Modelling a Smoking Cessation Assistance mHealth

(Mobile Phone Based Health Intervention)

for Male Smokers in Macao

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Dedication

To my beloved ones

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List of Abbreviations

ASE	Attitude-Social Influence-Efficacy
AUD	Australian dollar
CBT	Cognitive behavioural therapy
FCTC	Framework Convention on Tobacco Control
FDA	U. S. Food and Drug Administration
HBM	Health Belief Model
MMS	Multimedia messaging service
MOP	Macau Pataca (The Macao's currency)
MPOWER	The WHO recommended tobacco control policy package
MRC	Medical Research Council
NCI	National Cancer Institute
NGO	Non-governmental organisation
NHS	National Health Service
NRT	Nicotine replacement therapy
SAGHA	Smoking Abstention and Good Health Association, Macao
SCT	Social Cognitive Theory
SMS	Short message service
SP	Service provider
SU	Service user
TFI	Tobacco Free Initiative
TPB	Theory of Planned Behaviour

TRA	Theory of Reasoned Action
TTM	Trans-theoretical Model
WHO	World Health Organisation

Abstract

***Introduction*:** It is well acknowledged that tobacco smoking can increase the risk of cancers, cardiovascular diseases and respiratory diseases and these are known leading causes of premature death in Macao. A large gender disparity in smoking status exists in Macao, with the prevalence of male smokers reported to be ten times higher than female smokers. In Macao, male smokers are also less willing to seek smoking cessation assistance when compared to their female counterparts. Additionally, the limited range of smoking cessation assistance services currently available in Macao and the lack of on-going counselling to further support smokers to cope with difficulties during their cessation journey may lead to quitting failure or early abstainers' relapse. Because of the damaging impacts of smoking, the large gender disparity in smoking prevalence, cessation assistance services that disfavour males, and the insufficiency of smoking cessation assistance services, smoking among males is a critical public health issue to be addressed and effective smoking cessation intervention that assists male smokers to quit needs to be provided in Macao.

Smoking cessation mHealth, or alternatively named mCessation, a mobile phone based health intervention which delivers motivational and supporting messages or relevant information to users' mobile devices, has recently been found to be an effective smoking cessation strategy in developed countries. mHealth is expected to be potentially effective strategy which could complement the smoking cessation interventions currently provided in Macao.

It is likely that cultural factors linked with gender norms may be having an impact upon Macao Chinese males' smoking and cessation behaviours. So a gender-sensitive smoking cessation mHealth that relates to cultural influences is projected to be effective for addressing the males smoking issue in Macao. This study aims to gather data and provide evidence that will inform the design of the smoking cessation assistance mHealth programme and help Macao's male smokers to quit smoking.

***Method*:** The Medical Research Council (MRC) Framework, an often cited guide on designing and evaluating many complex healthcare interventions, divides the whole process into five phases. During the conduction of these five phases, opportunities for correcting and refining the components of proposed intervention will be provided. The MRC Framework is therefore valuable for framing the design of and evaluating the smoking cessation mHealth.

The first two phases of the Medical Research Council (MRC) Framework, consisting of the theoretical (or preclinical) phase and the modelling phase, were incorporated in this study. In order to develop evidence and explore the existing theories and the scientific evidence on smoking and cessation behaviours (with a special focus on the behaviours of Macao's males), as well as

examining effective interventions that assist smoking cessation and identifying the knowledge gap, a systematic search and a narrative review of literature were conducted. Informed by the narrative review of literature, a qualitative inquiry using in-depth interviews was carried out. Both service users and service providers from the Smoking Abstention and Good Health Association (SAGHA), the sole smoking cessation non-governmental organisation (NGO) in Macao, were invited to participate in the study. After receiving informed consent, all interviews were audio recorded and then transcribed verbatim. Data analysis was conducted using a parallel mixed coding approach involving both deductive and inductive coding.

Result: The main themes identified in this study were in relation to: the influencing factors upon smoking and cessation behaviours; the gender and culture specific issues that enhanced the effect of influencing factors particularly upon Macao males' smoking cessation; the effectiveness and deficiencies of smoking cessation interventions; and smoking cessation assistance mHealth and that regarding male smokers in Macao.

While a favourable social environment is reported to motivate smoking cessation, the major factor motivating smoking cessation is smoking related health concerns. Smoking cessation barriers, including physiological effects (such as nicotine withdrawal symptoms) and psychological factors (such as a lack of self-efficacy) which have been reported in other studies, were also found in this study. However, specifically for Macao's male smokers, their smoking and cessation behaviours were found to be broadly and significantly influenced by their unfavourable social environment and cultural factors. Cultural influences included the concepts of Confucian philosophy such as social harmony, politeness, and '*face*' that have been embedded into Chinese culture for thousands of years. For instance, Macao's male smokers were unlikely to refuse smoking together or sharing cigarettes with peers in social gatherings since the need to maintain social harmony and politeness was highly regarded. These socially constructed attitudes were additional smoking cessation barriers and increased the risk of relapse.

mHealth was reported by participants to be a potentially effective programme for assisting smoking cessation in Macao. However, the need for a culturally specific, localised, and tailor-made smoking cessation mHealth was emphasised. The delivery mode, presentation, time and frequency of intervention, as well as critical concerns and risks, were raised when informing the design of a feasible smoking cessation mHealth in Macao for male smokers.

Discussion and Conclusion: In this study, the modelling of a culture and gender specific smoking cessation mHealth regarding Macao's male smokers has been informed. The mHealth intervention is recommended for policy and practice for effectively assisting Macao's male smokers

to quit smoking.

Later phases of the MRC Framework, consisting of exploratory trials and definitive randomised controlled trial phases are needed to follow up the findings of this study before the mHealth smoking cessation intervention can be implemented and evaluated for its effectiveness in Macao.

The findings of this study also have implications for traditional Confucian philosophy embedded into the cultures in other regions and countries, and for expanding the smoking cessation mHealth to other populations.

