002; Schlieper, 2021). Eudaimonic well-being involves psychological and social components such as personal growth, autonomy, positive relations, and social integration and acceptance (Schotanus-Dijkstra et al., 2016). Critical Care Healthcare Professionals (CCHP) displaying both hedonic and eudaimonic well-being are viewed as "flourishing" within the workplace (Keyes, 2002; Keyes and Haidt, 2010). Being in a state of flourishing is a favorable form of mental health and describes the subjective estimate of one's perceptions and evaluations of their life (in terms of social, emotional, and psychological functioning; Schotanus-Dijkstra et al., 2016; Schlieper, 2021). Schotanus-Dijkstra et al. (2016) reported that individuals who flourished within the workplace tended to have excellent physical and mental health and could cope with challenges both within and outside of work compared to people who were not flourishing (Schotanus-Dijkstra et al., 2016). The concept of flourishing is composed of varying factors that may play a role in counteracting high-stress levels, emotional exhaustion, and subsequently burnout experiences (Berend et al., 2020).

Burnout is defined as a negative reaction to chronic occupational stressors, where there is a misfit between the individual's needs, values, and job performance (Galletta et al., 2016). Maslach et al. (1996) identified burnout as a psychological syndrome characterized by emotional exhaustion, depersonalization, and personal inefficacy (Maslach et al., 1996). Emotional exhaustion is relative to the employee's stress experiences and result in decreased physical and emotional resources (Maslach et al., 1997; Leiter and Maslach, 2005; Taris et al., 2017). Maslach et al. (1997) suggested that emotional exhaustion diminished self-initiative and engagement and progressively decreased the capacity for demanding work (Maslach et al., 1997; Leiter and Maslach, 2005; Taris et al., 2017). Similarly, cynicism is caused by the overload of exhaustion and concerns to reactions of work detachment (Maslach et al., 1996; Portoghese et al., 2014). It facilitates an environment for emotional involvement within the workplace and contributes to the loss of enthusiasm (Leiter and Maslach, 2005). The third component of professional inefficacy can be perceived as decreased productivity, ineffectiveness, and lack of achievement within the workplace (Leiter and Maslach, 2005). Perceived professional inefficacy can be categorized as a personality characteristic (Shirom, 2003), whereas both emotional exhaustion and cynicism can be recognized as two fundamental core components of burnout (Bakker et al., 2002; González-Romá et al., 2006).

Critical Care Healthcare Professionals (CCHP) are at high risk of distress and burnout due to their highly demanding and challenging work conditions (Galletta et al., 2016). These conditions enforce certain mental and social demands, negatively affecting their health and well-being (Galletta et al., 2016; Rattray et al., 2021). Example conditions included the constant care of high acuity patients, high workload and time pressures, reduced social support, and frequent unexpected critical events that often lead to suffering and death (Galletta et al., 2016; Rattray et al., 2021). For these reasons, critical care units are considered high-strain workplaces that predisposed workers to adaptation disorders and job dissatisfaction (Galletta et al., 2016; Rattray et al., 2021). Burnout experiences are common among critical care employees, having reached the epidemic level (Gomez et al., 2020). The COVID-19 pandemic and the healthcare system's response have placed immense and unprecedented strain on the critical care workforce (Ripp et al., 2020). Being at the front line has meant that CCHP has been forced to meet sudden and dramatic rises in workload and demands, namely, expanding critical care provisions (Ripp et al., 2020). This experience has produced its own types of psychological stressors, including concerns

Abbreviations: CCHP, Critical care healthcare professionals; RAMESES II, Realist and Meta-narrative Evidence Synthesis Evolving Standards II; CMOC, Context-mechanism-outcome configuration; TP, Theory preposition.

regarding a lack of Personal Protective Equipment, contracting the virus and risking exposure to family and friends, as well as increased adverse patient outcomes and mortality (Gomez et al., 2020; Greenberg et al., 2021). These working conditions can adversely affect the mental health of CCHP, including moral injury and mental health diagnoses such as depression and post-traumatic stress disorder (Gomez et al., 2020; Greenberg et al., 2021).

Depression and post-traumatic stress disorder was identified as being more prevalent in critical care physicians and nurses with burnout syndrome (Kerlin et al., 2020). The effects of burnout can have wide-ranging effects on both the individual and the safety of patient care (Kerlin et al., 2020). An observational prospective multicenter study (31 intensive care units and 1,500 employees) determined that depression in CCHP was an independent risk factor for errors within the workplace (Garrouste-Orgeas et al., 2015). The study also reported a relationship between productivity and burnout—an increase in sick days and intent to leave the job as burnout experiences increased (Dewa et al., 2014; Garrouste-Orgeas et al., 2015).

In 2016, the Critical Care Societies Collaborative announced *a "call for action"* that encouraged stakeholder groups to promote well-being among CCHPs by protecting their mental and physical health (Moss et al., 2016). In addition, the Critical Care Societies Collaborative anticipated that novel methods for addressing burnout and well-being would be discovered with the assistance of stakeholders that may, in turn, shape regulations, promote quality patient care and decrease healthcare costs (associated with turnover; Moss et al., 2016). Stakeholders may be defined as a person or entity with a conceivable or declared stake or interest in a policy concern (Garthwaite et al., 2005). In this paper, we focused on expert stakeholders (herein referred to as experts) being people whose knowledge in the subject of interest (critical care workforce) has been earned through training or education and life experience (Garthwaite et al., 2005).

Evidence of interventions that address well-being and burnout specific to the critical care health professional community is lacking. In an umbrella review and realist-theory synthesis (in press) that focused on individual-level interventions, we identified contextual factors and mechanisms of interventions that broadly applied to the healthcare workforce (Adnan et al., 2022). While we were able to determine what interventions were likely to work, for whom and under what circumstances in the general population of healthcare professionals, our theoretical synthesis and preposition were not specific to the unique needs and profile of CCHP (because of a limited number of original intervention studies in CCHP). Additionally, the umbrella review identified gaps in understanding how self-efficacy, self-care, social support, and awareness/mindfulness may improve emotional intelligence and resilience—well-being indicators (Adnan et al., 2022). Moreover, there was insufficient evidence to consider the context-mechanism-outcome configurations for the critical care population. To address the need for and support the design of targeted interventions to CCHP that are theoretically sound (thus likely effective) and feasible, this study sought opinions from critical care experts that determined contextual factors and mechanisms of potential interventions.

Objectives of this review

This study's aim was to gather expert opinion to determine what types of individual-focused interventions work, under what circumstances and how to improve well-being and decrease burnout for Critical Care Healthcare Professionals (CCHP). The specific study objectives were to:

1. Gather expert opinions on the anticipated effectiveness of implementing one or a combination of individual-focused interventions to improve well-being and decrease burnout among CCHP.
2. Identify issues relating to the feasibility of implementing identified singular or combination of intervention(s) among CCHP.
3. Identify and confirm uncovered and present ideas about mechanisms and contextual factors that may contribute to the effective (or ineffective) implementation of singular or combination intervention(s).

Materials and methods

This prospective qualitative study used semi-structured interviews with a realist evaluation method. In addition, this study was reported in adherence to the Realist And Meta-narrative Evidence Synthesis II: Evolving Standards (RAMESES II) guideline (Wong et al., 2016). This study received ethics approval from Flinders University Human Research Ethics Committee.

Program theory

The paper used our earlier umbrella review's program theory to understand the context, mechanism and outcome of individual interventions aimed at improving well-being and decreasing burnout (Adnan et al., 2022). The main elements of the program theory are described in Supplementary File 1.

Study population

A total of 21 critical care healthcare professionals were included in the advisory interviews. The critical care healthcare professionals included the following eight professions: intensivist, registered nurse, psychiatrist, social worker, speech pathologist, physiotherapist, psychologist, and dietitian, as summarized in Table 1. The authors used the World Health Organization's definition of healthcare professionals (World Health Organization,

TABLE 1 Demographics and professional characteristics pf participant's current practice.

Characteristics	*n* (%) of participants
Response rate	
Invited and participated	21 (100%)
Gender	
Male	6 (29%)
Female	15 (71%)
Role in critical care	
Senior registered nurse	8 (38%)
Intensivist	3 (14%)
Psychiatrists	2 (10%)
Speech pathologist	2 (10%)
CC clinical psychologist	2 (10%)
Senior medical registrar	1 (5%)
Social worker	1 (5%)
Physiotherapist	1 (5%)
Dietitian	1 (5%)
Area of specialty	
Clinical	15 (71%)
Academia	6 (29%)
Country/state of service	
South Australia	7 (33%)
New South Wales	4 (19%)
Queensland	4 (19%)
New Zealand	3 (14%)
Western Australia	1 (5%)
Victoria	1 (5%)
Australian Capital Territory	1 (5%)

CC, critical care. Percentages (%) depicted in this table have been rounded to full number.

2019) and the American Association of Critical-Care Nurses definition of "critical care" (Every Nurse, 2018) These definitions are presented in Supplementary File 2.

Experts

This expert opinion defined "experts" using Grundmann's (2017) definition, which included individuals that possessed experience, technical skills (including intellectual and manual skills), judgment, trustworthiness, knowledge dissemination, and the ability to provide advice to others (Grundmann, 2017). Notably, technical skills are not merely knowledge; they include comprehensive reflections on relevant science and scientific activity (Grundmann, 2017). Therefore, in this paper, participants were screened based on these criteria to be included in the interview process.

Recruitment

The authors invited relevant organizations in Australia and New Zealand (Australian and New Zealand Intensive Care Society) to contribute toward the expert panel process by distributing a flyer and supporting the nomination of representative expert individuals from the critical care workforce. Key experts through professional networks were also identified, directly emailed, and invited to participate. The authors ensured maximum variation in sampling to reflect diversity in terms of profession, professional experience, and skill level. The information sheet, pre-readings, and interview time and day were sent and arranged prior to the interviews. The information sheet included information about the preparation required for the interview and completion of the pre-reading of the preliminary results of the umbrella review in the form of Context-Mechanism-Outcome Configuration (CMOC) results tables.

The CMOC tables (Supplementary File 3) were provided (in confidence) with a relevant selection of provisional results of the umbrella review (in press), being a modified version of the results table that described the intervention's context (i.e., population and setting), mechanism (i.e., how/why the intervention works, duration, context, follow-up), and outcomes (i.e., implicit and explicit reasoning and effectiveness) (Adnan et al., 2022).

Semi-structured interviews

Each semi-structured interview consisted of up to 16 questions and began with context-setting before the in-depth and core questions (DeJonckheere and Vaughn, 2019). An interview guide was developed and used, which had been pilot tested (research assistant, NA) in three mock interviews (two clinical psychologists, one senior registered nurse expert) to ensure ease of comprehension, validity (able to extract appropriate data that correlated with the aim), and guidance in the pace of the interview (i.e., not to exceed the time limit of 30 min per interview; DeJonckheere and Vaughn, 2019). Three questions (to the initially proposed 13 questions) were added as a result of the pilot interviews, which was directed to only clinical psychologists. The questions sought to determine the validity of each intervention's proposed contextual factors and reasonings. All authors agreed upon all changes made to the guiding questions to form the final interview guide. This was part of ensuring questions were open-ended where appropriate, clear and neutral, and avoided leading language and jargon unsuited to this professional but multi-disciplinary group of participants (DeJonckheere and Vaughn, 2019). The 13 questions asked of all participants were about the perceived effectiveness of interventions (outcome) and reasoning (context and mechanisms; Supplementary File 4).

Interviews were conducted in real time *via* an online meeting platform (Zoom Video Communications, I, 2021). The first interviewer (research assistant) asked experts a range of questions. The lead researcher (NA) was additionally present during each interview, with the role of taking observational notes, making reflective memos and answering any direct questions from the interviewer or participant that sought clarification of information and only if required to ensure the smooth continuation of the

interview and depth of opinion obtained (NA). Observational notes and reflective memos were recorded in a pre-defined form to ensure consistency in the note-taking process.

Methodological rigor

To establish trustworthiness in this expert opinion, the study authors applied Lincoln and Guba's Four-Dimensions Criteria, which included the following stringent criteria: credibility, dependability, confirmability, and transferability (Lincoln and Guba, 1986). These criteria were chosen because of the commonality of their prior use in other contexts of qualitative health research, their practical process to meet the trustworthiness criteria for qualitative processes, and their applicability to expert opinion methodology where there is a need to minimize bias (Supplementary File 5; Lincoln and Guba, 1986; Nowell et al., 2017). Furthermore, the semi-structured interviews were carefully planned and conducted based on the four-dimension criteria to assess and ensure the robustness of the expert opinions.

Data extraction and synthesis

Expert opinions were evaluated using an interpretative evaluation strategy where notes recorded by authors during interviews were accumulated and re-checked with the recording in order not to lose information and avoid any corresponding distortion. The main statements by experts were checked independently by two authors (NA and DC) and respective notes (Korber and Becker, 2017). Each interview was also discussed (NA and DC) regarding its contribution to the Context-Mechanism-Outcome Configuration (CMOC). In the context of this study, the authors did not record non-verbal elements (Korber and Becker, 2017). Preliminary codes were initially generated, and overarching themes were identified from these codes. Within each theme, data were categorized into context, mechanism, and outcome configurations (Supplementary File 6) and examined for: *what individual interventions are effective and ineffective (outcome) when implemented on CCHCP (context)? What causes these effects (mechanisms), and what internal and external influences (context) produced this outcome?* Pawson and Tilley (1997) defined *context* as the condition in which the intervention is being introduced, ensuring relevance to the operation of the mechanism (i.e., demographics, relationships, technology; Pawson and Tilley, 1997; Salter and Kothari, 2014). *Mechanism* describes the underlying processes and how the intervention may produce the *outcome* (Salter and Kothari, 2014).

Data (empirical evidence) were synthesized by connecting underlying causal processes to Context-Mechanism-Outcome Configurations (CMOC) in order to produce theory prepositions (Shearn et al., 2017). To determine causal processes, authors initially employed abductive and retroductive logic of internal relations of a phenomenon (i.e., intervention) to facilitate abstraction (Meyer and Lunnay, 2013). Both abductive and retroductive inferences are analysis tools that were used to refine and redevelop a conceptual framework or theory (Meyer and Lunnay, 2013). Retroduction sought to identify sufficient and necessary conditions and causes for the phenomenon to exist (Armet, 2013). Moving between data and theory, abductive reasoning was also used to compare, explore, and explain observable patterns within the data while exploring non-observable data that was overlooked by the umbrella review's program theory (Armet, 2013). Next, the authors used information from both retroduction and abduction to create associations (iteratively hypothesizing how an outcome is achieved using identified mechanisms) and recontextualize data (determining the context within which those mechanisms were triggered; Armet, 2013). Authors (NA and DC) discussed potential explanations, strategies, and new findings to refine CMOC, which then facilitated the creation of new plausible conclusions (Armet, 2013). Authors (NA and DC) then conceptualized the necessary processes and generative mechanisms used to create empirical outcomes (Armet, 2013). Next, abstract conceptualization was used, which involved learning about the phenomenon using theories, ideas, and logic to understand the phenomenon (Armet, 2013). An empirical social product was created, followed by the generation of a conceptual map and evaluation of claims for causality using realist criteria to create theory prepositions (Armet, 2013). Next, the authors (NA and DC) determined the relationships and connections between theory prepositions, which created a web of causation that reflected a rich picture of the process and integrated into the umbrella review's program theory to enable refinement (Adnan et al., 2022). The refined program theory is a full collation of supporting evidence.

Results

Demographical and professional characteristics of participants

A total of 21 critical care experts were invited and individually interviewed. There were $n = 15$ female and $n = 6$ male participants, with $n = 18$ from Australia and $n = 3$ from New Zealand. A summary of the demographical and professional characteristics of participants is demonstrated in Table 1.

Context-mechanism-outcome configuration

Four overlapping theoretical prepositions were generated explaining *what supported successful implementation and uptake of interventions among critical care healthcare professionals*. Four middle-range theories were used during data synthesis, which guided the development of theory prepositions: (1) skill acquisition theory (VanPatten and Williams, 2014), (2)

TABLE 2 Theory preposition (TP) using context-mechanism-outcome configuration (CMOC).

Identifier	Theory prepositions using context-mechanism-outcome configuration
TP1	Interventions that promoted knowledge and skill development (personal growth initiatives) *(C)*, facilitated self-awareness *(M)* enabling individuals to exercise self-regulation with the assistance of appropriate resources *(O)*.
TP2	Critical care healthcare professionals assessed and established the intervention's effectiveness using evidence-based knowledge—where the ability to justify facilitated ease in the translational process of the intervention. Having full awareness on its credibility *(C)* facilitated autonomy in their assessment and judgment of the intervention *(M)*. This led to successful implementation of the intervention, which may allow prolonged usage of the intervention *(O)*.
TP3	Interventions that were easily accessible and inclusive *(C)* provided opportunities for critical care healthcare professionals to interact with the resource *(M)*, which facilitated feelings of acceptance and enabled a larger reach to different social groups (i.e., organizational, cultural, personality barriers) *(O)*.
TP4	Interventions should be co-produced *(C)* as it facilitated collaboration *(M)*, which meets end-users' expectations and needs *(O)*.

C, Context; M, Mechanisms; O, Outcomes.

self-determination theory (Patrick and Williams, 2012), (3) social capital theory (Machalek and Martin, 2015), and (4) collaboration theory (Hurwitz and Adair, 2014). Descriptions of these theories in conjunction with the presented data/theory prepositions are provided in Supplementary File 7. Theory Prepositions (TP) developed within the data synthesis are described in Table 2. To promote transparency, the data described below also provided memo notes taken by the second interviewer (NA).

Theory preposition 1 (TP1): Interventions focused on knowledge and skill development to enhance self-regulation

Knowledge and skill development was identified to be a common theme among interventions (advocated as effective by experts). For example, resilience training, mindfulness, cognitive-based intervention, and communication and stress management skills promoted education and learning for self-improvement. One expert *(Critical Care Clinical Dietitian, 7 years of experience)* described having conflicting preferences when choosing the most effective intervention for critical care healthcare professionals. However, the expert concluded that all interventions required education and skill development.

> *Everyone may choose an intervention based on their priorities and how the intervention may help them. It is normal because everyone is different, but in the end, many of the interventions require education so that skills can be developed and used.*

Another expert *(Intensivist, 9 years of experience as a specialist)* supported the idea of interventions that comprised of education as its foundations.

> *Using an intervention will allow us to be educated about an issue, which can be used to improve our day-to-day encounters. Education enables us to reason why we need to know something rather than looking at it as just faith. Without educating ourselves or improving our knowledge and skills, we will not be able to advance and overcome stressful and challenging experiences.*

Self-awareness interventions also positively influenced the ability of critical care healthcare professionals to acquire personal development skills. For example, an expert suggested that mindfulness (a type of self-awareness intervention) facilitated positive perceptions of a stressor by putting situations into perspective, resulting in positive reactions. Similarly, debriefing interventions facilitated knowledge and skill development by sharing new knowledge through discussions, collaborations, and reflection. Shared information is learnt, used, and implemented in future stressful situations. The expert below *(Intensivist, 15 years of experience)* reflected on the debriefing process, which led to the uptake of emotional intelligence skills. Thus, this can be used within the workplace to overcome stressors.

> *Team debriefing or team discussions can normalise an experience, and it helps to de-escalate the issue in one's mind. This way, we can rationally think about our circumstances and use appropriate resources.*

The ability to become emotionally aware and self-regulated in challenging situations is promising, as experts noted potential opportunities for strengthening an already resilient cohort (critical care healthcare professionals).

Theory preposition 2 (TP2): Justifying interventions using evidence-based knowledge

Experts reported that critical care healthcare professionals required evidence to rationalize how and why an intervention is effective. The iterative requirements of ensuring that clinical interventions and performances are evidence-based have shaped their daily thought process to ensure the credibility of information before implementing it within their daily practices. Critical care health professionals use evidence-based reasoning daily within their workplace. Consequently, any intervention implemented needed to be based on similar rigor before being accepted by this group, as stated by an expert *(Critical Care Senior Registered Nurse, 28 years of experience)*.

> *These interventions work because they are evidence-based; this is how critical care healthcare professionals work. It is a cause-and-effect response…we are medically minded, that is, using evidence and education – what is the practice and its benefits.*

Experts suggested that interventions such as resilience training, communication and stress management, and mindfulness and cognitive interventions were "logical" (provided sound reasoning to their effectiveness) and would resonate with critical care healthcare professionals. One expert *(Intensivist, 18 years of experience)* suggested that these interventions were proposed as "logical" due to the abundance of literature and evidence of their effectiveness.

> *These interventions would work within the critical care workforce because there is a lot of research and evidence to prove their effectiveness. I have also seen the effects of these interventions within the clinical setting, and there are positive results in terms of improved wellbeing and decreased stress.*

Theory preposition 3 (TP3): Accessibility and inclusivity of interventions

Nine experts reported that implementing the intervention would be practical and effective in terms of consistency and long-term use. One respondent *(Critical Care Senior Registered Nurse, 22 years of experience)* explained that interventions should be implemented within a whole system as factors that facilitated well-being and burnout are interrelated. For example, implementing communication skills on an individual level does not prevent the employee from being affected by negative conversations by their colleagues.

> *It is not only about the individual but rather a whole system. If you instil changes within the system, then everyone will follow.*

Another expert *(Critical Care Senior Registered Nurse, 28 years of experience)* suggested that exhaustion may also influence the accessibility to interventions.

> *Exhaustion potentially limits the critical care workforce to use an intervention. If you have an intervention done during personal time, it becomes hard to think about it and do it. It would be better to have the intervention during your work hours and within the clinical setting.*

Twelve experts supported interventions used during the critical care healthcare professional's time. This decision was majorly influenced by workplace factors such as negative work cultures and lack of management support—preventing accessibility and engagement to interventions as mentioned by one expert *(Intensivist, 9 years of experience as a specialist)*.

> *If you are in a unit that allows you to show your vulnerability and talk about wellbeing, then it can be an excellent place to implement the intervention (i.e., debriefing) – vice versa, it would be difficult to implement depending on the workplace culture.*

Other experts have also emphasized the extreme work environments within critical care settings. One expert suggested the following *(Intensivist, 9 years of experience as a specialist)*.

> *Expecting staff to engage in interventions can be difficult if they are working hard already.*

Other experts justified that implementing interventions at an individual level should not hinder the accessibility and consistency in using the interventions. One expert stated the following *(Critical Care Senior Registered Nurse, 10 years of experience)*.

> *Critical care nurses would be motivated to participate in something good for them…they became nurses for a reason… don't think that they will leave their role unless they are unable continue due to stress and burnout.*

One expert proposed using digital technology to ease accessibility, for example, using online debriefing sessions or mobile applications for mindfulness practice.

Theory preposition 4 (TP4): Collaboration using co-production

Interventions enforced by managers tended to be short lasting and created an environment of reluctance. Experts reported that a top-down approach would be ineffective as critical care healthcare professionals felt unvalued of their feelings, thoughts, and ideas. As an expert *(Critical Care Senior Registered Nurse, 22 years of experience)* stated.

> *Ask people what they would like (implemented). People will provide suggestions and feel valued and invested in the project, which means that they will be more likely to implement it (intervention)… when imposed, people become less motivated.*

Instead, working with critical care healthcare professionals and co-producing interventions was reported as potentially effective as it allowed end-users' expectations to be met. This process also considered differences in individual needs, which can be more engaging according to an expert *(Critical Care Senior Registered Nurse, 22 years of experience)*:

> *People will resonate with different interventions, and everyone is at different levels as an individual, so it might be more beneficial to have interventions that addressed issues that the person may want to improve.*

Other established theory prepositions

This study identified theory prepositions that were previously reported in the umbrella review (Adnan et al., 2022). This included (1) the use of a tailored intervention, (2) the process of learning and education, (3) engagement, and (4) maintaining the quality of interventions in terms of delivery, duration, and intensity. Due to

the similarity of these findings, the authors have decided not to repeat the reporting of these findings. Nevertheless, these theory prepositions demonstrated similarities between critical care healthcare professionals and general healthcare professionals.

Discussion

Twenty-one experts were interviewed to determine what individual interventions work for the critical care workforce, under what circumstances, and why. The program theory from an umbrella review was used to guide the questions and develop a refined program theory exclusively directed to critical care healthcare professionals (Adnan et al., 2022). A wide range of experts from differing professional fields was included within the population sample, encompassing in gender, state/country, and specialty (academic/clinical) variations. As a result, the depth and breadth of the population reached theoretical saturation and met this study's objectives. The interviews extrapolated four theory prepositions, which led to the identification of five main themes discussed below.

Personal growth and self-awareness

Personal growth initiatives were a prominent theme within interventions endorsed by experts. This is referred to as attaining skills for self-improvement by using cognitive skills (planfulness and readiness) and behavioral skills (utilize resources, intentional behavior; van Woerkom and Meyers, 2019). High levels of personal growth protect individuals from psychological distress (van Woerkom and Meyers, 2019), which mirrors the effects of (expert endorsed effective) interventions – such as debriefing, mindfulness, and cognitive behavioral therapy. For example, mindfulness interventions develop the capacity to accept and tolerate painful experiences (personal growth and development) by acquiring resources that help stabilize distressful effects and reduce impulsivity (Segall, 2005). van Woerkom and Meyers (2019) suggested that interventions surrounding personal growth and development restructured perceptions of stressors to build and enhance self-confidence, which provides opportunities for positive changes and growth (van Woerkom and Meyers, 2019). The concept of self-awareness resonates with the ideologies of personal growth and development (Sutton, 2016). Self-awareness enable individuals to perceive their traits, behaviors, and feelings (Drigas and Papoutsi, 2018). It facilitates positive thought changes, allowing changes in emotions and, eventually actions (Drigas and Papoutsi, 2018). Reflection is a prime example of this process, where the cycle commences with awareness, description, analysis, evaluation, learning and eventually leads to the development of new knowledge and skills (Jayatilleke and Mackie, 2013). Experts suggested that the lack of awareness and recognition of low well-being and high burnout hinders opportunities to cope with its symptoms and consequences. Self-awareness is paramount to preventing burnout—also known as self-knowledge (Harman, 2010). Relative to the concept of anosognosia, if individuals lack the insight or awareness of a condition, in this case, burnout, it can precipitate undesirable behaviors such as misperceptions, conflicts, recklessness, and avoidance of treatments (National Alliance on Mental Illness, 2022). Likewise, if individuals are not self-aware of their burnout experience, they may not be interested in utilizing interventions to overcome their negative experiences (National Alliance on Mental Illness, 2022), impacting the usability and sustainability of interventions.

Reflection such as reflective writing, meditation, and debriefing, are effective in developing self-awareness and overall improvement of burnout (Harman, 2010). When investigating the transactional model of burnout, it is prominent that all three stages, including (1) job stressors, (2) individual strain and (3) defensive coping, are relative to the concept of self-awareness (Maslach and Leiter, 2016). That is, in the component of (1) job stressors, the Job-Demands-Resources (JD-R) model proposed that an imbalance between work demands and individual resources may contribute to (2) individual strain that can elicit an emotional response such as anxiety and exhaustion (Maslach and Leiter, 2016). It is theorized in the program theory (from the umbrella review) that decreased job stress awareness discouraged the use of resources; this is also relative to the concept of anosognosia and avoiding treatments (National Alliance on Mental Illness, 2022). Consequently, the lack of awareness and non-use of resources led to an automatic (3) defensive coping behavior and attitude such as increased cynicism, a component prominent within the gold-standard definition of burnout (Maslach and Leiter, 2016).

Evidence and credibility

A prominent opinion among experts included the notions that attributes of rationality and evidence-based knowledge in decision-making processes are often found among critical care healthcare professionals. Rationale decision-making is defined as a multi-step process that favors objectivity, logic, and analysis over insight and subjectivity (Prowle, 2020). Rationale behaviors are often referred to as a decision-making process that chooses the optimal level of utility or benefit for the individual (Lighthall and Vazquez-Guillamet, 2015). Although there were no identified studies that supported explicitly or opposed such claims, it is evident that there is a growing recognition of the applicability of intuitive strategies such as the heuristic and pattern recognition to be applicable within high acuity environments such as among critical care practitioners (Lighthall and Vazquez-Guillamet, 2015). The critical care workforce environment is recognized for its highly stressful and uncertain environment (Piquette et al., 2009). Healthcare professionals in this environment care for patients with few physiological reserves; hence, such professionals are forced to utilize and make timely and accurate decisions (Lighthall and Vazquez-Guillamet, 2015). Often, such decision-making is based on both the hypothetical-deductive model

and intuitive methods, creating a hypothetical framework for subsequent data collection and analysis and subjective experience and recognizing clinical patterns, respectively (Lighthall and Vazquez-Guillamet, 2015). Rationality falls into the intuitive method of thinking, where authors such as Djulbegovic et al. (2018) explained that in evidence-based medicine, actions and beliefs are justified by evidence trustworthiness and reliabilism (Djulbegovic et al., 2018). Therefore, if the evidence is of higher quality, calibrating the estimates of harms and benefits are enhanced (Djulbegovic et al., 2018) due to the premise that "rational people respect theory evidence" (Djulbegovic et al., 2009). This relates back to the results, where experts suggested that even though the proposed interventions provided logical and robust evidence on why or why not an intervention may work, the explanation of interventions lacked a depth of evidence and the exploration of physiological mechanisms. Thus, experts suggested that critical care health professionals would be captivated by interventions with strong logical evidence as it provided credibility and coincides with their thinking process. By providing solid evidence on the effectiveness of interventions, it provides strengths of evidence to appropriately consider the application of intervention within one's life through the core principles of rationality—provides the autonomy to consider components such as benefits, harms, goals, reliability, probabilities, uncertainties, context, constraints, and ethics and morality (Djulbegovic et al., 2018).

Autonomy in assessment and judgment

The ability to provide evidence also facilitate the autonomous decision process of utilizing an intervention. Autonomy is a critical concept proposed both by experts and within literature (Wancata and Hinshaw, 2016; Wensing and Grol, 2019). Experts suggested that if interventions are enforced on the individual by higher authority, it is likely that interventions would not flourish and produce ideal well-being outcomes. Wancata and Hinshaw (2016) proposed that respecting an individual's autonomy enable them to make the best decision for themselves, as they are the best judges of those interests (Wancata and Hinshaw, 2016). For example, a physician does not decide for their patient even though they possess a depth of knowledge that the patient may not have. Instead, the physician may guide the patient through the process (Wancata and Hinshaw, 2016). Likewise, both experts and literature such as Wensing and Grol (2019) and Miech et al. (2018) suggested that a key stakeholder or a change champion should "guide" the process of intervention uptake to enable successful implementation and utilization of the intervention (Miech et al., 2018; Wensing and Grol, 2019). The revised program theory is demonstrated in Figure 1, and its summary is located in Supplementary File 8.

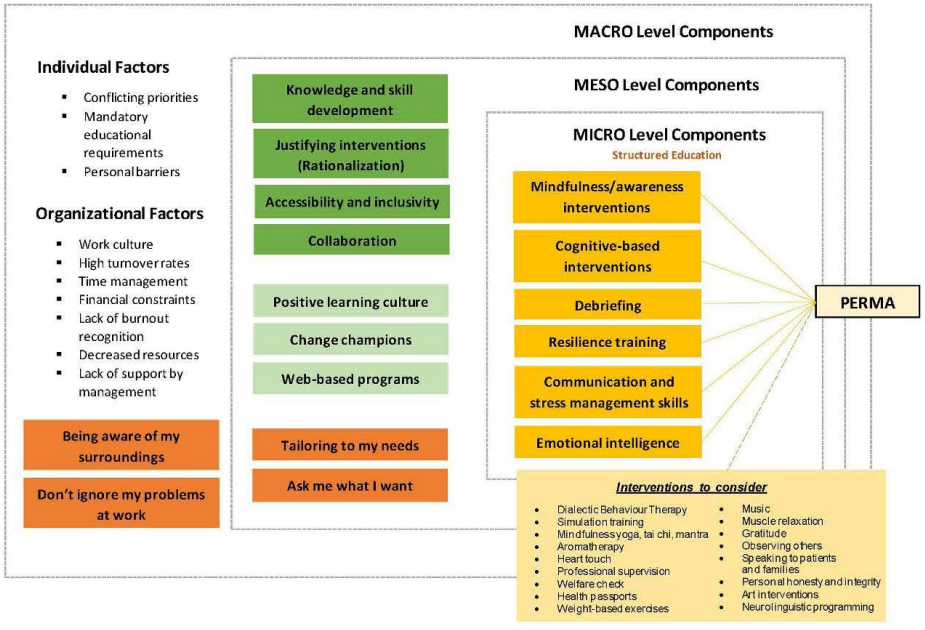


FIGURE 1
Revised program theory.

Accessibility

Experts suggested that the component of accessibility to interventions is paramount to enable successful uptake. A combination of organizational and personal barriers impeded successful access and uptake of the intervention. Experts suggested that modifying the intervention to suit the individual's needs may be promising in minimizing such barriers. For example, integrating web-based instruments such as video conferencing and applications. Hersch et al. (2016) conducted a study using seven web-based intervention modules consisting of nurses sending emails describing their work environment's main stressors (Hersch et al., 2016). The nurses were then provided with directions on how to deal with the work stressor, which subsequently demonstrated overall improvements in stress management (Hersch et al., 2016). Another study that investigated the effects of web-based life skills education demonstrated improvements in burnout experiences (Yektatalab et al., 2020). Heber et al. (2017) compared the use of web- and computer-based intervention with face-to-face interventions for stress management and found no differences in the outcomes of depression or stress levels (Heber et al., 2017). However, the benefits of web-based interventions extended to their ability to have greater reach and facilitated a platform that reaches affected individuals at earlier stages of their burnout experiences (Heber et al., 2017).

Collaboration using co-production

Collaboration was also a significant theme raised during the interview, where experts suggested that individual interventions should be created based on the needs of end users—that includes seeking their advice on what would or would not work. Research suggested that it is currently widely acknowledged that stakeholder involvement is paramount to enhancing the quality of healthcare delivery (Spanò et al., 2018). Integrating the involvement of stakeholders within the planning and development stage of projects can facilitate the successful implementation of interventions and enhance sustainability and scalability within the healthcare workforce (Lazo-Porras et al., 2020). Moreover, the shared experience of co-production may leave a more beneficial and enduring legacy compared to traditional service development – often due to service user satisfaction (Brook et al., 2020). Co-production led to interventions that are more likely to meet end-users' needs through transparency, accountability, learning, responsiveness, and trust, all of which led to a more responsive organization (Vanleene et al., 2015). Although experts raised no limitations regarding the use of co-production of individual interventions, Flinders et al. (2016) suggested that factors such as the "rhetoric-reality gap" between the promised and delivered "co-produced" intervention was a significant impedance of successful utilization of co-production (Flinders et al., 2016). That is, despite the positive normative spirit of co-production, there exists a possibility where interventions may not meet the high expectations of end-users – often termed as an expectation gap (Flinders et al., 2016). Another significant gap in co-production included the assurances of validity, how lived experiences can be translated into academic knowledge and what information may be lost in translation (Flinders et al., 2016). This is relative to the research objectivity and results, where the interests of researchers or partners can have an effect on questions asked in the co-production stage and the inclusion of information that may be deemed interesting or valuable (Flinders et al., 2016). Although limitations exist in the concept of co-production, experts proposed that the absence of co-production can decrease the utilization and sustainability of the intervention, as observed in many confounding factors within studies.

Strengths, limitations, and avenues for future research

This expert realist approach was able to determine the context, mechanisms, and outcome of individual interventions and understand why, how, and under what circumstances interventions may work among critical care healthcare professionals. It included a multi-disciplinary population enabling a robust representation of the nursing and medical workforce. However, it was not possible in this review to determine if questions directed to only psychologists reached theoretical saturation due to the inclusion of only two clinical psychologists. Nevertheless, expert interviews reached a point of theoretical saturation on all other questions.

As previously discussed, contextual factors such as work culture, high turnover rates, time management, and the lack of resources and support from management influenced how interventions are used within the critical care workforce. Determining the components of what makes the intervention useful and applicable for the workforce was beneficial for future applications within the "real-world." Components such as ensuring interventions promote knowledge and skill development are evidence-based, accessible, inclusive, and take on a collaborative pathway were discussed as prime importance for critical care to accept and use the intervention. Future research, such as piloting individual interventions and integrating these theoretical findings may be promising to gain a greater understanding of its effectiveness for future translation and implementation in the "real-world" setting—potentially providing a unique evidence-based solution to improve well-being and decrease burnout among critical care healthcare professionals.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by Flinders University Human Research Ethics

Committee (ID 4901). Verbal informed consent to participate in this study was provided by the participants.

Author contributions

NA, CB, HD, and DC: conceptualization, methodology, validation, formal analysis, visualization, and writing—review and editing. NA: writing—original draft preparation. All authors contributed to the article and approved the submitted version.

Funding

This research was supported by the Caring Futures Institute in the context of recruiting a research assistant to conduct the interviews (seed funding; principal investigator: DC).