Declaration

I certify that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Signed: ....

Date: 31 March 2016

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A Chinese idiom says, "*Knowledge, like a sea, is boundless; only through hard study can one reach the destination*" ("學海無涯　唯勤是岸" in Chinese characters). In the long journey of study, I have studied very hard and experienced tough, stressful, sometimes frustrated and lonely times. Because of these experiences, the journey has become more remarkable.

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Chapter One: Introduction

1.1   Background

The tobacco smoking epidemic is a serious public health issue that kills many people due to their consumption of tobacco and exposure in second- or third-hand smoke [1-5]. Tobacco control is a global policy aimed at preventing the morbidity and mortality of smokers and protecting non-smokers from second- or third-hand smoke [1-5].

Like many other developing countries, a large gender inequality of smoking prevalence has been reported in Macao [1, 6]. Compared with females, a lower usage of smoking cessation assistance among males has also been found in Macao [7-10]. Macao is a populous city, and the health impacts on non-smokers due to their exposure to second- or third-hand smoke is projected serious.

Smoking cessation assistance intervention, which is linked with the 'O' component of MPOWER, is a crucial component of tobacco control which has not been highlighted in Macao. Improving smoking cessation assistance services is needed, and the opportunity to develop smoking cessation mHealth, a mobile phone-based smoking cessation intervention, is identified.

1.2   Smoking and Tobacco Control

1.2.1   Smoking is a Global Critical Public Health Threat

Since the plant *Nicotina tobacum* was discovered in the New World by Columbus over 500 years ago, tobacco use has become widespread throughout the world and the number of people exposed to tobacco and its combustion products has dramatically increased. Tobacco smoking has been recognised as one of the leading preventable causes of death and disease [11-15]. It causes more deaths than: illicit drugs, alcohol consumption, automobile crashes, unintentional injuries, violence, and the human immunodeficiency virus epidemic combined [16-18]. Tobacco use has been reported

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to be the single most important risk factor for cancer, causing about 20% of cancer deaths and 70% of lung cancer deaths worldwide [19]. A smoker's risk of lung cancer is 5-10 times higher compared with a non-smoker [20]. In addition to its effects in the lung, tobacco use increases the risk of cancer at many sites in the body [20]. For instance, male tobacco users (in the form of either chewing or smoking) increase their risk of oral cancer 27-fold over their non-tobacco-using counterparts [20]. Solid scientific evidence indicates that tobacco smoking also increases the risk of pancreatic cancer [20-23].

Strong correlations have been reported between smoking related morbidity and mortality, the number of cigarettes smoked daily, and years of use [21, 24]. However, adverse health effects do not only occur from 'heavy' or daily smoking but also from 'light' smoking (infrequent), as well as passive smoking (second- and third-hand smoking) [25-27]. Tobacco smoke does not only lead to serious adverse health consequences for adults but also for youths and even children [28-31].

In addition to the health impacts, damaging economic impacts of smoking related morbidity and mortality are also of concern. Smokers who die prematurely deprive their families of income and hinder economic development. Additionally, a heavy burden to healthcare system will be caused by millions of people suffering from smoking associated diseases [11, 32].

Because of anti-tobacco marketing efforts, a decline in the rate of smoking prevalence has been reported at the global level since the 1980s [33]. However, the trend has been mainly attributed to the decline of smoking prevalence in developed countries in Northern and Western Europe, North America and the Western Pacific region, but it has been partially offset by the increase in smoking prevalence in some Asian, South American, and African countries [34, 35]. For instance, in Bangladesh, the prevalence rate of adult tobacco use (in the forms of either smoking, smokeless tobacco or both) has been reported as high as 43.3% [36]. In Russia, the overall adult smoking prevalence rate has been reported at 39.1% (60.2% of male and 21.7% of female) [37], and in

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Mainland China, the smoking prevalence rate was also very high (overall, 28.1% of adults were smokers) [38, 39].

Male smoking is a critical concern. Higher smoking prevalence rates among males are commonly found in comparison with females worldwide [38-42]. Although gender disparity has narrowed in previous decades in Western countries in conjunction with economic development and the expansion of feminism, it remains significant in many developing countries where cigarette smoking is predominantly a male behaviour [1, 6, 38, 41-47]. High male smoking prevalence (higher than 50%) has been reported in many Asian and South Pacific Ocean countries including Armenia, Cambodia, China, Fiji, Indonesia, Japan, Kiribati, Republic of Korea, Lao, Mongolia, Nauru, Niue, Papua New Guinea, Philippines, Russia, Timor-Leste, Tokelau, Tonga, Tuvalu and Vietnam [38, 39, 48, 49].

1.2.2   Tobacco Control is an Important Public Health Policy

Referring to the existing standard definitions including the definition of tobacco control in the Framework Convention on Tobacco Control (FCTC), tobacco control was defined as "*any measures aimed at improving health by enhancing smoke free lifestyles and environments and reducing the harms caused by tobacco*" [50].

The World Health Organization (WHO) FCTC has been developed with the aim of comprehensive tobacco control [51]. As of 4 March 2015, there are 180 parties to the WHO FCTC, including China and Macao, and more than a third of the world's population are protected by at least one of the measures of FCTC [32, 52].

To help make the FCTC a reality, WHO introduced MPOWER, which is a policy package intended to assist in the country-level implementation of effective interventions to reduce the demand for tobacco products [53]. Six evidence-based components of MPOWER have been suggested to

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comprehensively control the use of tobacco and hence to reduce the possible harmful impacts from tobacco use [53]. These measures include: monitoring tobacco use and prevention policies; protecting people from tobacco smoke; offering help to quit tobacco use; warning about the dangers of tobacco; enforcing bans on tobacco advertising, promotion and sponsorship; and raising taxes on tobacco.

1.2.3   Smoking and Tobacco Control in Macao

Macao is located on the southeast coast of China, to the west of the Pearl River Delta with borders on Zhuhai, Guangdong. With a 100% urban area in its 31.3 square kilometres, Macao has been ranked the most densely populated city in the world since 2013 [1-5].

In Macao, three leading causes of premature death including cancers (most commonly lung and bronchus), cardiovascular diseases and respiratory diseases are smoking related [1, 4, 54-59]. Apart from adverse health outcomes caused by active smoking, in such a populous city, serious adverse health outcomes for non-smokers exposed to second- or third-hand smoke have also become a very crucial concern [25].

1.2.3.1   Male Smoking in Macao

Cross sectional studies reported that the prevalence of tobacco use in Macao, mostly in the form of cigarette smoking, was 17.3% in 2008, 16.0% in 2009, and 16.9% in 2011 [1, 6]. However, smoking is a predominantly male behaviour in Macao, and large gender differences in smoking prevalence have been reported with the male-to-female smoking prevalence ratio as high as almost ten to one. The smoking prevalence rates among males were 30.7%, 29.9% and 31.4% in 2008, 2009 and 2011 respectively, significantly higher than those of females, which were 4.3%, 3.0% and 3.8% in those same years [1, 6].

Gender inequality in Macao occurs not only in terms of smoking prevalence, but it also seems to

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prevail in smoking cessation service usage. The ratio of male-to-female smoking cessation service usage in the cross-sectional data from a smoking cessation agency was reported between 1.6 to 4.3 during 2007 to 2011 in Macao [7-10]. Critically, these data depict the ratio of male-to-female cessation assistance service usage being far lower than the actual difference in the gender ratio of smoking prevalence (1.6 to 4.3-fold for the former in comparing with almost 10-fold for the latter). It implies that male smokers are less willing to seek assistance with smoking cessation or less willing to quit smoking compared with their female counterparts. The issue of male smoking and cessation assistance intervention is a particularly important concern in Macao, especially since these issues cause serious impacts to the public health and economic development.

1.2.3.2 Macao's Diverse Cultural Mix: Implications for Smoking

Social and economic status favouring male smoking behaviours has been commonly cited to explain the gender inequity of smoking in many Asian societies [42, 60-62]. However, it was argued that no single set of predictors might hold for the smoking behaviour in all ethnic groups and among different societies [63]. Cultural backgrounds and contexts including the social norms against female smoking were argued to be important predictors of smoking behaviour [63, 64].

Culture is defined as "*the beliefs, customs, arts, etc., of a particular society, group, place, or time*" [65]. Culture is commonly understood as an enduring set of social norms and institutions that organise the life of particular ethnic group members and gives them a sense of continuity and community [66].

Macao had been a Portuguese colony for centuries and was returned to China in 1999 [67-69]. Along with Hong Kong, it is currently one of the two Special Administrative Regions of the People's Republic of China [67, 68]. Regarding ethnicity, Chinese constitute the majority of Macao's population at 92.4% [70, 71]. Being largely a Chinese society, traditional Chinese culture and philosophical concepts, such as Confucianism and Taoism, remain but are interweaved with

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imported Western values, beliefs and practices in Macao's culture [70, 72]. Comparing with Western cultures, some Chinese traditional values and beliefs about masculinity are deeply grounded in Macao's culture. Even though gender equality in terms of economic status exists widely in Macao, Macao is nevertheless still a very male-dominated society. Importantly, China's unique cigarette culture has somehow been having an impact upon Macao Chinese males' smoking behaviour [73].

Another crucial force has had an impact upon Macao's culture. Since the late 1970s, a huge number of migrants from mainland China have made their homes in Macao. After the Communist Cultural Revolution occurring in the decade between the 1960s and 1970s in Mainland China, traditional Chinese practiced beliefs and values have been transformed [74, 75]. Even though all mainland migrants were Chinese, they imported the transformed Chinese culture to Macao [76, 77]. Having a specific culture may cause the gender disparity in smoking prevalence and cessation service usage in Macao being different from these issues in the Western societies and in Mainland China [78, 79].

1.2.3.3   Tobacco Control in Macao

Tobacco Control Legislation in Macao

It is commonly acknowledged that tobacco use is a complex issue and cannot be solved by any single approach. However, the Government of Macao has traditionally addressed the issue with legislation, which is a recommended key strategy of effective tobacco control and is more or less fulfilling the WHO MPOWER [53, 80]. Tobacco control legislation was initiated in Macao in 1983 [81, 82]. In 1996, all kinds of cigarette advertising and promotion were banned [83]. Since the tobacco tax was first levied in 2000, it has risen thirty fold in the past fifteen years [84-87].

China signed the FCTC in 2003 and the FCTC has officially come into force in China since 2006 [52, 88, 89]. Being a Special Administrative Region of China, in accordance with the Basic Law of the Macao Special Administrative Region, the FCTC and the declaration made by the Government

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of China has to be applied to Macao [52, 89, 90].

To effectively implement the FCTC, the Government of Macao has initiated reviewing and revising the legislation as early as in 2004 [91, 92]. After studying and discussing for years, a new tobacco control legislation named '*Regime of Tobacco Prevention and Control*' however came into effect in 2012 [93]. According to the legislation, smoking is prohibited in a list of designated indoor areas from 1 January 2012. Advertising and promoting bans are continually implemented, whereas point-of-sale display is still permitted under regulation. New regulations on tobacco products such as labels, packages and the maximum level of tar came into effect from 2013 [93]. The progress and details of tobacco control legislations and measures in Macao are summarised in Appendix 1-A.

By referring to MPOWER, tobacco control measures in Macao including on-site inspection for ensuring compliance with the smoking prohibition legislations (a measure related to components 'M' and 'P'), a tobacco advertising and promotion ban (component 'E'), warning labels and maximum tar level regulations (component 'W'), and increasing tobacco taxes (component 'R') have been regulated by legislation. However, component 'O' has never been regulated by any legislation.