Acknowledgments

The authors would like to thank all participants in this study.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2022.991946/full#supplementary-material

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Appendix 7 RAMESES III Checklist (as published)

Reporting item	Description of item	Reported on page(s)
Title		
1	In the title, identify the document as a realist evaluation	Pages 1
Abstract		
2	Journal articles will usually require an abstract, while reports and other forms of publication will usually benefit from a short summary. The abstract or summary should include brief details on: the policy, programme or initiative under evaluation; programme setting; purpose of the evaluation; evaluation question(s) and/or objective(s); evaluation strategy; data collection, documentation and analysis methods; key findings and conclusions Where journals require it and the nature of the study is appropriate, brief details of respondents to the evaluation and recruitment and sampling processes may also be included Sufficient detail should be provided to identify that a realist approach was used and that realist programme theory was developed and/or refined	Page 2,3
Introduction		
3 Rationale for review	Explain the purpose of the evaluation and the implications for its focus and design	Pages 4-5
4 Programme theory	Describe the initial programme theory (or theories) that underpin the programme, policy or initiative	Page 7, Figure 1, Supplementary File 2
5 Evaluation questions, objectives and focus	State the evaluation question(s) and specify the objectives for the evaluation. Describe whether and how the programme theory was used to define the scope and focus of the evaluation	Pages 6, 7
6 Ethical approval	State whether the realist evaluation required and has gained ethical approval from the relevant authorities, providing details as appropriate. If ethical approval was deemed unnecessary, explain why	Page 20
Methods		
7 Rationale for using realist evaluation	Explain why a realist evaluation approach was chosen and (if relevant) adapted	Pages 6,7

Reporting item		Description of item	Reported on page(s)
8	Environment surrounding the evaluation	Describe the environment in which the evaluation took place	Pages 11,12
9	Describe the programme policy, initiative or product evaluated	Provide relevant details on the programme, policy or initiative evaluated	Supplementary File 2 and 6.
10	Describe and justify the evaluation design	A description and justification of the evaluation design (i.e. the account of what was planned, done and why) should be included, at least in summary form or as an appendix, in the document which presents the main findings. If this is not done, the omission should be justified and a reference or link to the evaluation design given. It may also be useful to publish or make freely available (e.g. online on a website) any original evaluation design document or protocol, where they exist	Pages 7-10
11	Data collection methods	Describe and justify the data collection methods – which ones were used, why and how they fed into developing, supporting, refuting or refining programme theory Provide details of the steps taken to enhance the trustworthiness of data collection and documentation	Pages 7-10, Figure 3, Supplementary File 3 and 5
12	Recruitment process and sampling strategy	Describe how respondents to the evaluation were recruited or engaged and how the sample contributed to the development, support, refutation or refinement of programme theory	Page 11
13	Data analysis	Describe in detail how data were analysed. This section should include information on the constructs that were identified, the process of analysis, how the programme theory was further developed, supported, refuted and refined, and (where relevant) how analysis changed as the evaluation unfolded	Pages 11-12
Results			
14	Details of participants	Report (if applicable) who took part in the evaluation, the details of the data they provided and how the data was used to	Pages 12-13, Supplementary File 8

Reporting item		Description of item	Reported on page(s)
		develop, support, refute or refine programme theory	
15	Main findings	Present the key findings, linking them to contexts, mechanisms and outcome configurations. Show how they were used to further develop, test or refine the programme theory	Pages 13-16
Discussion			
16	Summary of findings	Summarise the main findings with attention to the evaluation questions, purpose of the evaluation, programme theory and intended audience	16-18, Figure 2, Supplementary File 7 and 9
17	Strengths, limitations and future directions	Discuss both the strengths of the evaluation and its limitations. These should include (but need not be limited to): (1) consideration of all the steps in the evaluation processes; and (2) comment on the adequacy, trustworthiness and value of the explanatory insights which emerged In many evaluations, there will be an expectation to provide guidance on future directions for the programme, policy or initiative, its implementation and/or design. The particular implications arising from the realist nature of the findings should be reflected in these discussions	Pages 2, 3, 18, 19
18	Comparison with existing literature	Where appropriate, compare and contrast the evaluation's findings with the existing literature on similar programmes, policies or initiatives	Not applicable as there were no existing literature that were similar in terms of programmes, policies or initiatives.
19	Conclusion and recommendations	List the main conclusions that are justified by the analyses of the data. If appropriate, offer recommendations consistent with a realist approach	Page 19
20	Funding and conflict of interest	State the funding source (if any) for the evaluation, the role played by the funder (if any) and any conflicts of interests of the evaluators	Page 20

Appendix 8 Ethics approval for expert realist opinion

10 November 2021



HUMAN ETHICS LOW RISK PANEL

APPROVAL NOTICE

Dear Miss Nurul Adnan,

The below proposed project has been approved on the basis of the information contained in the application and its attachments.

Project No:	4901
Project Title:	A realist expert opinion of individual-focused interventions to improve wellbeing and decrease burnout for critical care healthcare professionals
Primary Researcher:	Miss Nurul Adnan
Approval Date:	10/11/2021
Expiry Date:	31/01/2022

Please note: Due to the current COVID-19 situation, researchers are strongly advised to develop a research design that aligns with the University's COVID-19 research protocol involving human studies. Where possible, avoid face-to-face testing and consider rescheduling face-to-face testing or undertaking alternative distance/online data or interview collection means. For further information, please go to https://staff.flinders.edu.au/coronavirus-information/research-updates.

RESPONSIBILITIES OF RESEARCHERS AND SUPERVISORS

1. Participant Documentation

   Please note that it is the responsibility of researchers and supervisors, in the case of student projects, to ensure that:

   - all participant documents are checked for spelling, grammatical, numbering and formatting errors. The Committee does not accept any responsibility for the above mentioned errors.
   - the Flinders University logo is included on all participant documentation (e.g., letters of Introduction, Information Sheets, consent forms, debriefing information and questionnaires –with the exception of purchased research tools) and the current Flinders University letterhead is included in the header of all letters of introduction. The Flinders University international logo/letterhead should be used and documentation should contain international dialing codes for all telephone and fax numbers listed for all research to be conducted overseas.

2. Annual Progress / Final Reports

   In order to comply with the monitoring requirements of the *National Statement on Ethical Conduct in Human Research 2007 (updated 2018)* an annual progress report must be submitted each year on the approval anniversary date for the duration of the ethics approval using the HREC Annual/Final Report Form available online via the ResearchNow Ethics & Biosafety system.

   Please note that no data collection can be undertaken after the ethics approval expiry date listed at the top of this notice. If data is collected after expiry, it will not be covered in terms of ethics. It is the responsibility of the researcher to ensure that annual progress reports are submitted on time; and that no data is collected after ethics has expired.

   If the project is completed *before* ethics approval has expired please ensure a final report is submitted immediately. If ethics approval for your project expires please either submit (1) a final report; or (2) an extension of time request (using the HREC Modification Form).

   For student projects, the Low Risk Panel recommends that current ethics approval is maintained until a student's thesis has been submitted, assessed and finalised. This is to protect the student in the event that reviewers recommend that additional data be collected from participants.

3. Modifications to Project

   Modifications to the project must not proceed until approval has been obtained from the Ethics Committee. Such proposed changes /

modifications include:

- change of project title;
- change to research team (e.g., additions, removals, researchers and supervisors)
- changes to research objectives;
- changes to research protocol;
- changes to participant recruitment methods;
- changes / additions to source(s) of participants;
- changes of procedures used to seek informed consent;
- changes to reimbursements provided to participants;
- changes to information / documents to be given to potential participants;
- changes to research tools (e.g., survey, interview questions, focus group questions etc);
- extensions of time (i.e. to extend the period of ethics approval past current expiry date).

To notify the Committee of any proposed modifications to the project please submit a Modification Request Form available online via the Research Now Ethics & Biosafety system. Please note that extension of time requests should be submitted prior to the Ethics Approval Expiry Date listed on this notice.

4. Adverse Events and/or Complaints

Researchers should advise the Executive Officer of the Human Research Ethics Committee on at human.researchethics@flinders.edu.au immediately if:

- any complaints regarding the research are received;
- a serious or unexpected adverse event occurs that effects participants;
- an unforeseen event occurs that may affect the ethical acceptability of the project.

Yours sincerely,

Ms Camilla Dorian

on behalf of

Human Ethics Low Risk Panel
Research Development and Support
human.researchethics@flinders.edu.au

Flinders University
Sturt Road, Bedford Park, South Australia, 5042
GPO Box 2100, Adelaide, South Australia, 5001

http://www.flinders.edu.au/research/researcher-support/ethics/human-ethics_home.cfm

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Appendix 9 Expert opinion information sheet



Expert Panel Advisory Group
Information Sheet

Contact Details

Name: Associate Professor Diane Chamberlain
Email: di.chamberlaine@flinders.edu.au

Name: Dr Claire Baldwin
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Name: Dr Alison Sinclair (RA)
Email: alisonmsinclair@bigpond.com

Name: Nurul Adnan (PhD Student)
Email: nurul.adnan@flinders.edu.au

1. Study title
Critical care healthcare workforce wellbeing, burnout prevention and improvement strategies: a systematic review of systematic reviews and realist synthesis

2. Background
A team of multi-disciplinary critical care researchers recently embarked on a systematic review of systematic reviews with realist synthesis, focussing on coping interventions to prevent burnout and improve wellbeing. The study is at the final stage of realist synthesis, which requires expert advisory input from critical care health professionals, and occupational psychologists and psychiatrists. Leading up to this systematic review and synthesis, a team of researchers conducted a comprehensive psychological survey for wellbeing, where survey results were presented at the *World Congress in Intensive Care*, 2019, and are awaiting publication. Taken together, we are looking to use these pieces of work to inform the development and implementation of contemporary self-care interventions that provide relief to the burnout issues, especially emotional exhaustion. Further we are seeking some advice from you, in an advisory role from the results we have presented.

3. Purpose of this research
This systematic review of systematic review will scope coping interventions aimed at improving burnout and wellbeing amongst healthcare professionals and utilise realist approach to synthesize evidence identifying which program components work, why, and whether they are acceptable and suitable for critical care professionals. The review focused on coping interventions for healthcare workers more broadly to scope potential intervention targets, but the expert advice we are seeking and application is intended for critical care settings and catered to an *individualistic* approach rather than organisational strategies.

4. Defining the intervention
Individual approach includes coping interventions that an individual may personally choose to utilise to enhance coping skills and job competencies. It does not include interventions aiming to change aspects of an organization's environment such as working practices and culture – although we understand that these two approaches can be closely interconnected. Please keep in mind that we are seeking to identify sustainable interventions that can be used as long-term strategies for healthcare professionals to cope with burnout and improve stress.

6. Realist approach informed within the provided tables
Realist research aims to explain the 'causal processes'; explained by the realist philosophy as an underlying mechanism which is triggered by particular contextual conditions that lead to an outcome. Human reasoning and social interactions often conceal the 'mechanisms' of action, making it impossible to directly observe it. Namely, the 'resources' included elements including why or how the intervention works, duration, intervention content, and follow-up; which can be introduced to the context, facilitating

changes in reasoning. Accordingly, the 'reasoning' alters the behaviour and produces an outcome – that is the reasoning to changes in an individual's behaviour.

7. Preparation for the interview

Your participation will include reviewing the realist CMOC (context, mechanisms, outcome configuration) tables prior to an individual interview. The tables are divided based on effective interventions (further divided into (1) mindfulness interventions, (2) wellbeing interventions, and (3) other interventions) and ineffective intervention (evidence reported no effective attribute i.e. resilience, burnout). **When reviewing the tables, please make note of the following questions – similar questions will be asked during the interview:**

- Review the context, mechanisms, outcomes column of the table and determine if the theories (listed in the mechanisms column) are logical and provide adequate reasoning
- Do you think that the interventions would work in the critical care setting?
- Which 3 to 5 interventions would you rate as most effective?
- Reason for why you chose the intervention as effective/ineffective
- Advantages and challenges that the chosen interventions may face
- Are there any interventions that were not included in the CMOC tables?

NOTE: *Keep in mind that you can also choose interventions that you believe may work for critical care environments from the ineffective table, if you believe they are relevant and would be effective for clinicians in critical care settings.*

8. Participation – *Individual interview*

We will contact you to arrange an appointment that caters to your availability. The interview will be held online via zoom due to the current pandemic restrictions – the meeting link will be sent to your calendar. On the day of the interview, an interviewer will commence recording of the interview and a list of questions similar to the above points will be asked. The interview should take no more than 20 minutes. Participants personal information will remain confidential and only contextual information will be recorded (eg. profession/Critical care population group etc). The information you provide in this interview will be used in consensus with other interviews to inform effective coping interventions. There are no follow-ups after the interviews, hence, if you are interested in obtaining the results of this research, you can access it through future publication.

9. Ethics

This is an advisory interview that does not require ethics. At certain points in time during the interview, it is possible to attain insight to your experiences. Please note that such information will not be used or reported as qualitative data in this research project and associated publications. Instead, your experiences will be used to verify the applicability of interventions in relation to the critical care workforce; facilitating the realist approach process.

Once again, thank you very much for your participation and we look forward to organising a suitable day and time for your interview. Please do not hesitate to contact us if you have any further questions.

Appendix 10 Effective interventions for mindfulness training (CMOC)

NOTE: *Highlighted demonstrates interventions with population of critical care health professionals*

	Intervention	No. Of Citations	Context *Macro-context*	Mechanism *Micro-context* (Resources)					Outcomes		
			Population, setting	**How/Why** the intervention work?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Effective	Ineffective	Inconclusive
Stress management											
1.1	Mindfulness-based stress reduction (MBSR)	7	Healthcare professionals/ students, disability professionals, psychologists, counsellors, mental health professionals; in medical, Intensive care unit (ICU), paediatrics, psychiatry, radiology, surgery, gynaecology, multiple, unspecified setting, emergency department (ED), medicine, primary and secondary care, NR	MBSR includes intensive mindfulness meditation (MM) and yoga practices/standard meditation program, which integrates Buddhist meditation with contemporary psychological and clinical practices (435). It alters emotional responding through the modification of cognitive-affective processes. Relative to the model of emotion regulation, MBSR may influence *attention deployment*; that is the ability to demonstrate cognitive control of negative rumination, orienting to spatial cue, and attention allocation and regulation (436).	2-16 weeks 30min – 2.5hours	☒	◙	Being attentive to one's inner behaviours and states can allow reflectively considered goals – responses that are situationally appropriate and self-endorsed (437). Doing so can impede habitual, overlearned, or automatized reactions (437). There is also evidence that directing one's attention to subjective emotional, mental and physical experiences can facilitate healthy self-regulation (437).	Empathy (177), emotional acceptance (177), emotional exhaustion (174), depersonalisation (174), personal accomplishment (174), mindfulness (169, 171, 175), awareness (171), anxiety (169, 171), depression (169, 171), stress (169, 171, 175), distress (171), anger (171), well-being (169, 171, 438), resilience (171), emotional intelligence (171), burnout (169), compassion fatigue (169), job satisfaction (169), self-compassion (169), serenity (169), quality of life (169)	Burnout (171, 175), self-compassion (175) psychological well-being (175)	Burnout (181), emotional contagion (177), resilience (173, 181), burnout (173)
1.2	MBSR and education	1	Healthcare professionals, students, trainees; setting NR	The delivery of MBSR in association with educating about mindfulness strategies and practices (175).	8 weeks (15 min) 30 min educate	☒	☒	Education is a process that produces a product. Such processes intentionally engage the capacities of individuals to imbue them with skills of reasoning, knowledge, values, social interactions, and socio-emotional awareness. Education enable growth producing creative, productive, engaged, and self-governing members of society (190).	Stress (175), mindfulness (175)	Ø	Ø

	Intervention	No. Of Citations	Context	Mechanism					Outcomes		
			Macro-context	*Micro-context* (Resources)							
			Population, setting	**How/Why** the intervention work?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Effective	Ineffective	Inconclusive
1.3	Mindfulness-based positive behavioural support	2	Healthcare professionals, disability professionals, psychologists, counsellors, mental health professionals; setting NR	A customized mindfulness that utilized mindfulness interventions in combination with positive behavioural support. It includes a broad array of meditation in combination with a person-centred framework providing support to individuals in a high risk situation or in an environment with challenging behaviours (439).	7 days – 7 weeks	☒	☒	Places individuals in a pathway that facilitates personal transformation and transcendence (439).	Anxiety (171, 179), burnout (171), depression (171, 179), distress (171), stress (171, 179), mindfulness (171, 179), awareness (179), distress (179), anger (179), well-being (179), resilience (179), emotional intelligence (179)	Burnout (179)	Empathy (171), compassion (171), emotional intelligence (171), regulation (171)
1.4	On-the-Job MBSR	1	Nurses; in ICU and critical care	Adaptive MBSR designed to address time-constraints of nurses (440).	30 days 5min	☒	☒	Occupational settings can provide opportunities to a more diverse populations and facilitate a more favourable climate – such as absence of "though, male" – oriented environments (441). Despite this, the location of delivery may either diminish or intensify contextual factors (i.e. implicit association of workplace with stress) (441).	Stress (168)	Ø	Ø
1.5	Experiential training module based on MBSR	1	Premedical/ medical/nursing/ psychology students, nurses;	A mindfulness skills course that used *vipassana* insight meditation – used concepts of breathing, body, emotion, and thoughts (442, 443).	12 weeks	☒	☒	It journeys through the root of the body and mind and reduces the mind's tendency to delve into the past (reduces regrets) and future (lowers expectations and anxieties) – helps participants to remain in their current state to achieve mental tranquillity (444).	Empathy (177), emotional acceptance (177)	Ø	Emotional contagion (177)

	Intervention	No. Of Citations	Context	Mechanism					Outcomes		
			Macro-context	*Micro-context* (Resources)							
			Population, setting	**How/Why** the intervention work?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Effective	Ineffective	Inconclusive
1.6	Mindfulness curriculum	2	Healthcare professionals, disability professionals, psychologists, counsellors, mental health professionals; setting NR	A curriculum for a module or course that incorporates mindfulness and self-care strategies in participant's daily life as a means to increase QOL build coping strategies for stress (445).	1 day – 10 months	☒	☒	Mindfulness skills and training does not necessarily aim at one psychiatric phenomena, rather, it focuses on modifying underlying processes influencing the psychiatric disorder (446).	Anxiety (171, 179), burnout (171), depression (171, 179), distress (171), stress (171, 179), mindfulness (171, 179), awareness (179), distress (179), anger (179), well-being (179), resilience (179), emotional intelligence (179)	Burnout (179)	Empathy (171), compassion (171), emotional intelligence (171), regulation (171)
1.7	Telephone MBSR	4	Healthcare professionals/ students, disability professionals, psychologists, counsellors, mental health professionals; setting NR	Delivery of traditional MBSR through telephone to provide access to MBSR – without the need to attend in-person (447).	8 weeks 1.5hours	☒	☒	Can decrease feelings of isolation and loneliness, provides individual motivation and positive psychological states (448). Can overcome aforementioned barriers through remote communication (449).	Empathy (177), emotional acceptance (177), anxiety (169, 171, 179), burnout (171), depression (171, 179), distress (171, 179), stress (169, 171, 179), mindfulness (169, 171, 179), awareness (179), anger (179), well-being (169, 179), resilience (179), emotional intelligence (179), depression (169), burnout (169), compassion fatigue (169), job satisfaction (169), self-compassion (169), serenity (169), quality of life (169)	Burnout (179)	Emotional contagion (177), empathy (171), compassion (171), emotional intelligence and regulation (171).
1.8	Cognitive-behavioural stress management based on MBSR	3	Healthcare professionals/ students; setting NR	Utilises materials from MBSR and cognitive therapy consists of didactic presentation, guided and training practices in mindfulness techniques, interactive exercise, group discussions, and assigned readings and audios for home use (450).	5-8 weeks 2 hours	☒	☒	Attempts to influence irrational thoughts whilst identifying and changing thought patterns and behaviours (451).	Empathy (177), emotional acceptance (177), Stress (169, 175), mindfulness (175) (169), anxiety (169), Depression (169), burnout (169), compassion fatigue (169), job Satisfaction (169), well-being (169), self-compassion (169), serenity (169), quality of life (169)	Burnout (175), self-compassion (175), psychological well-being (175)	emotional contagion (177)

Intervention	No. Of Citations	Context *Macro-context* Population, setting	Mechanism *Micro-context* (Resources) **How/Why** the intervention work?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Outcomes Effective	Ineffective	Inconclusive
1.9 Interpersonal mindfulness	4	Healthcare professionals/ students, disability professionals, psychologists, counsellors, mental health professionals; setting NR	Mindfulness during interpersonal interactions, training that enables the development of awareness of oneself and others, and qualities of nonreactive presence and nonjudgements (452).	6 weeks 1.5hours	☒	☒	Develop considerate listening, increased presence and attentiveness, less judgemental attitudes, increased awareness of patient's perspective, change the way people operate within the workplace, and ability to prepare for and handle difficult situations	Anxiety (171), burnout (171), depression (171, 179), distress (171, 179), stress (171, 175), mindfulness (171, 175, 179), awareness (179), anxiety (179), stress (179), anger (179), well-being (179), resilience (179), emotional intelligence (179), empathy (177), emotional acceptance (177)	Burnout (175, 179), self-compassion (175), psychological well-being (175)	Empathy (171), compassion (171), emotional intelligence (171), regulation (171), emotional contagion (177)
Cognitive therapy										
1.10 Mindfulness-based cognitive therapy (MBCT), includes mindful therapy	9	Healthcare professionals/ students, disability professionals, psychologists, counsellors, mental health professionals; NR, in medical/ICU/ critical care, paediatrics, psychiatry, radiology, surgery, gynaecology, multiple, unspecified	"Three-minute breathing space" is the key element in MBCT (446). It aims to assimilate learnt formal meditation practices into the participant's everyday life (446). There are three steps including: (1) awareness of thoughts, bodily sensations, feelings (2) attention to breath (3) attention to body.	8 weeks 90min-10hours	☒	◙	Enables cognitive restructuring – that is the ability to identify and challenge rigid and negative thoughts. This allows for the facilitation of resilience rather than the ability to achieve a specific outcome or solve a particular issue (453).	Empathy (177), emotional acceptance (177), anxiety (171, 179), burnout (171), depression (171, 179), distress (171, 179), stress (168, 171, 175, 179), mindfulness (171, 175, 179), awareness (179), anger (179), well-being (175, 179), resilience (179), emotional intelligence (179)	Burnout (175, 179),self-compassion (175), psychological well-being (175)	(occupational) stress (170, 172), Emotional contagion (177), empathy (171), compassion (171), emotional intelligence and regulation (171), burnout (170, 181), resilience (181)
Technology										
1.11 Web-based mindfulness programme	1	Healthcare professionals; setting NR	Includes experiential audio exercises and online applied training (lifestyle coaching and personalized progress tracking) (454).	☒	☒	☒	Promising in this era – provides ease (i.e. due to heavy work schedules), cost effective, and less time consuming	Well-being (438)	Ø	Ø

	Intervention	No. Of Citations	Context	Mechanism					Outcomes		
			Macro-context	*Micro-context* (Resources)							
			Population, setting	**How/Why** the intervention work?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Effective	Ineffective	Inconclusive
Acceptance and Commitment Therapy (ACT)											
1.12	ACT based self-management	1	Healthcare professionals, students, trainees; setting NR	ACT uses mindfulness and acceptance strategies in developing behaviour change through the improvement of psychological flexibility (446). Such programs use metaphors and real-life examples to increase awareness of the 'present moment' and decrease rumination of past deeds, worries, and future problems (446).	1 day – 12 weeks (30min phone consult for 3 months)	☒	☒	Does not aim to replace unhealthy psychological events with healthy events, rather, concurrent cultivation of acceptance towards an unhealthy psychological event, teaches the observation of events for what they are and not being entangled with them, and enables commitment of behaviours that support living through healthy values (455).	Stress (175), mindfulness (175), psychological flexibility (175)	Burnout (175), self-compassion (175), psychological well-being (175)	Ø
Supportive Therapy											
1.13	MBST	3	Healthcare professionals/ students, disability professionals, psychologists, counsellors, mental health professionals; setting NR	A psychological intervention that consists of five components – presence, listening, empathy, compassion, and boundary awareness (456). MBST differs to other mindfulness-based psychotherapies as it utilises the three domains of mindfulness, that is, present moment attention, deliberate attention, and nonreactive attention (456).	5-7 weeks 1 hour	☒	☒	Enables inputs to enter an individual's awareness in a way that the individual does not notice of its process (456).	Anxiety (169, 171, 179), burnout (171), depression (169, 171, 179), distress (171), stress (169, 171, 179), mindfulness (169, 171, 179), awareness (179), distress (179), anger (179), wellbeing (179), resilience (179), emotional intelligence (179), burnout (169), compassion fatigue (169), job satisfaction (169), well-being (169), self-compassion (169), serenity (169), quality of life (169)	Burnout (179)	Empathy (171), compassion (171), emotional intelligence (171), regulation (171)

	Intervention	No. Of Citations	Context	Mechanism					Outcomes		
			Macro-context	*Micro-context* (Resources)							
			Population, setting	**How/Why** the intervention work?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Effective	Ineffective	Inconclusive
Retreat											
1.14	Mindfulness-Based Professional Development retreat	2	Healthcare professionals, students, trainees;	Designed by psychiatrists, collaboration with a Zen Master. It involves mindfulness exercises such as meditation and mindfulness (457).	9 hours – 2 days	☒	◙	Enables the cultivation of benevolent mental states, which includes compassion, loving-kindness, empathic joy, and equanimity (458).	Stress (175), mindfulness (175), distress (180)	Burnout (175), self-compassion (175), psychological well-being (175)	Ø
Meditation											
1.15	Introduction to mindfulness and mindfulness in daily life	2	Healthcare professionals/ students, disability professionals, psychologists, counsellors, mental health professionals; setting NR	MBIs constitutes of a significant homework component, either guided or unguided meditation daily home practices (446). Such programs also include informal practices to enable the integration of mindful awareness in the participant's everyday activities (i.e. mindful eating) (446).	1 hour	☒	☒	Enables individuals to focus on reactions to stress, recognize difficult thoughts and feelings, and act with acceptance (286).	Anxiety (171, 179), burnout (171), depression (171, 179), distress (171), stress (171, 179), mindfulness (171, 179), awareness (179), anger (179), well-being (179), resilience (179), emotional intelligence (179)	Burnout (179)	Empathy (171), compassion (171), emotional intelligence (171), regulation (171)
1.16	Mindfulness meditation	3	Nurses; ICU and critical care	Meditation is used as a tool to develop mindfulness, encouraging attitudes of non-judgemental acceptance and openness, equanimity, and stillness (459).	8 weeks or 8 sessions 90min	☒	◙	Repeated meditation practices can enhance body awareness, self-regulation, and develop emotion regulation skills.	Stress (168, 179), mindfulness (179) and awareness (179), anxiety (179), depression (179), distress (179), anger (179), well-being (179, 438), resilience (179), emotional intelligence (179)	Burnout (179)	Ø
Education											
1.17	Mindfulness based group psychoeducation activities	1	Healthcare professionals; in primary healthcare centres.	Group-based enables the sharing of personal experiences in practicing mindfulness – learn via modelling and direct feedback (446).	8 weeks	☒	☑	Psychoeducation provides individuals with skills, knowledge, strength, and strategies to overcome associated impairments (460). Moreover, it provides significant improvements in psychiatric symptoms, cognitive insight, and functioning (460).	Distress (180)	Ø	Ø

	Intervention	No. Of Citations	Context	Mechanism					Outcomes		
			Macro-context	*Micro-context* (Resources)							
			Population, setting	**How/Why** the intervention work?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Effective	Ineffective	Inconclusive
1.18	Mindfulness education program	2	Healthcare professionals; primary care, ICU, paediatric, ED, NR	Educates formal and informal mindfulness meditation practice that aims to train non-judgemental attitudes and attentional control components of mindfulness (446).	8 weeks	☒	☑	Education is a process that produces a product. Such processes intentionally engage the capacities of individuals to imbue them with skills of reasoning, knowledge, values, social interactions, and socio-emotional awareness. Education enable growth producing creative, productive, engaged, and self-governing members of society (190).	Emotional exhaustion (174), depersonalization (174), personal accomplishment (174)	Ø	Stress (172)

Abbreviations: NR=not reported, min=Minutes, (-)=to, ☒=Not reported in citations, ☑=Reported in all citations, ◙-=eported in some citations (inconsistencies), No.=Number of

Appendix 11 Effective interventions for well-being (CMOC)

NOTE: *Highlighted demonstrates interventions with population of critical care health professionals*

	Intervention	No. of Citations	Context	Mechanism				Reasoning *(implicit/explicit presence of theory)*	Outcomes		
			Macro-context	*Micro-context* (Resources)							
			Population, setting	**How/why** the intervention works	Duration	Content	Follow-up		Effective	Ineffective	Inconclusive
Cognitive-behavioural skills training											
2.1	Emotional intelligence	1	Nurses; Intensive care unit (ICU) and critical care	Education through general conference programme, inter-group sessions, and educational booklets (168).	4 sessions 2 hours	☒	☒	Includes four aspects including (1) ability to perceive, assess, express emotions accurately, (2) use emotions to promote thinking, (3) Understand emotions and emotional knowledge, (4) ability to manage and regulate actions (461).	Occupational stress (168)	Ø	Ø
2.2	Education on Cognitive Behaviour Therapy (CBT) skills	1	Physicians; setting NR	Education was provided to participants, which focused on CBT skills including cognitive restricting and relaxation (170).	7 sessions 6 mins	☒	☑	To enable symptom reduction, improved function, and remission of disorder, individuals are exposed to problem-solving processes aimed to challenge maladaptive cognitions and modify such behavioural patterns (462).	Occupational stress (170)	Ø	Ø
2.3	CBT – not based on MBSR	3	Healthcare professionals; primary healthcare centres, NR	Utilised emotion-focused coping to regulate the stressful emotion reaction associated with the environment by solving problems and changing negative thoughts and behaviours (174).	5 weeks 5 hours	☒	◙	To enable symptom reduction, improved function, and remission of disorder, individuals are exposed to problem-solving processes aimed to challenge maladaptive cognitions and modify such behavioural patterns (462).	Distress (180), emotional exhaustion (174), depersonalisation (174), personal accomplishment (174)	Ø	Ø

Intervention	No. of Citations	Context	Mechanism					Outcomes		
		Macro-context	*Micro-context* (Resources)							
		Population, setting	**How/why** the intervention works	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Effective	Ineffective	Inconclusive
2.4 Resilience training	2	Healthcare professionals/ students, disability professionals, psychologists, counsellors, mental health professionals; ICU and critical care, NR	Resilience training can be summarized into three dimensions, that is understanding resilience and characteristics resilient people possesses, methods in developing resilience, and internal and external support factors. Training included question and answer, lectures, and group discussions. Delivered by trained researchers supervised by psychiatrists (463).	5 sessions for 8-12 weeks 90 – 120 min	☒	☒	Resilience training is 'preventative' (forward looking) in nature and focuses on fostering personal qualities required to deal with unanticipated stressors (464).	Occupational stress (168) mindfulness (179) awareness (179), anxiety (179), depression (179), stress (179), distress (179), anger (179), well-being (179), resilience (179), emotional intelligence (179)	Burnout (179)	Stress (172)
2.5 Cognitive coping strategies and problem-solving method	1	Healthcare professionals; NR	Coping training was administered as a structured education programme framework, which utilised problem- and emotion-focused coping methods (465).	7 weeks	☒	☑	Cognitive coping strategies assists in regulating emotions in response to a stressor (466). Together with problem-solving methods, it can facilitate recognition, acceptance, and solving existing problems by concentrating on one's strengths and weaknesses (467).	emotional exhaustion (174), depersonalisation (174), personal accomplishment (174)	Ø	Ø
2.6 Emotion regulation training	1	Nurses; ICU and critical care	Develop the ability to manage and respond to one's own emotions (468). There were descriptions of how the intervention works.	8 sessions 2 hours	☒	☒	Ability to break the *vicious emotional* cycle through emotion dysregulation (468).	Occupational stress (168).	Ø	Ø

	Intervention	No. of Citations	Context	Mechanism					Outcomes		
			Macro-context	*Micro-context* (Resources)							
			Population, setting	**How/why** the intervention works	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Effective	Ineffective	Inconclusive
2.7	Counselling session	1	Physicians, psychiatrists; surgery, medicine, primary and secondary care, NR	Provides support, relief, and psychological first aid to individuals who are unable to cope with current situations (469).	1 day 6-7 hours **1 to 1**	☒	☑	Counselling programme aimed to motivate reflection of current situation and personal needs (170).	Occupational stress (170)	Ø	Resilience (173), burnout (173)
					5 days – 9 months 1 hour **group**	☒	☑		Occupational stress (170)	Ø	Resilience (173) , burnout (173)
2.8	SMART program	3	Physicians, psychiatrists; in medical/ICU/ critical care, paediatrics, psychiatry, radiology, surgery, gynaecology, multiple, medicine, primary and secondary care, unspecified, NR	Administered as an individual training program that integrated resilience and stress management through paced breathing meditation (170).	Once off 90 min; 30min follow up phone call	☑	☒	Considering time constraints, SMAT program can be learned in one to two brief sessions, which does not require an elaborate sitting practice (470).	Occupational stress (170)	Ø	Burnout (181), resilience (173, 181), burnout (173)
2.9	Balint group	1	Physicians; setting NR	Sessions providing understanding on interaction with patients (170).	4-9 sessions (1-1.5 hours)	☒	☒	Balint groups allows individuals to emotionally mobilize negative experiences and prevents oneself to seep deeply into personal life (471).	Occupational stress (170)	Ø	Ø
2.10	Educational workshop/seminars	1		Seminars focused on relaxation training, management of social-support, self-management, and practice management (170).	Fortnight 3 sessions 3 hours	☑	☒	Enable the sharing of evidence-based knowledge and retention of knowledge through active learning strategies and increased learning (472).	Occupational stress (170)	Ø	Ø

	Intervention	No. of Citations	Context	Mechanism					Outcomes		
			Macro-context	*Micro-context* (Resources)							
			Population, setting	**How/why** the intervention works	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Effective	Ineffective	Inconclusive
2.11	Communication and/or stress management skills class	3	Healthcare professionals; primary care, ICU, paediatric, ED	Teaching method was skilled-focused, practice-oriented, intensive, and learner-centred, Offered theoretical information regarding communication skills within two to three- person interviews. Theoretical sessions were facilitated via role-plays and immediate feedback by experienced facilitators. Stress management training focused on four topics – cognitive restructuring, relaxation techniques, time management, and detection of job stressor (473).	3 - 8 weeks 2-4 hours	☒	☒	Communication skills are majorly acquired through learning, whereas clinical experiences have a smaller role in the development of such skills (474). One component of life-skills include stress management skills, which are paramount to the enhancement of positive psychological states, particularly in vitality and mental well-being (475).	Occupational stress (170), emotional exhaustion (174), depersonalisation (174), personal accomplishment (174)	Ø	Stress (172)
Low-intensity exercise											
2.12	"The Basic Eight" Qigong	1	Healthcare professionals, nursing aides and assistant, no specification; setting NR	Synchronizes physical movements that are precise with specific breathing techniques. The Basic Eight consists of eight exercises to activate 14 meridians, which is often utilised by acupuncturists – large-intestine, lungs, spleen, stomach, small intestine, heat, kidney, urinary bladder, heart governor, gallbladder, triple heater, liver, conception and the governing vessels (476).	12 hours	☒	☑	It adjusts the individual's body, mind, and breath into oneness. Disease is attributed to deficiency or access of Qi – disruption of Qi to flow to organs, systems, and structures. Thus, Qi is paramount to produce optimal health (Qigong aims to restore or maintain the natural flow and balance of Qi) (477).	Stress (478)	Ø	Ø

	Intervention	No. of Citations	Context	Mechanism					Outcomes		
			Macro-context	*Micro-context* (Resources)							
			Population, setting	**How**/**why** the intervention works	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Effective	Ineffective	Inconclusive
2.13	Supervised yoga instructions/ yoga nidra	1	Healthcare professionals, nursing aides and assistant, no specification; setting NR	Aims to increase brain-wave activity and creates neuroplastic effects that improves memory, mood, cognition, and anxiety (459).	9-12 hours	☒	◙	Allows positive influences on the quality of sleep and can also compensate for the lack of sleep (479).	Stress (478)	Ø	Ø
Self-compassion											
2.14	Self-compassion intervention	1	Healthcare professionals, students, trainees; setting NR	Aim to equip individuals with the ability to treat oneself compassionately during personal suffering. Intervention included educating individuals to notice their own suffering, provision of informal self-compassion techniques, and applying these techniques within their daily life (480).	3 weeks 1.5hours – first 2 session, 3rd session 45 min	☒	☒	Self-compassion facilitates resilience through the moderation of individual's reactions towards a negative event (480).	Mindfulness (175), self-compassion (175)	Ø	Stress (175)

	Intervention	No. of Citations	Context	Mechanism					Outcomes		
			Macro-context	*Micro-context* (Resources)							
			Population, setting	**How**/**why** the intervention works	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Effective	Ineffective	Inconclusive
2.15	Self-guided online self-compassion training	1	Healthcare professionals, students, trainees; setting NR	Based on emotion regulation model of self-compassion – proposing that self-compassion can assist in the relation of emotions when encountered with a stressful event, reducing the negative impact (481). The online training was designed based on key elements of the MAB model on psychotherapy and therapeutic change (includes psychoeducation, reflective and experiential exercise, meditation instructions, experiential exercises, feedback, and self-monitoring) (481).	Weekly 1-2 hours	☒	☒	Intervention enable flexibility, accessibility, and sustainability for mental health prevention. Particularly, online interventions enable cost-effectiveness on a wide scale, enabling them to be implemented for a greater scale of health promotion initiatives (481).	Mindfulness (175), self-compassion (175)	Ø	Stress (175)

Abbreviations: NR=not reported, min=Minutes, (-)=to, ☒=Not reported in citations, ☑=Reported in all citations, ◙=reported in some citations (inconsistencies).