The Tobacco Control Office and its Efforts

For overall coordination of the government's tobacco control measures, the Tobacco Control Office of Macao was established in 22 November 2011 and soon before the new tobacco control legislation came into effect [94]. According to the regulations of the Tobacco Control Office, there are a series of functions and responsibilities to be borne by the Office (as shown in Appendix 1-B). However, at the initial stage of the enforcement of the new tobacco control legislation in 2012, the Tobacco Control Office concentrated its utmost efforts into on-site inspection of the violations of legislation and fining people who were smoking in prohibited areas (a search of news articles and reports on the Office was conducted to confirm the allocation of its efforts, and the search strategy

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and results are described in Appendix 1-C).

On-site inspection is crucial for monitoring tobacco use. Smoking prohibition can work by protecting people from exposure to second- or third-hand smoke and motivating smokers to consider smoking cessation. However, monitoring tobacco use is neither the only nor the most important tobacco control strategy. No single component of MPOWER shall be emphasised to the exclusion of other components of tobacco control in Macao. Nevertheless, the list of the primary functions of the Tobacco Control Office (Appendix 1-B) does not include 'Offer help to quit tobacco use'. In Macao, among all components of MPOWER, 'M' has been emphasised but 'O' has not been highlighted in a policy setting.

1.3   Smoking Cessation Assistance Intervention – The 'O' Component of MPOWER

With strong correlations between the number of cigarettes smoked daily and years of use, and tobacco related morbidity and mortality, it was argued that the opportunity existed to reduce tobacco related morbidity and mortality over the next few decades if current smokers successfully abstained from smoking [14, 15, 21, 24]. It has been reported that, in comparing with those smokers who continued to smoke, smokers abstaining from smoking before 40 years of age can avoid more than 90% of the excess risk of premature death and disease during their next few decades of life [95, 96]. While the beneficial effectiveness reduces if smokers abstain from smoking later than 50 years of age, more than half of the excess risk can still be avoided [95, 96].

It seemed an encouraging message to public health professionals that about two-thirds of current smokers worldwide would like to quit smoking, whereas nearly 80% of current smokers have made at least one attempt [97]. However, the evidence that the majority of smokers failed their quitting attempts motivated public health professionals to put effort into assisting them to abstain from smoking [97].

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1.3.1 The Importance of Smoking Cessation Assistance

Notwithstanding evidence of heterogeneity on the effect significances between individual studies were found, smoking cessation interventions, including pharmacological and behavioural interventions, were reported to be effective in assisting smokers to quit and increased the success rates of cessation compared with no intervention [98-100].

Smoking cessation assistance interventions, especially continuous assistance as well as relapse prevention, are crucial to assist smokers to cope with difficulties on their cessation trajectory and to avoid the temptations of relapse triggers [98, 99, 101-105]. Without assistance, an individual's cessation attempts have low success and high relapse rates [106, 107]. Smoking cessation assistance interventions which have a strong association with the 'O' component (offer help to quit tobacco use) from MPOWER are important in tobacco control for reducing tobacco related morbidity and mortality and so improve impacts upon public health and the economy.

1.3.2 Smoking Cessation Assistance Services in Macao

While smoking cessation was neither regulated by legislation nor highlighted in the policy setting in Macao, the Government provides and subsidises smoking cessation assistance services. Free of charge smoking cessation assistance services are provided at eight government-operated primary healthcare centres or healthcare stations under the umbrella of the Health Bureau [108]. A NGO, named Smoking Abstention and Good Health Association (SAGHA), operates a smoking cessation clinic providing smoking cessation assistance services free of charge with financial subsidisation from the Social Welfare Bureau of the Government of Macao (the organisational structure of the Government of Macao is shown in Appendix 1-D) [7-10, 109-115]. In addition to free of charge smoking cessation assistance services, an outpatient unit of Hospital Kiang Wu, a private hospital in Macao, provides full-fee paying smoking cessation assistance service.

Although the smoking cessation interventions provided in Macao comply with the commonly

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recommended guidelines and both pharmacological and behavioural interventions are currently provided, the range of services is limited. NRTs are provided in the forms of a transdermal patch and gum, but no non-nicotine containing mediation, such as bupropion or varenicline, is prescribed in the smoking cessation clinics. Pre-treatment counselling and evaluation are carried out routinely as part of the behavioural intervention. However, telephone follow-up is only given by SAGHA, and not by either the government-operated smoking cessation clinics or the smoking cessation unit of the private hospital. Critically, due to the limitation of manpower, only irregular telephone follow-up service can be provided by SAGHA, which may not be intensive enough to fully satisfy users' demand.

The lack of effective and regular on-going motivation and support will, critically, lead early abstainers to lapse or relapse. Because of the imperfection of the smoking cessation assistance services currently available in Macao, improving the service or developing additional interventions are projected to be crucial for enhancing the effectiveness of the service and eventually contribute to the decline of the prevalence of smoking, the improvement of MPOWER implementation, and the health of the public in Macao.

1.4   The Opportunity for Smoking Cessation mHealth Intervention

mHealth, a mobile phone based health intervention, was argued as an attractive pathway for the delivery of health promotions and interventions [116-124]. The WHO explained: "*The use of mobile and wireless technologies to support the achievement of health objectives (mHealth) has the potential to transform the face of health service delivery across the globe*" [125].

1.4.1   The Effectiveness of Smoking Cessation mHealth Intervention

In terms of smoking cessation, mHealth is considered to provide continuous behavioural intervention through the delivery of motivating and supporting messages or information to smokers' mobile devices to assist them in coping with the difficulties of smoking cessation [126-131].

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Scientific evidence informs the effectiveness of the smoking cessation mHealth on increasing the success rates of smoking cessation [127, 130-135].

1.4.2   The Potential Transferability of Smoking Cessation mHealth to Macao

The price of mobile communication devices has dropped dramatically in the last two decades. As a modern technology, mobile phones are integrated into people's daily lives, especially young people [117, 120, 126, 136]. Meanwhile, the functionality of mobile phones has greatly improved from being a simple voice communications device to one that carries the functions of a computing device.

In Macao, there were 2.84 mobile phone subscriptions *per capita* in 2012 when Macao was ranked the first in term of mobile phone subscriptions *per capita* globally. Nevertheless, the number has further increased to 2.91 at the end of 2014 [137-139].

There is reason for optimism about the potential of mHealth being a valuable intervention strategy in Macao, because of the high rate of mobile phone subscription ownership, the existence of scientific evidence on the effectiveness of smoking cessation mHealth, and the recent advance of tobacco control as a priority of the Government of Macao. mHealth represents a scalable but underutilised smoking cessation intervention. But the Government of Macao has not yet recognised it as an emerging strategy in the area of tobacco control in Macao [140].

The large gender disparities of smoking prevalence and smoking cessation assistance service usage that exist in Macao highlight the need and opportunity to develop a smoking cessation mHealth intervention regarding male smokers.

1.5   The Study Questions

The assumption underpinning this study is that mHealth has already been demonstrated to be

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effective at increasing the success rate of smoking cessation in other countries. It may also show its effectiveness in assisting Macao's male smokers in their smoking cessation, especially with a mobile device that has been well integrated into people's daily life in Macao. For modelling a smoking cessation mHealth which will potentially be effective in assisting Macao's male smokers to quit smoking, a few questions, as presented and further discussed in the sections immediately below, about developing a smoking cessation mHealth in Macao were raised.

1.5.1 Feasibility and Acceptability of Approaching mHealth in Macao

In terms of availability and accessibility, is advanced mobile technology usable and feasible as an intervention of smoking cessation? It is also important to understand the capability and willingness of service providers to launch the intervention, as well as the characteristics of potential service users for learning their capability to engage the advanced technology of mHealth. For instance, information is needed to learn whether service providers are willing and capable, in terms of resources and technology, of launching an additional smoking cessation intervention in a way that involves advanced mobile phone technology. It is also necessary to consider the possibility that some potential service users may not be familiar with the advanced functions of mobile phones; for example: only making phone calls.

1.5.2 Culture and Gender Influences Associated with Males' Smoking

What are the Chinese cultural influences on mobile device-based smoking cessation programmes for male smokers in Macao? Being largely a Chinese society [70, 71], Chinese culture and traditional philosophical concepts have been grounded in Macao [66]. Since all scientific evidence on the effectiveness of smoking cessation mHealth intervention was found in non-Chinese societies, mostly in the West, it is unlikely to guarantee that the same design of mHealth will be appropriate and effective for Macao's smokers. Regional and cultural influences should therefore be studied in the stages of policy development and for modelling the smoking cessation mHealth regarding

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Macao's smokers. Where smoking cessation mHealth shows promise in other countries, there is lack of local understanding in Macao.

A gender disparity in smoking prevalence rates that disfavours males exists in Macao. Gender norms that may be linked with cultural influences may impact Macao males' smoking and cessation behaviours. Therefore, both an understanding of culture and gender influences, and a culture and gender sensitive smoking cessation mHealth are needed to address the male smoking issue in Macao.

1.5.3   The Design and Delivery of an Appropriate mHealth Intervention

How should the mHealth intervention be designed and delivered to suit the target population? To design an appropriate mHealth intervention, it is necessary to understand the potential effective components. In addition, there is also a need to learn about the potential effective delivery of the intervention, such as the delivery medium, time, frequency, and duration for modelling an acceptable and potentially effective mHealth intervention.

1.5.4   The Need to Address the Concerns at the Policy Making Level

How should the researcher convince policy makers making the smoking cessation mHealth becoming reality? Since the development of a smoking cessation mHealth intervention is expected to be costly, careful evaluation is essential before investing into launching the programme [141]. Importantly, implementing public health interventions in Macao have traditionally relied heavily on the financial subsidisation provided by the Government. As 'scientific evidence for policy making' is a preferred approach for the Government of Macao, it is apparent that a supportive study could and should be commissioned and assimilated throughout the processes of policy development and implementation.

1.6   Study Significance

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While a smoking cessation mHealth regarding male smokers is expected to be beneficial in Macao, there is a knowledge gap for projecting an effective smoking cessation mHealth for male smokers in Macao. There is a need to answer the study questions including: In terms of availability and accessibility, is advanced mobile technology usable and feasible as an intervention of smoking cessation? What are the Chinese cultural influences on mobile device-based smoking cessation programmes for Macao's male smokers? How should the mHealth intervention be designed and delivered? What should a researcher do to convince policy makers to make the programme become a reality? A scientific study is nevertheless essential to answering these study questions and to provide sufficient evidence to support developing and launching the smoking cessation mHealth intervention for assisting male smokers in Macao.

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Chapter Two: Literature Review

2.1   Introduction

This search of literature, is aiming at systematically finding all sources for gaining as much understanding as possible on the study topic. A systematic narrative approach, which is a combination of systematic literature searching and narrative synthesis and analysis, will be conducted in this literature review [142-144].

In the early sections of this chapter, both relevant past and current literature on the development of mHealth and eHealth in the area of smoking cessation assistance interventions are the focus. This search strategy works on identifying evidence of the effectiveness of smoking cessation mHealth with regards to: motivating smokers to progress from the contemplation stage to the action stage (in accordance with the Transtheoretical Model [145]) in their smoking cessation behaviour; assisting their smoking cessation in order to increase quitting rates; and in preventing relapse.

The theoretical perspectives and the efficiency of smoking cessation behavioural interventions are also searched for reviewing theoretical perspectives for intervention (which alter the hypothesis and assist in specifying potential components). In later sections of this chapter, gender and cultural issues associated with smoking and cessation behaviours are discussed with a special focus on Asian and particularly Chinese male smokers. Lastly, the gaps in the knowledge-base are pointed out in this chapter, which motivate the study conducted.