Appendix 12 Effective interventions for others (CMOC)

***NOTE**: Highlighted demonstrates interventions with population of critical care health professionals*

	Intervention	Citations	Context *Macro-context* Population, setting	Mechanism *Micro-context* (Resources) **How/Why** the intervention works?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Outcomes Effective	Ineffective	Inconclusive
3.1	Occupational Mindfulness	1	Healthcare professionals/ students, disability professionals, psychologists, counsellors, mental health professionals; setting NR	Utilizes an array of components derived from MBCT (mindfulness-based cognitive therapy), MBSR (mindfulness-based stress reduction), and positive psychology (482). The program is designed to be customizable for the requirements of specific workforces (482).	8 weeks	☒	☒	Enhances the awareness of sources and signs of stress, and positively changes attitudes, interactions, and behaviours of self-care (483).	Mindfulness (179), awareness (179), anxiety (179), depression (179), stress (179), distress (179), anger (179), well-being (179), resilience (179), emotional intelligence (179)	Burnout (179)	Ø
3.2	Mind-body course	2	Healthcare professionals/ students, disability professionals, psychologists, counsellors, mental health professionals; setting NR	Learn about mind-body medicine (yoga, neuroscience, breathing techniques, meditation) (484).	11 weeks	☒	☒	It emphasizes connections between feelings, thoughts, psychology, behaviours, and corresponding impact on overall health (485).	Anxiety (171, 179), burnout (171), depression (171, 179), distress (171), stress (171, 179), mindfulness (171, 179), awareness (179), distress (179), anger (179), well-being (179), resilience (179), emotional intelligence (179)	Burnout (179)	Empathy (171), compassion (171), emotional intelligence (171), regulation (171)
3.3	Mindfulness in motion	1	Healthcare professionals/ students, disability professionals, psychologists, counsellors, mental health professionals; setting NR	This is a type of MBI that incorporates music, yoga, and mindfulness practices on a time-limited fashion (486).	8 weeks	☒	☒	It is offered in method that is less time intensive, which can be delivered in the workplace – intended for busy individuals to experience the benefits of mindfulness (487).	Mindfulness (179), awareness (179), anxiety (179), depression (179), stress (179), distress (179), anger (179), well-being (179), resilience (179), emotional intelligence (179)	Burnout (179)	Ø

	Intervention	Citations	Context *Macro-context* Population, setting	Mechanism *Micro-context* (Resources) **How/Why** the intervention works?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Outcomes Effective	Ineffective	Inconclusive
3.4	Job stress awareness, Progressive Muscle Relaxation (PMR), assertiveness training, time management	1	Nurses; intensive care unit (ICU) and critical care	Focused on general requirement of the job, caring for patients, relationships with co-workers and supervisors, progressive muscle relaxation, and time management (488).	PMR (2 hours), assertive (7 hours), time manage (3hours)	☒	☒	Opportunities to discuss problems and issues at work can enable conflict management (488, 489).	Occupational stress (168)	Ø	Ø
3.5	Mindfulness-based mentoring	2	Healthcare professionals/ students, disability professionals, psychologists, counsellors, mental health professionals; setting NR	Psychiatrist mentored (using eastern holistic mentoring process) on behavioural and psychopharmacological aspects of mindfulness. Particularly, it focused on *shunyata* (emptiness) (490).	6-11 sessions	☒	☒	The eastern holistic mentoring process emphasizes on the inherent strengths of individuals its interrelatedness. Mentors assist in the willingness of individuals to empty the mind of old patters of practices and thoughts so that the individual is fully present in each moment. This assists in the ability to accept new information, development, behaviour, and strengthening of relationships (490).	Anxiety (171, 179), burnout (171), depression (171, 179), distress (171), stress (171, 179), mindfulness (171, 179), awareness (179), distress (179), anger (179), well-being (179), resilience (179), emotional intelligence (179)	Burnout (179)	Empathy (171), compassion (171), emotional intelligence (171), regulation (171)
3.6	Promotion of acceptance in carers and teachers	2	Healthcare professionals/ students, disability professionals, psychologists, counsellors, mental health professionals; setting NR	Uses acceptance- and mindfulness-based approaches – specifications on how the intervention works was not reported (491).	1.5 days	☒	☒	Mindfulness-based interventions enhances awareness of current moment experiences and perceptible mental processes instead of adjusting resources and problem-solving. Similarly, acceptance-based approaches incorporate mindfulness to avoid unpleasant feeling and thoughts (491).	Anxiety (171, 179), burnout (171), depression (171, 179), distress (171, 179), stress (171, 179), mindfulness (171, 179), awareness (179), anger (179), well-being (179), resilience (179), emotional intelligence (179)	Burnout (179)	Empathy (171), compassion (171), emotional intelligence (171), emotional regulation (171)

	Intervention	Citations	Context *Macro-context* Population, setting	Mechanism *Micro-context* (Resources) **How/Why** the intervention works?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Outcomes Effective	Ineffective	Inconclusive
3.7	Mailed intervention consisted of letter with feedback on General health Questionnaire-12 (GHQ-12) score	1	Healthcare professionals; in primary healthcare centres.	Administration of GHQ-12 with an interpretation score and self-help sheet. Individual grade their scores as none to mild, mild to moderate, and moderate to severe. Administered in a newspaper style with comments regarding doctor's emotional health and emotional arousal via self-reflective writing and self-evaluation activities (492).	Once	☒	☒	Cost-effective methods to reach 'at-risk' individuals. Mailed interventions are likely to succeed through the incorporation of Transtheoretical Model of Change, proposing five key stages – pre-contemplation, contemplation, preparation, action, and maintenance (492).	Distress (180)	Ø	Ø
3.8	Acceptance and mindfulness workshop	2	Healthcare professionals/ students, disability professionals, psychologists, counsellors, mental health professionals; setting NR	Based on principles of ACT (acceptance and commitment therapy) and utilised group discussions, didactic teaching, metaphors, written exercises, short video presentations, practical interactive exercises (493).	1.5 days	☒	☒	Increases psychological acceptance and mindfulness of thoughts, sensations, feelings and reducing literal control of language and thoughts of behaviours – creating goals and defining values. Ut also frees up cognitive resources and development of driven behaviour can assist in improving behaviour activation (493).	Anxiety (171, 179), burnout (171), depression (171, 179), distress (171), stress (171, 179), mindfulness (171, 179), awareness (179), distress (179), anger (179), well-being (179), resilience (179), emotional intelligence (179)	Burnout (179)	Empathy (171), compassion (171), emotional intelligence (171), emotional regulation (171)

Abbreviations: NR=not reported, min=Minutes, (-)=to, ☒=Not reported in citations, ☑=Reported in all citations, ◙=reported in some citations (inconsistencies), No.=Number

Appendix 13 Ineffective interventions (CMOC)

NOTE: *Highlighted demonstrates interventions with critical care health professionals*

	Intervention	No. of Citations	Context *Macro-context* Population, setting	Mechanism *Micro-context* (Resources) **How/Why** the intervention works?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Outcomes Effective	Ineffective	Inconclusive
4.1	Neuro-linguistic programming	1	Nurses; intensive care unit (ICU) and critical care	Communication framework that uses techniques to understand and enable change in one's behaviour and thinking (494).	6 months 3 hours	☒	☒	Demonstrates internal representations of the world is biased depending on sensory modality (auditory, visual, olfactory, kinaesthetic, gustatory) (494). Individual's dominant modality is signalled via various behaviours, especially through eye movements and verbal expressions (494).	Ø	Ø	Stress (168)
4.2	Coping and support groups	2	Healthcare professionals; primary care, ICU, paediatric, emergency department (ED)	Coping groups integrated cognitive coping and problem-solving structured education framework. Support groups utilised the Gibbs' reflection model, which included the following components: description, feelings, evaluation, analysis, conclusion, and action plan (465).	6 months	☒	◙	Coping groups enable the development of problem-focused coping methods and emotion-focused coping methods – that is methods directed to change the situation and methods employed to change emotional and cognitive reactions towards a situation. Support groups enable the provision of support, information, an environment where experiences can be shared, and a sense of belonging (465).	Ø	Ø	Stress (172, 174)
4,3	Heart touch technique	1	Healthcare professionals; primary care, ICU, paediatric, ED, NR	A method used to intentionally change thoughts and feelings. It comprises of three steps – heart centred awareness, loving touch, and connection with the higher power (495).	☒	☒	☒	Develops meaningful connection/commitment with other individuals by enabling feelings of love or appreciation, social support, and spirituality. Moreover, such techniques improve physical, menta, emotional, and spiritual health and well-being – essential for psychological health and hardiness (495).	Ø	Ø	Stress (172)

	Intervention	No. of Citations	Context *Macro-context* Population, setting	Mechanism *Micro-context* (Resources) **How/Why** the intervention works?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Outcomes Effective	Ineffective	Inconclusive
4,4	Auriculotherapy	1	Healthcare professionals; primary care, ICU, paediatric, ED, NR	A method used to diagnose and treat disease by stimulating specific acupoints located on the external ear. This includes acupoint acupressure, electrical stimulation, and the use of different types of needles, magnetic balls and seeds (496).	☒	☒	☒	Stimulates an area of the brain, causing discharges of endorphins and the release of neurotransmitters (497).	Ø	Ø	Stress (172)
4.5	Career identity training	1	Healthcare professionals; primary care, ICU, paediatric, ED, NR	Assists individuals with defining their roles and how they are expected to act in a changing career context (498).	☒	☒	☒	Offers a more flexible base for the construction of identity (498).	Ø	Ø	Stress (172)
4.6	Mental practice sessions	1	Physicians; setting NR	Systematic mental rehearsal where individuals imagine themselves performing the action without physical movements (499).	5 sessions 30 min	☒	☒	Enhances physical performances and cognitive skills. Responses to a negative or stressful stimulus can be moderated through visualization (499).	Ø	Ø	occupational stress (170), burnout (170)
4.7	Debriefing sessions	1		Debriefing included topics on chronic work related emotional and interpersonal stressors. Includes feedback, peer support, mentoring, and problem-solving (500).	8 weeks 1 hour	☒	☒	Provides an opportunity to meet and discuss with peers and other individuals – facilitated by a trusted senior health professional. Ability to share experiences enables potential antidotes to burnout, alongside peer-support groups that facilitates the prevention (500).			
4.8	Meeting	1	Physicians, psychiatrists; surgery, medicine, primary and secondary care.	Discussion groups that discusses on elements of mindfulness, shared experiences, reflection, and a small-group learning (173).	3 sessions in 4 weeks 3 hours	☒	☒	This mindfulness-oriented training assists in the promotion of physician well-being and patient-oriented care through elements of awareness, attention, self-reflection, and intention (501).	Ø	Ø	Resilience (173), burnout (173),

	Intervention	No. of Citations	Context *Macro-context* Population, setting	Mechanism *Micro-context* (Resources) **How/Why** the intervention works?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Outcomes Effective	Ineffective	Inconclusive
4.9	RISE (resilience in stressful event) intervention	1	Physicians; in medical/ICU/ critical care, paediatrics, psychiatry, radiology, surgery, gynaecology, multiple, unspecified	Peer-led psychological first aid and emotional support for individuals in a stressful patient-related or unanticipated adverse event (181, 502).	☒	☒	☒	Demonstrates how to establish a peer-to-peer support program and educate multi-disciplinary teams on how to support and respond to a team member involved in a stressful situation, unanticipated patient event, or patient-related injury (502).	Ø	Ø	Burnout (181), resilience (181)
4.10	Simulation training	1		Gynaecological and obstetrical boot camp simulation training not limited to the inclusion of the following learning objectives: surgical skills, extensive debriefing to practice diagnosis, team-based training, work-up of encountered problems, and management (503).	☒	☒	☒	It provides simulation-, hands-on training to improve procedural skills, medical knowledge, communication, teamwork, and professionalism (503).			
4.11	Micro-task	1	Physicians, psychiatrists; surgery, medicine, primary and secondary care.	Crafted for physicians and designed to promote professional well-being and satisfaction – physicians required to choose and complete a task weekly (173).	10 weeks	☑	☒	Informed by six themes using literate on physical well-being, career satisfaction, psychology, and mindfulness. Purposefully designed to resonate with physicians in practice so that can promote positive culture, effectively implemented, and allows physicians to thrive (504).	Ø	Ø	resilience (173), burnout (173),
4.12	Adaptation practice course	1	Physicians, psychiatrists; surgery, medicine, primary and secondary care.	The course provided education on how to engage with ones moods and feelings physically rather than cognitively, and included methods of how not to engage thoughts about oneself (505).	6 months	☑	☒	Adaptation enables individuals to experience less stress in the same activity that was previously stressful through *overload principle* – more stress is required to be abled to the system to stimulate improvements (506).	Ø	Ø	resilience (173), burnout (173)

	Intervention	No. of Citations	Context *Macro-context* Population, setting	Mechanism *Micro-context* (Resources) **How/Why** the intervention works?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Outcomes Effective	Ineffective	Inconclusive
4.13	Didactic or interactive instruction in biopsychosocial approach to patient care	1	Physicians; setting NR	Mixed interventions which included role play, balint groups, and individual teaching to improve self-awareness. Workshops were provided to facilitate the interventions (170, 507).	12 weeks 5-6 hours	☒	☑	Related to the concept of the biopsychosocial model that views health and illness as a product of behavioural factors, biological characteristics, and social conditions (508). Accordingly, the lack of self-awareness can result to negative interpretations of situations – being a challenge or a threat (507).	Ø	Ø	Occupation stress (170), burnout (170)
4.14	Relaxation response resiliency program (3RP) Palliative Care Clinicians (PCC)	1	Physicians; in medical/ICU/ critical care, paediatrics, psychiatry, radiology, surgery, gynaecology, multiple, unspecified	Adapted from Massachusetts General Hospital (MGH) Benson-Henry Institute (BHI) for mind-body medicine. It is based on CBT and positive psychology principles (181). It included introduction and education facilitated by physicians from MGH (BHI). Education comprised of the introduction or reinforcement of new skills to elicit relaxation responses. This is followed by in-class exercises and didactics (509).	☒	☒	☒	It elicits relaxation, reduce stress reactivity, and increase the relationship of connectedness to oneself and towards others (509).	Ø	Ø	Burnout (181), resilience (181)
4.15	Background affect trouble handling empathy (BATHE)	1	Physicians; setting NR	Instructions on BATHE psychotherapeutic tool was provided to participants, where it focused on self-empathy and awareness. Participants were then encouraged to individually practice three time a week (170).	3 times per week 45 min	☒	☒	Psychotherapy tools can empower feelings of trust and allow the development of positive feelings of themselves to control certain circumstances of their lives (510).	Ø	Burnout (170)	Ø

	Intervention	No. of Citations	Context *Macro-context* Population, setting	Mechanism *Micro-context* (Resources) **How/Why** the intervention works?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Outcomes Effective	Ineffective	Inconclusive
4.16	Psychosocial skills training combined with cognitive behavioural and solution-focused counselling	1	Physicians, psychiatrists; surgery, medicine, primary and secondary care.	Focused on situations and problems in the 'real world', which included coping support and strategies alongside the formulation of future goals between colleagues (511). Training included psychoeducation (videos, oral group discussions, theoretical input, experimental exercises, self-awareness, and home assignments). Content of interventions were designed to facilitate cognitive behavioural training and solution-focused group work principles (511).	12 sessions 1.5hours	☒	☒	Function as a recovery-oriented psychosocial rehabilitation intervention which trains new skills and thoughts that may interfere with performances (i.e. low self-esteem) in the real world (512).	Ø	Ø	Resilience (173), burnout (173)
4.17	General Swedish Massage	2	Nurses; ICU and critical care, NR	Massage was performed on hands, legs, back, chest, lower back. Lotion were applied and massage performed using stroking motions on the surface of the skin with moderate palm pressure (513).	4-5 weeks 25 min	☑	☒	It aims to relax the individual through muscle manipulation – enables relaxation, stretching to relieve muscular tension or tightness, and reduces physical stress (514, 515).	Ø	Ø	Stress (168), job-related stress (182)
4.18	Chair Massage – offered to play music	1	Healthcare professionals; primary care, ICU, paediatric, ED, NR	Chair massage by massage therapist whilst offered preferences of music. Included, back, neck, shoulders, arms and hands (182).	10 weeks 10-15min	☑	☑	Chair massage is easy to set up, can be located in semiprivate areas as individuals remain clothed, and does not utilise much space (516).	Ø	Ø	Stress (182)

	Intervention	No. of Citations	Context *Macro-context* Population, setting	Mechanism *Micro-context* (Resources) **How/Why** the intervention works?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Outcomes Effective	Ineffective	Inconclusive
4.19	Respiratory One Method	1	Physicians; setting NR	Includes relaxation and meditation practices. The practitioner will repeat the word “one” or a phrase such as “let go” and individuals will then exhale (517).	4 workshop 1 hour	☒	☒	Enhances self-regulation of one’s negative emotion and thinking (518).	Ø	Ø	Occupational stress (170)
4.20	Inhalation	3	Healthcare professionals/ students, disability professionals, psychologists, counsellors, mental health professionals; ICU and critical care, NR	Steam infusion of therapeutic grade lavender essential oil throughout nursing units (182).	10-15 min for 24hr	☑	◙	There are differences in research views for inhalation therapy. Essentially, research argues that the main mechanism for aromatic therapy is between the olfactory and limbic system, where scent receptors in the nose send chemical-based messages to the brain’s limbic region via the olfactory nerve. This regulates body function including breath, emotions, body function and blood pressure (519).	Ø	Ø	Stress (168, 172), job-related stress (182)
4.21	Massage and aromatherapy	1	Nurses, setting NR	Massage can relieve pain through the stimulation of endorphins whilst using essential oils such as lavender can provide more pain relief through increased adrenocorticotropic hormone (520).	6 weeks 90 min	☒	☒	Aroma massage should be administered by professionals with specialized training. Particularly for hand massage, it can induce feelings of empathy towards the individual – this can enable the development of ‘peace of mind’ during stressful events (521).	Ø	Ø	Job-related stress (182)
4,22	Gargle	1	Nurses; setting NR	15-20cm^3 aromatic gargle solution daily (182).	10-15 seconds	☑	☒	Different essential oils can have different effect on an individual. For example, the use of ylang ylang has sedative effects on the nervous system. When used as a gargle, it can be effective as scent is inhaled when gargling (522).	Ø	Ø	Job-related stress (182)

	Intervention	No. of Citations	Context *Macro-context* Population, setting	Mechanism *Micro-context* (Resources) **How/Why** the intervention works?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Outcomes Effective	Ineffective	Inconclusive
4.23	Bottle hung on chest	1	Nurses; setting NR	Lavender essential oil bottle hung on the right chest of participants.	4 days	☑	☒	There are differences in research views for inhalation therapy. Essentially, research argues that the main mechanism for aromatic therapy is between the olfactory and limbic system, where scent receptors in the nose send chemical-based messages to the brain's limbic region via the olfactory nerve. This regulates body function including breath, emotions, body function and blood pressure (519).	Ø	Ø	Job-related stress (182)
4.24	Inner forearm	1	Nurses; setting NR	5% solution of *Lavandula angustifolia* (3%) and *Salvia sclarea* (2%) in sweet almond oil as carrier. Five drops in the inner aspect of forearm was applied and rubbed with the opposite arm (182).	☒	☑	☒	When some essential oils are applied topically, it enables the skin to become more penetrable, which causes them to increase the effectiveness of other topical pharmaceuticals or via the use of a blended concoction (523).	Ø	Ø	Job-related stress (182)
4.25	Relaxation breathing; progressive muscle relaxation	1	Healthcare professionals: manufacturing, various, healthcare, secondary school, office- based	It encompasses a variety of strategies in aim to increase calmness and decrease stress. Since stress can contribute to physiological responses, relaxation can address these factors; for example, increased heart rate, muscle tension, shortness of breath, and subjective emotional experiences (524).	☒	☒	☒	Assists individuals to decrease anxiety and tension both physically and psychologically (524).	Ø	Ø	Well-being (438)

	Intervention	No. of Citations	Context	Mechanism					Outcomes		
			Macro-context	*Micro-context* (Resources)							
			Population, setting	**How/Why** the intervention works?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Effective	Ineffective	Inconclusive
4.26	Neurofeedback-based relaxation	1	Healthcare professionals: manufacturing, various, healthcare, secondary school, office- based	Teaches aspects of self-control of the brain by providing feedback signals through brain waves. The electroencephalography records the neurofeedback treatment, where data is extracted and fed back to individuals using an online feedback tool as either audio, video or a combination of both (525).	☒	☒	☒	Enables individuals to interact, monitor, change, and manage their mental and physiological states (526).	Ø	Ø	Well-being (438)
4.27	Hatha Yoga	1	Nurses; ICU and critical care	Includes *pranayama* (breathing exercises), *asana* (physical movements), *shavasana* (deep relaxation) (168).	6 sessions 15 min	☑	☒	It can improve one's breathing depth, chemoreceptive sensitivity, and reduces metabolic rate in healthy individuals. Moreover, the meditation aspect of yoga can facilitate hypo-metabolic states – *pranayama* does the opposite (527).	Ø	Ø	Stress (168)
4.28	Tai Chi	1	Nurses; ICU and critical care	Contents included breathing exercises tai chi practices, visualization, and cool-down exercises with assistance by a tai chi instructor with 22 years of experience (528).	1-2 hours	☒	☒	Emphasizes on mind-body connection (528). It integrates self-defence and physical strengthening using mindfulness techniques (i.e. relaxation of mind) (529).	Ø	Ø	Stress (478)

	Intervention	No. of Citations	Context	Mechanism					Outcomes		
			Macro-context	*Micro-context* (Resources)							
			Population, setting	**How/Why** the intervention works?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Effective	Ineffective	Inconclusive
4.29	Physical exercise ((non-) workplace based, individually designed)	1	Healthcare professionals, nursing aides and assistant, no specification; setting NR	Standardized program that was led by an educated leader, included warming up, exercises of coordination, general strength exercises for back, arms, legs, and aerobic profiled activities with two or three intervals to increase hear rate of 120bpm, and stretching of major muscles. Music was played whilst activities were performed (530).	10 - 106 total hours	☒	☒	an extensive list of comorbidities can weaken an individual, which is often intensified in the state of exhaustion – leading to greater sense of burnout. Thus, physical exercises can be beneficial in terms of physiological changes and allow behavioural distraction from an stressful event (degrading the psychological impact of the event) (531).	Ø	Ø	Occupational stress (478)
4.30	Narrative training	2	Physicians music and art therapist, staff administration, unlicensed healthcare workers; medical/ICU/ critical care, paediatrics, psychiatry, radiology, surgery, gynaecology, multiple, unspecified, workplace, clinic, classroom, virtual meetings, NR	Wrote about emotional responses to patients and families, attachments to patients, attempt of viewing clinical situations from the patients and family member's perspectives. Narratives were then read along to one another, followed by a facilitated discussion (532).	☒	☒	☒	Illuminates boundary conditions of expressive disclosure and discloses ones experiences to those who can benefit from it (533).	Ø	compassion fatigue (534), grief (534)	Burnout (181), resilience (181)

	Intervention	No. of Citations	Context *Macro-context* Population, setting	Mechanism *Micro-context* (Resources) **How/Why** the intervention works?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Outcomes Effective	Ineffective	Inconclusive
4.31	Knitting	1		Provided education on knitting instructions, materials in the basket, and different types of needles and yarns (535). Provided opportunity to knit during breaks or after a stressful event. Encouraged group knitting to enable time to debrief over the stressful event. Knitting aimed to create a knitted square that were framed, conjoined and displayed in the nursing units (535).	☒	☒	☒	Combination of repetitive tasks, cognitive/physical skills, and enjoyment to create a product. It also facilitates the combination of concentration, rhythm, and distance of oneself from the outside world, enabling the escape from negative issues (536).	Ø	compassion fatigue (534), grief (534)	Ø
4.31	Storytelling (face-to-face, virtual)	1	Healthcare professionals, music and art therapist, staff administration, unlicensed healthcare workers; workplace, hospital clinic, classroom, virtual meetings, NR	Human oxytocin response can signal another person as safe, familiar, and trustworthy, and thus, this molecule initiates and motivates reciprocation (537).	☒	☒	☒	Stories can enable us to pay attention and allow use to become emotionally involved – moving us to make an action. This is particularly prominent for stories that have a dramatic arc (537).	Ø	compassion fatigue (534), grief (534)	Ø
4.32	Music therapy	1		Music used open format – that is the improvisation of spontaneous musical and verbal expressions and creativity. Therapists provided support and grounding at times. Instruments were supplied (538).	☒	☒	☒	Listening to music can initiates multiple aspects of the brain's cognitive processes. Music influences stress-related cognitive processes, which enables physiological responses (539).	Ø	compassion fatigue (534), grief (534)	Ø

	Intervention	No. of Citations	Context	Mechanism					Outcomes		
			Macro-context	*Micro-context* (Resources)							
			Population, setting	**How/Why** the intervention works?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Effective	Ineffective	Inconclusive
4.33	Recreational Music-Making	1	Healthcare professionals, music and art therapist, staff administration, unlicensed healthcare workers; workplace, hospital clinic, classroom, virtual meetings, NR	Trained by a facilitator, utilised instruments including hand drums and an array of percussion instruments (540). Sessions included welcoming, introduction, overview, Yamaha Mind-Body Wellness exercise, ice-breaker activity, and utilisation of instruments (540).	☒	☒	☒	Accessible, enjoyable, and fulfilling group-based activity that enables individuals of all ages to unite regardless of their ethnicity, challenges, background, culture, abilities, or experiences. Used as a universal language to enhance interpersonal bonding by caring supportive guides that focuses on enabling individuals to achieve non-musical outcomes (540).	Ø	compassion fatigue (534), grief (534)	Ø
4.34	Mantram	1		A silent, meaningful, self-selected, and repetitive word or phrase which aims to slow down behaviours and thoughts (541).	☒	☒	☒	Enables the ability of individuals to focus using one-pointed attention (focus on a single task at a time) (541).			
4.35	Group Drug Counselling workshop and group consultation	1	Healthcare professionals, students, trainees; setting NR	Psychologically-focused group consultation and education workshop based on acceptance and commitment therapy, which included evidence-based treatment – Group Drug Counselling (542).	1 day – 8 weeks for 1.5 to 6 hours	☒	☒	Assists in breaking barriers of psychological barriers of the practitioner such as fears of judgements by others and discomfort in trying out new things (542).	Ø	Burnout (175), self-compassion (175),psychological well-being (175)	Ø
4.36	Art therapy	1	Healthcare professionals, music and art therapist, staff administration, unlicensed healthcare workers; workplace, hospital clinic, classroom, virtual meetings, NR	Can include art viewing, art making, healing quilts, clay mask making, and symbolic imagery (543).	☒	☒	☒	Can increase an individual's understanding of themselves and others, allows self-reflection, alter thinking patterns and behaviours, and reduce symptoms (544).	Ø	compassion fatigue (534), grief (534)	Ø

	Intervention	No. of Citations	Context	Mechanism					Outcomes		
			Macro-context	*Micro-context* (Resources)							
			Population, setting	**How/Why** the intervention works?	Duration	Content	Follow-up	Reasoning *(implicit/explicit presence of theory)*	Effective	Ineffective	Inconclusive
4.37	Biofeedback-assisted relaxation (Only 1 study included workshop)	2	Healthcare professionals; setting NR	Utilises a 'brain wave synchronizer' to activate relaxation responses of the individual through the excitement of specific brain waves (438).	2 twice weekly (30min workshop and 5min biofeed-back)	☒	◙	Monitors physiological changes of emotions, thoughts and behaviours b providing information to individuals whilst they are practicing relaxation and cognitive changes – visualize effects of the biofeedback instrument (545). Allows individuals to become more attuned to their mind-body connection, provides symptom management, and improves quality of life (545).	Ø	Ø	Well-being (438), occupational stress (170), burnout (170)
4.38	Intensive educational program in mindfulness, communication, and self-awareness	2	Physicians, psychiatrists; surgery, medicine, primary and secondary care, NR	Silent retreat (at a retreat centre) where participants were engaged in a guided silent mindfulness practice for one day (546). Intensive training components included didactic material, formal mindfulness meditation, and narrative and appreciative inquiry exercises (546).	8 weeks intensive (2.5hours) 7-hour retreat; 10-months maintain (2.5hours)	☒	◙	Developing self-awareness skills allows individuals to understand the inner and outward (social) components, as well as understanding the individual's personal resources, self-regulation, and prerequisites (547). Developing skills of communication can enable individuals to better regulate their emotions through reflection and ability to maintain composure during tense situation; rather than being overwhelmed by emotions (548).	Ø	Ø	Resilience (173), burnout (170, 173), occupation stress (170)
4.39	Activities contributing comparisons, emotions, pushing away, thoughts, sensations (ACCEPTS)	1	Physicians; in medical/ICU/ critical care, paediatrics, psychiatry, radiology, surgery, gynaecology, multiple, unspecified	ACCEPTS is one of many tools used in dialectical behavioural therapy – develops the ability to use "wise-mind", that is a metaphoric mental state between "logical" and "emotional" states (446).	☒	☒	☒	Can develop emotion regulation as it incorporates mindfulness, focus on developing emotion-regulation skills, and emphasizes on the role of difficulties in emotion regulation (ER) (453). ER can hinder emotion-focused coping, distancing, and emphasizing positivity (549).	Ø	Ø	Burnout (181), resilience (181)

Abbreviations: NR=not reported, min=Minutes, (-)=to, ☒=Not reported in citations, ☑=Reported in all citations, ◙=reported in some citations (inconsistencies), No.=Number.

Appendix 14 Expert opinion interview questions

Introduction: Greeting **<name>** My name is **<name>**. Thank you for agreeing to participate in this interview which will contribute to the realist synthesis component of this research. I will be conducting the interview along with <second interview name>, who is a PhD student with the research team, and <second interview name> will be taking notes, assist with any questions about the context and content of the information sent to you. (ie 4 CMOC(Context-Mechanism-Outcome-Configuration) Tables or also referred to as individual-level interventions).

As explained, we will keep your **personal details private**. And although we **do not require ethics approval** to seek your advice, we wish to assure you than any **experiences you share during the interview will not be used** or reported in any formal sense as part of this research, we are only interested in your advice on the research findings and its fit or otherwise for individuals in the Critical Care workforce. The information we gather in the interview will be analysed along with that from other interviewees, to identify common themes and perspectives across the critical care workforce, examining the applicability and feasibility of the interventions and the theories behind them. With your permission, we will **record this interview** and we will also **collect some very basic information** about your profession/experience/role etc in the critical care workforce, to enable us to document the range of perspectives gathered in these interviews. **So, are you happy to proceed on this basis? Consent given:**

Questions	**Notes**
Demographic info:	
Profession: *(Nursing/Allied Health/Medicine)* *(pre populate)*	
State/Country *(pre populate)*	
In what setting and/or with what population group do you work?	
How long have you been working there?	
Can you please describe your role in the critical care setting?	

Questions		Notes
Choosing effective interventions for the Critical Care Workforce:		
1	Which interventions do you think would be **most effective for individuals in a critical care context** and **why?**	***Interventions:***
3	**Why do you think these interventions would work for the critical care workforce in particular**?	
4	**In your experience, what would you suggest are the barriers** to implementing such interventions for people in the critical care workforce?	
5	Again, in your experience, are there any particular things which would **enable them to more easily implement these** interventions?	
7	*In our review there are not any interventions that address* ***sleep, exercise, or triangulation as interventions to reduce burnout and improve well-being*** Are you aware of any interventions in relation to **sleep, exercise, or triangulation that have** been used and thought to be effective? **If so, please describe**. How would you apply these interventions?	

Questions		Notes
8	*In the research we have examined, some interventions have been combined with others to achieve the desired results.* In your opinion, do you think **a combination of approaches would be more effective** than one specific intervention? If so, can you suggest **what combination** of interventions might work for you and why?	
9	Are there any interventions listed in the **Ineffective table** that you think should be considered/would be effective in a critical care context?	
10	Are there any interventions you would **have expected to be included as effective that were not listed in the CMOC tables**?	
FOR ALL ORGANISATIONAL PSYCHOLOGISTS/PSYCHIATRISTS ONLY		
12	In **reading through the 4 tables,** are the explanations of why interventions might work, logical?	
13	In the tables provided, do the interventions listed provide **adequate reasoning for their effectiveness**? (*refer Reasonings Column)*	
14	In relation to those interventions that you believe would be effective, are there any	

Questions		Notes
	theories/reasonings that you would change or elaborate on?	
15.	What interventions/approaches would you suggest for managing a group that were resilient, but had high levels of emotional exhaustion?	
16.	In your experience, what is the connection between depression and emotional exhaustion/burnout?	
15	Anecdotally, **organisational factors impact significantly on well-being and burnout**. What would you suggest are some of **the key organisational influences that impact significantly on individual's well-being** and burnout?"	
16	Is there **anything else t**hat you would like to add?	

Thank you for your contribution to this important study.

---- END OF QUESTIONS ----

Appendix 15 Flinders and UoSQ data sharing agreement

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Data Sharing Agreement

Parties

Name: The party set out in Item 1 of Schedule 1.
Short form name: **Flinders**

Name: The party set out in Item 2 of Schedule 1.
Short form name: **Recipient**

Background

A The Recipient has requested that Flinders disclose the Data to the Recipient, and Flinders has agreed to do so pursuant to the terms of this Agreement.

B The Recipient has agreed to keep confidential all Confidential Information disclosed to it by Flinders pursuant to the terms of this Agreement.

Agreed terms

1. Definitions & interpretation

1.1 Definitions

In this Agreement:

Business Day means a day that is not a Saturday, Sunday, public holiday or bank holiday in South Australia.

Business Hours means from 9:00am to 5:00pm on a Business Day, unless otherwise agreed by the parties.

Commencement Date means the date specified in Item 3 of Schedule 1.

Confidential Information means all information in whatever form disclosed by the Flinders to the Recipient or otherwise acquired by the Recipient which is marked as confidential, treated by Flinders as confidential or is otherwise by its nature confidential, including the Data, but excluding information that:

(a) the Recipient creates (whether alone or jointly with any third party) independently of Flinders;

(b) is public knowledge (otherwise than as a result of a breach of confidentiality by the Recipient); or

(c) lawfully comes into the Recipient's possession from a third party on a non-confidential basis.

Data means the data to be provided to the Recipient by Flinders as specified in Item 5 of Schedule 1.

Derived Data means all data, in whatever format, created or generated by (or on behalf of) the Recipient utilising the Data.

Flinders Policies means those policies, standards and procedures as specified in in Item 9 of Schedule 1.

Intellectual Property Rights means all intellectual property rights, including the following rights:

(a) patents, inventions, copyright, circuit layouts rights, registered designs, plant breeders' rights, trade and service marks (including goodwill in those marks), domain names, business names and trade names and any right to have Confidential Information kept confidential;

(b) any application or right to apply for registration of any of the rights referred to in paragraph (a); and

(c) all rights of a similar nature to any of the rights in paragraphs (a) and (b) that may subsist anywhere in the world (including Australia),

whether or not such rights are registered or capable of being registered.

Permitted Purpose means the purpose for which the Data may be used as specified in Item 7 of Schedule 1.

Personal Information has the meaning given in applicable Privacy Laws from time to time, and includes any information or opinion in any form, whether recorded or not, about an identified individual or an individual who is reasonably identifiable.

Personnel means, in relation to a party, that party's directors, officers, employees, agents and contractors.

Privacy Laws means all laws relating to data security and the protection of Personal Information in force from time to time, including the *Privacy Act 1988* (Cth), the *Spam Act 2003* (Cth), the *Do Not Call Register Act 2006* (Cth), any codes or guidelines approved under any of those acts.

Term means the period of time specified in Item 4 of Schedule 1.

1.2 Interpretation

In this Agreement, except where the context otherwise requires:

(a) headings are for convenience only and do not affect interpretation;

(b) a reference to this Agreement includes a reference to this Agreement as amended, varied, novated or substituted from time to time;

(c) a reference to any person includes that person's successors and permitted assigns;

(d) a rule of construction does not apply to the disadvantage of a party because the party was responsible for the preparation of this Agreement or any part of it; and

(e) the meaning of general words is not limited by specific examples introduced by 'including', 'for example' or similar expressions.

2. Term and no exclusivity

2.1 No exclusivity

This Agreement is non-exclusive. Nothing in this Agreement restricts either party from, at any time, collaborating on or participating in, or engaging any other person to collaborate on or participate in, any data sharing activities that are the same as, or similar to, the data sharing activities under this Agreement.

2.2 Term

This Agreement will commence on the Commencement Date and continue until the expiry of the Term unless terminated earlier in accordance with this Agreement.

3. Provision and use of Data

3.1 Data to be shared

Subject to the terms of this Agreement, and except to the extent Schedule 1 provides otherwise, Flinders will provide the Recipient with the Data in the manner and on the terms set out in Item 5 of Schedule 1.

3.2 Personal Information

Except to the extent Item 6 of Schedule 1 provides otherwise, Flinders must ensure that the Data provided to the Recipient under this Agreement does not contain any Personal Information.

3.3 Licence to use Data

Flinders grants to the Recipient a non-exclusive, non-transferable, royalty-free licence to use the Data during the Term solely for the Permitted Purpose.

3.4 Rights, title and interest

Nothing in this Agreement transfers any right, title or interest (including any Intellectual Property Rights) in:

(a) any Data to the Recipient; or

(b) any Derived Data (except to the extent Item 8 of Schedule 1 provides otherwise).

3.5 Data to remain unencumbered

The Recipient must ensure that all Data is signified as the property of Flinders and must not cause or have caused any pledge, lien, charge, mortgage, encumbrance of a third party or any other security interest to be placed on the Data or any database (whether electronic or otherwise) in which such Data is stored.

3.6 Permitted Purpose

(a) The Recipient acknowledges and agrees that it is responsible for all acts and omissions of its Personnel (including subcontractors).

(b) The Recipient must (and must ensure that its Personnel):

(i) comply with all applicable laws in respect of the use of the Data;

(ii) not use Data held by it, or to which it has access, other than for the Permitted Purpose;

(iii) not purport to sell, let for hire, assign rights in, or otherwise dispose of, any Data; or

(iv) not alter Data in any way, other than for the Permitted Purpose.

3.7 Derived Data

The parties must comply with any terms, obligations, conditions or restrictions in relation to Derived Data as specified in Item 8 of Schedule 1.

4. Data security

4.1 Acknowledgment

The Recipient acknowledges that the security of the Data and Flinders' systems is fundamental to Flinders, and a security breach may:

(a) affect Flinders' duties to, and relationships with, its staff and students; and/or

(b) cause Flinders to breach legal obligations it may have.

4.2 Security procedures

The Recipient must:

(a) keep the Data under its control;

(b) comply with all Flinders Policies;

(c) prohibit and prevent any person who does not have the appropriate level of security clearance from gaining access to the Data;

(d) notify Flinders immediately, and comply with all directions of the Flinders, if the Recipient becomes aware of any contravention of the security requirements set out in this clause 4.

4.3 Copying of Data

Each party must ensure that all copies of Data of the other party are prominently marked **CONFIDENTIAL**.

4.4 Data loss prevention

Without limiting clause 4.2, the Recipient must have in place appropriate software (including data loss prevention software), systems and processes to prevent:

(a) any misuse, destruction, loss or theft of;

(b) any unauthorised or unlawful access to, or use, modification, disclosure or other handling of; and

(c) any damage to,

any Data or Personal Information (where applicable) in its or its Personnel's possession, custody or control.

4.5 Data to remain in Australia

The Recipient must not store or process any Data or Personal Information (where applicable) collected by the Recipient in connection with this Agreement in any country outside of Australia without Flinders' prior written consent.

5. Privacy obligations

5.1 Recipient's compliance with Privacy Laws

The Recipient must (and must ensure that its Personnel):

(a) comply with all Privacy Laws with respect to any act done or practice engaged in by the Recipient under or in connection with this Agreement;

(b) comply with all guidelines issued by applicable regulators (and any similar privacy offices) and the privacy and information security procedures or policies which form part of the Flinders Policies;

(c) at Flinders' request:

(i) cooperate fully with, and not hinder, obstruct or delay, Flinders in its handling of any complaints, access or correction requests or regulatory investigations received or conducted in connection with this Agreement; and

(ii) allow Flinders or its nominee to control and direct the handling of any such complaint, request or investigation;

(d) comply with Flinders' reasonable directions with respect to:

(i) the processing of Personal Information collected from, or on behalf of, Flinders; and

(ii) the discharge of its obligations under this clause 5; and

(e) not do or omit to do anything that would cause Flinders to breach any Privacy Laws.

5.2 Collection and handling or Personal Information

If the Recipient collects or accesses Personal Information in connection with the performance of this Agreement, and without limiting its other obligations under this clause 5, the Recipient must:

(a) give collection notices to individuals about whom it collects Personal Information and include in those collection notices (at a minimum) that the Personal Information may be disclosed to Flinders, the purposes for which the Personal Information may be used or disclosed, that the individuals may request to access any Personal Information so collected or request that Personal Information so held be corrected if it is not accurate or complete, and details of any legal requirement to collect the Personal Information on behalf of Flinders;

(b) to the extent required by the Privacy Laws, obtain consents to the collection of Personal Information, keep records of each such consent, and provide copies of those consents to Flinders promptly on request;

(c) take all reasonable steps to ensure that the Personal Information is protected against misuse and loss, and from unauthorised access, modification or disclosure;

(d) provide appropriate training to its Personnel with respect to the correct handling of the Personal Information so as to minimise the risk of accidental security breaches;

(e) give Flinders notice as soon as the Recipient becomes aware that use or disclosure of the Personal Information is required or authorised by or under law; and

(f) not collect or disclose Sensitive Information (as defined in the *Privacy Act 1988* (Cth)) in connection with this Agreement except with the prior written consent of Flinders.

5.3 Protection of Personal Information

The Recipient must:

(a) take all reasonable steps, including appropriate technical and organisational measures, to protect Personal Information shared by Flinders, including against misuse, loss or interference, from unauthorised access, modification or disclosure, and from accidental or unlawful destruction or alteration, and at the other party's request, must provide evidence that its technical and organisational security measures comply with the requirements of applicable Privacy Laws (for example, by providing copies of relevant certifications and specifications of security arrangements);

(b) only permit access to the Personal Information by those of its Personnel who need to access it for the purpose of performing that party's obligations in this Agreement and must ensure that the Personnel are properly trained in the correct handling of Personal Information, and are bound by appropriate obligations of confidentiality; and

(c) ensure its Personnel comply with the requirements of:

(i) this clause 5; and

(ii) applicable Privacy Laws, and must provide evidence of this on request (for example, by providing copies of contractual terms Personnel are required to sign, information regarding their training on applicable Privacy Laws, and procedures and copies of policies).

5.4 Deletion of Personal Information on expiry or termination

On the expiry or termination of this Agreement, the Recipient must promptly and permanently de-identify or destroy all Personal Information collected from (or on behalf of) Flinders in connection with this Agreement.

6. Confidential Information

(a) The Recipient:

(i) must keep the Confidential Information of Flinders secret and confidential;

(ii) may use Confidential Information only for the Permitted Purpose;

(iii) must establish and maintain effective security measures to safeguard Confidential Information from access or use not authorised under this Agreement, including by exercising a degree of care not less than the care used by that party to protect its own Data, and no less than a reasonable degree of care; and

(iv) must immediately notify the other party of any suspected or actual unauthorised use, copying or disclosure of Confidential Information.

(b) The Recipient may disclose Confidential Information of Flinders:

(i) to Personnel of the Recipient who have a need to know for the purposes of this Agreement (and only to the extent that each has a need to know) and before disclosure, have been directed by the Recipient to keep confidential all Confidential Information of Flinders; and

(ii) where it is required by law to do so, provided that the Recipient must before doing so:

(A) notify Flinders;

(B) give Flinders a reasonable opportunity to take any steps that Flinders considers necessary to protect the confidentiality of that information; and

(C) notify the third party that the information is Confidential Information of Flinders,

where reasonably possible.

7. Acknowledgment and indemnity

7.1 No representations or warranties

The Recipient acknowledges that:

(a) Flinders makes no representations or warranties as to the accuracy or completeness of the Data or that reasonable care has been taken in its preparation; and

(b) the Recipient must make and rely upon its own evaluation of the Data.

7.2 No obligation to update

Flinders is not obliged:

(a) to update any information (including Data) disclosed to the Recipient or any of its Personnel; or

(b) to give the Recipient notice if they become aware of any inaccuracy, incompleteness or change in the Data.

7.3 Acknowledgement

The Recipient acknowledges that, in the event of a breach of this Agreement, damages will not be an adequate remedy and Flinders is entitled to seek and obtain injunctive relief or specific performance.

7.4 Limitation of liability

Except as and to the extent required by law, Flinders is not liable for direct or indirect damage or loss of any nature arising in any way out of:

(a) the use by the Recipient or any of its Personnel of information (including Data) directly or indirectly provided by or on behalf of Flinders; or

(b) the termination of this Agreement.

7.5 Indemnity

The Recipient indemnifies Flinders and its Personnel (**those indemnified**) from and against all losses, damages, expenses and reasonable legal costs that Flinders may reasonably sustain or incur as a result, whether directly or indirectly, of any breach by the Recipient (or its Personnel) of this Agreement.

8. Termination

8.1 Termination

Either party may terminate this Agreement at any time with immediate effect by giving written notice to the other party.

8.2 After termination or expiry

(a) Upon the expiry or termination of this Agreement:

(i) the Recipient's right to use Data ceases; and

(ii) the right of any Personnel to whom Data has been disclosed to use that Data also ceases; and

(iii) the Recipient must immediately return or destroy (at Flinders' election) all of the Confidential Information and Data in the Recipient's possession or control.

(b) Termination of this Agreement will not affect the accrued rights or remedies of either party.

(c) The rights and obligations under clauses 4, 5, 6, 7, 8.1 and this clause 8.2 survive termination or expiry of this Agreement.

9. Dispute resolution

(a) A party must not start arbitration or court proceedings (except proceedings seeking interlocutory relief) in respect of a dispute arising out of this Agreement (**Dispute**) unless it has complied with this clause 9.

(b) Each party must continue to perform their obligations under this Agreement, while the parties comply with this clause 9, unless otherwise agreed by the other party in writing.

(c) A party claiming a Dispute has arisen must give the other parties to the Dispute notice setting out details of the Dispute.

(d) During the 14 days after a notice is given under clause 9(c) (or longer period if the parties to the Dispute agree in writing), each party to the Dispute must use its reasonable efforts to resolve the Dispute through their authorised representatives. If the parties cannot resolve the Dispute within that period, they must refer the Dispute to a mediator if one of them requests.

(e) If the parties to the Dispute cannot agree on a mediator within 7 days after a request under clause 9(d), the chairman of the Resolution Institute or the chairman's nominee will appoint a mediator.

(f) The role of a mediator is to assist in negotiating a resolution of the Dispute. A mediator may not make a binding decision on a party to the Dispute except if the party agrees in writing.

(g) Any information or documents disclosed by a party under this clause 9 must be kept confidential and may only be used to attempt to resolve the Dispute.

(h) Each party to a Dispute must pay its own costs of complying with this clause 9. The parties to the Dispute must equally pay the costs of any mediator.

(i) A party to a Dispute may terminate the dispute resolution process by giving notice to each other after it has complied with clauses 9(a) to 9(d). Clauses 9(g) and 9(h) survive termination of the dispute resolution process.

10. Notices

(a) A notice must be:

(i) in writing, in English and signed by a person duly authorised by the sender; and

(ii) hand delivered or sent by prepaid priority post or email to the receiver's address for notices (as set out in in Item 1 and Item 2 of Schedule 1), as varied by any notice given by the receiver to the sender.

(b) A notice given in accordance with clause 10(a) takes effect when taken to be received (or at a later time specified in it), and is taken to be received:

(i) if hand delivered, on delivery;

(ii) if sent by prepaid priority post, on the fifth Business Day after the date of posting (or on the tenth Business Day after the date of posting if posted to or from a place outside Australia); or

(iii) if sent by email, when sent by the sender unless the sender receives a delivery failure notification indicating that the email has not been delivered to the addressee,

but if the event that gives rise to deemed receipt occurs on a day that is not a Business Day or occurs after the end of Business Hours, the notice is taken to be received at the start of Business Hours on the next Business Day after that event.

11. Miscellaneous

(a) A party may only assign this Agreement or a right under this Agreement with the prior written consent of the other party.

(b) This Agreement may be amended only in writing signed by each party.

(c) Each party must pay its own costs of negotiating, preparing and executing this Agreement.

(d) This Agreement may be executed in counterparts, which together will constitute one document.

(e) This Agreement constitutes the entire agreement between the parties in connection with its subject matter and supersedes all previous agreements or understandings between the parties in connection with its subject matter.

(f) Each party must do all things reasonably necessary to give full effect to this Agreement.

(g) Except where this Agreement expressly states otherwise, it does not create a relationship of employment, trust, agency or partnership between the parties.

(h) A term or part of a term of this Agreement that is illegal or unenforceable may be severed from this Agreement and the remaining terms or parts of the terms of this Agreement continue in force.

(i) A party does not waive a right, power or remedy if it fails to exercise or delays in exercising the right, power or remedy. A single or partial exercise of a right, power or remedy does not prevent another or further exercise of that or another right, power or remedy. A waiver of a right, power or remedy must be in writing and signed by the party giving the waiver.

(j) This Agreement is governed by the law applicable in South Australia and each party irrevocably and unconditionally submits to the non-exclusive jurisdiction of the courts of South Australia.

Signing page

EXECUTED as an agreement.

Signed for **Flinders University** by an authorised representative:

Signature of officer

Simon Brennan

Name of officer (print)

Director, Research Development & Support

Position title

29/07/2022

Date

Signed for **University of Southern Queensland** by an authorised representative:

DocuSigned by:
Samantha Rose
ADC3974AB071444...

Signature of officer

Samantha Rose

Name of officer (print)

Director, Office of Research

Position title

29/7/2022 | 1:16 PM AEST

Date

Template 03/21

Schedule 1 - Details

	Item	Details	
1.	**Flinders**	Name: ABN: Address: Email: Attention:	Flinders University 65 542 596 200 Sturt Road, Bedford Park, South Australia 5042 research.contracts@flinders.edu.au Mr Simon Brennan Director of Research, Development and Support
2.	**Recipient**	Name: ABN: Address: Email: Attention:	University of Southern Queensland 40 234 732 081 West Street, Toowoomba, Queensland 4350 cm-ri@usq.edu.au Deputy Vice-Chancellor, Research and Innovation
3.	**Commencement Date**	The date of signing of this Agreement by the last party	
4.	**Term**	Commencement Date – 25 November 2022	
5.	**Data**	For the purposes of clause 3.1 of the Agreement the Data to be shared by Flinders with the Recipient includes: Case notes from the initial one-to-one consult, and case notes and/or field notes from debrief sessions and problem-solving education. **Manner of Provision -** Flinders will provide access to a file on R-Drive containing the data. Flinders will provide the option to 'view only' the data.	
6.	**Personal Information**	N/A The Data will not include identifiable information about the individual participant nor information in which an individual could be reasonably identified.	
7.	**Permitted Purpose**	For the purposes of the Agreement the Permitted Purposes for which the Recipient is permitted to use the Data are: (a) review the data (b) used as clinical file evidence for psychologist student's placement requirements. The following conditions and restrictions will apply: Data is not permitted to be edited, combined, rented, sold, transferred, or otherwise shared, with any other party, including subsidiaries, other than the Recipient identified in this Agreement.	
8.	**Derived Data**	Not applicable.	
9.	**Flinders Policies**	**Flinders Privacy Policy** as available on the Flinders website at: https://www.flinders.edu.au/content/dam/documents/staff/policies/facilities-info-management/privacy-policy.pdf (as amended from time to time).	

Appendix 16 Pilot RCT manual

Flinders UNIVERSITY

Research Project Management Plan

Achieving wellbeing and managing burnout in critical care healthcare professionals: a parallel, interventional, feasibility and realist informed pilot Randomized Control Trial Protocol

Deliverable name:	**Project management plan**
Version:	**1.3**
Release date:	**1September 2022**
Dissemination level:	**Confidential**
Status:	**Final**
Author:	**Nurul Adnan**

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Document history:

Version	Date of issue	Content and changes	Edited by
1.0	23/03/2022	First draft version	Nurul A.
1.0	24/3/2022	First draft version	Claire B.
1.0	24/3/2022	First draft version	Hila D.
1.0	24/3/2022	First draft version	Di C.
1.1	29/3/2022	Second draft version	Nurul A.
1.2	8/6/2022	Third draft version	Nurul A.

Last Reviewed:

Reviewer	Date
Professor Di Chamberlain	25/3/2022
Dr Claire Baldwin	24/3/2022
Dr Hila Dafny	24/3/2022

Abbreviations and Acronyms:

Acronym	Description
CCHCP	Critical Care Healthcare Professional
CPS	Clinical Psychologist Student
IMP	Individual Management Plan
TL	Task Leader
WPL	Work Package Leader

Tables and Figures:

Tables/Figures	Description
Table 1	Members and their positions
Table 2	Investigator Roles
Table 3	Task Leader Responsibilities
Table 4	Data collection process and aims and objectives
Table 5	One-to-one consult schedule
Table 6	Problem solving education content
Table 7	CPS debrief scheduled sessions
Table 8	Post-intervention feedbacks survey
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Figure 3	Pilot Randomised Control Trial Flowchart

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Executive Summary

High burnout amongst healthcare professionals have dramatically escalated within the past year due to the rapid dispersion of COVID-19 (Jalili, Niroomand, Hadavand, Zeinali, & Fotouhi, 2021). Nurses and doctors are exposed to unusually high work hours, prolonged working days, and increased levels of work overload and exigency (Silva-Gomes & Silva-Gomes, 2021). Burnout affects healthcare professionals on a national scale even before the COVID-19 pandemic, with statistical reporting of 25% to 75% prevalence rates amongst healthcare professionals worldwide (Dobson et al., 2021; Elghazally, Alkarn, Elkhayat, Ibrahim, & Elkhayat, 2021). Highly stressful professions such as healthcare professionals within critical care environments are more susceptible to developing burnout due to the stressful nature of the workforce (Moss, Good, Gozal, Kleinpell, & Sessler, 2016). Continuous exposure to stress can lead to increased rates of absenteeism, distress, compassion fatigue, and burnout, which eventually compromises the quality and safety of patient care provision (Bateman et al., 2020; Saravanabavan, Sivakumar, & Hisham, 2019). Individual-focused interventions aimed at implementing change such as through mindfulness promotion and wellness curriculum are not consistently sufficient to confront severe burnout symptoms because of contextual factors and mechanisms (Bateman et al., 2020; Gunasingam, Burns, Edwards, Dinh, & Walton, 2015). The ability to develop an individual-focused intervention that considers such factors can be promising may provide improved outcomes. Extending the concept of personalised medicine individually tailored interventions may prove to be an effective use of resources and facilitate implemented within the 'real world' setting.

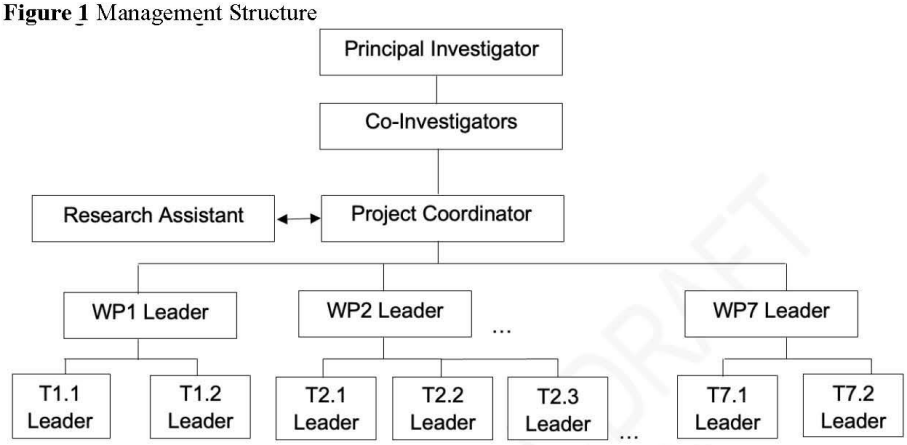
An umbrella review (submitted under review) was conducted to investigate the existence and effectiveness of individual-focused interventions for critical care healthcare professionals. The review reported insufficient evidence for the specific population, instead, reporting on individual interventions for general healthcare professionals. Thus, an expert opinion using realist evaluation was conducted (based on the umbrella review from which a program theory was developed and currently under review) to determine what individual interventions might be effective, why, in what context, and to what extent, where results were used to refine the program theory. This research project aims to use the program theory as a framework in conducting a pilot Randomised Control Trial (RCT). The pilot RCT seeks to determine the feasibility and acceptability of two evidence-based models of individual-focused interventions to improve wellbeing and decrease burnout amongst critical care healthcare professionals. The ability to provide a solution for this chronic endemic can potentially address and minimise negative personal and work-related consequences of burnout (i.e. poor quality of life, decreased job satisfaction);[1] improve health workforce turnover and retention and increase patients safety.[2]

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1. Management Structure

The management structure of this study is demonstrated in the following Figure 1.

Figure 1 Management Structure



List of investigators are listed below in Table 1

Table 1 Investigator members and their positions

	Name	Position
1	Professor Di Chamberlain	Principal investigator
2	Dr Claire Baldwin	Co-Investigators
3	Dr Hila Dafny	Co-Investigators
4	Associate Professor Gavin Beccaria	Co-Investigators
5	Miss Nurul Adnan	Project Coordinator
6	Amy Butler	Research Assistant

2.1 Work Package Leader (WPL)

A Work Package (WP) is defined as an allocated task or activity.[3] The Work Package Leader (WPL) is the individual nominated to be responsible in coordinating and completing all aspects of the allocated WP.[3] Work Package Leaders are also required to present the work package progress when required and be responsible. Allocation of the WPL to work packages will be organised in the protocol stage and agreed by everyone that is involved. Table 2 demonstrates the WP and allocated WPL.

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Table 2 Investigator Roles

	Work Package (WP)	Work Package Leader (WPL)
1	Management	Professor Di Chamberlain
2	Trial Design (Protocol)	Miss Nurul Adnan
3	Trial Registrations and Ethics	Miss Nurul Adnan
4	Platform Creation and Management	Miss Nurul Adnan
5	Administration	Miss Nurul Adnan
6	Intervention Dissemination and Monitoring	Miss Nurul Adnan
7	Data Collection, Management, and Storage	Miss Nurul Adnan

2.2 Task Leader (TL)

The responsibility of managing each task in a work package is attributed to the appointed to the Task Leader (TL). The task leader is required to manage, coordinate, and report the work done to the Work Package Leader (WPL).
The table below (Table 3) provides a breakdown of the task leader's responsibilities.

Table 3 Task Leader Responsibilities

Work Package		Task	Task Leader
Management			
WP1	T1.1	Overlooking the trial	Professor Di Chamberlain
	T1.2	Quality control	Supervision team
	T1.3	Meetings, reviews, communication	Miss Nurul Adnan
Trial Design			
WP2	T2.1	Methodology preparation	Miss Nurul Adnan
	T2.2	Reviewing trial drafts	Supervision team
	T2.3	Allocation of investigators to WPL	Supervision team
Trial Registration and Ethics			
WP3	T3.1	Applying and approval of Ethics	Miss Nurul Adnan, Associate Professor Gavin Beccaria
	T3.2	Registration to ANZCTR	Miss Nurul Adnan
Platform Creation and Management			

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WP4	T4.1	Develop pilot RCT Website (with dedicated email), pre-paid mobile phone	Miss Nurul Adnan
	T4.2	Website trial run and drafting	Supervision team
	T4.2	Managing Website throughout trial rollout	Miss Nurul Adnan
Administration			
WP5	T5.1	Recruitment	<Research Assistant>
	T5.2	Participant primary communication (include emails, text messages/calls, enquiries)	<Research Assistant>
	T5.3	Participant consent	<Research Assistant>
	T5.4	Gathering participant baseline	Miss Nurul Adnan
	T5.5	Randomisation and blinding	<Research Assistant>
Intervention Dissemination			
WP6	T6.1	Managing 1:1 consult	Associate Professor Gavin Beccaria
	T6.2	Managing debriefing intervention	Associate Professor Gavin Beccaria
	T6.3	Feedback survey	<Research Assistant>
	T6.4	Managing individual management plan	Miss Nurul Adnan
	T6.5	Multi-disciplinary case conference	All research team
	T6.6	Monitoring control and intervention groups, ensuring adherence and measures completed	<Research Assistant>
Data Collection, Management, Storage, and Reporting			
WP7	T7.1	Collect, manage, and store data	Miss Nurul Adnan
	T7.2	Data analysis and reporting	Miss Nurul Adnan

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2. Objectives

The aim of this research project is to evaluate the feasibility and acceptability of two different evidence-based models of individual-focused interventions that seek to impact burnout levels and promote engagement and wellbeing in critical care healthcare professionals.

Primary objectives are as follows:

1. Determine if participants can be recruited, enrolled, and retained
2. Determine if participants can adhere to all components of the intervention

Secondary objectives are as follows:

1. Examine the extent to which participants who receive the intervention have increased levels of wellbeing (and other positive measures) compared to those who do not receive the intervention
2. Examine the extent to which participants have decreased burnout, negative affect (other negative measures) compared to those who do not receive the intervention
3. Examine the extent to which participants who receive the intervention have improved resilience, emotional intelligence and decreased anxiety and depression compared to those who do not receive the intervention

3. Study Design

This is a mixed-method study that focuses on determining the feasibility and acceptability of two evidence-based models of individual-focused interventions. The main outcome of this study is directed to the feasibility of recruitment, measurement of tools (surveys), acceptability of the interventions of both groups, and participant adherence. The use of weekly journaling, debriefing field notes, and feedback experience survey will be used as qualitative data to gain insight into participant's experiences. Quantitative will include baseline, post-intervention, and at one-month and three-months follow up. Psychometric scales will be used to collect these data, which will include the following outcomes: resilience, likeliness of employee turnover, burnout, ability to practice skilfully and deliver high quality care, emotional intelligence, depression, anxiety, stress, post-traumatic stress scale, positive and negative affect, and quality of life.

4. Participants

Participants will be recruited through the Australian and New Zealand Critical Care Society (ANZICS) and Australian College of Critical Care Nurses (ACCCN). As this is a feasibility study, there will not be a formal sample size calculation. However, to reach the primary objectives, sample size calculation with 20% attrition rate was done to obtain an estimate of 106 participants (53 in each group) – rounding to the nearest tens (110 participants with 55 in each group). Participants enrolled into this study will be divided into one of two groups (intervention and control). The eligibility criteria are as follows:

a. Participants are more than 18 years of age
b. Currently practising within an Australian or New Zealand critical care setting as a registered health professional, Physicians, Nurses, Allied Health.
c. Have access to a personal computer or device with camera and microphone
d. Have access to an internet browser
e. Have access to a phone with an app store or google play.

The trial will include individuals that are currently undertaking prescribed treatments for mental health conditions. Unless they meet any of the following exclusion criteria, in which case they will not be eligible for participation:

a. Are under any type of work compensation claims

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b. Have contradictions to any of the interventions in both control and intervention groups
c. Are considered as 'high risk' of self-harm or psychological harm, determined at screening/eligibility phase, assessed using the impact of event scale-revised (IES-R)

Participants scoring 37 or more on the scale is termed as 'high risk' and will be excluded from the trial. They will then be on-referred to their workplace or personal psychologist. Scoring 37 or more is *high enough to suppress the immune system's functioning*.

5.1 Recruitment

Participants will be recruited via electronic flyers attached to an invitation distributed via the Australian and New Zealand Critical Care Society's (ANZICS) and the Australian College of Critical Care Nurses (ACCCN) distribution email lists and social media pages. The target audience for recruitment includes critical care healthcare professionals within the organisational membership, who are then able to forward onto their networks and people who may not be members. The flyers will include a link to the study's website that will include access to the 'registration and eligibility form' and 'full participant information sheet'. Other details about the trial such as trial information, timeline, and progress will be provided on the website. An experienced clinical psychologist will screen the 'participant's registration and eligibility form' to determine if participants are safe for participating in the study (not considered as 'high risk'). Participants that are considered 'high risk' will be on-referred and provided with appropriate acute management, whilst participants that meet the eligibility criteria will progress to the next stages of formal recruitment processes. A research assistant will monitor and contact potential participants by their provided phone or email, confirm their eligibility status, provide and explanation of the study (consistent with the participant information sheet) and answer any questions and gain written in-principal intent to participate (consent form). Individuals who are confirmed to meet the eligibility criteria and have submitted a completed consent form will then be randomised to one of two study groups (control or intervention). After randomisation, participants will be sent a set of online surveys that measures their baseline, which will need to be completed – this includes 'Demographic Information', 'Scale Surveys', and 'Journal' entry.

5.2 Informed Consent

Consent will be sought prior to baseline assessment. Participants that registered, met the inclusion criteria, and randomised will be contacted by the research team and asked to provide written consent. The appropriate consent form (i.e. control or intervention consent form) will be sent to the participant's email, where they are expected to reply with a signed consent form before the last day of recruitment. All potential participants have the autonomy to withdraw from the study at any point in time with no consequences or questions.

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5. Ethics and Trial registration

Researchers will seek to attain study ethics from the Flinders University (4703) and University of Southern Queensland Human Research Ethics Committee. Researchers have also registered this study into the ANZCTR Trial Registry (ACTRN12622000749707p) prior to study commencement. Timeline of ethics and trial application and registration can be seen in Appendix 1.

6. Intervention

This study will include two intervention arms, denoted as the intervention group and control group. Interventions in both arms are individual-focused (as opposed to organisational) and supported by evidence-based models developed using a refined program theory that can be found in the recent realist expert opinion paper (under publication review). The evidence-based models aim to test the feasibility and acceptability of two highlighted components of the program theory. The relationship between each data collection process (i.e. debrief session field notes, journaling) and study aims and objectives are reflected in Table 4.

Table 4 Data collection process and aims and objectives

	Data collection process	Purpose	Attends to objectives:
1	Demographics	Greater understanding of the participant's occupation, lifestyle, and possible correlation with feasibility and acceptability	**Primary** – i.e. age, gender, profession
2	Impact of Event Scale-Revised	To determine participant's risk level prior to inclusion into the trial	**Inclusion and exclusion criteria**
3	Scale surveys	Provides understanding of preliminary efficacy of the intervention	**Secondary** – attends to secondary measures such as resilience, emotional intelligence and decreased anxiety and depression
4	Journaling	Qualitative understanding of how participants and coping and how they feel in terms of their level of burnout.	**Secondary** – coping and burnout
5	Debrief field notes and voice recording	Having two reviewers checking the field notes against the recording will ensure quality (assessment)	**Secondary** – contents discussed which may facilitate greater understanding of burnout experiences and potential correlation
6	Feedback experience survey	How participants feel about the interventions	**Primary/Secondary** – insight into feasibility and acceptability
7	Audit of study records	Audit of study screening, enrolment logs, attendance list	**Primary** – i.e. sessions attended, recruited, adherence

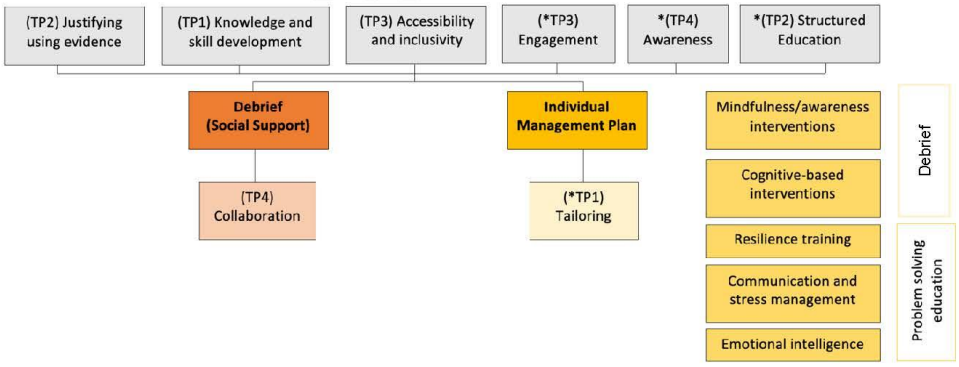
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8	Consult case notes	Evidence for clinical psychologist students' placement requirements	**Not Applicable**
9	Case conference	Field notes taken to keep record on how triage decision was processed	**Not Applicable**

6.1 Debrief and Consult (Intervention group)

To facilitate tailoring of interventions (described in the program theory), investigators created an Individualised Management Plan (IMP). The IMP is a three-step process where participants are expected to attend a (Step 1) one-to-one consult with a CPS (overlooked by an experienced clinical psychologist), followed by (Step 2) a case-conference of data and allocation of interventions, and (Step 3) intervention rollout. Tailoring of interventions was the second key component in the refined program theory due to its ability to cater to the individual experience – addressing contextual factors and mechanisms. For example, understanding the unique characteristics and experiences of the individual may allow investigators to address their individual's needs, resources, preferences, and goals – ultimately giving meaning to the intervention, increasing personal relevance, and prioritizing the user's control and involvement. Figure 2 demonstrates the IMP and its affiliation with the program theory/theory preposition components, where the grey boxes denotes same components with the control (Debrief). Concurrent to the IMP, participants are also expected to attend weekly debrief sessions as described previously in section 4.1.1.

Figure 2. Arms and its program theory components



TP = *Theory Preposition*
* = *unrefined theory preposition/program theory (located in the umbrella review), which were also discovered in the refined version. Instead of labelling as 'TP5', we noted this as "Other established theory prepositions" in the paper. By labelling as '*', it enables easy tracking of where the theory prepositions were discovered.*
Note: The current theory prepositions/program theory used in this paper is the refined program theory/theory prepositions in the expert opinion paper.

6.2 Why is debriefing (social support) listed as its own intervention?

As seen in the above program theory components in Figure 2, there are a total of four theory prepositions. All theory prepositions align with the interventions (meaning that they are assumed to achieve the components in grey. However, there are two prepositions that do not align with each intervention, and that is, TP4 Collaboration and *TP1 Tailoring. Collaboration cannot be in integrated in the individual management plan. This is because if for example, debrief was added as a potential intervention (highlighted in light yellow), collaboration cannot be added as part of the individual management plan's TP (highlighted grey boxes). Collaboration does not correlate with any of the interventions (highlighted in light yellow), as it only correlated with debriefing. For instance, headspace and problem-solving education does not promote collaboration. Thus, for this reason, we are required to separate debriefing as its own intervention with its own unique TP of collaboration. For this reason, we are also unable to add the TP tailoring as part of debrief TP. When we tailor the intervention, we aim to provide potential participants with an intervention that best suits their needs, either through headspace or problem-solving education.

As seen in Figure 2, Tailoring is part of the unrefined program theory, meaning that it was identified in the initial and refined program theory. The TP of collaboration was determined in the refined program theory. By having an intervention group (debrief and IMP) and control group (debrief only), we can determine if collaboration on its own would be effective or if the integration of an individual management plan would produce better outcomes.

6.3 IMP setting

In **step 1**, the research assistant will contact participants and arrange the best available time for a one-to-one consult (Table 5 is an example of the schedule). The consult (consult questions Appendix 2) will be conducted once-off via the online platform Zoom Video Communications, Inc. 2022. The Clinical Psychology Student (CPS) overlooked by an experienced clinical psychologist will provide some immediate and simple management strategies (i.e. recommendations for positive sleeping habits, stress management techniques) within the session as usual practice and record in the participant's case files. The one-to-one consults will not be recorded, and no field notes will be taken. This will allow participants to feel comfortable and minimise any biases or factors that may influence the participant's consult answers. In the following **step 2,** CPS will present this at a multi-disciplinary case conference about each individual participant's case files alongside the participants baseline outcome assessments and journal entry. The multi-disciplinary case team will consist of an experienced clinical psychologist, CPS, nurses and a physiotherapist. The case conference will be held between 15-20 minutes per participant's case. An Individual Management Plan (IMP) will then be determined with recommendations suited to the individual's needs. The recommendation plan will be performed using the multi-disciplinary's normal scope of practice to prescribe interventions such as examples of one or a combination of headspace and problem-solving education. As the participant will have already received an initial consult with

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a psychologist, the research team provide participants with a written detail of the plan (written in the prescribed template) via email. The multi-disciplinary case conference will not be recorded, however, field notes will be taken. There will not be any analysis done to these field notes. Rather, these data will be used to record down the thinking and triaging process of the case conference.

Step 3 demonstrates the rollout of the Individual Management Plan. The IMP is designed by the PERMA+ model, where developing components of PERMA (Positive emotion, engagement, positive relationships, meaning, and accomplishments/achievements) are achieved through interventions from the triage referral process. The headspace app comprises of the '+' aspect of PERMA+, which includes consideration of physical activity, nutrition, and sleep. All interventions were designed to meet the theory preposition of *structured education* as per the program theory. Templates of the consult questions and written IMP is provided in the appendix of this document (Appendix 4 and Appendix 5 accordingly).

Table 5 One-to-one consult schedule

	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
<CPS 1>	10-10:30 am	2 pm-2:30pm		4-4:30 pm	4-4:30 pm
	10:30-11 am	2:30pm-3pm		4:30-5 pm	4:30-5 pm
	11-11:30 pm	3pm-3:30pm			5-5:30 pm
	11:30-12 pm	3:30pm-4pm			5:30-6 pm
<CPS 2>		10-10:30 am	2 pm-2:30pm	4-4:30 pm	4-4:30 pm
		10:30-11 am	2:30pm-3pm	4:30-5 pm	4:30-5 pm
		11-11:30 am	3pm-3:30pm	5-5:30 pm	
		11:30-12 am	3:30pm-4pm	5:30-6 pm	
<CPS 3>		4-4:30 pm	10-10:30 am	2 pm-2:30pm	4-4:30 pm
		4:30-5 pm	10:30-11 am	2:30pm-3pm	4:30-5 pm
		5-5:30 pm	11-11:30 am	3pm-3:30pm	
		5:30-6 pm	11:30-12 am	3:30pm-4pm	
<CPS 4>	4-4:30 pm		4-4:30 pm	10-10:30 am	2 pm-2:30pm
	4:30-5 pm		4:30-5 pm	10:30-11 am	2:30pm-3pm
	5-5:30 pm			11-11:30 am	3pm-3:30pm
	5:30-6 pm			11:30-12 am	3:30pm-4pm

CPS=Clinical Psychologist Student. Table depicts schedule for 55 participants, which can be adjusted accordingly.

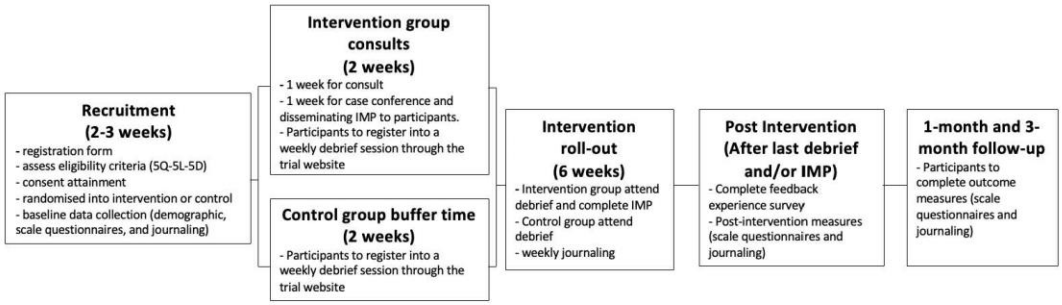
6.4 Consult and where it 'fits' in the Program Theory

Cognitive based therapy, resilience training, communication and stress management skills, and emotional intelligence intervention were identified in the program theory as possible interventions to improve wellbeing amongst critical care healthcare professionals. These interventions were chosen as it was highlighted as key interventions that are likely to be compatible for critical care healthcare professionals. There are other interventions that can be considered such as, supervised or individually prescribed physical activity programs (including aerobic

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and/or resistance training), muscle relaxation, gratitude, and art interventions, however, this trial will not include these interventions. The section listed as *interventions to consider* were based on the population of general and critical care healthcare professionals. Further explanation can be read in the umbrella review and expert opinion papers. This pilot trial aims to determine the effects of the four proposed interventions, as these interventions were uniquely proposed for critical care healthcare professionals. Instead of having five different interventions, researchers were able to devise two interventions (headspace and problem-solving education) that summarised the five interventions. Further details about the interventions is located below. A flowchart of the pilot Randomized Control Trial design is located in Figure 3.

Figure 3 – Pilot Randomised Control Trial Flowchart



6.4.1.1 Problem-solving education

Problem-solving education will be conducted by clinical psychologist students to educate participants about problem-solving techniques that can be implemented within their daily life and practices. These group sessions will run weekly for 6-weeks via an online platform (approximately 60 minutes per session). The problem-solving education was designed based on the six-stage model (social problem-solving model) proposed by D'zurilla and Goldfried. The layout of the education was adapted by a previously published experimental design '*Effects of problem-solving skill training on emotional intelligence of nursing students*' by Shahbazi et al. 2018. The sessions will be planned as follows in Table 6. The problem-solving education will be conducted by clinical psychologist students.

Session Number	Content
Week 1	General directions, ability to identify problems and accept it as a natural, potentially manageable phenomenon, belief in the efficacy of the problem-solving framework in dealing with the problem, high perceived self-efficacy in completing all the

	stages of the model, and forming the habit of pausing and thinking before taking action to solve a problem
Week 2	Defining and formulating the problem, collecting all available information, discriminating between facts and hypotheses requiring further research, analysing the problem, and determining real goals
Week 3	Developing alternative solutions, suggesting a variety of possible solutions, and selecting the most effective solution
Week 4	Decision-making and predicting the possible outcomes of each action and the benefits of each outcome
Week 5	Implementing the selected solution
Week 6	Revision and evaluation

Table 6. Problem-solving education content

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6.5 Debrief

The intervention and control group will be administered a group-based weekly social support debrief session. The aim of the debrief session is not to facilitate advance debriefing skills, rather, it aims to provide a source of informal semi-structured social support for participants.

6.6 Debrief Setting

The social support debrief sessions will be administered weekly to participants virtually via the online platform Zoom Communication (2022) to optimize attendance. A Clinical Psychologist Student (CPS) student will run the 60 minutes debrief session, which will be overlooked by an experienced Clinical Psychologist. The clinical nature of the CPS includes debriefing, and thus, this process of conducting debrief sessions will not require additional training. The link to the online platform will be sent to each participant's email calendar, where a research assistant will ensure to remind participants of the sessions at least one day prior to the session. The debrief session will be held as a group-based session with approximately 7-10 participants in each group. There will be a total of five session groups held across the week (i.e. one group on Monday, second group on Tuesday etc.). Further sessions can also be created to ensure all participants are included in the debrief sessions. The sessions are to be held early evening – after daytime work hours. It is understandable that participants may work different shifts, thus, creating the flexibility to move to different debrief groups throughout the week will facilitate (Theory Preposition 3) accessibility and inclusivity of the intervention. A make-up session will be available – by joining in other debrief groups. This will be organized by the research assistant (participants may contact the research assistant to reschedule their sessions), where an invite to the debrief group will be sent to the participant's calendar. A template with semi-structured questions can be found in Appendix 4. At the start of the debriefing session, the CPS will take attendance to ensure all

participants are present. If participants are not present, then the research assistant will be advised to contact the participant via email or phone to enable them to participate in a makeup available session. During each session, the CPS will ask a range of open-ended questions to participants and encourage interactions between participants. The list of open-ended questions will be constant throughout the weekly debriefing sessions (questions can be found in Supplementary File X). It is expected that in the first debrief session, the first ten to fifteen minutes will be used for introduction (CPS introduction and participant's self-introduction) to encourage engagement. Table 7 demonstrates debrief schedules.