2.2   Systematic Search Strategy and Keywords

Literature searching requires a systematic approach in an attempt to be orderly and efficient, and for the results to represent the broader and deeper literatures [146-148]. In this literature search, three themes were focused on, including smoking cessation mHealth, smoking cessation behavioural

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interventions, and gender and culture issues potentially associated with the smoking and cessation behaviours of males in Macao.

2.2.1 Commencing Literature Search and Identifying Keywords

In order to have broad understandings about the study topic and to help identify keywords, the literature search was initiated by exploring the websites of the WHO, the World Bank, and the Health Bureau of Macao, and searching relevant scholarly and grey literature with words including smoking, tobacco control, cessation, and mHealth. The website of the Flinders University Library was also visited, where a number of health databases on the subject of Public Health were found to be valuable sources [149]. In addition, Health Science Encyclopaedias, such as *Encyclopedia of Health Services Research*, *Encyclopedia of Health and Behavior*, and *Encyclopedia of Science and Technology Communication* [150-157] were accessed and a number of relevant chapters about mHealth or eHealth, as well as smoking cessation and behavioural interventions that may be outside the immediate area of study interest, were retrieved and reviewed [145, 158-173]. Google Scholar was also accessed with the keyword 'mHealth' and relevant articles found, including those not related to smoking cessation but other public health interventions, were retrieved and read in order to broaden the knowledge about mHealth interventions [174-187].

2.2.2 Databases to be Accessed and Systematic Search Strategy

There are large number of databases available and valuable for the systematic literature search [149, 188]. It would be an endless task to access all databases to obtain all relevant literatures. In order to conduct a literature search rationally and effectively, it was necessary to make a selection of databases that were most relevant to the research questions, as part of the search strategy.

A number of databases, including Cochrane Library, PubMed and PsycINFO, were selected. The selection of these databases was based on searching for informative articles that are most relevant to the research question, developing an understanding about the content areas and theories, identifying

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the knowledge gaps, and helping establish the study objectives [146, 147]. Additionally, local databases including Wanfang Data and Hong Kong Macau Periodicals Network have been accessed to search for literature, especially that written in Chinese which may not exist in other databases, for learning local knowledge and experiences.

The systematic search of literature is, however, not a linear process but a continuous journey. Searching literatures more broadly (for example, not limited to studies related to Macao), can help address the research questions more comprehensively [148]. Additionally, a literature search needs to be continued throughout the whole process of the study until the dissertation is complete. For instance, an encyclopaedia named *Encyclopedia of Health Communication* published in 2014 [189] contains chapters closely related to mHealth and this was accessed during the process of writing the dissertation [190-194].

2.3   Smoking Cessation mHealth Studies

To deeply understand the development of smoking cessation mHealth programmes worldwide, a systematic literature search was undertaken in Cochrane Library, PubMed and PsycINFO. Since mHealth is a newly developing area, no time range for limiting the search scale was set. Literatures written either in English or Chinese were included while those in other languages were disregarded.

Nevertheless, in order to understand Macao's experiences, as explained previously, Wanfang Data, Hong Kong Macau Periodicals Network and additional sources (such as Health Science Journal of Macao) would be accessed while different search strategies had to be employed.

2.3.1   Systematic Literature Search Strategy

While in the process of literature searching, the keywords were modified. The inclusion and exclusion criteria applied in the search of smoking cessation mHealth projects were as follows:

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Inclusion Criteria

> Either one of the following terms:
>
> - mhealth OR mcessation OR ehealth OR telemedicine
>
> OR
>
> - mobile phone OR cell phone OR cellular phone
>
> OR
>
> - txt OR pxt OR sms OR mms OR text message
>
> AND
>
> - smoke OR smoking OR tobacco OR cigarette

Exclusion Criteria

> Articles in languages other than English or Chinese
>
> Study articles involved only children or adolescent participants

While the criteria of a systematic literature search are listed herein, the search process, literature selection criteria and the results are presented in greater detail in Appendix 2-A. The main findings are summarised and the themes discussed below.

2.3.2   An Overview of the Smoking Cessation mHealth Programmes

Smoking cessation eHealth interventions, which involve delivering smoking cessation intervention via the internet and other electronic media, have been initiated as early as in 1990 [195]. However, smoking cessation mHealth, in which a mobile phone was involved as the intervention delivery medium, was initiated later, in 2004 [196]. Parallel to the development of mHealth in smoking cessation assistance, the strategy had also been trialled in other health related programmes, including medical appointment reminding and psychological support provision [117, 197, 198].

Smoking cessation mHealth studies were approached by making phone calls or sending SMS or pre-recorded audio or video messages that delivered interventions individually or in combination with other behavioural interventions and pharmacotherapy, to smokers who intended to quit smoking. mHealth can be approached in passive or active forms. The former, which is usually

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referred to as 'push' strategy, involves messages delivered by service providers or popped-up from an mHealth app, whereas the latter, named 'pull' strategy, involves service users accessing their Smartphone to search for information on the Internet or from an mHealth app.

In addition to facilitating training on problem solving skills, smoking cessation mHealth was also used for enhancing self-efficacy and providing social support, and it can potentially influence the change of smoking behaviours and enhance smokers' self-management skills while they are attempting to quit smoking [199].

The advantages of approaching smoking cessation mHealth include: the usage convenience of anywhere at any time; the resource and cost effectiveness; the scalability of intervention delivery meaning that a large number of smokers can be served and covered by the intervention at the same time; the flexibility of message tailoring with a user-characteristic base; the capability of sending messages that were time sensitive to the needs of users; the provision of content that can potentially distract users from cravings and hence prevent lapse; and the ability to link users to other people for social support [126]. As a self-help intervention, an advantage of mHealth over self-help printed materials is that it can be provided in a variety of formats: text, picture or multimedia. As with the importance of ongoing advice and support for smokers on the journey of their smoking cessation, these characteristics and advantages give an optimistic outlook to mHealth being an effective smoking cessation intervention [126, 127, 200].

There are a number of smoking cessation mHealth studies including: the study conducted by Obermayer et al. in the United States [196]; the 'STOMP' [134, 135], 'STUB IT' [201] and 'Txt2Quit' [202] projects studied in New Zealand; 'txt2stop' [127, 132, 133, 203, 204], 'iQuit' [205] and 'MiQuit' [206], implemented in the UK; 'Happy Ending' in Norway [130, 131, 207]; 'SMS Turkey', carried out in Turkey [200, 208, 209]; 'SMS-COACH' studies conducted in Germany and Switzerland [210-212]; the 'on Q' program conducted in Australia [213]; and

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'Text2Quit' [214, 215] and 'Stop My Smoking (SMS) USA' [216] carried out in the United States. Nevertheless, no homogenous result was reported in those smoking cessation mHealth studies.

In addition, Vidrine et al. conducted an mHealth smoking cessation intervention project for smokers living with HIV/AIDS and the scholarly article was published recently [217]. There was also a smoking cessation mHealth study targeting socially deprived young adults carried out by Haug et al. in 2008. However, since the article was written in German, it was not included in the review.

Apart from the programmes mentioned in the previous paragraph, there are also reports from the grey literatures (those not published in peer-reviewed literature) and ongoing studies, including the 'Smokefree Together Programme' launched by the National Health Service (NHS) in England [218], the 'smoke freeTXT' programme [219], and a smoking cessation study examining the cell phone-based expert systems to deliver text messages [126]. Additionally, there are also many smoking cessation assistance mHealth apps currently available worldwide (including the 'Quit Smoking App' developed in Hong Kong, Macao's neighbouring region), and which are available to the public [220]. However, there is no published scientific evidence informing either the implementation or the outcome of these programmes, nor is there any consideration given to gender and cultural issues.

2.3.3   The Development of Smoking Cessation mHealth

2.3.3.1 The First Smoking Cessation mHealth Study

The programme carried out in the United States by Obermayer et al. in 2004 was the first mHealth intervention implemented in the area of smoking cessation [196]. While the delivery of text messages to smokers via mobile phone was reportedly effective in assisting smoking cessation, since there was no control group, it could not provide scientific evidence to inform the efficacy of the intervention [196].

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2.3.3.2   The STOMP – The First Controlled Trial

The STOp smoking by Mobile Phone (STOMP) trial was conducted in New Zealand with 1,700 participants involved and was the first controlled trial smoking cessation mHealth study [126, 134, 135, 221]. The 'push' strategy was applied, delivering tailored text messages that incorporated participants' nicknames and basing on matching keywords with participant characteristics [134, 135]. A 'pull' strategy was also available on demand of individual participants [134, 135]. 'Quit Buddy' paired individual smokers allowing them to send a text message directly to each other for social support [134, 135]. The 'STOMP' trial provided evidence to support the short-term effectiveness of smoking cessation mHealth within six weeks while the effectiveness of a 26-week follow-up was less significant [126, 134, 135].

2.3.3.3   The txt2stop – The First Large Scale Programme

The 'txt2stop' study adapted and modified the 'STOMP' trial to suit regional and culture-specific needs in the UK [203]. The pilot trial of the 'txt2stop' programme was a single-blind randomised controlled study with 200 participants [133].

The 'txt2stop' pilot phase was followed by a full trial in 2011 and almost twelve thousands participants were involved [126, 127, 203]. Although evidence of long-term effectiveness in six months was given across socioeconomic and age groups in the full trial of 'txt2stop' [127], the long-term effectiveness of smoking cessation mHealth was first published in the 'Happy Ending' programme conducted in Norway, mentioned above [131].

Nonetheless, an important lesson learnt from the 'txt2stop' study was that, upon conducting content modification, the technical transferability of smoking cessation mHealth was demonstrated [203].

2.3.4   The Design of Smoking Cessation mHealth

2.3.4.1   Mode of Intervention Delivery

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Because of the high popularity nature of text messages, a 'push' strategy using the delivery of mobile phone text messages timed around the quit date was most commonly employed in smoking cessation mHealth studies [130, 134, 135, 196, 202, 206, 212, 215, 216].

The barriers associated with quitting, in particular stress and bad mood which commonly lead early abstainers to lapse or to consequently relapse, usually appear in minutes rather than hours. Just-in-time delivery was therefore an important strategy for an effective intervention [207, 222]. However, a 'push' strategy may not be capable of delivering just-in-time intervention, and a 'pull' strategy was employed in some studies where smokers demanded additional support when needed [130, 134, 135, 196, 202, 206, 212, 215, 216]. In addition, communicating interactions with the computer system or with the paired 'Quit Buddy' were arranged in a few studies that employed the 'pull' strategy [126, 132, 134, 135, 215].

Some studies involved a combination of multiple behavioural intervention strategies. For example, in some studies, text messages were delivered along with providing leaflets or video messages, making phone calls, or offering Quitlines (that are telephone-based services for helping smoker quit) by smoking cessation assistance service providers [130, 131, 206, 207, 221, 223]. In some other studies, behavioural interventions were delivered via mobile phone in combination with the internet approach, including email and web, and interactive voice response [130-132, 213].

2.3.4.2 Intervention Tailoring

Wide individual differences appeared on the reasons for maintaining smoking behaviour and on the barriers to smoking cessation. Tailored, as opposed to non-tailored, interventions had a higher effectiveness because of their personal relevance [224]. Some studies involved the delivery of tailored interventions, including incorporating participants' names to the messages sent, matching characteristics and cessation stage-matched interventions [130, 196, 206, 211, 212, 215, 217].