Table 7 CPS debrief scheduled sessions

	Monday	Tuesday	Wednesday	Thursday	Friday
<CPS 1>	9-10am		4pm–5pm		
	10-11am		5pm-6pm		
<CPS 2>		9-10am		4pm–5pm	
		10-11am		5pm-6pm	
<CPS 3>			9-10am		4pm–5pm
			10-11am		5pm-6pm
<CPS 4>		4pm–5pm		9-10am	
		5pm-6pm		10-11am	

CPS=Clinical Psychologist Student. Table depicts schedule for 110 participants, which can be adjusted accordingly (need 16 debrief sessions).

Participants in the control and intervention groups will not be mixed to maintain blinding. Orange represents debrief timings for the intervention group and Yellow represents debrief timings for the control group. A researcher will take field notes of the debriefing sessions. Voice recording will be taken for the purpose of quality assessment (2 reviewers checking the field notes and its correlation with the debriefing sessions) and will be discarded appropriately after the process of quality assessment. At post-intervention, participants will be asked to complete a survey of their experience, which should take approximately 30 minutes to complete (alongside post-intervention survey). An understanding of how each question correlates to feasibility and acceptability of the intervention can be found in Table 8.

6.7 Debriefing models

The Agency for Healthcare Research and Quality (2021) resources was used to guide this semi-structured debrief question. There exists a multitude of debriefing frameworks, tools, and scripts to assist leaders with implementing debriefing. However, it is agreed upon that the foundations of debriefing stems from the components to be able to facilitate emotional release. Four debriefing methodologies were suggested by AHRQ including plus-delta, promoting excellence and reflective learning in simulation (PEARLS), 3D model, and 7-step after-action review. The 3D Model methodology demonstrated the closest correlation with this study was it suggests an open-ended question in comparison to the other methodologies. CPS will use the 3D model breakdown (Appendix 4).

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Table 8 Post-intervention feedbacks survey

Feasibility and acceptability	**Describe your experience in taking part in your allocated intervention.**
Understanding	Why did you agree to participate?
Process of change	What did you learn from this experience?
	Are there changes in your views of living with stress, burnout, or mental health disorders?
	What effort or involvement did it require of you? How did you feel about that?
	What components have helped you the most?
Acceptability	What was your favourite part of this experience?
	Would you recommend this experience to your family, friends and/or colleagues?
Implementing change	Will you be implementing what you've learnt? If so, what is it?
	In what ways do you think the program has impacted your health wellbeing so far?
	How confident do you feel about continuing to implement what you have learnt? Have these feelings changed along the way throughout the program?
Barriers	What was challenging in this experience?
Suggestions for further improvements	What was your least liked experience in this program and what and how do you it can be improved?
	Were there anything you think should have been included ion this program? What about the program structure and frequency of sessions/interactions, duration of the program?

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7. Outcome Measures

7.1 Primary Outcomes

The primary outcome in this study include the feasibility of recruitment, measure, and adherence to the intervention, and acceptability of the intervention.

Feasibility

Feasibility of recruitment

- Number of potential participants enrolled in the trial (measured using an audit of study screening and enrolment logs)
- Number of potential participants excluded from the trial (measured using an audit of study screening and enrolment logs)
- Retention rate (measured using enrolment logs and attendance list)

Feasibility of measurement tools

- A completion rate of psychometric scale questionnaire and journaling (measured usinga n audit of study records)

- Follow-up response rates (1-month and 3-months follow-ups) (measured using an audit of study records).

Acceptability

Acceptability of the intervention

- Barriers (collected using feedback questionnaires)
- Enablers (collected using feedback questionnaires)
- Recommendation to family, friends, and colleagues (collected using a feedback questionnaire (designed specifically for this study)

7.2 Secondary Outcomes

The secondary outcomes include the scale surveys (measured at baseline, post-intervention, 1-month, and 3-months). These outcomes are only meant to provide preliminary data on outcomes including resilience, likeliness of employee turnover, burnout, ability to practice skilfully and deliver high quality care, emotional intelligence, depression, anxiety, stress, post-traumatic stress scale, positive and negative affect, and quality of life. Secondary measures will also include qualitative measures including an online weekly journaling, where participants are to provide an open-ended answer to the question: 'I feel burned out', on why or why not they feel burned out and 'how are you coping?' (average completion time 8 minutes). Debriefing field notes collected at all debriefing sessions will be used to further understand contextual factors that influence stress and burnout amongst critical care healthcare professionals. Both of these qualitative data will be used to either confirm or further refine the program theory. Secondary outcomes will also include the feedback questionnaire (impact of the intervention), specifically on the questions 'What did participants benefit?' and 'Changes in participant's viewpoints'.

The following scale surveys should take approximately 60 minutes to complete.

7.2.1 Attrition Turnover Inventory

The TIS scale is used to determine turnover intentions.[4] It is a 6 item scale scored on a five point Likert scale, between poles of intensity from 1 being never to 5 being always.[4]

7.2.2 Maslach Burnout Inventory

The MBI scale is the gold standard in measuring burnout.[5] It comprises of three scales of emotional exhaustion (9 items), depersonalization (5 items) and personal accomplishment (8 items). It is a 22-item instrument.[5]

7.2.3 Practice Environment Scale

The Practice Environment Scale is an instrument, which measures the practice environment, defined as factors that enhance the ability to practice skilfully and deliver high quality care.[6]

7.2.4 Depression, Anxiety, and Stress Scale

DASS-21 is the shorter version of the DASS-42 scale.[7] It is a self-reporting scale that is designed to measure negative emotional states of stress, anxiety, and depression.[7] The three subscales contain 7 items as demonstrated below:

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- Depression: dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia, and inertia. (items 3,5,10,13,16,17,21)
- Anxiety: autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experiences of anxious affect. (items 2,4,7,9,15,19,20)
- Stress: levels of chronic nonspecific arousal, difficulty relaxaing, nervous arousal, and being easily upset/irritable, agitated/over-reactive and impatient (items1,6,8,11,12,14,18)

Scoring can be presented as total scores and scores for three subscales.[7] The subscales are further divided into five severity ranges including normal, mild, moderate, severe, and extremely severe.[7]

7.2.5 Impact of Event Scale- Revised (IES-R)

The IES-R is a 22-item self- reported measure. It assesses the individual's subjective distress caused by a traumatic event. The revised version contains an additional seven items that relates to hyperarousal symptoms of post-traumatic stress disorder. Items are rated in a 5-point likert scale from "0" being not at all and "4" being extremely. This scale will also be used in the screening phase to screen for 'high risk' participants (scoring 37 or more on the scale), where it is termed as *high enough to supress your immune system's functioning*.

7.2.6 Positive and Negative Affect Schedule

The PANAS scale measures positive and negative affect using 20-items; 10 negative affect markers, and 10 positive affect markers.[8] The positive affect subscale describes the participant's excited, interested, strong, enthusiastic, proud, alert, inspired, determined, attentive, and active.[8] The negative affect scale describes stress, being upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery, and afraid.[8] The items are rated on a scale from 1 being 'very slightly or not at all', to 5 being 'extremely'.[8]

8. Blinding

Participants will be randomly allocated into control and intervention group in a 1:1 ratio at the pre-baseline phase. Block randomisation will be done by a computer-generated random number list prepared by an investigator with no clinical involvement in the trial. After the research assistant obtain participant's consent, the investigator (with no clinical involvement) will be contacted – independent of the recruitment process for allocation consignment. Although participants allocated to the intervention group were aware of the allocated arm, outcome assessors and data analysts were kept blinded to the allocation – by assigning a number system to each participant to ensure blinding.

9. Planned analysis

Since this study primarily seeks to determine the feasibility and acceptability of two-evidence based models of individual-focused interventions, the analysis will focus on key parameters required to conduct a future larger trial. Majority of the analysis will be reported descriptively. Feasibility will be determined by assessing the measurement tools (completeness of questionnaires, missing items, follow-up) and recruitment process (number of participants referred, attended the one-to-one consult). Acceptability will be analysed by determining the prospective acceptability

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(participant's perception of the intervention prior to recruitment), intervention adherence and coherence (understanding of the program and measures on their understanding of how it works and their engagement with the program), and participant experiences (process of change, acceptability, implementing change, barriers, and improvements). Further exploration on acceptability of the program will be investigated using feedback surveys at post-intervention.
Field note data collected in the semi-structured interviews will be analysed using thematic analysis. The interviews will be transcribed verbatims into a word document to enable the researcher to identify recurring themes and sub-themes. Thematic analysis will be conducted first manually utilising Braun and Clarke's (2019) [9] six-step process and with NVIVO 10 software [10] which includes: Step 1: Become familiar with the data; Step 2: Generate initial codes; Step 3: Search for themes; Step 4: Review themes; Step 5: Define themes and Step 6: Write up. Two researchers will validate the analysis, and any disagreements will be resolved using a third researcher. Furthermore, it facilitates an essentialist method that enables reporting of meanings, experiences, and the participant's reality – which fits well with the aims and objectives of this study (determining feasibility and acceptability). The same thematic analysis process will be adopted for field note data collected from the debriefing sessions. Qualitative data analysis will further extend to analysis of the weekly journals. Data will be reported descriptively.

10. Quantitative evaluation

Quantitative data will include the collection of outcomes such as resilience, burnout, wellbeing, turnover, practice environment, emotional intelligence, depression, anxiety, and stress, positive and negative affect, and quality of life. Descriptive statistics (mean, standard deviation) will be used to report on the above outcomes, which will provide deeper insight into the characteristics of the population and indications of potential changes denoted as mean score differences between the four timepoints (baseline, post-intervention, 1-month, and 3-months follow-up). In-subject effects will also be reported and presented in a tabular format (F, df, t-test, effect size, CI, and p-values).

11. Expected Outcomes

In this study, researchers aim to determine the feasibility of recruiting critical care healthcare professionals to attend one of two evidence-based models of individual-focused interventions. Expected outcomes will include determining the recruitment and retention rates, testing procedures in the program, and exploring the acceptability of the program. Researchers will also investigate potential changes in resilience, burnout, wellbeing, turnover, practice environment, emotional intelligence, depression, anxiety, and stress, positive and negative affect, and quality of life. This study was guided by the Medical Research Council (MRC) to enable the development of complex interventions.
In this pilot Randomised Control Trial, we do not expect to test for the effectiveness of the two modelled programs. Rather, it will measure whether it is feasible and acceptable to Australian and New Zealand critical care healthcare professionals that may or may not experience stress, burnout, and/or low wellbeing. The qualitative data will provide us with understanding on the experiences in taking part in the intervention, whereas the quantitative data will provide initial insight on its potential benefits. Furthermore, this process will demonstrate the barriers to taking part and

reasons for discontinuation, which can be improved on for the larger randomised control trial.

12. Data Storage

Data will be stored and used for at least 5 years from the date of publication. It will be stored as an electronic copy at Flinders University. Other researchers than those listed in this research team will have access to the data. This is because this pilot study will inform a larger trial. Access is required as investigators plan to include other researchers into the larger trial to ensure quality and comprehensiveness. The raw data will be individually identifiable and will be stored on an R-Driven (Flinders University managed on-site Enterprise Storage) secured by Flinders University. Identifiable information will not be publicly released, and other individuals will not be able to identify participants in the published research outcomes. Data access will also be granted to the University of Southern Queensland (Gavin) to access case notes for students involved in this trial. A data sharing agreement will be organised.

13. Adverse Events

A clinical psychologist will assess baseline results for safety of participants. If the trial clinical psychologist identifies, or if the participant voices any psychological, emotional, or physical risks to themselves at any point during the study (including during debrief sessions or consult sessions), the clinical psychologist will organise a time to meet with the participant individually (organised by the research team), where the clinical psychologist will provide psychological support and make a referral to the participant's workplace or personal psychologist or Beyond Blue Ltd or a psychiatrist or emergency mental health services within 12 hours and followed up daily until the participant is receiving appropriate care. The participant will then be automatically withdrawn from the trial and will be reported as an adverse event. At the initial registration, if the clinical psychologist identifies that a potential participant is 'high risk', researchers will exclude the participant and follow the required adverse event processes. Appendix 7 demonstrates a flowchart that can be followed during an adverse event.

14. Dissemination

Knowledge gained from this study will be shared with critical care healthcare professionals and relevant organizations through publication of manuscripts and conference presentations. Within the bigger picture, it aims to engage knowledge translation specialists to create and facilitate the implementation of the intervention in aim to improve wellbeing and decreased burnout within the global critical care workforce.

15. Website development

A website will be developed to enable ease in accessing information about the trial, registration, completing surveys, and asking questions. Researchers aim to develop the website before recruitment. Contact details will also be provided. The research team will have an allocated trial phone to enable ease in receiving and answering queries and questions. Website address (www.wellbeingandburnout.com).

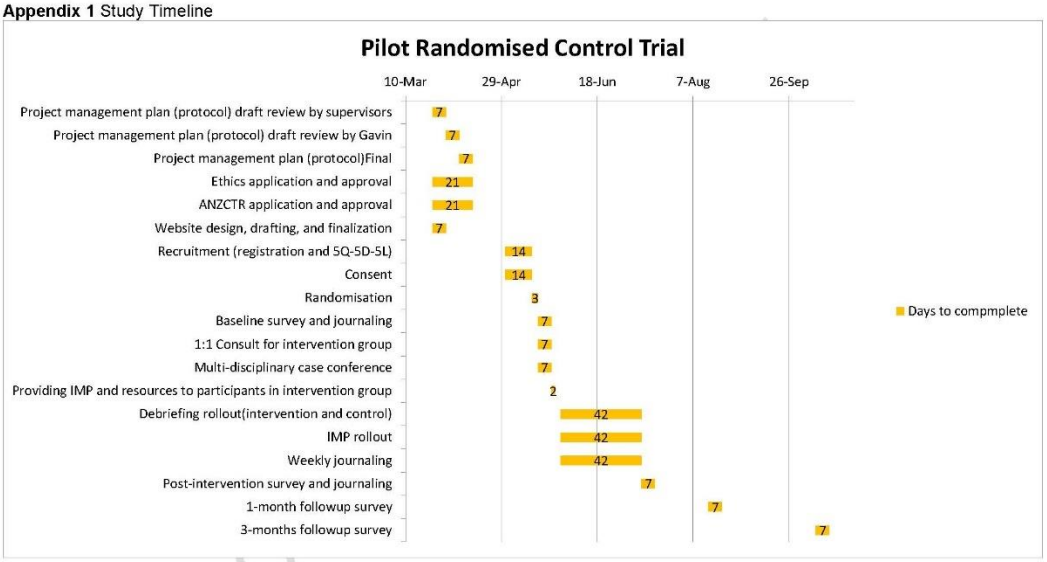
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16. Budget

Budget considerations can be found in Appendix 8.

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Appendix 1 Study Timeline



Appendix 2 Consult Questions

	Guiding questions	CPS Notes
	Lifestyle Behaviours	
1	How has the quality of your **sleep** been? Please expand.	
2	How has your **diet** been – do you normally cook at home? Would you consider your meals to be healthy?	
3	Are you **physically active**? Expand on questions about physical activity.	
	Mental Health Assessment	
4	It is easy for me to concentrate on what I am doing	
5	I am preoccupied by the future	
6	I can tolerate emotional pain	
7	I can accept things I cannot change	
8	I can usually describe how I feel at the moment in considerable detail	
9	I am easily distracted.	
10	I am preoccupied by the past	
11	Its easy for me to keep track of my thoughts and feelings	
12	I try to notice my thoughts without judging them	
13	I am able to accept the thoughts and feelings I have	
14	I am able to focus on the present moment	
15	I am able to pay close attention to one thing for a long period of time.	

CPS = Clinical Psychologist Student

NOTE: The mental health assessment is guided by the Cognitive and Affective Mindfulness Scale-Revised (measured 1=rarely/not at all, 2=sometimes, 3=often, 4=almost always). The CAMS-R scale measures mindfulness (domainsof attention, present-focus, awareness, acceptance/non-judgement).

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Appendix 4 Semi-Structured Debrief Question

		Script
Prebriefing	Purpose: To explicitly state how the learners should participate in the debriefing and how you as the instructor will participate. **Points to Include:** > Clarify your role as instructor > Detail your expectations for learner participation > Explain the format the debriefing will follow > Tell the learners how long the session will last.	"My role as an instructor is not to evaluate your performance, but to help facilitate a discussion and prompt self-reflection. I expect you to do most of the talking, raise questions about what was going on, identify issues, and volunteer your perspectives. The format of the discussion is as follows: we are going to debrief in three parts. First, we will have an opportunity to talk about our emotions and the impact of the simulation. Next, we will clarify the clinical details of the scenario. During the second part, you will analyse your own performance and evaluate how well the management of those situations worked. Our goal during this phase is to discover your mental model that guided your behaviour and then talk about that mental model utilizing all the experience in the room. We will then connect new learning to future clinical situations. Finally we will summarize key learning points."
Defusing	Purpose: To allow learner to "vent" emotions. To recap and clarify what happened during the scenario. To conduct a needs analysis of objectives important to the learner. **Points to Include:** > Elicit reactions and emotions > Describe what happened	Does anyone want to talk about how they feel or if they've encountered any stressful scenarios within the week? "How did it feel to be part of that scenario?" "Thank you for bringing that up.... Let's hold that thought and come back to it during the second part of the debriefing . . . . ." "Let's recap WHAT happened during that scenario so that we can then discuss WHY during the second part of the debriefing."
Discovering	Purpose: To analyse and evaluate performance through reflection. To discover mental models or rationale for specific behaviours through Inquiry. To identify gaps/matches between existing and targeted mental models. **Points to Include:** > Identify an observed behaviour or outcome > Ask a question to discover the mental model guiding that action > Cue Individual to make/identify analogy/ connection to Target Mental Model	"Person A, I noticed that you did x in y situation. I was curious about that action because... (instructor offers his own mental model about how to deal with y). Can you tell me why you did x?" "Thanks for sharing the rationale. Has anyone else every experienced this? What did you do to deal with that situation and why?" "Person A, how might this situation have been different if you had used that strategy". Or "Another way to handle x is z (target mental model). If you had done z, how would that change y?"
Deepening	Purpose: To apply lessons from simulation and make connections to clinical practice. **Points to Include:** > Prompt learner to connect new learning to larger clinical environment	"If you were to encounter a similar situation in the future, how would you handle it?" "How can you use the information we just discussed in your clinical practice?" "Can you think of other situations where this information could be applied?"
Summary	Purpose: To review what was learned throughout the session **Points to Include**: > Highlight the key objectives and lessons learned	"Today we learned the following: . . . . ." "Let's end with this... What is one thing that you can take away from this session to use in your practice?"

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Appendix 5 Individual Management Plan Template

Individual Management Plan

Participant ID: _____

You have been triaged into the following interventions alongside weekly debriefing sessions:

- ☐ Headspace
- ☐ Problem-solving education

If you are allocated headspace, instructions on how to access, register, and use the application will be sent to you. If you were allocated any of the resources (sleep, diet, and/or exercise), you are expected to book into the problem-solving education group program via the study's website (www.wellbeingandburnout.com).

If you are allocated into headspace, the research team suggests that you undertake the following sessions: _____

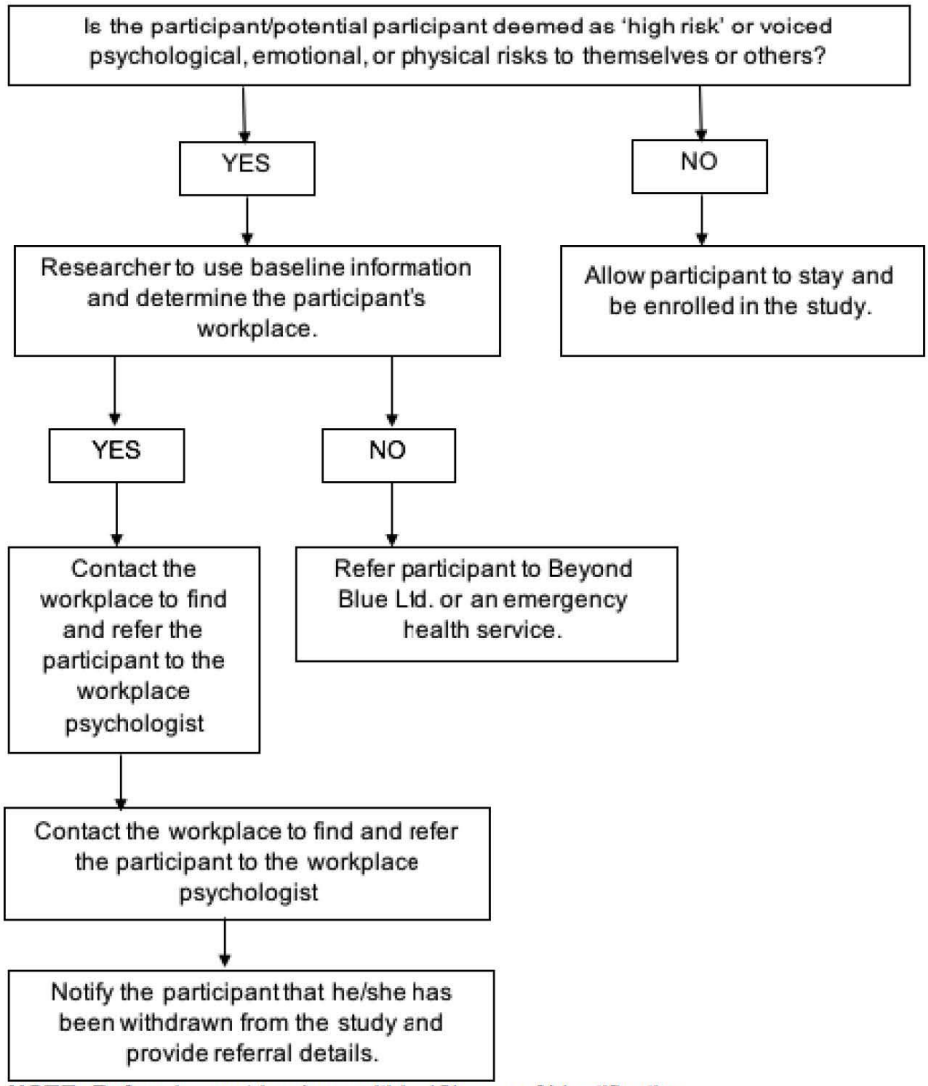
CONFIDENTIAL DRAFT

Appendix 8 Budget

Expense item	Cost
Research Assistant HEO Level 5 plus oncosts	$45.96 hour plus 25% (11.49) oncosts
	$57.45 hour x 7.35 $422.25 day (~1 day a week x 12 weeks $5067.00
Scale permissions	
Burnout scale x 50	$125.00
Website + Marketing basic renewal	$119.39
Website upgrade to premium (to use facilities of website – i.e. booking for consult/debrief session)	$168.98
Website set-up domain	$19.95
Calendly Subscription ($30USD) $49.26 AUD	$49.26
Mobile phone dedicated prepaid	$79
Gift cards for Psych Student 7 x $100	$700
Participant feedback interview $30	$900
Zoom Video Communications Oct 2022 – Jan 2023	$92.36
TOTAL	$7,320.94

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Appendix 6 Adverse Event Flowchart



NOTE: Referrals must be done within 12hours of identification.

Appendix 17 An authoethnography on intervention development

Developing the intervention

Starting off on the wrong foot

Developing the intervention for my PhD was undeniably one of the most challenging aspects of my research journey. At times, I felt overwhelmed and uncertain about the direction I was taking. Together with the research team and stakeholders, we engaged in numerous meetings to conceptualize the intervention, basing it on the initial program theory.

In my first proposal dated 29th April 2021, I proposed a comprehensive Cognitive Behavioural Therapy (CBT) education/workshop that aimed to integrate various elements, including debriefing, stress management skills, cognitive coping strategies, emotional intelligence, emotion regulation training, and problem-solving methods. It seemed like a promising idea at the time, as I tried to incorporate all the micro-components of the program theory derived from the umbrella review, which were believed to be effective for critical care healthcare professionals. However, as I delved deeper, it became apparent that this ambitious approach was neither feasible nor practical, as I failed to account for contextual factors and mechanisms that could influence its implementation and acceptability. In retrospect, I realized that expecting participants to undertake an overwhelming array of interventions and courses in their already busy lives was impractical. Consequently, I returned to the drawing board and embarked on a rigorous process of refining the intervention through additional meetings and discussions.

On 28th July 2021, I presented a revised intervention, the Co-designed And Complex Tailored Individual (CACTI) trial. This iteration involved virtual debrief sessions complemented by a tailored individual-level intervention that included options such as vitamin D, melatonin, herbal medications, mindfulness-based intervention (MBI), cognitive-based therapy (CBT), physical exercise, and healthy eating. To make the trial more comprehensive, we planned to collaborate with a clinical psychologist for the MBI and CBT, a physiotherapist for guidance on physical exercise, and a dietitian for advice on healthy eating. While this approach appeared promising to the research team and stakeholders, we recognized the critical importance of feasibility. To assess the intervention from the participants' perspective, I put myself in their shoes and pondered whether the study was worthwhile, given the multitude of components required. *See Table below to understand the different components involved in this CACTI trial.*

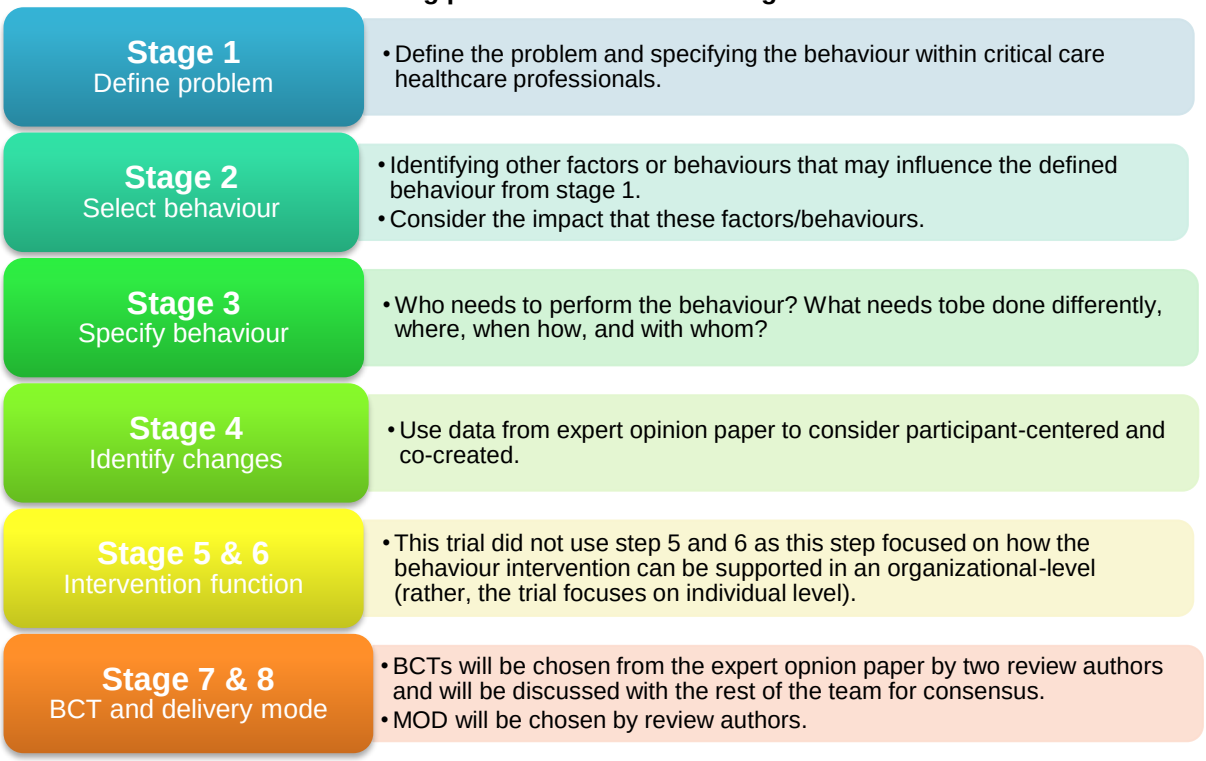
An overview of CACTI trial intervention

Intervention	Frequency	Administration
Vitamin D	Daily (morning)	Orally 3 times per week
Melatonin	Daily (30-60min before bedtime) (550)	Orally
Herbal	Daily	Orally
Mindfulness based intervention	Once per week	Virtual (Zoom)
Cognitive based therapy	Once per week	Virtual (Zoom)
Physical exercise	Daily	Self
Healthy eating	Daily	Self

In addition to its complexity, the CACTI trial also incorporated a behaviour change component, as depicted in Figure 37. As a researcher, I grappled with the realization that this trial might be overly intricate, and it became evident that a different approach was necessary to streamline the intervention. Our aim was to find a way to bring together all the components of the program theory into one simple and accessible intervention that would not burden critical care healthcare professionals with additional personal and work commitments.

At this juncture, I sensed there was more to explore and refine in the intervention. Both the research team and key stakeholders concurred with this assessment, and it was time for another attempt to redesign and enhance the intervention. As time flew by, the beginning of 2021 was upon us, and I found myself still grappling with the design of the intervention.

Modelling phase of behaviour change wheel



Abbreviations: MOD=Mode of delivery, BCT=Behaviour Change Techniques,

A turning point came when I participated in the Academic Internship Program for Doctoral Students in 2022, where I had the opportunity to collaborate with a PhD colleague on a co-design project for her own research. Her project involved an app designed to assist older individuals with back pain, which also allowed them to inform their GP about their symptoms and signs. This collaboration offered valuable insights into the importance of developing an intervention that was easy to access, time-efficient, and all-encompassing through a web-based platform. Around the same time, I came across a publication describing a randomized controlled trial that included a Project Management Plan (PMP), which essentially served as a manual for their intervention. This discovery marked a significant turning point in my journey, pointing me in the right direction for the progression of the intervention.

The beginning of a new chapter

The feeling of being deeply immersed in my work during the peak of my PhD journey was truly exhilarating. It felt like the start of a new chapter, a solution to the challenges I had been grappling with, and a realization of what I could achieve. To begin, I decided to replicate the Project Management Plan (PMP) template, starting with the easier aspects. This included

outlining the team members involved, defining the objectives, identifying participants, and determining the outcome measures. In collaboration with the research team and key stakeholders, we decided to retain the data collection and follow-up measures from the previous intervention design, as they were deemed suitable for this trial. This allowed me to compile a comprehensive list of feasibility and acceptability measures, as well as the psychometric questionnaire that would be utilized. Drawing from the earlier intervention design, which involved virtual sessions followed by tailored individual-level interventions, I crafted a plan for a virtual, one-to-one consult with a psychologist. In this consult, the psychologist would provide immediate and simple management strategies as part of their usual practice and include a recommendation plan in their session report. Subsequently, a case conference within a multidisciplinary team would be conducted to determine the most appropriate type of intervention for each participant. Depending on the outcome of the case conference, participants would be referred either to existing services or to the MoodGym app. The concept of a web-based intervention that I had been pondering about earlier resurfaced. I embarked on a search for web-based interventions effective for addressing burnout and enhancing well-being in critical care healthcare professionals. Among various options, the MoodGym app stood out for its CBT-based approach, which was graded A and highly recommended. MoodGym offered different app-based sessions delivered over six weeks, incorporating elements of behavioural activation, relaxation techniques, problem-solving, cognitive restructuring, and understanding the relationship between thoughts and feelings. Additionally, the team aimed to address other critical aspects, such as sleep, nutrition, and exercise. These components were included as resource handouts provided to participants during the consult sessions. The culmination of my efforts led to the integration of nearly all aspects of the program theory into a user-friendly, efficient, and time-saving app. It was a moment of pride and excitement to witness the transformation of complex ideas into a simple and accessible platform.

The finale

The development of the trial manual for the pilot Randomized Controlled Trial (RCT) was a process that involved extensive collaboration and careful considerations from both the research team and stakeholders. However, this journey was not without its challenges and uncertainties. One significant aspect that underwent multiple changes was the selection of the app to be used in the intervention. Initially, we explored the use of mindfulness apps such as Headspace and Calm as potential components of the trial. However, as we delved deeper into the literature and engaged in discussions with critical care healthcare professionals, we came to a realization regarding the importance of problem-solving. Despite the inherent resilience

of these professionals, we recognized the existence of gaps in their ability to effectively problem-solve during times of burnout. The insights gained from the literature and feedback led to iterative revisions of the trial manual, as we sought to refine and improve the intervention. We gradually moved away from the app-based approach, as it did not provide the desired individualization necessary for addressing burnout effectively.

Instead, we decided to integrate problem-solving education into the debrief sessions, a crucial step in streamlining the trial and minimizing unnecessary components. By incorporating problem-solving into the virtual debrief sessions, we aimed to create a more comprehensive and tailored experience for each participant. This approach not only aligned with the program theory but also attended to the contextual factors and mechanisms essential for the program's success. Conducting the debrief sessions virtually proved to be a practical and flexible solution, accommodating the busy schedules of participants, and fostering greater engagement. Through this process of refining the trial manual, we solidified an approach that encompassed all aspects of the program theory while addressing the specific needs of critical care healthcare professionals.

Appendix 18 Pilot RCT publication

PLOS ONE

STUDY PROTOCOL

Is this the solution to wellbeing and burnout management for the critical care workforce? A parallel, interventional, feasibility and realist informed pilot randomized control trial protocol

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OPEN ACCESS

Citation: Adnan NBB, Dafny HA, Baldwin C, Beccaria G, Chamberlain D (2023) Is this the solution to wellbeing and burnout management for the critical care workforce? A parallel, interventional, feasibility and realist informed pilot randomized control trial protocol. PLoS ONE 18(4): e0285038. https://doi.org/10.1371/journal.pone.0285038

Editor: Ali B. Mahmoud, St John's University, UNITED STATES

Received: November 30, 2022

Accepted: April 5, 2023

Published: April 27, 2023

Peer Review History: PLOS recognizes the benefits of transparency in the peer review process; therefore, we enable the publication of all of the content of peer review and author responses alongside final, published articles. The editorial history of this article is available here: https://doi.org/10.1371/journal.pone.0285038

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Data Availability Statement: No datasets were generated or analysed during the current study. All

Abstract

Critical care healthcare professionals are at high risk in developing burnout and mental health disorders including depression, anxiety, and post-traumatic stress disorder. High demands and the lack of resources lead to decreased job performance and organizational commitment, low work engagement, and increases emotional exhaustion and feelings of loneliness. Peer support and problem-solving approaches demonstrate promising evidence as it targets workplace loneliness, emotional exhaustion, promotes work engagement, and supports adaptive coping behaviors. Tailoring of interventions have also shown to be effective in influencing attitudes and behavior changes, attending to the individual experience and specific needs of end-users. The purpose of this study is to assess the feasibility and user-perceived acceptability of a combined intervention (Individualized Management Plan (IMP) and Professional Problem-Solving Peer (PPSP) debrief) in critical care healthcare professionals. This protocol was registered in the Australian and New Zealand Clinical Trials Registry (ACTRN12622000749707p). A two-arm randomized controlled trial, with pre-post-follow-up repeated measures intergroup design with 1:1 allocation ratio to either 1) treatment group–IMP and PPSP debrief, or 2) active control group–informal peer debrief. The primary outcomes will be conducted by assessing the recruitment process enrolment, intervention delivery, data collection, completion of assessment measures, user engagement and satisfaction. The secondary outcomes will explore preliminary effectiveness of the intervention using self-reported questionnaire instruments from baseline to 3-months. This study will provide the interventions' feasibility and acceptability data for critical care healthcare professionals and will be used to inform a future, large-scale trial testing efficacy.

relevant data from this study will be made available upon study completion.

Funding: The author(s) received no specific funding for this work.

Competing interests: The authors have declared that no competing interests exist.

Introduction

Wellbeing is a combined definition of feeling good and functioning well [1]. It can be conceptualized as a spectrum with high wellbeing, flourishing, and happiness at one end, and low wellbeing, increased anxiety, and depression at the other end [2]. High wellbeing portrays the experience of positive emotions and having a sense of purpose and control [1]. It is a sustainable condition that enables individuals to develop within their environment and thrive [3]. Individuals with high wellbeing in the workplace demonstrate optimal workplace engagement, productivity, and performance [3, 4]. Work engagement is characterized by dedication, vigor, and absorption [5, 6]. It is an indicator of intrinsic motivation and general autonomy within the workplace [6]. Unlike intrinsic motivation that focuses on one job task, work engagement reflects on a more pervasive and persistent affective-cognitive state [6]. Engaged workers will feel enthusiastic, energized, and will want to genuinely work [5, 6]. These workers facilitate positive organizational outcomes as they transcend employment expectations [6].

Burnout and work engagement are negatively associated and influence mental and physical health [5, 7]. Burnout is a prolonged response caused by chronic exposure to interpersonal stressors within the workplace [8]. Maslach and Leiter (2016) defined burnout as a psychological syndrome consisting of three dimensions: exhaustion, feelings of cynicism, and having a sense of ineffectiveness [8]. Exhaustion was described as the loss of energy, wearing out, depletion, fatigue, and debilitation, whereas cynicism portrays irritability, withdrawal, inappropriate attitudes towards patients, and loss of idealism [8]. Inefficacy was depicted as low morale, reduced capability or productivity, and the inability to cope [8]. Burnout and work engagement are influenced by job characteristics, which can be conceptualized by the job demands and job resources model (Job Demands-Resources (JD-R) model) [7, 9]. Job demands are energy-depleting aspects of the job that requires emotional, physical, and cognitive efforts—for example, workload, role stress, and work pressure [5, 9]. When employees are exposed to high job demands, they become chronically exhausted and psychologically distances themselves from their work [9]. Available and adequate job resources may psychologically fulfil the needs of employees and buffer the effects of high job demands on burnout [5, 9]. Job resources aims to achieve work goals and encourage personal development and growth [5, 9]. The JD-R model also considers the use of personal resources to attend to job demands [9]. Personal resources refers to self-beliefs, for example, the development of self-efficacy, optimism, and resilience—as it motivates employees to achieve work-related goals, which improves their wellbeing and job performance [9].

Healthcare professionals encounter high workload, adversities, and stress on a daily basis, which makes them vulnerable to burnout [10]. While burnout is experienced by healthcare professionals in general, the critical care workforce has been identified to be at heightened risk [11]. This is because critical care healthcare professionals are exposed to difficult daily workloads, high patient trauma, mortality, tragedy, and encounter challenging ethical situations on a daily basis [12]. The coronavirus 2019 (COVID-19) global pandemic has added a greater magnitude of strain on the critical care workforce with higher patient acuity, mortality rates, and struggles for personal safety [13]. National leaders have raised concerns regarding the impact of COVID-19 on the workforce's wellbeing [13]. A systematic review of critical care healthcare professionals revealed 49.3% to 58% of the workforce experienced burnout and many suffer from mental health disorders [14]. Another cross-sectional study demonstrated 41% of intensive care workers had low wellbeing and 46% had peritraumatic distress [11]. Psychiatric morbidities including depression, anxiety, insomnia, post-traumatic stress disorder, suicidal ideation, and somatization were also significant [15–17].

Reports suggests elevated levels of loneliness during the pandemic for healthcare professionals [18]. Loneliness is prominent amongst healthcare professionals, where a combined prevalence across 101 countries was 21% during the COVID-19 pandemic in comparison to 6% before the pandemic [18]. It is a major health concern as it is a predictor of high emotional exhaustion of workplace burnout [19, 20]. Loneliness occurs when employees begin to lack meaningful social relationships regardless of the number of contacts [20]. It focuses on the quality of relationships and inconsistent expectations between desired and real social relations [20]. Loneliness and social isolation have drastic implications in the workplace, contributing to burnout and decreased job performance, creativity, organizational commitment, and work engagement [21, 22]. Work engagement is demonstrated as mediator between loneliness and organizational citizenship behaviors, which are relative to job satisfaction and employee well-being [21–23].

Critical care employees working in extremely difficult and high-risk conditions require urgent need for mental support [20]. Peer support is an important element and a significant work resource with positive effects on mental health [20]. It refers to the sharing of common experiences by individuals facing similar challenges and giving and receiving help based on knowledge from the shared experience [24]. Peer support can facilitate the development of decision-making, problem-solving, coping and stress management skills [25]. Supports from co-workers and friends have demonstrated reduction in emotional exhaustion, burnout experiences and loneliness [20, 26]. Maslach and Goldberg (1998) suggests that peer support groups may provide new insights, personal rewards, emotional comfort, and may contribute as a source for optimism, humor, and encouragement during difficult and stressful times [26, 27].

Problem-solving abilities significantly influences overall psychological wellbeing and social competence because the ability to resolve or cope with daily stressors is strongly affiliated to social and personal functioning [28, 29]. Problem-solving can be viewed as a self-directed cognitive-behavioral process, where individuals attempt to discover or identify adaptive or effective solutions to a problem encountered during their daily living [29]. Ineffective or maladaptive coping behavior leads to various personal and social consequences (i.e., anxiety, anger, psychological distress) [29]. Contrastingly, problem-solving skills can act as a buffering factor to attenuate the negative effects of stress [29].

Tailoring is a process of customizing to match the characteristics of individuals [30]. It is used to respect the differences amongst people, which influences attitudes and facilitates behavior change by attending to the specific needs of end-users [30, 31]. By understanding tailoring, and the aforementioned research and practice context for critical care healthcare professionals, our research team were prompted to conduct an umbrella review that sought individual interventions to improve wellbeing and decrease burnout for critical care healthcare professionals [32, 33]. This was followed by realist expert opinion paper by Adnan et al. (2022) that interviewed 21 critical care experts to describe (using theory prepositions) contextual factors and mechanisms required for an intervention to work for critical care healthcare professionals [32]. Tailoring was highlighted as an essential component in both the umbrella review and expert opinion methodologies, which enabled development and refinement of a program theory of individual-focused interventions for healthcare professionals in critical care settings [32, 33]. The authors then used the program theory to guide the design of the intervention in this study.

This study will combine the three concepts of peer support, problem-solving and tailoring to determine its effectiveness in improving wellbeing and engagement and decreasing burnout amongst critical care healthcare professionals. To the authors' knowledge, there are no similar studies with the proposed intervention within the critical care workforce. Thus, the primary aim of this study is to test the feasibility and user-perceived acceptability of a combined

Individual Management Plan (IMP) and Professional Problem-Solving Peer (PPSP) debrief in comparison to informal peer debrief. Specifically, the study will test the feasibility of the recruitment process, enrolment, intervention delivery, data collection, and completion of assessment measures in a sample of critical care healthcare professionals. User-perceived acceptability will be assessed using participant engagement to the intervention and user satisfaction. The secondary aim is to examine the preliminary effectiveness of the intervention on improving wellbeing, work engagement, and decreasing burnout. This study hypothesizes that the combined intervention will be (1) feasible (in terms of recruitment, enrolment, intervention delivery, and data collection, and completion of assessment measures), (2) acceptable in terms of participant engagement and user satisfaction, and (3) effective in improving wellbeing, engagement, and decreasing burnout symptoms than the informal peer debrief intervention at post-treatment and at the two follow-up periods (1 month and 3 months).

Materials and methods

Study design

This study will be a parallel-designed, two-armed, pilot randomized control trial (RCT) determining and comparing the feasibility and user-perceived acceptability of a personalized management program (IMP and PPSP) and conventional program (informal peer debrief) in critical care healthcare professionals. It will also determine the preliminary effectiveness of improving wellbeing, work engagement, and decreasing burnout symptoms. After baseline screening questionnaires are completed, eligible participants will be randomized into one of two groups in a 1:1 ration. This protocol was prepared in accordance with the SPIRIT guidelines (Fig 1 and S1 Table). Flinders University (ref. number: 4703) and University of Southern Queensland (ref. number: H22REA178) Human Research Ethics Committee approved the study (S2 Table). The study was also registered under the Australian and New Zealand Clinical Trials Registry (ACTRN12622000749707p). Fig 2 demonstrates the study flowchart.

Study setting

The study center will be located at the College of Nursing and Health Sciences, Flinders University. Study data will be collected through online questionnaires using Qualtrics [34] and virtual sessions (IMP, debrief, and feedback semi-structured interviews) using Zoom Video Communications [35].

Eligibility criteria

Critical care professionals who are interested to participate will register their interest in an electronic form. The form will contain the Impact of Event Scale-Revised (IES-R), which will be used to assess their eligibility prior to completing and signing the electronic informed consent form. The eligibility criteria will include (a) registered healthcare professionals practicing within an Australian or New Zealand critical care setting (i.e., Physicians, Nurses, Allied Health) and (b) have access to a personal computer or device with camera and microphone. The trial will also include individuals that are either undertaking or not undertaking prescribed treatments for mental health conditions. The exclusion criteria will include (a) individuals that are under any type of work compensation claims, (b) have contradictions to any of the interventions, and (c) are considered as 'high risk' of self-harm or psychological harm, which will be determined at the recruitment phase using the Impact of Event Scale-Revised (IES-R) [36]. Potential participants scoring 37 or more on the IES-R will be excluded, as this demonstrates a score that is high enough to suppress the individual's system's functioning,

	STUDY PERIOD											
	Enrolment	Allocation	During treatment								End treatment	
TIMEPOINTS →		T0	T1								T2	T3	T4
Week →			1	2	3	4	5	6	7	8			
ENROLMENT:													
Eligibility screen	X												
Informed consent	X												
Randomization		X											
Allocation		X											
INTERVENTIONS:													
*IMP + PPSP debrief**			←	→	←				→				
Informal peer debrief					←				→				
ASSESSMENTS:													
Sociodemographic data	X												
IES-R	X												
Primary outcomes													
Journaling			X	X	X	X	X	X	X	X			
Post-treatment feedback (questionnaire & interview)											X		
Secondary outcomes (Psychometric scales)													
CD-RISC	X										X	X	X
TIS	X										X	X	X
MBI	X										X	X	X
PES	X										X	X	X
DASS-21	X										X	X	X
PSI	X										X	X	X
PANAS	X										X	X	X

Fig 1. SPIRIT schedule of enrolment, interventions, and assessments. *IMP will run for 2 weeks (blue arrow), PPSP debrief will run for the following 6 weeks (black arrow), IMP, Individualized Management Plan; PPSP, Professional Problem-Solving Peer; IES-R, Impact of Event Scale-Revised, CD-RISC, Connor-Davidson Resilience Scale 25; TIS, Attrition Turnover Inventory; MBI, Maslach Burnout Inventory; PES, Practice Environment Scale; DASS-21, Depression, Anxiety, and Stress Scale-21; PSI, Problem Solving Inventory; PANAS, Positive and Negative Affect Schedule.

https://doi.org/10.1371/journal.pone.0285038.g001

requiring referral for professional support [36, 37]. Participants that score 37 and above will be contacted by the research team and offered a one-on-one consult with a clinical psychologist, where they will be on-referred to an employee assistance program or their general practice for further professional support.

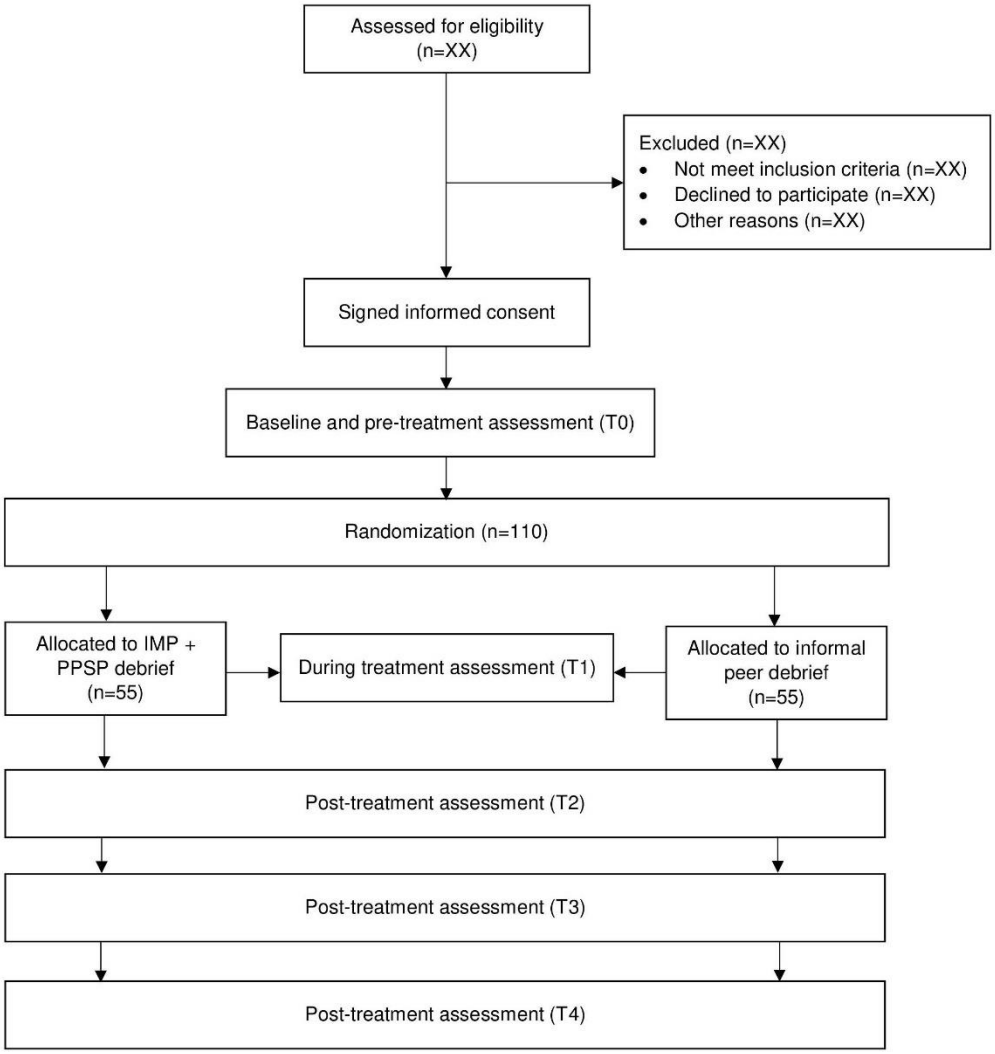


Fig 2. Study flowchart.

https://doi.org/10.1371/journal.pone.0285038.g002

Intervention

Intervention group. The intervention group will receive an Individualized Management Plan (IMP) and Professional Problem-Solving Peer (PPSP) debrief. The IMP is a 30-minute,

virtual, once-off, one-to-one consult with a psychologist. The psychologist will provide tailored, immediate, and simple strategies within the session as their usual scope of practice (using clinical judgement). These strategies will be centered around the participant's everyday living, for example, recommendations for improved sleeping habits, encourage development of exercise habits, and methods for relaxation. Participants will be advised by the psychologist to implement these strategies into their daily lives. The list of semi-structured questions can be found in Table 1.

This study will administer a professional peer debrief led by accredited peer support leader (s). It will include a semi-structured, 6-week, group-based, virtual, informal, peer debrief session. The peer debrief session aim to encourage social interactions and engagement between participants rather than to achieve structured debrief objectives, such as successful reflection. The objectives are weighted towards achieving peer support using informal structures of debrief. The peer debrief will also incorporate the theory of social problem-solving. The goal for peer debrief is to learn and apply problem-solving approaches [38]. The peer support leader will support participants to positively change problematic situations and/or provide techniques to decrease emotional distress from the afflicted problem [38]. This will be facilitated through group discussions, experience sharing, and individual guidance to summarize the causes of the problem, develop feasible goals and strategies, and perform analysis on the effects (success or failure) of the implemented strategy [38].

The purpose of integrating IMP was due to the key component of 'tailoring', which was identified in Adnan et al. (2022) refined program theory [32, 33]. Tailoring caters towards the individual's experience, addressing contextual factors and mechanisms. It also facilitates understanding of the unique characteristics and experiences of the individual, which may allow investigators to address their individual's needs, resources, preferences, and goals; ultimately giving meaning to the intervention, increasing personal relevance, and prioritizing the user's control and involvement. Moreover, debrief facilitates the reflection of situations, exploring one's thoughts, and questioning assumptions to achieve positive learning that is based on lived experiences [39]. An individual's performance can also be revisited to enable greater understanding of the situation, foster critical thinking, and provide adjustments toward future situations [39].

Table 1. IMP semi-structured questions.

Themes	Guiding Questions
General Questions	How are you feeling?
	How are you finding your job at the moment? Are there any stressors that you are currently experiencing?
Mental Health	Can you tell me about any times over the past few months/weeks that you've been bothered by low feelings, stress, or sadness?
Physical Health	Has it affected your sleeping habits? Have you noticed any changed? Difficulty sleeping? Restlessness?
	How would you describe your appetite over the past weeks? Have your eating habits changed in any way?
Autonomy, choice, and control	How often during the past months/weeks have you felt as though your moods, or your life, were under control?
Relationships and belonging	Describe how 'supported' you feel by others around you—friends, family or otherwise
Self-perception	Let's talk about how often you have felt satisfied with yourself over the past months/weeks.
Hope and hopelessness	Can you tell me about your hopes and dreams for the future? What feelings have you had recently about working towards those goals?

https://doi.org/10.1371/journal.pone.0285038.t001

Active control group. The informal peer debrief will include mutual support between participants with shared experiences. Like PPSP debrief, its goals are not to achieve debrief outcomes, rather, to encourage social interaction and engagement between participants—enabling a platform to discuss concerns, problems, and feelings [40]. The informal peer debrief will be a semi-structured, 6-week, group-based virtual, peer debrief intervention. Peer support leader(s) will conduct the sessions but will not provide active solutions. The list of semi-structured questions will be consistent in both intervention and control debrief groups with differences in the 'Pre-briefing', 'Discovering', and 'Deepening' sections; informal peer debrief will not include problem-solving approach (see Table 2).

Measurements

Participants will complete self-reported questionnaire measures at four timepoints: baseline (T0), after treatment (T2), 1-month follow-up (T3), and 3-months follow-up (T4). Qualitative journal entry will be completed throughout treatment (T1)—the journal entry will include reflective questions for participants complete. Participants will additionally provide sociodemographic characteristics at T0 and treatment feedback (both through an online questionnaire and demi-structured interviews) at T2. Examples of sociodemographic characteristics will include gender, age, living status, citizenship, employment, qualifications, and family responsibilities. Audits of study screening, enrolment logs, attendance list to the consult and debrief sessions (intervention and active control), and study records (completion of the assessment measures at the five assessment points) will also be conducted.

Primary outcomes

Feasibility. Feasibility of the study will be assessed based on the recruitment process, enrolment, treatment delivery, and data collection. The audits of participants referred and attended the consults each week will be used to measure the recruitment and enrolment. Audits of completing questionnaires, journal entries, feedback questionnaires, and feedback

Table 2. Debrief session layout.

Topic	Content
Introduction	• Introduction of the support leader and researcher present in the session • What this study is about and who is conducting the study
Pre-briefing	• Purpose of the debrief session and the role of the support leader in facilitating discussions and prompting self-reflection • Items that can be discussed (i.e., encounters/stressors at the workplace) • **Management of situations using problem-solving approaches and connecting new learnings into future situations.**
Defusing	• Encouraging participants to talk about how they feel when encountered with a stressful situation. • Allow reflection of their feelings and recapping the scenario
Discovering	• Allow other participants to reflect on the situation and provide their thoughts and ideas • Enable participants to explore any similar situations that they may have encountered. • **Support leader(s) may ask other participants on how they would approach the situation, their rationale, and potential future strategies. The support leader(s) can also offer their own mental model on problem-solving approaches to deal with the situation.**
Deepening	• **Reflection on what can be done in similar future situations.** • **Finding a relationship between the suggested strategy to other situations at work.**
Summary	• Recapping what was discussed in the session • Ending with one thing that can be taken away from the session and used in their workplace.

Note: The intervention group (PPSP debrief) will also use techniques stated in both 'roman' and 'bold' typeface, whereas the control group will follow techniques noted in 'roman' typeface only.

https://doi.org/10.1371/journal.pone.0285038.t002

semi-structured interviews will measure the feasibility of treatment delivery and data collection.

User-perceived acceptability. User-perceived acceptability will measure user intervention engagement and user satisfaction. Both outcomes will be measured using journal entries, treatment feedback questionnaire, and feedback semi-structured interviews. Journal entry question such as 'What knowledge/strategies were you able/unable to implement from the debrief session?" will measure intervention user engagement. Treatment feedback questionnaire will be used to measure user satisfaction, which includes questions surrounding user experience, barriers, enablers, and likelihood of recommendation. This will be further supported by feedback semi-structured interviews, that will be conducted as a 30 minute, one-on-one, once-off session for each participant. The feedback semi-structured interviews aim to ask questions surrounding feasibility and user-perceived acceptability. The questions will include topics that cover benefits, improvements, and potential changes for the future larger study. Other secondary outcomes will be measured using questionnaire instruments described below.

Secondary outcomes

The secondary measures are directed to determine the impact of the intervention. Secondary outcome measured using self-reported questionnaire instruments, treatment feedback questionnaire, feedback semi-structured interviews, and journal entry. The journal entry question on 'I feel burned out' will measure the participant's perception on burnout. The treatment feedback questionnaire and feedback semi-structured interviews that addresses questions surrounding benefits of the intervention and changes in participant's viewpoints measures the impact of the intervention.

The Utrecht Work Engagement Scale (UWES). The UWES-9 is used to measure work engagement–assumed to be the opposite of burnout. It is a 9-item revised scale scored on a 7-point Likert scale from "Never" to "Always" [41].

Attrition Turnover Inventory (TIS). The TIS scale is used to determine turnover intentions [42]. It is a 6 item scale scored on a five point Likert scale, between poles of intensity from 1 being never to 5 being always [42].

Maslach Burnout Inventory (MBI). The MBI scale is the gold standard in measuring burnout [43]. It comprises of three scales of emotional exhaustion (9 items), depersonalization (5 items) and personal accomplishment (8 items). It is a 22-item instrument [43].

Practice Environment Scale (PES). The PES is an instrument, which measures the practice environment, defined as factors that enhance the ability to practice skillfully and deliver high quality care [44].

Depression, Anxiety, and Stress Scale (DASS-21). DASS-21 is a self-reporting scale that is designed to measure negative emotional states of stress, anxiety, and depression with seven subscales within each measure [45]. Scoring can be presented as total scores and scores for three subscales [45]. The subscales are further divided into five severity ranges including normal, mild, moderate, severe, and extremely severe [45].

Problem-Solving Inventory (PSI). The PSI assess awareness and evaluates the individual's problem-solving styles or abilities [46]. It is a self-reported measure consisting of 35 six-point Likert scale with three factors including problem-solving confidence, approach-avoidance style, and personal control [46]. Lower scores demonstrate attitudes and behaviors that are associated with successful problem solving [46].

Positive and Negative Affect Schedule (PANAS). The PANAS measures positive and negative affect using 20-items; 10 negative affect markers, and 10 positive affect markers [47].

The items are rated on a scale from one being 'very slightly or not at all', to five being 'extremely' [47].

Sample size estimation

To achieve the primary aims of determining feasibility and acceptability, a pragmatic approach will be taken in that if sufficient data to address the secondary aim (preliminary effectiveness) can be achieved, this should also be sufficient for the primary aim. Power calculations were therefore conducted to determine the sample size required for the secondary aim of this study.. Analyses variance with repeated measures between and within the design in relation to the participants wellbeing was used, with low effect size estimated ($\eta^2 = 0.061$). Significance level was 0.05 and power at 0.95. This resulted to a minimum sample of 106 participants for the study, having considered 20% attrition rate. The sample size was rounded off to 110 participants (55 each group) to enable equal samples sizes in both groups.

Recruitment

Recruitment will be conducted using flyers distributed to members of the Australian and New Zealand Critical Care Society (ANZICS) and Australian College of Critical Care Nurses (ACCCN). The target audience for recruitment will include critical care healthcare professionals within the organizational membership, who are then able to forward onto their networks and people who may not be members. The flyer will include a link to the study's website containing further information about the trial and a registration form to be completed by interested participants.

Informed consent

Those interested in participating will be able to register for the study through the study's website (www.wellbeingandburnout.com) or through the distributed flyers. Additional information about the study (i.e. purpose, significance, study content, risks and benefits, and confidentiality principles) can also be accessed through the study's website. Questions can also be asked through study website's platform, as well as through emails, text messages, and phone calls. Participants that register for the study will be provided with an electronic version of the information sheet and consent form to be signed and returned prior to being accepted into the study.

Group allocation and blinding

The project's work group are experienced in research project management and will be responsible for the recruitment and intervention delivery in both intervention and active control groups. Randomization will be implemented using a randomization table created by a computer software, conducted by an independent research assistant who will be unaware of the characteristics of the study and will not have any involvement in the trial or access to the trial data. This will be a single-blinded study, where the outcomes of assessment will be blinded, however, participants will be aware of their group assignment. Members of the project's work group that are involved in the assessment of participants will be blinded to the participant's assignment. Additionally, since participants will have direct access to their intervention, participants will not be blinded to their group allocation, but will not know which intervention group is active.

Data collection methods

Baseline (questionnaire scale, sociodemographic, work-related information), journal entry, post-treatment feedback, post-intervention (questionnaire scales), and one- and three-months follow-up (questionnaire scales) assessments will be performed by sending a survey link to participant's email. Participants will be able to complete the questionnaires on an electronic device, such as a computer, tablet, or smartphone. The questionnaires will be checked weekly after each delivery to ensure participant's completion. Participants that do not complete the questionnaires within a specified time will be sent a reminder via email. Likewise, if participants do not attend their Individual Management Plan and/or debrief sessions, the research team will contact participants via email to join the session or to re-book into another session during the week. The feedback semi-structured interviews will be conducted by inviting participants to attend a virtual one-on-one semi-structured interview, which will be organized through email communication.

Data management

All data files including consent forms, intervention materials, participant's data, consult and debrief notes, questionnaire data, and journal entry data will be stored in the Flinders University managed on-site Enterprise Storage. After the last data collection timepoint (T4), any identifiable data will be de-identified and stored for five years after publication of the results. Following the required data storage period, all data will be securely destroyed. Deidentified research data will be made publicly when the study is completed and published. Feedback of the study outcomes will be provided to participants via a short summary of the research outcomes and a copy of the published research project.

Data monitoring

A data monitoring committee is not necessary for this study as the planned intervention is short and we are not expecting any harms or adverse effects during the intervention. An independent Safety Officer (researcher who is independent from the study team) will monitor the participant's safety (from participant recruitment to the end of intervention delivery), scientific integrity, study risks and benefits, and ethical conduct of the study. There are no serious adverse events expected, but there may be potential adverse events that could occur during the Individual Management Plan and debrief sessions such as negative emotional reactions and mild distress. If an adverse event were to occur, the safety officer will be notified immediately.

Planned analysis

Since this study primarily seeks to determine the feasibility and user-perceived acceptability of the intervention, the analysis will focus on key parameters required to conduct a future larger trial. Majority of the analysis will be reported descriptively. The study will measure feasibility of the recruitment, enrolment process, treatment delivery, and data collection. The study screening log, enrolment log, attendance list and study records will be used to descriptively inform these outcomes. User-perceived acceptability of engaging and satisfaction of the intervention will be measured and reported descriptively using journal entries, treatment feedback questionnaire, and feedback semi-structured interviews. Journal entries, treatment feedback questionnaires, and feedback semi-structured interviews will also be analyzed qualitatively using thematic analysis. Thematic analysis will be conducted first manually utilizing Braun and Clarke's (2019) [48] six-step process and with NVIVO 10 software [49]. Two researchers will validate the analysis, and any disagreements will be resolved using a third researcher.

Using thematic analysis will facilitate an essentialist method that enables reporting of meanings, experiences, and the participant's reality, which fits well with the aims and objectives of this study (determining feasibility and acceptability) [48, 49]. The process of thematic analysis will also enable the reporting of secondary outcome measures on the impact of the intervention (i.e., benefits of the intervention, changes in participant's viewpoints, and feeling of burnout).

Secondary outcome measures using questionnaires will be analyzed following the Intention to Treat (ITT). ANOVA or chi-square will be used to compare the sociodemographic data and baseline outcome measures (T0) [50]. Secondly, longitudinal changes (baseline, post-treatment, and 1 month and 3 months follow-up) and the differences between the two groups will be examined using mixed linear models as these models are more precise than the repeated measures of ANOVA [50]. Missing or incomplete data will be considered in the ITT analysis using maximum likelihood estimation method [50]. Effect sizes will be calculated using Cohen's *d* (bias corrected) to represent the difference between Standard Mean Changes (MC) (T0-T2, T0-T3, T0-T4) [50]. Calculation of SMC in each group will be conducted, providing the *d* index of the general effect size from the differences between combined Individualized Management Plan (IMP) and Professional Problem-Solving Peer (PPSP) debrief vs. informal peer debrief [50]. After the data is analyzed, summary tables will be provided for all planned evaluations at pre-treatment (T0), post-treatment (T2), 1 month follow-up (T3), and 3 months follow-up (T4) [50]. Results will be reported as frequencies and descriptive statistics (mean, standard deviation, and percentages), summarizing the characteristics of the total sample and participants within each group [50].

Discussion

Critical care healthcare professionals experience high levels of burnout and mental health implications such as depression, anxiety, and post-traumatic stress disorder [51]. This is relative to chronic occupational stressors that they routinely experience, including high workloads and frequent encounters with adversities [51]. High demands and insufficient resources within critical care implicate to loneliness, poor work engagement and increased levels of burnout symptoms [5, 21, 22]. Amongst the different individual interventions (personal resources) developed to address the symptoms of burnout, peer support demonstrates promising evidence as it targets workplace loneliness, emotional exhaustion, and promotes work engagement [20, 26]. The integration of a problem-solving approach aims to enhance the peer support component through cognitive-behavioral processes to support adaptive coping behaviors [29]. The intervention in this study is also supported by evidence from an expert realist opinion paper (under review) interviewing 21 critical care experts on effective individual interventions. The paper suggested interventions should promote knowledge and skill development, be evidence-based, accessible, inclusive, collaborative, tailored, and promote engagement–which are reflected in the intervention of this study. Tailoring is reflected in the Individualized Management Plan (IMP), which aims to cater to the individual experience and specific needs of end users. The mechanism of self-regulation proposed in the expert opinion was also employed in this study through the integration of a problem-solving approach. Despite strong evidence and theory synthesis supporting the use of these interventions, there have yet to be randomized trials testing and confirming its feasibility, acceptability, and efficacy.

This protocol provides information on a randomized control trial that plans to carry out the intervention based on the combination of tailoring the intervention, peer support, and problem-solving approach on critical care healthcare professionals. The lack of evidence on

the feasibility and acceptability of such concepts requires a pilot study to gain greater insight into the preparation process. It is expected that the participants assigned to the intervention group will demonstrate feasibility and user-perceived acceptability of the treatment processes, alongside statistically significant better results in improving wellbeing, work engagement, and decreasing burnout components. The outcomes in this study will be used as preliminary data for the larger and more defined randomized control trial.

One strength identified in this protocol is the inclusion of a large sample size, which is a result from the estimation of the sample size calculations. This provides an opportunity to acquire more accurate mean values, provides smaller margin or error, and identify outliers that may be present (in skewing the data) within smaller samples [52]. The use of randomization, controlled, and the use of two follow-up timepoints in the design of this study may also provide understanding of both immediate and early longitudinal patterns and outcomes of treatment changes of the intervention. A limitation of the study includes the use of an active control intervention, rather than the use of a waitlist control design. Active controls have ethical advantages as it allows the provision of care to participants that are seeking help and enables non-intervention evaluation. However, such designs may produce overestimates of the intervention's effects and that having an active control counteract and minimize such aspects. Despite this, a greater understanding of the feasibility and acceptability of combining IMP and PPSP debrief is essential to foster a larger study that determines its effectiveness in improving wellbeing, work engagement, and decrease burnout symptoms for critical care healthcare professionals.

Supporting information

S1 Table. SPIRIT checklist.
(DOC)

S2 Table. Study protocol.
(PDF)

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Appendix 19 SPIRIT checklist

SPIRIT
STANDARD PROTOCOL ITEMS: RECOMMENDATIONS FOR INTERVENTIONAL TRIALS

SPIRIT 2013 Checklist: Recommended items to address in a clinical trial protocol and related documents*

Section/item	Item No	Description	Addressed on page number
Administrative information			
Title	1	Descriptive title identifying the study design, population, interventions, and, if applicable, trial acronym	Page 1
Trial registration	2a	Trial identifier and registry name. If not yet registered, name of intended registry	Pages 2 and 7
	2b	All items from the World Health Organization Trial Registration Data Set	Not Applicable
Protocol version	3	Date and version identifier	Not Applicable
Funding	4	Sources and types of financial, material, and other support	Page 19
Roles and responsibilities	5a	Names, affiliations, and roles of protocol contributors	Page 1 and 19
	5b	Name and contact information for the trial sponsor	Not Applicable
	5c	Role of study sponsor and funders, if any, in study design; collection, management, analysis, and interpretation of data; writing of the report; and the decision to submit the report for publication, including whether they will have ultimate authority over any of these activities	Not Applicable
	5d	Composition, roles, and responsibilities of the coordinating centre, steering committee, endpoint adjudication committee, data management team, and other individuals or groups overseeing the trial, if applicable (see Item 21a for data monitoring committee)	Not Applicable

Introduction			
Background and rationale	6a	Description of research question and justification for undertaking the trial, including summary of relevant studies (published and unpublished) examining benefits and harms for each intervention	Pages 2-6
	6b	Explanation for choice of comparators	Pages 5-6
Objectives	7	Specific objectives or hypotheses	Page 6
Trial design	8	Description of trial design including type of trial (eg, parallel group, crossover, factorial, single group), allocation ratio, and framework (eg, superiority, equivalence, noninferiority, exploratory)	Page 6-7
Methods: Participants, interventions, and outcomes			
Study setting	9	Description of study settings (eg, community clinic, academic hospital) and list of countries where data will be collected. Reference to where list of study sites can be obtained	Page 7
Eligibility criteria	10	Inclusion and exclusion criteria for participants. If applicable, eligibility criteria for study centres and individuals who will perform the interventions (eg, surgeons, psychotherapists)	Pages 7-8
Interventions	11a	Interventions for each group with sufficient detail to allow replication, including how and when they will be administered	Pages 8-10
	11b	Criteria for discontinuing or modifying allocated interventions for a given trial participant (eg, drug dose change in response to harms, participant request, or improving/worsening disease)	Pages 7-8
	11c	Strategies to improve adherence to intervention protocols, and any procedures for monitoring adherence (eg, drug tablet return, laboratory tests)	Pages 16-17
	11d	Relevant concomitant care and interventions that are permitted or prohibited during the trial	Page 8
Outcomes	12	Primary, secondary, and other outcomes, including the specific measurement variable (eg, systolic blood pressure), analysis metric (eg, change from baseline, final value, time to event), method of aggregation (eg, median, proportion), and time point for each outcome. Explanation of the clinical relevance of chosen efficacy and harm outcomes is strongly recommended	Pages 11-13
Participant timeline	13	Time schedule of enrolment, interventions (including any run-ins and washouts), assessments, and visits for participants. A schematic diagram is highly recommended (see Figure)	Pages 11-12

Sample size	14	Estimated number of participants needed to achieve study objectives and how it was determined, including clinical and statistical assumptions supporting any sample size calculations	Pages 13
Recruitment	15	Strategies for achieving adequate participant enrolment to reach target sample size	Page 13
Methods: Assignment of interventions (for controlled trials)			
Allocation:			
Sequence generation	16a	Method of generating the allocation sequence (eg, computer-generated random numbers), and list of any factors for stratification. To reduce predictability of a random sequence, details of any planned restriction (eg, blocking) should be provided in a separate document that is unavailable to those who enrol participants or assign interventions	Page 15-16
Allocation concealment mechanism	16b	Mechanism of implementing the allocation sequence (eg, central telephone; sequentially numbered, opaque, sealed envelopes), describing any steps to conceal the sequence until interventions are assigned	Pages 15-16
Implementation	16c	Who will generate the allocation sequence, who will enrol participants, and who will assign participants to interventions	Pages 15-16
Blinding (masking)	17a	Who will be blinded after assignment to interventions (eg, trial participants, care providers, outcome assessors, data analysts), and how	Pages 15-16
	17b	If blinded, circumstances under which unblinding is permissible, and procedure for revealing a participant's allocated intervention during the trial	Pages 15-16
Methods: Data collection, management, and analysis			
Data collection methods	18a	Plans for assessment and collection of outcome, baseline, and other trial data, including any related processes to promote data quality (eg, duplicate measurements, training of assessors) and a description of study instruments (eg, questionnaires, laboratory tests) along with their reliability and validity, if known. Reference to where data collection forms can be found, if not in the protocol	Page 14
	18b	Plans to promote participant retention and complete follow-up, including list of any outcome data to be collected for participants who discontinue or deviate from intervention protocols	Pages 14-15

Data management	19	Plans for data entry, coding, security, and storage, including any related processes to promote data quality (eg, double data entry; range checks for data values). Reference to where details of data management procedures can be found, if not in the protocol	Page 15
Statistical methods	20a	Statistical methods for analysing primary and secondary outcomes. Reference to where other details of the statistical analysis plan can be found, if not in the protocol	Pages 15-17
	20b	Methods for any additional analyses (eg, subgroup and adjusted analyses)	Page 15-17
	20c	Definition of analysis population relating to protocol non-adherence (eg, as randomised analysis), and any statistical methods to handle missing data (eg, multiple imputation)	Page 15-17
Methods: Monitoring			
Data monitoring	21a	Composition of data monitoring committee (DMC); summary of its role and reporting structure; statement of whether it is independent from the sponsor and competing interests; and reference to where further details about its charter can be found, if not in the protocol. Alternatively, an explanation of why a DMC is not needed	Page 15
	21b	Description of any interim analyses and stopping guidelines, including who will have access to these interim results and make the final decision to terminate the trial	Not Applicable
Harms	22	Plans for collecting, assessing, reporting, and managing solicited and spontaneously reported adverse events and other unintended effects of trial interventions or trial conduct	Page 15
Auditing	23	Frequency and procedures for auditing trial conduct, if any, and whether the process will be independent from investigators and the sponsor	Not Applicable
Ethics and dissemination			
Research ethics approval	24	Plans for seeking research ethics committee/institutional review board (REC/IRB) approval	Page 18-19
Protocol amendments	25	Plans for communicating important protocol modifications (eg, changes to eligibility criteria, outcomes, analyses) to relevant parties (eg, investigators, REC/IRBs, trial participants, trial registries, journals, regulators)	Not Applicable

Consent or assent	26a	Who will obtain informed consent or assent from potential trial participants or authorised surrogates, and how (see Item 32)	Page 13-14
	26b	Additional consent provisions for collection and use of participant data and biological specimens in ancillary studies, if applicable	Not Applicable
Confidentiality	27	How personal information about potential and enrolled participants will be collected, shared, and maintained in order to protect confidentiality before, during, and after the trial	Page 15
Declaration of interests	28	Financial and other competing interests for principal investigators for the overall trial and each study site	Page 19
Access to data	29	Statement of who will have access to the final trial dataset, and disclosure of contractual agreements that limit such access for investigators	Page 15
Ancillary and post-trial care	30	Provisions, if any, for ancillary and post-trial care, and for compensation to those who suffer harm from trial participation	Page 7,8,15
Dissemination policy	31a	Plans for investigators and sponsor to communicate trial results to participants, healthcare professionals, the public, and other relevant groups (eg, via publication, reporting in results databases, or other data sharing arrangements), including any publication restrictions	Page 15
	31b	Authorship eligibility guidelines and any intended use of professional writers	Page 19
	31c	Plans, if any, for granting public access to the full protocol, participant-level dataset, and statistical code	Not Applicable
Appendices			
Informed consent materials	32	Model consent form and other related documentation given to participants and authorised surrogates	S2
Biological specimens	33	Plans for collection, laboratory evaluation, and storage of biological specimens for genetic or molecular analysis in the current trial and for future use in ancillary studies, if applicable	Not Applicable.

*It is strongly recommended that this checklist be read in conjunction with the SPIRIT 2013 Explanation & Elaboration for important clarification on the items. Amendments to the protocol should be tracked and dated. The SPIRIT checklist is copyrighted by the SPIRIT Group under the Creative Commons "Attribution-NonCommercial-NoDerivs 3.0 Unported" license.

Appendix 20 Flinders university HREC ethics approval for pilot RCT

29 April 2022

Flinders UNIVERSITY

HUMAN RESEARCH ETHICS COMMITTEE

APPROVAL NOTICE

Dear Ms Nurul Adnan,

The below proposed project has been approved on the basis of the information contained in the application and its attachments.

Project No:	4703
Project Title:	Achieving wellbeing and managing burnout in critical care health professionals: a parallel, interventional, feasibility and realist informed pilot Randomized Control Trial
Primary Researcher:	Ms Nurul Adnan
Approval Date:	29/04/2022
Expiry Date:	25/11/2022
Conditions of Approval:	None

Please note: Due to the current COVID-19 situation, researchers are strongly advised to develop a research design that aligns with the University's COVID-19 research protocol involving human studies. Where possible, avoid face-to-face testing and consider rescheduling face-to-face testing or undertaking alternative distance/online data or interview collection means. For further information, please go to https://staff.flinders.edu.au/coronavirus-information/research-updates.

Please note: For all research projects wishing to recruit Flinders University students as participants, approval needs to be sought from the Office of the Deputy Vice-Chancellor (Students). To seek approval, please provide a copy of the Ethics approval for the project and a copy of the project application to the Office of the Deputy Vice-Chancellor (Students) via dvcsoffice@staff.flinders.edu.au.

RESPONSIBILITIES OF RESEARCHERS AND SUPERVISORS

1. Participant Documentation

Please note that it is the responsibility of researchers and supervisors, in the case of student projects, to ensure that:

- all participant documents are checked for spelling, grammatical, numbering and formatting errors. The Committee does not accept any responsibility for the above mentioned errors.
- the Flinders University logo is included on all participant documentation (e.g., letters of Introduction, Information Sheets, consent forms, debriefing information and questionnaires – with the exception of purchased research tools) and the current Flinders University letterhead is included in the header of all letters of introduction. The Flinders University international logo/letterhead should be used and documentation should contain international dialling codes for all telephone and fax numbers listed for all research to be conducted overseas.
- the HREC contact details, listed below, are included in the footer of all letters of introduction and information sheets.

This research project has been approved by Flinders University's Human Research Ethics Committee (Project ID 4703). If you have any complaints or reservations about the ethical conduct of this study, you may contact Flinders University's Research Ethics & Compliance Office via telephone on 08 8201 2543 or by email human.researchethics@flinders.edu.au.

2. Annual Progress / Final Reports

In order to comply with the monitoring requirements of the *National Statement on Ethical Conduct in Human Research 2007 (updated 2018)* an annual progress report must be submitted each year on the anniversary of the approval date for the duration of the ethics approval using the HREC Annual/Final Report Form available online via the ResearchNow Ethics & Biosafety system.

Please note that no data collection can be undertaken after the ethics approval expiry date listed at the top of this notice. If data is

collected after expiry, it will not be covered in terms of ethics. It is the responsibility of the researcher to ensure that annual progress reports are submitted on time; and that no data is collected after ethics has expired.

If the project is completed *before* ethics approval has expired please ensure a final report is submitted immediately. If ethics approval for your project expires please either submit (1) a final report; or (2) an extension of time request (using the HREC Modification Form). For student projects, the Low Risk Panel recommends that current ethics approval is maintained until a student's thesis has been submitted, assessed and finalised. This is to protect the student in the event that reviewers recommend that additional data be collected from participants.

3. Modifications to Project

Modifications to the project must not proceed until approval has been obtained from the Ethics Committee. Such proposed changes / modifications include:

- change of project title;
- change to research team (e.g., additions, removals, researchers and supervisors)
- changes to research objectives;
- changes to research protocol;
- changes to participant recruitment methods;
- changes / additions to source(s) of participants;
- changes of procedures used to seek informed consent;
- changes to participant remuneration;
- changes to information / documents to be given to potential participants;
- changes to research instruments (e.g., survey, interview questions etc);
- extensions of time (i.e. to extend the period of ethics approval past current expiry date).

To notify the Committee of any proposed modifications to the project please submit a Modification Request Form available online via the ResearchNow Ethics & Biosafety system. Please open the project, then select the 'Create Sub-Form' tile in the grey Action Menu, and then select the relevant Modification Request Form. Please note that extension of time requests should be submitted prior to the Ethics Approval Expiry Date listed on this notice.

4. Adverse Events and/or Complaints

Researchers should advise the Executive Officer of the Human Ethics Research Committee on human.researchethics@flinders.edu.au immediately if:

- any complaints regarding the research are received;
- a serious or unexpected adverse event occurs that effects participants;
- an unforeseen event occurs that may affect the ethical acceptability of the project.

Yours sincerely,

Camilla Dorian

on behalf of

Human Research Ethics Committee
Research Development and Support
humanresearchethics@flinders.edu.au

Flinders University
Sturt Road, Bedford Park, South Australia, 5042
GPO Box 2100, Adelaide, South Australia, 5001

http://www.flinders.edu.au/research/researcher-support/ethics/human-ethics_home.cfm

ResearchNow
Ethics & Biosafety

Flinders Proactively supporting our Research

Appendix 21 University of southern queensland HREC ethics approval

[RIMS] USQ HRE Application H22REA178 - Expedited Review Outcome - Approved

H human.Ethics@usq.edu.au
To Gavin.Beccaria@usq.edu.au

Reply | Reply All | Forward | ...
Mon 15/08/2022 1:28 PM

Dear Gavin

Thank you for submitting your ethical review approval for the project listed below.

The University of Southern Queensland conforms to principles of minimising duplication of ethical review for research projects, in accordance with Chapter 5.3 of National Statement on Ethical Conduct in Human Research (2007).

Your project has now been administratively reviewed to ensure that USQ's role in the project has been disclosed duly approved as outlined below. As part of the approval the research team acknowledge that relevant information and advice about this ethical approval may be exchanged with relevant review body/ies. The Principal Investigator will be responsible for informing the ethical review body that reviews and approves the research at all other sites at which the research will be conducted; the name and location of any other body that will conduct an ethical review of the research; and any previous decisions made about the research by other review bodies (in Australia or elsewhere).

USQ HREC ID: H22REA178
Project title: Wellbeing and Burnout Interventions for Critical Care Healthcare Professionals
Approval date: 15/08/2022
Expiry date: 25/11/2022
Project status: Approved (with conditions).

The standard conditions of this approval are:

(a) conduct the project strictly in accordance with the proposal submitted to the originating registered human research ethics committee and ethics approval, including any amendments made to the proposal required by that committee;

(b) advise the USQ HREC (via human.ethics@usq.edu.au) immediately of any complaint or other issue in relation to the conduct of this project which may warrant review of the overarching ethical approval of the project;

(c) provide advice via submission of a USQ HRE Amendment for ethical approval of any amendments or revision to the original approved project by the originating registered human research ethics committee prior to implementing any changes;

(d) complete and submit a USQ milestone (progress) report as requested, and at least for every year of approval; and

(e) complete and submit a USQ milestone (final) report when the project does not commence within the first 12 months of approval, is abandoned at any stage, or is completed (whichever is sooner).
Additional conditions of this approval are:

(a) Nil.

Failure to comply with the conditions of approval or the requirements of the National Statement on Ethical Conduct in Human Research (2007) may result in withdrawal of ethical approval for this project.
If you have any questions or concerns, please contact an Ethics Officer.

Kind regards

The Human Research Ethics Team

University of Southern Queensland
Toowoomba – Queensland – 4350 – Australia
Email: human.ethics@usq.edu.au

Appendix 22 ANZCTR trial registration

ANZCTR
Australian New Zealand Clinical Trials Registry

CREATE ACCOUNT LOGIN

DEFINITIONS HINTS AND TIPS FAQs REGISTER TRIAL MY TRIALS

Trial Review

Registering a new trial?
New videos on how to complete Step 3: Intervention, Step 4: Outcomes and Step 11: Data sharing are now available!

To achieve prospective registration, we recommend submitting your trial for registration at the same time as ethics submission.

VIEW TRIAL AT REGISTRATION VIEW HISTORY

The safety and scientific validity of this study is the responsibility of the study sponsor and investigators. Listing a study does not mean it has been endorsed by the ANZCTR. Before participating in a study, talk to your health care provider and refer to this information for consumers

< BACK

Trial registered on ANZCTR

Registration number	ACTRN12622000749707p
Ethics application status	Submitted, not yet approved
Date submitted	6/04/2022
Date registered	25/05/2022
Date last updated	25/05/2022
Date data sharing statement initially provided	25/05/2022
Type of registration	Prospectively registered

Titles & IDs

Public title	Wellbeing and Burnout in Critical Care
Scientific title	The effect of Individualised Management Plans on wellbeing and managing burnout in critical care health professionals: a parallel, interventional, feasibility and realist informed pilot Randomized Control Trial
Secondary ID [1]	None
Universal Trial Number (UTN)	U1111-1275-5268
Trial acronym	BT
Linked study record	

Health condition

Health condition(s) or problem(s) studied:

Wellbeing

Burnout

Stress

Emotional Exhaustion

Disengagement

Cynicism

Condition category	Condition code
Mental Health	Depression
Mental Health	Suicide

Mental Health | Other mental health disorders

Intervention/exposure

Study type	Interventional
Description of intervention(s) / exposure	Participants in the intervention group are required to attend a one-to-one consult with a clinical psychologist student (overlooked by an experienced clinical psychologist) to collect information such as lifestyle behaviours, and mental health assessments, and provide some immediate and simple management strategies (i.e. recommendations for positive sleeping habits, stress management techniques) within the session as usual practice and record as case file. This should take no longer than 30 minutes per participant consult. Consult data alongside baseline data will be presented in a case conference by the clinical psychologist to develop an Individual Management Plan (IMP) suited to the individual's needs. The case team will consist of an experienced clinical psychologist, clinical psychologist students, nurses, and physiotherapist. Participants will be notified of their Individual Management Plan (IMP) within 7 days of their consult, where they will be able to commence their prescribed IMP immediately. The Individualised Management Plan (IMP) and debriefing sessions will be administered to the intervention group on a weekly basis for 6 weeks. Participants will be allocated IMPs - examples can include MoodGYM, Headspace, and problem-solving education. MoodGym is an online program consisting of five modules that run for a duration of 20 to 40 minutes each module - is designed to run sequentially for a 6-weeks duration. MoodGym aims to provide behavioural activation, relaxation, problem-solving, cognitive restructuring, and understanding of the relationships between one's thoughts and feelings. Headspace is an app that conducts mindfulness training program, which consists of 45 guided and unguided meditation sessions that last between 10 to 20 minutes. It aims to improve individual's physical and mental health by encompassing components such as improving sleep, reducing stress, increase focus, and improving relationships. Participants will be asked to complete step-wise sessions for the 6- weeks. Problem-solving education will be run by clinical psychologist students to educate participants about problem-solving techniques that can be implemented within their daily life and practices. These group sessions will run weekly for 6-weeks via an online platform (approximately 60 minutes per session). The research team will administer examples of the interventions (such as debrief, MoodGym, Headspace, and problem-solving education) via an online platform. During the intervention rollout, participants are expected to complete weekly journaling. Within the weekly journaling, participants will be required to confirm that they have completed their respected modules for MoodGym and Headspace and provide evidence of the completed module. Adherence to debriefing sessions and problem-solving education will be monitored by the research team - where attendance will be done prior to each debrief session and problem-solving education to ensure attendance and adherence. Participants that do not attend their respected sessions will be contacted by the research team. Details for debriefing will be explained below (Comparator/control treatment). The debriefing processes will be the same for the intervention and control group, but these will occur separately to avoid participant mixing.
Intervention code [1]	Treatment: Other
Comparator / control treatment	The control group will include weekly (for 6 weeks) debrief sessions administered virtually. A Clinical Psychologist student (overlooked by an experienced clinical psychologist) will conduct the 60 minutes group debrief session with approximately 15 participants in each group. During each session, the CPS will ask a range of open-ended questions to participants and encourage engagement between participants. The 3D model will be used to guide the debrief sessions, which will include aspects of pre-briefing (expectations of participation), defusing (recap and clarify their scenarios), discovering (analysing and evaluating performance through reflection), deepening (applying lessons from simulations), and concluding with a summary to review what was learned throughout the session. Debrief sessions will compose of a structured debriefing regarding work related wellbeing, stressors, and burnout.
Control group	Active

Outcomes

Primary outcome [1]	To assess the feasibility of recruitment (composite outcome) - Number of potential participants enrolled in the trial (measured using an audit of study screening and enrolment logs) - Number of potential participants excluded from the trial (measured using an audit of study screening and enrolment logs) - Retention rate (measured using enrolment logs and attendance list)
Timepoint [1]	Baseline, 6-weeks of intervention rollout
Primary outcome [2]	To assess the feasibility of measurement tools (composite outcome) - A completion rate of psychometric scale questionnaires and journaling (measured using an audit of study records) - Follow-up response rates (1-month and 3-months follow-ups) (measured using an audit of study records)
Timepoint [2]	Baseline, 6-weeks of intervention rollout, post-intervention (completion of intervention), 1- and 3- month

	follow-up
Primary outcome [3]	Acceptability of the intervention (composite outcome): - Barriers (collected using a feedback questionnaire (designed specifically for this study) - Enablers (collected using a feedback questionnaire (designed specifically for this study) - Recommendation to family, friends, and colleagues (collected using a feedback questionnaire (designed specifically for this study)
Timepoint [3]	Post-intervention (completion of intervention)
Secondary outcome [1]	Secondary measures will include qualitative measures including online weekly journaling.
Timepoint [1]	The online weekly journaling will be collected at baseline, throughout six weeks of intervention (weekly), post-intervention (completion of intervention), 1- month and 3-months follow-up.
Secondary outcome [2]	The Connor-Davidson Resilience Scale 25
Timepoint [2]	The scale survey will be collected at baseline, post-intervention (completion of intervention), 1- and 3-month follow-up.
Secondary outcome [3]	Attrition Turnover Inventory
Timepoint [3]	The scale survey will be collected at baseline, post-intervention (completion of intervention), 1- and 3-month follow-up.
Secondary outcome [4]	Maslach Burnout Inventory
Timepoint [4]	The scale survey will be collected at baseline, post-intervention (completion of intervention), 1- and 3-month follow-up.
Secondary outcome [5]	Practice Environment Scale (i.e. factors that enhance or attenuate a healthcare professional's ability to practice skilfully and deliver high-quality care.)
Timepoint [5]	The scale survey will be collected at baseline, post-intervention (completion of intervention), 1- and 3-month follow-up.
Secondary outcome [6]	Trait Emotional Intelligence Questionnaire
Timepoint [6]	The scale survey will be collected at baseline, post-intervention (completion of intervention), 1- and 3-month follow-up.
Secondary outcome [7]	Depression, Anxiety, and Stress Scale
Timepoint [7]	The scale survey will be collected at baseline, post-intervention (completion of intervention), 1- and 3-month follow-up.
Secondary outcome [8]	5Q-5D-5L
Timepoint [8]	The scale survey will be collected at baseline, post-intervention (completion of intervention), 1- and 3-month follow-up.
Secondary outcome [9]	Positive and Negative Affect Schedule
Timepoint [9]	The scale survey will be collected at baseline, post-intervention (completion of intervention), 1- and 3-month follow-up.
Secondary outcome [10]	Professional Quality of Life
Timepoint [10]	The scale survey will be collected at baseline, post-intervention (completion of intervention), 1- and 3-month follow-up.
Secondary outcome [11]	Feedback Questionnaire (designed specifically for this study) Impact of the intervention: - What did participants benefit? (collected at feedback questionnaire) - Changes in participant's viewpoints (collected at feedback questionnaire)
Timepoint [11]	Post-intervention (completion of intervention)

Eligibility

Key inclusion criteria	The eligibility criteria are as follows: a. Participants are more than 18 years of age b. Currently practising within an Australian or New Zealand critical care setting as a registered health professional. Physicians, Nurses, Allied Health. c. Have access to a personal computer or device with camera and microphone d. Have access to an internet browser e. Have access to a phone with an app store or google play
Minimum age	18 Years
Maximum age	No limit
Gender	Both males and females
Can healthy volunteers participate?	Yes
Key exclusion criteria	Potential participants will be excluded if they: a. Are under any type of work compensation claims

b. Have contradictions to any of the interventions in both control and intervention groups
The trial will exclude participants that are considered as 'high risk' of self-harm or psychological harm.

Study design

Purpose of the study	Treatment
Allocation to intervention	Randomised controlled trial
Procedure for enrolling a subject and allocating the treatment (allocation concealment procedures)	Central randomisation by computer
Methods used to generate the sequence in which subjects will be randomised (sequence generation)	Simple randomisation using a randomisation table created by computer software.
Masking / blinding	Blinded (masking used)
Who is / are masked / blinded?	The people assessing the outcomes The people analysing the results/data
Intervention assignment	Parallel
Other design features	
Phase	Not Applicable
Type of endpoint(s)	
Statistical methods / analysis	The majority of the analysis will be reported descriptively. Feasibility will be determined by assessing the measurement tools and recruitment process. Acceptability will be analysed by determining the barriers, enablers, and potential recommendations to family, friends, and colleagues. The feedback questionnaire at post-intervention will be analysed using thematic analysis to provide a further descriptive understanding of the trial's feasibility and acceptability. Quantitative data will include the collection of outcomes such as resilience, burnout, wellbeing, turnover, practice environment, emotional intelligence, depression, anxiety, and stress, positive and negative affect, and quality of life. Descriptive statistics (mean, standard deviation) will be used to report on the above outcomes, which will provide deeper insight into the characteristics of the population and indications of potential changes denoted as mean score differences between the four-time points (baseline, post-intervention, 1-month, and 3-months follow-up). In-subject effects will also be reported and presented in a tabular format (F, df, t-test, effect size, CI, and p-values). Debriefing field notes will be analysed using thematic analysis.

Recruitment

Recruitment status Not yet recruiting

Date of first participant enrolment

Anticipated 30/05/2022 **Actual**

Date of last participant enrolment

Anticipated 19/06/2022 **Actual**

Date of last data collection

Anticipated 30/10/2022 **Actual**

Sample size

Target 110 **Accrual to date** **Final**

Recruitment in Australia

Recruitment state(s) ACT,NSW,NT,QLD,SA,TAS,WA,VIC

Recruitment outside Australia

Country [1] New Zealand

State/province [1]

Funding & Sponsors

Funding source category [1] Self funded/Unfunded

Name [1] Professor Di Chamberlain

Address [1]	Flinders University, Sturt Rd, Bedford Park SA 5042
Country [1]	Australia
Funding source category [2]	University
Name [2]	Flinders University Research Student Maintenance (RSM)
Address [2]	Sturt Rd, Bedford Park SA 5042
Country [2]	Australia
Primary sponsor type	Individual
Name	Professor Di Chamberlain
Address	Flinders University, Sturt Rd, Bedford Park SA 5042
Country	Australia
Secondary sponsor category [1]	None
Name [1]	None
Address [1]	None
Country [1]	

Ethics approval

Ethics application status	Submitted, not yet approved
Ethics committee name [1]	Flinders University Human Research Ethics Committee
Ethics committee address [1]	Sturt Rd, Bedford Park SA 5042
Ethics committee country [1]	Australia
Date submitted for ethics approval [1]	28/03/2022
Approval date [1]	
Ethics approval number [1]	4703
Ethics committee name [2]	University of Southern Queensland Human Research Ethics Committee
Ethics committee address [2]	USQ Toowoomba, 487-535 West St, Darling Heights QLD 4350
Ethics committee country [2]	Australia
Date submitted for ethics approval [2]	13/05/2022
Approval date [2]	
Ethics approval number [2]	

Summary

Brief summary	This research seeks to conduct a pilot Randomised control trial to determine the feasibility and acceptability of two evidence-based models of individual-focused interventions aimed ta improving wellbeing and decreased burnout amongst critical care healthcare professionals. Previous umbrella review and expert advice suggest that tailored interventions are effective as it attends to contextual factors and mechanisms that influence outcomes of the intervention. Thus, this project will test weekly debrief session alongside a once-off one-to-one clinical psychologist consult as triage to devise a weekly Individualised Management Plan (IMP) for the intervention group, versus only weekly debrief sessions for the control group. This research aims to determine the feasibility and acceptability to inform a larger multi-site RCT.
Trial website	www.wellbeingandburnout.com
Trial related presentations / publications	
Public notes	

Contacts

Principal investigator

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Data sharing statement

Will individual participant data (IPD) for this trial be available (including data dictionaries)?	Yes
What data in particular will be shared?	All of the individual participant data collected during the trial, after de-identification
When will data be available (start and end dates)?	Immediately following data collection completion; no end date determined.
Available to whom?	Only researchers who provide a methodologically sound proposal
Available for what types of analyses?	Any purpose
How or where can data be obtained?	Contacting the principal investigator (Di.Chamberlain@flinders.edu.au), or via the study website (www.wellbeingandburnout.com).
What supporting documents are/will be available?	No other documents available

Summary results

No Results

< BACK

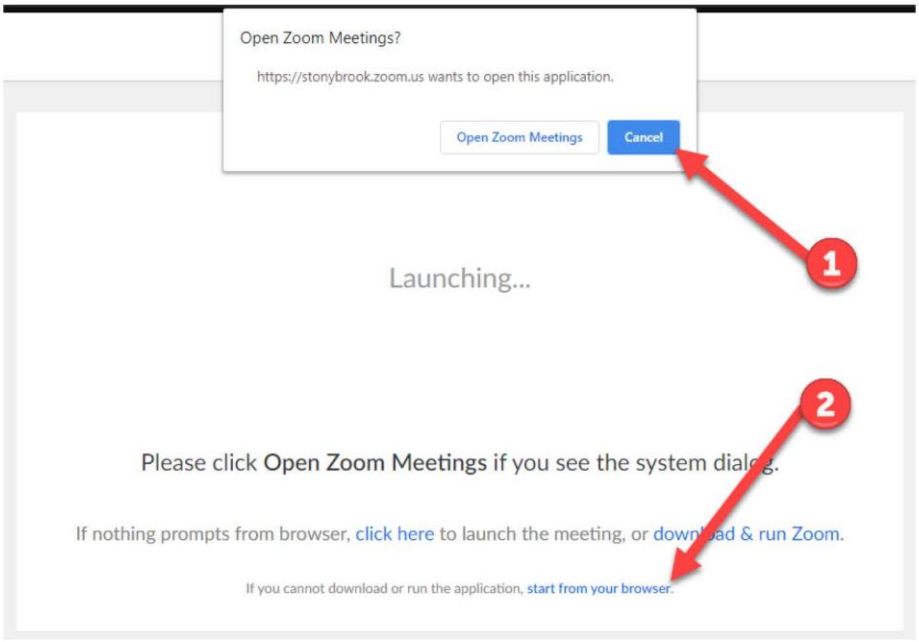
Appendix 23 Pilot RCT zoom communications instructions

Flinders University | University of Southern Queensland | Caring Futures Institute

Join a Zoom meeting without downloading the app

Note: The meeting host must enable **Show a "Join from your browser" link** for their participants.

1. Locate the meeting invite link from your email or calendar invitation.
2. Click the join link to join the meeting.
   On your web browser, a pop-up window will prompt you to open or download the application.
3. In the pop-up window, click **Cancel**.



4. At the bottom of the page, click **join from your browser**.
   You will be directed to a new page.
5. Click **Allow** to allow Zoom permission for your microphone and camera.
6. Sign in with your name to join the meeting.
7. (Optional) Select the **Remember my name for future meetings** check box.
8. Click **Join**.

Should you have any difficulties with this process please contact +61 432 697 921 and we will try and assist.

Appendix 24 Consult template

Guiding Questions

Themes	Guiding Questions	Notes (as required)
General Questions	How are you feeling?	
	How are you finding your job at the moment? Are there any stressors that you are currently experiencing?	
Mental Health	Can you tell me about any times over the past few months/weeks that you've been bothered by low feelings, stress, or sadness?	
Physical Health	Has it affected your sleeping habits? Have you noticed any changed? Difficulty sleeping? Restlessness?	
	How would you describe your appetite over the past weeks? Have your eating habits changed in any way?	
Autonomy, choice, and control	How often during the past months/weeks have you felt as though your moods, or your life, were under control?	
Relationships and belonging	Describe how 'supported' you feel by others around you – friends, family or otherwise	
Self-perception	Let's talk about how often you have felt satisfied with yourself over the past months/weeks.	
Hope and hopelessness	Can you tell me about your hopes and dreams for the future? What feelings have you had recently about working towards those goals?	

Appendix 25 Consult progress note template

Psychotherapy Note
(Group A Individualised Consultation)

Date of Exam: DD/MM/YY
Time of Exam: H:MM AM/PM
Duration of Exam: MM mins

Participant Name: _____
Participant ID: _____

Problem Pertinent Review of Symptoms:

Content of Therapy:

Mental Status:

Instructions / Recommendations / Plan:

Link to treatment plan problem:

Short/long term Goals:

Notes & Risk Factors:

Appendix 26 Debrief progress note template

Template – Professional Problem-Solving Peer Debrief (Note Taking if required)

Name: Date: Week: Time: Participants present: Participants not present:	
Field Notes:	
Introduction	
Pre-briefing	
Defusing	
Discovering	
Deepening	
Summary	

Appendix 27 Debrief semi-structured questions

Template – Professional Problem-Solving Peer Debrief

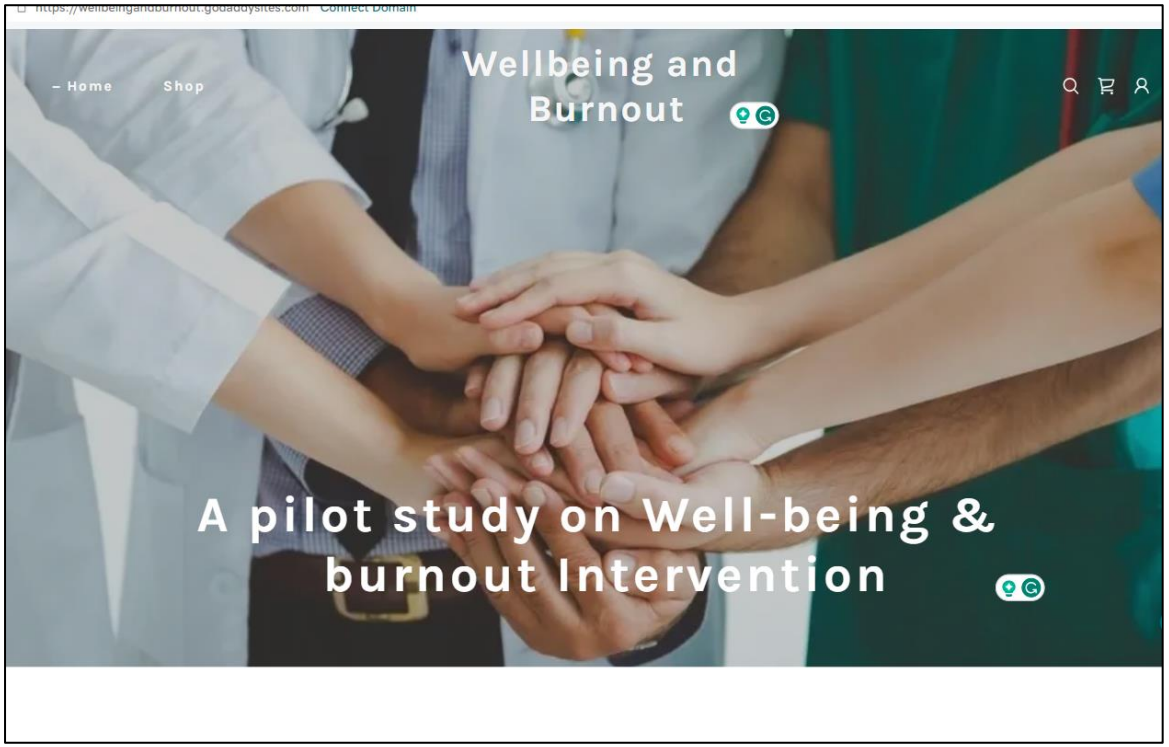
Aim: The peer debriefing will focus on the application of problem-solving skill (D'zurilla et al., 2004). This will be facilitated through group discussions, experience sharing, and individual guidance to summarize the causes of the problem, develop feasible goals and strategies, and perform analysis on the effects (success or failure) of the implemented strategy (D'zurilla et al., 2004).

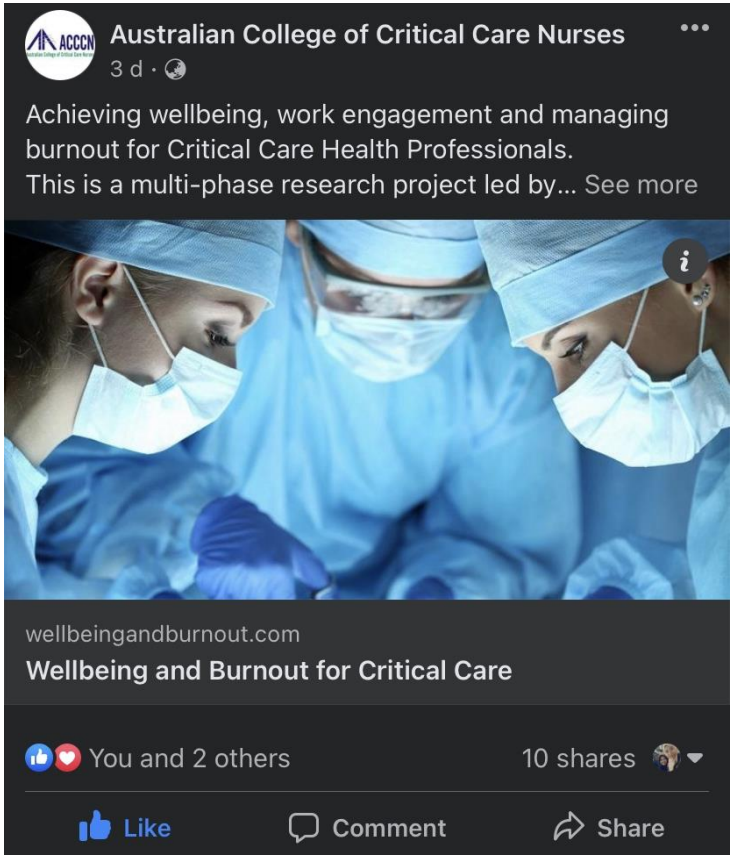
	Guiding script (you don't have to follow it word-by-word)
Introduction	Hi everyone. My name is _____ and I am <insert your profession>. Thank you for participating in this debrief session. I will be conducting the debrief sessions, facilitated by Associate Professor Gavin Beccaria, who is an experienced Clinical Psychologist. We also have Miss Nurul Adnan, who is a PhD Candidate involved in this study. She will be taking notes and assisting with any questions about the study today.
Pre-briefing	My role is not to evaluate your performance, but to help facilitate a discussion and prompt self-reflection. This is a platform for you to talk out your emotions and impact of any stressors you may have encountered at work. I will also get you to reflect those encounters, analyse your performance, and evaluate how well you managed the situation. I will also provide you with directions on how you may want to manage these types of situations using problem-solving approaches. We will then connect the new learnings into future situations. The session today shouldn't take too long. All debrief sessions will run for approximately half and hour. Any questions before we start?
ONLY AT WEEK 1	Before we get into debriefing, can I please get everyone in this room to introduce yourselves and tell us your profession.
Defusing	Does anyone want to talk about how they feel or if they've encountered any stressful scenarios within the week? "How did it feel to be part of that scenario?" "Thank you for bringing that up.... Let's hold that thought and come back to it during the second part of the debriefing . . . . ." "Let's recap WHAT happened during that scenario so that we can then discuss WHY during the second part of the debriefing."
Discovering	"Person A, I noticed that you did x in y situation. I was curious about that action because... (instructor offers his own mental model (problem solving approach about how to deal with y). Can you tell me why you did x?" "Thanks for sharing the rationale. Has anyone else every experienced this? What did you do to deal with that situation and why?" "Person A, how might this situation have been different if you had used that strategy". Or "Another way to handle x is z (target mental model). If you had done z, how would that change y?"
Deepening	"If you were to encounter a similar situation in the future, how would you handle it?" "How can you use the information we just discussed in your clinical practice?" "Can you think of other situations where this information could be applied?"
Summary	"Today we learned the following: . . . . ." "Let's end with this... What is one thing that you can take away from this session to use in your practice?"

Appendix 28 Pilot RCT flyer



Appendix 29 Trial website and social media advertisement





Appendix 30 Pilot RCT consent form

Wellbeing and Burnout Interventions for Critical Care Healthcare Professionals

INFORMATION SHEET

WHO IS CONDUCTING THE RESEARCH?

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What is the study about?

High burnout amongst healthcare professionals have dramatically escalated within the past year due to the rapid dispersion of COVID-19. Highly stressful professions such as healthcare professionals within critical care environments are more susceptible to developing burnout due to the stressful nature of the workforce. A team of multi-disciplinary critical care researchers embarked on an umbrella review using realist synthesis and sought expert advice to determine the effectiveness of individual-focused interventions that can provide relief to burnout issues and improve wellbeing. This project aims to conduct a pilot randomised control trial to determine the feasibility and

acceptability of two evidence-based models of individual interventions to improve wellbeing and decrease burnout amongst critical care healthcare professionals.

Purpose & Benefits of the study
The purpose of this project is to pilot two evidence-based individual-focused interventions (with strong theoretical backgrounds) to determine its feasibility and acceptability. The ability to provide a solution for this chronic endemic can potentially address and minimise negative personal and work-related consequences of burnout (i.e. poor quality of life, decreased job satisfaction, absenteeism, cynicism) for critical care.

Participant involvement
If you decide to participate in this project, you will be randomly assigned to one of two groups:

(1) Group A - IMP + Facilitated Peer Group Debrief
If you are allocated into this group, you are expected to complete a once-off one-to-one IMP. IMP is a consultation session that includes tailored strategies to improve your wellbeing and decrease burnout experiences. You are also required to undertake 6-weeks of weekly facilitated peer group debrief sessions. Both IMP and debrief will run virtually. You will also need to undertake online questionnaires and journaling.

(2) Group B - Facilitated Peer Group Debrief
If you are allocated into this group, you are required to complete a 6-week weekly facilitated peer group debrief sessions that will be conducted virtually. You are also expected to complete online questionnaires and journals.

Commitments
Questionnaires are required to be completed at baseline, post-intervention and at one- and three- months after the intervention. Journaling is to be completed weekly during the 6-weeks of prescribed intervention. Questionnaires should take no longer than 45 minutes to complete and journaling should take no longer than 8 minutes.

Communication
After you have been accepted into this study, we will contact and remind you about questionnaires to be completed and interventions that you are required to attend. We will send you a website link to your allocated group, which provides further information about your group allocation and the next steps for you.

Potential Risks
Questions in the survey will cover sensitive topics, which may be uncomfortable for some participants. If you experience feelings of distress as a result of the question and/or participation in this study, please let the research team know immediately. If you experience any psychological, emotional, or physical distress, we will make a referral to your workplace or personal psychologist or Beyond Blue Ltd or a psychiatrist or

emergency mental health services and follow up daily until you receive appropriate care. You will then be automatically withdrawn from the trial. There will not be any penalty for withdrawals. For further supports, please contact the following services:

- Lifeline – 13 11 14, www.lifeline.org.au
- Beyond Blue – 1300 22 4636, www.beyondblue.org.au

Withdrawal Rights

You may, without any penalty, decline to take part in this research study. If you decide to take part and later change your mind, you may, without any penalty, withdraw at any time without providing an explanation. To withdraw, please contact the Chief Investigator, the research team, or you may just not participate in the interventions at any time. Any data collected up to the point of your withdrawal will be securely destroyed.

Confidentiality and Privacy

Privacy and confidentiality will be assured at all times. The research outcomes may be presented at conferences, written up for publication or used for other research purposes as described in this information form. Information of participants is not intended to be shared with researchers outside the research team. The privacy and confidentiality of individuals will be protected at all times. You will not be named, and your individual information will not be identifiable in any research products without your explicit consent.

Data Storage

The information collected may be stored securely on a password protected computer and/or Flinders University server throughout the study. Any identifiable data will be de-identified for data storage purposes unless indicated otherwise. All data will be securely transferred to and stored at Flinders University for five years after publication of the results. Following the required data storage period, all data will be securely destroyed according to university protocols.

How will I receive feedback?

On project completion, the publication of this study will be emailed to all participants.

Ethics Committee Approval

The project has been approved by Flinders University's Human Research Ethics Committee (ID 4703) and the University of Southern Queensland (ID H22REA178).

Queries and Concerns

Queries or concerns regarding the research can be directed to the research team. If you have any complaints or reservations about the ethical conduct of this study, you may contact the Flinders University's Research Ethics & Compliance Office team via telephone 08 8201 2543 or email human.researchethics@flinders.edu.au.

Thank you for taking the time to read this information sheet which is yours to keep. If you accept our invitation to be involved, please sign the enclosed Consent Form.

Appendix 31 Sphericity assessment for secondary findings of the pilot RCT

Within Subjects Effects	Mauchly's W	Approx. Chi Square	df	Sig.	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
DASS-21							
Depression	.816	3.391	5	**.641**	.871	1.000	.333
Anxiety	.961	.658	5	**.985**	.974	1.000	.333
Stress	.777	4.210	5	**.520**	.862	1.000	
MBI-HSS							
Emotional exhaustion	.324	18.859	5	.002	.753	**.703**	.333
Personal accomplishment	.407	14.143	5	.015	**.748**	.918	.333
Depersonalisation	.794	3.627	5	**.605**	.868	1.000	.333
PANAS							
Positive Affect	.660	6.532	5	**.259**	.810	1.000	.333
Negative Affect	.492	11.158	5	.049	**.744**	.971	.333
UWES-SF							
Vigor	.508	11.332	5	.046	.767	**.935**	.333
Dedication	.384	15.988	5	.007	**.710**	.853	.333
Absorption	.369	16.693	5	.005	**.721**	.868	.333
Complete UWES scale	.353	17.403	5	.004	**.702**	.842	.333
TIS							
Turnover intention	.613	7.685	5	**.175**	.795	.989	.333
SPSI-SF							
Avoidant style	.362	16.992	5	.005	**.601**	.701	.333
Rational PS	.735	5.151	5	**.398**	.821	1.000	.333
Negative PO	.335	18.266	5	.003	**.691**	.826	.333
Impusivity/Carelessness	.656	7.039	5	**.218**	.770	.939	.333
Positive PO	.628	7.778	5	**.170**	.765	.932	.333

Appendix 32 Levene's test on homogeneity of variance

Variables	Timepoint 1		Timepoint 2		Timepoint 3		Timepoint 4	
	Levene Statistics	Sig.	Levene Statistics	Sig.	Levene Statistics	Sig.	Levene Statistics	Sig.
DASS-21								
Depression	.21	.655	.007	.93	.06	.82	.10	.76
Anxiety	1.88	.19	1.19	.29	.88	.36	.84	.37
Stress	7.43	.01	1.39	.26	.57	.46	25.33	<.001
MBI-HSS								
Emotional exhaustion	2.01	.173	2.72	.12	1.82	.19	1.08	.31
Personal accomplishment	.44	.52	13.17	.002	.67	.42	8.87	.008
Depersonalisation	1.09	.31	10.57	.005	.68	.42	1.01	.33
PANAS								
Positive Affect	.15	.71	2.12	.16	5.89	.03	1.39	.25
Negative Affect	.29	.60	.81	.38	.81	.38	.78	.38
UWES-SF								
Vigor	1.38	.26	.02	.90	2.95	.10	19.41	<.001
Dedication	.07	.80	.49	.49	18.80	<.001	16.46	<.001
Absorption	4.26	.05	1.30	.27	4.39	.05	13.13	.002
Complete UWES scale	1.57	.23	1.09	.31	7.74	.01	15.33	.001
TIS								
Turnover intention	2.10	.17	1.05	.32	3.64	.07	3.24	.09
SPSI-SF								
Avoidant style	.027	.870	.08	.79	3.92	.06	8.23	.01
Rational PS	.58	.46	1.71	.21	1.86	.19	4.32	.05
Negative PO	1.49	.24	.03	.86	3.69	.07	4.70	.04
Impusivity/Carelessness	1.31	.27	2.66	.12	.55	.46	.76	.40
Positive PO	.09	.77	.05	.82	.17	.69	4.65	.05

PS=Problem-solving, PO=Problem Orientation, UWES= Utrecht Work Engagement Scale

Appendix 33 Pilot RCT thematic analysis

Group B Analysis

Personal interests

Main theme	Sub-theme	Program Theory Components	Sub-theme (sentences)	Quote
Motivation enhancement (PI)	Resources, Encouraging vitality through resources, self-management Resources as a coping mechanism	1. Knowledge and skill development, 2. Tailoring to my needs, 3. Ask me what I want, 4. Justifying interventions, 5. Don't ignore my problems at work <u>Addressing 0organizational factors:</u> 1. Decreased resources	Strategies - Sharing information and reinforcement of strategies	- I kinda haven't felt what there was necessarily tools that I could access to put into practise 'cause I mean I used to go away from a psychology session with my clinical Skype psychologist I'd come in this week go I haven't done my homework word I know that these certainly where things have come up this potential to identify tools that people can use CBT or whatever and I was I didn't know what to write for response because there was never really I didn't feel like there was skills given or you know maybe at that 10 minutes to go mark as the point to go these are the kind of things that have come up these are some tools that potentially you could utilise let's run through those I don't know something on those lines(33244B) - 'cause you do the debrief but it actually well sorry although I kinda find that you need time for it to sink and resonate start to look at it in your own practise and of course with shift work you may not be back in for five days so yeah(33244B)
			Resources - Having additional resources that can be used, stored, or shared	- I think it's helpful I think it's helpful to have some sort of support system at work as well as some sort of mentor ship your system so that there's a certain personal people that that you that you can go to to talk about things(20933B) - I think there was scope for some homework for lack of a better word to say "you guys could go away here's a link to read you know maslow's hierarchy of needs or something" but this is how we can get to self actualization or here is Wimhoff breathing or here is something else here's jujitsu you know have a look at these things or here's a comedy sketch about nursing you know something that that gives you a tool to practise(13721B) - in martial arts for example, I think if you do a recruitment thing and provide vast number of resources for students, and you have like a hundred resources, I know that a big percentage of them are not going to do anything with it. I think it is the one person you reach is why you persist, (13721B)
			Effectiveness - Feelings on weather they felt the debrief intervention worked	- I joined in on were very helpful I think it was good just to have a platform just to you know be able to freely say what was in my mind so yeah I found them but like the sessions that I joined were quite helpful (30392B)

Group B Analysis

Main theme	Sub-theme	Program Theory Components	Sub-theme (sentences)	Quote
				- To be honest I don't know whether it improved burnout symptoms or well being because the same issues and difficulties didn't change but it I don't know it it just felt good to be able to talk about them in a safe space (30392B) - I came into it like approaching it from a really positive point of view and I think for me doing that I got what I felt I needed from it (30392B)
Reciprocity (Give and take) (PI)	Positive learning culture, Reassurance, Expression, Collaboration	1. Positive learning culture 2. collaboration 3. Being aware of my surroundings 4. Don't ignore my problems at work	Isolation, silos - Working in silos, lack of social connection with others	- but after that it sort of drops off and there isn't really any sort of structured mentorship thing going on where I work so that is something a little group of us are trying to look into it as a project is to to sort of try and workout some sort of mentor ship system and social sort of support (20933B)
			Comfort, anonymity - Having a sense of comfort where people are helping each other	- it would have to be a an ongoing long-term process probably with the same people they've got that level of comfort and security and would be able to share(33244B) - I think some in some instances it's probably better to not know who you're talking to so yeah so that you can just talk about different issues and hear somebody's viewpoint that's not involved at all but yeah pretty sometimes I think probably to have people that are in the same situation going through the same thing as it's gonna be helpful but yeah probably both equally I think(20933B)
			Relating to others - Ability to resonate with others	- I felt like they understood what I was going through 'cause I understood what they were going through(30392B) - an you know colleagues that work across the other side of the country feeling the same types of pressures and and had hardships that you know we feel in my big load ICU(30392B)
			Getting used to each other - Working together/collaborative	- I'm a believer and it takes time for everyone to get used to each other (13721B) - we're all getting used to each other but you know once people start once the first person pops the cork and starts talking freely I think everyone feels more comfortable asking if you bring it into many by me with one or two it wasn't a big deal they all adapted quickly to the group (13721B)

Group B Analysis

Main theme	Sub-theme	Program Theory Components	Sub-theme (sentences)	Quote
			Ability to express oneself - Being able to express onself	- I found what the talking through things is actually way better than bottling it all up yourself or feeling that you're somehow less worthy or that somehow your you know your past experiences don't matter and all that sort of stuff so I felt that that was really good(34424B) - just having the ability to talk through some of the things that bother you is really good so you know just to say you know I really felt bad about you know this patient who's just sitting on the end of the ventilator and you know nobody will make a decision to stop that's all this stuff I found that that that's not just our unit the doing that it's actually us a wide and maybe it's worldwide as well yeah(34424B) - this gives you the opportunity to actually bring those feelings out but you feel like frustrated and angry that we are you know we're putting this position(34424B)
			Collaboration - Working together/collaborative	- I really like I really see their place in it and like like I've mentioned before like they I think they need to be out of the workplace and that we that way you can kind of contextualise your experience with other people (42238B) - I guess for me it just puts things in perspective a lot yeah we're all in this together and we're all dealing with similar sort of issues across Australia and I guess I don't know I I actually just feel really grateful for my situation in Canberra(34824B) - I'm hearing hearing other people's stories was really was really good like seeing their perspective on things and yeah getting advice from some of the other more senior nurses yeah that was really good yeah yeah(34824B) - it's about reflecting and talking to people that share the same work as you it's much easier to relate to them then yeah then I've seen a lot of like other counsellors and things and it's it's quite hard to relate to people that aren't in the same industry(34824B)
			Ability to connect with others - Ability to resonate with others	- it's just nice to be able to bounce an idea and know that there are you know for me the last last week there were three other people in the room that were in a sort of a similar place you know with varying degrees on what are we going to do what's the path forward(13721B)

Group B Analysis

Main theme	Sub-theme	Program Theory Components	Sub-theme (sentences)	Quote
Self-awareness (PI)	Self-reflection, coping, assistance,	1. Ask me what I want 2. Knowledge and skill development	Normalizing the experience - Grounding yourself	- **I felt it would be good to do it more often I can during those those periods easier to share those experiences and it helps to I guess normalise your experience**(42238B) - I think when I signed it actually so I was really stressed about a few things but that's all the stress had disappeared somewhat but so by the time I started this study I was probably feeling in a good space but I did find it really useful too talked to the other participants because some of them are experiencing an awful other stress(34424B) - would just love it to be successful in it and debriefing becomes a normal part of if any critical care environment or any health care environment where hardware you see things that you shouldn't see yeah yeah where it just becomes yeah part of what we do yeah looking after each other yeah (30392B)
			Ability to share stories - Foundational aspects of why debriefing may work/inbuilt nursing cultrure?	- me and another lady but I didn't even mind that because it was the I think the first session or second session so it was just sort of sharing stories which I really liked yeah sometimes I think if you get like more than 10 people it gets a bit yeah but people kind of get a bit forgotten (34824B)
			Awareness - Self-identification/self-improvement through reflection	- I didn't realise out the impact COVID had or like I guess I intellectually knew it when I didn't know it as per the feedback of some of the guys it was kind of that was interesting to hear and it was good to hear(33244B)
			Self-reflection - Reviewing/reflection	- I guess that was probably more and regards to self reflection and more of a critical overview of what's going on in my own environment at this stage(33244B)

System Structures

Main theme	Sub-theme	Program Theory Components	Sub-theme (sentences)	Quote
Structural integrity (SS)	Structure	1. Accessibility and inclusivity	Changes needed in workplace to enable greater sense of wellbeing	- I guess but in terms of burnout and well being because you know things don't change in your workplace yeah if that is too I don't know if that made sense or not (30392B)
			Guilt issues/collaboration - Guilt in attending the sessions	- I guess it prevents like the grass is always greener syndrome that you sometimes get going Oh well they get paid more they have like set ratios and all those sorts of things and particularly in one of the sessions we discussed like how one of the nurses in WA had like a really complex like guilt issue around the pandemic(42238B) - well it fills a kind of void (33244B)
			Implementing in the hospital - Structure of the debrief (pertaining to free flow rather than structured)/ Setting for debrief/ Time constrictions /Pertaining to group size	- when your debriefing you not totally into the debrief it you probably thinking on the side of like your patient and you know are they alright out there do you need my help that kind of thing so yeah at all like in the middle your debrief session is like your emergency buzzes and stuff going it really like it ruins of carbs like it's just it's hard to kind of have that in the back your head yeah(42238B)
			Structure of participants - Structure of the debrief (pertaining to free flow rather than structured)/ Setting for debrief/ Time constrictions /Pertaining to group size	- it's a real challenge experiences out of different people and because often the groups are quite small like 2-3 people that's kind of too small I think to too small to intimate that makes sense and you're not getting I think one of the benefits of doing something like this is you're getting feedback from people a lot of people on different areas(33244B) - I think a lot of us were expecting a little more structure but that not wasn't necessarily bad thing(13721B) - I think there was is there a way to make it a little more open in the group by even something like what was your understanding of the things discussed in the group and themes discussed in the group versus you know there wasn't a lot of tools that we offered each other in terms of managing burnout and self care(13721B)
			Content Structure - Structure of the	- I felt that sometimes I needed more structure I guess I think I would have benefited from go hey like what do you guys think about this and

			debrief (pertaining to free flow rather than structured)/ Setting for debrief/ Time constrictions /Pertaining to group size	kind of the conversation flowing on from there maybe that would prevent it end from turning into like a massive bitch session about like how much we all hate word(42238B) - I think an hour was probably was definitely enough I wouldn't want to go past past the hour more so because I mean I've I've got three kids that are very busy schedule kinda as it is and sometimes like blocking an hour out of my day without the interruption of of kids is a little bit challenging so like even even if they were like a little bit more structured you could make them a bit shorter and snappier and make it sort about half an hour 45 minutes kind of length of the time(42238B) - I guess I thought it would be a bit more structured but then in the end I kind of kind of like that it just flowed(34824B) - he same issues kept coming out which is OK 'cause it was different people but I kind of feel like we got lost sometimes we got a bit lost in sort of more about nurses and not about why we love being a nurse(34824B) - I just felt with we just felt I felt that we circled around to the same things a lot of the time because it's obviously the things that are bothering people the most you know they're not bothered about other colleagues so much (34424B) - so I don't think you can change what content is discussed when it's an open forum it's just what people are feeling and their experiences for that week yeah (30392B) - once somebody started saying something other people sort of talked about their experiences as well and if people hadn't said anything of the person that was overseeing would sort of like specifically bring them in and sort of say have you had any any experiences and so they did try to involve the whole group and things(20933B) - I think I probably was quite interested in the topic that we were discussing so that was really annoying like that but I did notice it like some people didn't have quite as much to contribute and I wonder if that's something that they felt that they weren't able to participate because they couldn't find their space in the conversation(42238B)
			Free-flow - Structure of the debrief (pertaining to free flow rather than structured)/	- you can't really because it was it was a very fluid process didn't feel particularly structured um and you know you just didn't know what was going to come from who so I think that putting restraints on it like there's actually would hinder the process overall especially because

			Setting for debrief/ Time constrictions /Pertaining to group size	nursing nurses eating their young is a very real part of the nursing environment(33244B) - For a maybe a short term process such as this, having some structure probably would have potentially provided some benefit but as you said it's a feasibility concept and I think that if you are going to do something that's much longer term like sitting down once a week over a six month or three month period of time allowing that fluidity for people to express themselves intentionally starting to build structure around what's actually coming out of the content I think so the content dictates the structure for the future rather than the other way around(33244B)
			Repetitive - Structure of the debrief (pertaining to free flow rather than structured)/ Setting for debrief/ Time constrictions /Pertaining to group size	- different things seem to come out each week but there is obviously some repetitive themes I didn't so much get the palliative care, it came up in my first station and my last session but it wasn't really an issue(33244B)
			Integrating positivity	- I think a the session just seems to be focused on how do we make ourselves feel better without bringing everybody down you know I guess we talk about it but we shouldn't we shouldn't dwell on as if that's going to be there and we should be able to like say oh this happened to me and someone says I will yeah that happened to me and this is what I did it should be more of a positive thing rather than rather than just dwelling on how bad it was(34424B)
			Expectations	- I think you know for my my personal journey and well being and it's a longer time period you know if I implemented tool in week one by week two I would be surprised if I suddenly magically felt better moving those scores the benefit of attending the group (13721B)
			Participant numbers - Number of participants	- maybe five people and that was actually really good because you didn't feel like you didn't get your opportunity to speak if you wanted to didn't feel like other people were dominating or what have you and sometimes(34424B)
Psychologists feedback (SS		1. Change Champions	Psychologist - Consistency with psychologists	- I think the psychologist did a really good job at trying to be like you include everyone but eight to really be group if you can't like see them all face to face like physically around with each other(42238B)

				- I think the psychologists were fine but perhaps they needed to I don't know how much they understood that the pressures on nurses on this is yeah I don't know whether that's something that I just didn't know that they they understood the pressures of shift work and all that sort of stuff(34424B) - the two psychologists that you had on board ask them really great questions and got the group talking really well but I felt but I probably were opening up more to the other participants in the group more than then I did to them, (30392B) - I think in if the in that type of role then you do need to be a little bit partial in and step back so that you can give you know some honest yeah you're not clouded i get I find I found that although my work situation didn't change to actually having colleagues to talk to so debriefing was I found to be really really important and and quite beneficial(30392B) - I think psychologists definitely have a place to play in debriefing especially they are trained(30392B) - I think that their trained to pick up on subtle things that would need following up yeah so that's really important especially if your debriefing about traumatic things that somebody is actually trained to say hey I think you should I think you need to go and talk to somebody else(30392B) - having a psychologist there would probably be able to see all the underlying issues points and things but I think sometimes with nursing you've gotta be you've got to have experienced it yourself to understand it, specific situations or how people think or what is expected of you and and so so maybe yeah maybe having a nurse involved as well as a psychologist or something would be would be good 'cause yeah I think some situations it may it might be fine to know what you're supposed to think or do or whatever but that's not necessarily what you actually do in the moment and yeah(20933B)
				- I definitely think this psychologist in particular sorry I'm not very good with names she was really lovely in terms of when people were telling their issues and situations she was very understanding and basically listening and being heard like I felt like I was heard(34824B)
Journal Feedback (SS)			Journal - Journaling structure	- I kind of felt like most weeks I didn't have like enough to specifically write on and I kind of felt like my responses are a bit light(42238B) - I felt like the journaling didn't relate as much to the debriefing maybe because like I can't remember some of the questions it was like what

				do you hope what did you get out of it what did you hope yeah I guess um no I do like the journaling but I thought it was good but I don't know how much it changed the debriefing(34824B) - I just don't think um there wasn't enough yeah I'm actually not sure I don't like doing my homework clearly(33244B) - nah, I cant stand it (33244B) - I do have a journal that if I've had a traumatic experience at work I do write in from time to time and then I find that just helps 'cause it just gets it out of my brain it helps me to process everything but I was able to do that with the debrief(30392B)
Innovative approach (SS	Accessibility, flexibility, Technological advancement	1. Accessibility and inclusivity 2. Web-based programs <u>Addressing individual factors:</u> 1. Conflicting priorities 2. Personal barriers <u>Addressing 0organizational factors:</u> 1. Work culture 2. High turnover rates 3. Time management 4. Financial constraints	Timing/child with participant - Post-debrief and having to do small talks/inconvenience	- ometimes it can be hard to like have a a concentrating conversation when he's got TV in the background or is like throwing stuff across the room all those sorts of things so like the opportunity to have them once they go to bed(42238B)
			Conducting in workplace - Providing a safe space to discuss stressors	- it's it's very rare that have enough time and just with the very small staff situation at it's kind of it's better to take it external working did you know what I mean(33244B) - : its better if its not within the workplace(33244B) - probably the one that's integrated into the workplace because I think that would be the one that would be of most benefit myself and my unit - I think because it would just become a part of our core business it would just become a part of what we do whether it be a traumatic week or not a traumatic week just be something that you know we just do with each other yeah(30392B) - if it's debriefing is integrated into our workplace then we would find that we would discuss it more between each other yeah(30392B) - I think I could see it being done just from a ward clinician and I think it would benefit everybody not just nurses so anybody kind of I guess I don't know like it's just an opportunity for people to get together whether it's once a week or and just talk about things that have impacted them through the week whether that's management as well or you know the cleaners the doctors the physios 'cause we're all part of that really big team... just a safe space for talking no matter who it is that works in that environment I think would be a wonderful thing to do(30392B)
			Confidentiality - Providing a safe	- : I actually like this one better I feel like because you know as I said before I see you has lots of big personalities I think it's easier to talk to

		5. Lack of support by management	space to discuss stressors	people you don't know actually yeah 'cause there's no prejudgment(34824B)
			Technology - Technology enables flexibility of the intervention/ confidence	- it's probably a technology related thing but having the number of participants that you can like comfortably see on a screen kind of helps too like there's always technology issues but are kind of sometimes feel that maybe like a four or five would be a better number 'cause that way like you can see everyone across the top of your zoom screen and like people get more conversation(42238B) - likely start to get to 8 then like you become it becomes more turn taking and people are naturally arnt as enthusiastic of the conversation and I kind of like then they jump in or they feel left out or it's a little bit hard to kind of keep everybody everyone going(42238B) - I definitely think like that the level of anonymity in around it kind of makes it a little bit easier to sometimes get like the little niggles off with not not the ever worried with work that had come back to bite you(42238B) - look I think online has its place but sometimes I feel like it's actually better to be face to face for some of these so the things 'cause people do feel like for that particular workplace you know they're all working together you know like people used to just sit there and cry(34424B) - I think zoom is online platform does help but I also find me all of these online platforms 'cause I've done online stuff years even before the pandemic if you're not in the room people people just talk over you and ignore you so yeah definitely(34424B) - I'm a little bit shy so I always you know struggle with other people but being online I don't know kind of makes it a little bit easier... I thought it worked well because as I said before it highlighted that no matter where you are you know you can talk to colleagues that are going through the similar or same things yeah it's not just unique to 1 area (30392B) - I think there's some psychology of online that allows people to hide like in face-to-face for debriefing you've got nowhere to hide whereas here if you're online, you've got a place to hide, I mean if you're embarrassed or if you've got tears in your eyes, you can turn the camera off but still talk and contribute I think this scope yeah just I think sometimes online protects people a little more in their own head.... And I think it allows less interruption like if you're in a meeting and if someone rings, you can't just mute it and carry on, it's an interruption. I didn't mind the online form(13721B)

Group B Analysis

(N=5) Control Group

Question	Survey Feedback
How do you feel about implementing strategies? **System Structures (SS)**	**Not Applicable for participants in this group allocation.**
How easy was it to implement it? **System Structures (SS)**	- It was hard sometimes to schedule the online zoom sessions around my work roster - I missed a couple of sessions because I was on the train or doing other things. The options for debrief times did not always fit with shift work. It didn't really bother me - Being more self aware, asking family / friends to comment if you are more irritable than usual - I didn't really need to put in any more effort. I did reflect more on my day to day activities and why I was feeling the way I was - Attend once weekly debrief sessions. I felt that it was alright - not much commitment which is very good
What are the changes in your views of living with stress and burnout **Personal Interests (PI)**	- That I had better coping mechanisms for my stress than many of my collegues - I'm probably feeling somewhat less stressed than I was - recognise if you are feeling tired of work, not just one random bad shift but it becomes the norm - No, because the circumstances that have led to stress and burnout are beyond my control and the same stressors are still there - Yes, I feel that I am not the only one going through stress and burnout at work.
What did you learn from this experience? **Personal Interests (PI)**	- That my experience of burnout is widely shared across all crit care areas around Australia - Definitely that it's not so bad at my workplace. Many others have worse conditions that my ICU. Sometimes talking about issues can lead to commonalities with others' experiences and maybe ways to deal with stressors - Boundaries are really important, leave work at work, share expereinces - That the issues I face are not unique to my unit, the same issues are faced by other nurses in other areas - I learnt that talking to others is beneficial
Do you think you improved in your ability to problem-solve challenges within your workplace and daily life? Why or why not? **Personal Interests (PI)**	- Not really, problem solving these challenges wasnt discussed at length in my sessions - Somewhat. More open to others' experiences at work and I can be more supportive, which helps me to feel like I a contributing in a meaningful way - I think recognise which battles you can solve, sometimes frustrating dealing with nursing admin and staff redeployment, discuss with medical staff and other team members for support on shift. - Maybe. Reflection has made me acknowledge that some things are out of my control - Yes, talking to others helped me create strategies for myself to use and solve problems within my workplace.
What was your favourite part of this experience? **System Structures (SS)**	- Sharing my experience online and listening to others experience - The talking about it really helps.

Question	Survey Feedback
	- make a list and work through it bit by bit, try not to get overwhelmed - Talking with other clinicians who have similar experiences to me - Talking out aloud - Sharing experiences with others - meeting others from different ICUs - group chats, hearing others experiences and solutions - As above - Meeting different people
Why would you recommend this experience? **System Structures (SS)**	- Yes, important to actively work to prevent burnout - Yes. I found it helpful to get priorities straight and for self care - yes, always good to have another outlet - Yes. I see the importance of talking to colleagues who have experienced hard days, not bottling every thing inside - Yes, it is beneficial especially to those that dont have others that they can shre their stressors with
In what ways do you think the program has impacted your health and wellbeing so far? **Personal Interests (PI)**	- Its given me perspective about my experience - Provided an outlet for issues that may have led to greater stress if not talked about - that it's ok to leave work at work - It has been beneficial in that it has made me look at the aspects of my day that were hard - It shas improved my outlook on my profession, which is a good thing
How confident do you feel about continuing to implement what you have learnt? Have these feelings changed along the way throughout the program? **System Structures (SS)**	- Not really, nothing concrete to implement - Probably - yes, promoting mentorship and social support within the unit - I would like to but I don't know where to start. - There wasnt really anything that was learnt, but I found that talking helps - I havent been able to implement many new things that I wasnt already doing. - Probably - Feel i have a good family support, pets at home - I thought that I needed to have specific training to implement debriefing however, from my experience, I now think that talking with colleagues who have the same experience is helpful - Very confident in using this experience within my workplace
What was challenging in this experience? **System Structures (SS)**	- The timing of the zoom sessions - Getting to the sessions and having something stressful to discuss - time - It was a positive experience - Nothing really

Question	Survey Feedback
What was your least liked experience in this program and what and how do you it can be improved? **System Structures (SS)**	- More varied prompts for the journalling and more strategies to implement - Not sure - planning specific times for all sessions in advance, so the sixth week one, things may have changed before it comes up and what sounded doable at the start may not be so easy to fit in at that time in the present - I think that having psychologist's with a medical background would be of benefit - NA
Were there anything you think should have been included in this program? What about the program structure and frequency of sessions/interactions, duration of the program? **System Structures (SS)**	- Later sessions in the evening - Maybe a little more structure and focus on strategies to deal with stress - I think its good to have a weekly session. If this were to be regular maybe a set time / day eg every Tuesday 6 pm, people could plan ahead in order to join the groups. - I thought the program was well structured, the sessions ran for a good amount of time - No

Appendix 34 An autoethnography of the pilot RCT

Prologue

The completion of my umbrella review and expert opinion study marked the beginning of a transformative and eventful journey—the development and conduct of the pilot Randomised Controlled Trial (RCT). As I embark on this autoethnography, I delved deep into the intricate details of my experience, recalling the challenges, triumphs, and personal growth that unfolded along the way. The decision to proceed with the pilot RCT was met with a mixture of excitement and trepidation. It was a significant step in testing the effectiveness of the Individualised Psychosocial (IP) program, a project that had been nurtured with passion and dedication.

Setting up the trial's components

Setting up the trial components was quite simple. Since I had constructed a trial manual as a guide, I was able to follow the necessary steps and requirements.

Trial website and flyer

I used www.godaddy.com to set up the trial website as it was the most familiar platform for me. My previous experience in creating a website for a scout's group I volunteered with proved to be helpful in facilitating my creativity. The steps to set up the trial website were simple, and I followed the recommended procedures listed on the website. During the design process, I made sure that the website was easily accessible and that all relevant information about the trial was available. However, I was cautious not to overwhelm potential participants with too much information that could deter them from participating. To achieve this, I included several pages on the site that introduced the research team, provided information about the trial and intervention, outlined the eligibility criteria, and included a user-friendly link for registration.

Designing the flyer for the trial was a straightforward process. I found appealing templates on Google that aligned with the trial's theme, and I followed their style accordingly. Ensuring compliance with the requirements of the ethics committee was of utmost importance, so I made sure the content and design were in line with their guidelines.

Trial email

Embarking on the journey of conducting my trial, I recognised the significance of effective communication with participants. As a researcher, I needed a reliable and organised way to track inquiries, manage communication, and ensure timely reminders. This led me to create a dedicated trial email on www.gmail.com, a simple yet powerful tool that would shape my interactions with participants throughout the trial. Setting up the trial email proved to be a game-changer. With a distinct and professional email address, I was able to establish a clear channel of communication for all trial-related matters. This allowed me to keep trial correspondence separate from my personal email, avoiding any confusion and ensuring a focused approach to research-related communication. The trial email became my central hub for participant inquiries. Participants could reach out to me directly through this dedicated email, allowing for an efficient and streamlined exchange of information. This enabled me to promptly address any questions, concerns, or feedback that participants had, fostering a strong sense of rapport and trust. To further enhance communication, I linked the study website's enquiry page to the trial email. This integration provided a seamless way for potential participants to reach out to me directly from the trial website. This user-friendly feature not only facilitated ease of communication but also ensured that no inquiry slipped through the cracks. Beyond handling inquiries, the trial email played a crucial role in sending reminders to participants. Timely reminders for debrief and consult sessions were sent through this channel, ensuring that participants were well-informed about their upcoming commitments. Additionally, reminders for completing psychometric questionnaire and demographics were efficiently delivered through the trial email. These gentle prompts proved invaluable in keeping participants engaged and committed to their involvement in the trial.

Data collection tools

I used Qualtrics to establish the data collection tools, encompassing psychometric questionnaires and journal entries. Given that this marked my inaugural attempt at crafting questionnaires, the endeavour posed challenges, largely stemming from uncertainty about how participants would engage with these instruments. This sentiment was accentuated by the presence of numerous psychometric questionnaires; there was apprehension that participants might become disengaged and not complete them. Seeking guidance, I consulted with a research assistant on our team, who proposed a solution: dividing the psychometric questionnaires into two separate Qualtrics surveys, labelled as Part A and Part B. The design allowed participants to proceed from Part A to Part B if they were comfortable doing so. Consequently, my role involved continual monitoring of participants' completion progress. If any participants hadn't finished the questionnaires, I had to contact them individually to prompt their completion of Part B. While this approach seemed promising initially, the experience revealed that a significant number of participants were not completing Part B. In response to my outreach, participants expressed surprise, mentioning that they were unaware of the requirement to complete both parts. Moreover, their feedback suggested a preference for a unified questionnaire rather than divided sections. This insight underscores the importance of participant comprehension and the potential for enhancing future research by incorporating a more seamless survey structure.

Booking platform

As I reflect on my experience of setting up the trial, I am reminded of the challenges I faced as a solo researcher managing a complex and multifaceted project. The realisation dawned on me that I needed a solution to simplify the scheduling process and ensure a seamless experience for both participants and myself. With the weight of responsibility on my shoulders, I began exploring various booking platforms that could aid in organising the consult and debrief sessions. It was during this search that I stumbled upon www.calandly.com, a game-changer

that revolutionised the trial management process. Calendly offered a user-friendly interface, empowering me to create customisable booking slots with ease. I could effortlessly set specific times and dates for the sessions, allowing participants to select their preferred slots based on their availability. This level of flexibility was crucial, considering the busy and demanding schedules of critical care healthcare professionals who were the heart of my study. The automation provided by Calendly proved to be a time-saving boon. The platform not only facilitated booking but also handled reminders efficiently. With just a few clicks, I could send automated email and text message reminders to participants, ensuring they were well-informed and prepared for their upcoming sessions. This feature alleviated the burden of manually tracking and reminding each participant, granting me peace of mind that everyone was on track. Calendly's organisation tools played a significant role in streamlining the trial process. I could easily monitor the number of participants attending each session, making it possible to manage group sizes and participant distribution effectively. The platform's flexibility allowed for seamless rearrangement of participants, ensuring a balanced and optimal session flow. As the trial progressed, I witnessed the positive impact of Calendly on participant engagement and satisfaction. The simplicity and convenience of the booking system made it easy for participants to select suitable time slots, minimising any barriers to their involvement. The automated reminders acted as gentle nudges, gently encouraging participants to stay committed to their sessions.

Meeting with the facilitators (supervised psychologist students)

Meeting with the facilitators for the first time was a nerve-wracking experience. This pilot RCT was not only my first time conducting such a trial but also my first time providing instructions to facilitators about its intricacies. Fortunately, a clinical facilitators on the team proposed a brilliant idea to involve final-year psychology students from the University of Southern Queensland (UoSQ) to conduct the consult and debrief sessions, while he supervised the process. This arrangement provided a win-win situation as the trial needed facilitators, and these students were seeking opportunities for their final placement.

Before the collaboration could begin, we had to organise several documents and a collaborative agreement between Flinders University and UoSQ due to the geographic distance between us. Once everything was set, we scheduled a meeting to introduce ourselves and discuss the study's details and our expectations from the facilitators students. Despite having created a template for the sessions, I couldn't shake off the worry of not having conducted a test run for the consult or debrief sessions. I relied on the clinical facilitator to review the template, but uncertainty remained as I was unsure if the actual sessions would unfold as planned in my head. Nevertheless, I pushed forward with hope and excitement to see how this collaboration would unfold.

As the psychology students were undertaking their placements during the peak of the pandemic, I had some concerns about their ability to conduct the sessions online. However, my worries were alleviated by the fact that they were tech-savvy and adaptable, which boosted my confidence in their capabilities. I informed the facilitators that we would be using Zoom Meetings Version 5.8.0 to conduct the sessions, and all session links had been sent to both participants and the facilitators through www.calandly.com. To ensure a smooth and safe debrief session, I made sure that each session had two psychology students present. One student would take on the role of the main facilitator, leading the session and guiding participants through the process. The second student acted as a supportive observer, keeping an eye on participants for any signs of potential adverse events or emotional distress. At the start of each session, the facilitator would introduce themselves and let the participants know that if anyone felt overwhelmed or needed additional support, they could personally message the second facilitator. This allowed for the provision of extra assistance through a breakout room or after the debrief session, ensuring that participants' emotional well-being was prioritised.

Appendix 35 Recommendations for implementation

MRC Framework on Implementation

This study focused on the development, feasibility, piloting, and evaluation of the Individualised Psychosocial (IP) program for CCHP. The findings of the study indicated that the IP program was feasible, acceptable, and effective in improving measures related to well-being and burnout among participants, with varying degrees of effectiveness at post-intervention and follow-up timepoints. The debrief sessions provided in the IP program demonstrated positive outcomes for the participants. While the immediate impact of the IP program was observed, the long-term effects the intervention required further investigation. Assessing the sustainability of the intervention would provide valuable insights for future implementation.

The implementation phase (phase IV) of the Medical Research Council (MRC) framework, which involved long-term dissemination, surveillance, monitoring, and application of the intervention in real-life contexts, is a crucial step. This phase aimed to evaluate the implementation of research findings and the translation of interventions with proven efficacy in research settings into routine care. Although the implementation phase was outside the scope of this study, recommendations for implementation was provided to guide future efforts.

Recommendations for implementation

Recruitment and retention

The following recommendations were proposed for the recruitment and retention of participants in the IP program:

- The eligibility criteria for the IP program should remain unchanged.
- The recruitment of participants from Australia and New Zealand was achieved through the use of ANZIC and ACCCN networks and snowballing. To enhance the

effectiveness of the program, it was suggested to continue recruiting participants through critical care organizations and utilizing snowballing. Additionally, expanding recruitment to include global participants would be valuable in establishing the program's effectiveness on a broader scale.

- The existing materials, such as the flyer, trial website, and registration link, should be maintained.
- Instead of recruiting participants over a 1-month period, a longer duration for recruitment is recommended, along with offering multiple start times for the program. It is also advisable to consider holidays throughout the year and avoid scheduling program start times during those dates.
- To encourage participation from doctors and other allied health professionals, the IP program should involve stakeholders from different professions.
- A separate program should be developed to address the needs of participants who were ineligible for the study due to high Impact of Event Scale-Revised scores.
- The recruitment methods should be evaluated to determine the number of participants identified and the rate of uptake.
- To record the reasons why individuals chose not to participate in the IP program.
- The experiences and reasons for dropping out from the IP program should be monitored for participants who do not complete the intervention.
- Records of attendance should be maintained, and reasons for non-attendance should be documented for program participants.

Facilitator's training

- The process evaluation yielded valuable insights, leading to the following recommendations for program facilitators:
- Including student psychologist (in their final year and final placement) as facilitators was feasible and acceptable for the IP program.

- The IP program manual was sufficient in providing facilitators with the necessary information about the program and its delivery.
- To ensure uniformity in the application of the problem-solving approach across all groups, additional information and/or training on the problem-solving approach is recommended. While this trial maintained fidelity in integrating the problem-solving approach, potential gaps may arise in the future, especially within larger trials. Providing extra training could minimize such possibilities.
- Facilitators were adequately oriented to the program through a once-off meeting. To further support facilitators and address any questions or concerns, conducting an additional meeting after the first week of the program is recommended.
- In future IP programs, fidelity should be closely monitored using multiple methods, including observations and fidelity logs, as demonstrated in this research. Researchers or observers should attend all consult and debrief sessions, actively participating in all research processes from registration to follow-up.
- Introducing a run-through of different types of stressors in critical care to facilitators would enhance their understanding and relatedness to participants.
- Emphasizing the importance of checking back with participants regarding their integration of the problem-solving strategy would ensure greater fidelity and consistency across all debrief sessions in future IP program research.

IP program elements

- Based on participant feedback, the study results indicate that the IP program content and delivery were acceptable. To further enhance feasibility and acceptability, the following suggestions were proposed:
- Utilizing **www.calandly.com** for bookings into debrief and consult sessions was a feasible and acceptable process. Participants found it convenient, especially for those

working shift work schedules, as it allowed flexibility to reschedule or unbook from a session as needed.

- Including an additional consult session towards the end of the IP program would offer participants a subtle and reflective closure, providing further support in future studies.
- Maintaining the debrief and consult session duration as delivered in the current study, with debrief sessions lasting a maximum of 60 minutes and consult sessions a maximum of 30 minutes. For smaller groups (three or fewer participants), adjusting the time accordingly may be beneficial.
- The six-week duration of debrief sessions was acceptable to participants. However, future implementations should consider running sessions throughout the year to establish a consistent weekly routine for participants and allow continuous access to the resource (IP program).
- Retaining the same potential adverse event plan as implemented in this study, despite no adverse events being noted, is deemed acceptable for addressing any potential concerns.
- Participants found the debrief sessions engaging, particularly the structured format that allowed for reflection and skill-building. Integrating a time for participants to discuss their stressors in the first half of the session, followed by themed discussions (e.g., stressors on caring for an intubated patient) may be beneficial to minimize repetition.
- Encouraging participants to refer others to the IP program is recommended for future studies to expand its reach and impact.
- Gathering feedback through semi-structured interviews on the IP program is valuable for refining it to meet the needs of critical care healthcare professionals. Using feedback questionnaires was less comprehensive in understanding the program's benefits and limitations.
- Removing journal entries from the study is suggested as participants did not feel engaged with the tool. Implementing self-reflection post-debrief sessions through a

technological tool, where participants can jot down reflections and strategies for the week, may increase their uptake of problem-solving strategies.

- Overall, these recommendations will contribute to further refining and enhancing the feasibility and acceptability of the IP program for critical care healthcare professionals.

Appendix 36 Pilot RCT trial expenses

In utilizing the proposed resources, it was worth indicating the prices for employing these resources within the pilot RCT. The table provided below provided a summary of the items and their related expenses. This provided future research with the opportunity to consider the resources affiliated with running another IP program study for intervention refinement and testing.

Pilot RCT trial expenses

Expense item	Cost
Research Assistant	
HEO Level 5 plus oncosts	$45.96 hour plus 25% (11.49) oncosts $57.45 hour x 7.35 $422.25 day (~1 day a week x 12 weeks $5067.00
Scale permissions	
Maslach Burnout Inventory	$125.00
Trial website	
Website + Marketing basic renewal	$119.39
Website upgrade to premium (to use facilities of website – i.e. booking for consult/debrief session)	$168.98
Website set-up domain	$19.95
Booking system	
Calendly Subscription ($30USD) $49.26 AUD	$49.26
Trial mobile	
Mobile phone dedicated prepaid	$79
Gift cards to student psychologist and participants	
Gift cards for Psych Student 7 x $100	$700
Participant feedback interview $30	$900
Consult and debrief platform	
Zoom Meetings Version 5.8.0 Oct 2022 – Jan 2023	$92.36
TOTAL	$7,320.94