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2.3.4.3 The Effectiveness of Smoking Cessation mHealth Programmes

There were no homogenous results reached among all individual studies. Some studies showed the short-term effectiveness of mHealth, but failed to demonstrate long-term effectiveness [204, 214, 216], while another study demonstrated long-term but not short-term effectiveness [206]. Nevertheless, several studies could not demonstrate any effectiveness with statistical significance [201, 206, 208, 210, 212, 213, 217].

2.3.5   Smoking Cessation mHealth in Macao

2.3.5.1 The Lack of Local Research

As with the systematic literature search (including grey literature), no local study of smoking cessation mHealth experience could be found in Macao or in its neighbouring region, Hong Kong. The strategy, process and databases or sources of the search are reported in detail in Appendix 2-A.

2.3.5.2 The Prospects of Conducting Smoking Cessation mHealth Programme in Macao

There is evidence of increases in both short- and long-term quitting rates using mHealth [127, 130-135]. mHealth has also been found to be effective in preventing relapse [130, 213, 225, 226]. There is, therefore, reason for optimism when developing smoking cessation mHealth, especially for young smokers, in Macao [126, 127, 129-131, 227].

Regarding acceptability, smoking cessation mHealth has been found acceptable in many studies [200, 206, 208, 215, 228]. While some users complained that the text messages delivered were annoying [206, 216, 228], no harm regarding the intervention was reported in any study.

It is necessary to count the cost involved in providing mHealth intervention. These costs includes: the cost of enrolling smokers (including the cost of collecting baseline information of enrollers); the cost of delivering intervention (including the cost of tailoring intervention, if applicable); the royalties paid for the use of intervention (for example, commercially available coaching

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programmes such as 'Text2Quit') [229]; and the cost of designing and developing in-house intervention. However, taking in consideration the health benefits, including the increase of life years of abstainers and the decrease in health service costs attributed to smoking, text-based smoking cessation mHealth provided on top of the existing range of smoking cessation services was argued cost-effective [230]. A smoking cessation mHealth as a behavioural intervention in Macao is consequently projected to be cost-effective.

It is necessary for both service users and providers to be both capable and accepting in order for them to be effective. It is therefore necessary to collect and analyse the opinions of both service users and providers, who are the major stakeholders, to ensure that the proposed intervention is both feasible and acceptable.

2.4 mHealth as a Smoking Cessation Behavioural Intervention

Smoking cessation mHealth is a behavioural intervention assisting smokers to quit smoking. In order to understand the possible working mechanisms of mHealth, another systematic literature search on smoking cessation behavioural interventions was conducted.

2.4.1 Databases Accessed and Search Criteria

Cochrane Library, PubMed, and PsycINFO were purposely accessed for the literature search about smoking cessation behavioural intervention. Since smoking and cessation behaviours has been a topic discussed for a long time and in a huge number of articles, in order to limit the scope of the search, articles published only in the last five years were targeted.

The search criteria are listed hereunder, but the details of the search process, literature selection and results are presented in Appendix 2-B. Findings are summarised and discussed in the following subsections.

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Inclusion Criteria

Either one of the following terms:

- behaviour therapy OR behaviour intervention OR behaviour treatment

OR

- behavior therapy OR behavior intervention OR behavior treatment

AND

- smoke OR smoking OR tobacco OR cigarette

AND

- cessation OR quit

Exclusion Criteria

Articles in languages other than English or Chinese

Study articles involving only children or adolescent participants

Articles published prior to 2008

2.4.2 Theoretical Perspectives on Smoking Cessation Behavioural Intervention

Behavioural interventions, which were defined as "*verbal instructions to modify health related behaviours*", often employ behaviour change techniques such as advice, discussion, encouragement and other activities designed to address factors such as self-efficacy and motivation which are highly important for the success of smoking cessation [231-234]. Scientific evidence demonstrated that behavioural interventions could increase the likelihood of maintaining abstinence from smoking up to 15-20% [98, 232, 235-237].

Smoking cessation behavioural interventions are delivered either: briefly or in-depth; individually or in a group; by smoking cessation specialists or other professionals; and face-to-face or via telephone or other media. They can also be carried out in a variety of forms, including: brief advice or motivational interviews that encourage quitting; cognitive behavioural therapy; social and coping skills training; self-efficacy improvement; contingency management; referral to other sources of support such as Quitline, and social or peer support; and providing or displaying self-help materials consisting of written or multimedia materials and, more recently, web- or mobile-phone-based

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materials [232, 238-243].

2.4.2.1 Theoretical Background of Smoking Cessation Behavioural Intervention

Smoking cessation is a complex process involving the transition from a smoker to an ex-smoker [244, 245]. A number of health behaviour and psychological theories explain the concepts that behavioural intention and motivation mediate the relations to social norms incorporating normative perception of the behaviour of others, and perceived social support or pressure in favour of or against the execution of behaviour [207, 246]. These theories include: the Health Belief Model (HBM) [247], the Theory of Planned Behaviour (TPB) [248] extended from the Theory of Reasoned Action (TRA) [249], the Trans-theoretical Model (TTM) [250, 251], the Social Cognitive Theory (SCT) [252], the Self-efficacy Theory [253-255], the Self-regulation Theory [256], the Diffusion of Innovation Theory [257], the Strategy of Motivational Interviewing [233, 258], and the Attitude-Social Influence-Efficacy Model (ASE model) which was applying the stages of change from TTM [259-261].

2.4.2.2 Motivational Factors of Smoking Cessation

Intention, a determination to act in a certain way, can be explained as a set of motivational factors that influence a behaviour [262]. Cessation intention has been found to be an important predictor of successful smoking cessation [263, 264]. Understanding the components involved in stimulating cessation intention is crucial for modelling an effective behavioural intervention to motivate smoking cessation.

While the reasons for smokers' cessation attempts are varied, perceived advantages outweighing the drawbacks of cessation strongly encourage smokers to quit [265-267]. The Health Belief Model (HBM) proposes that people are motivated to perform healthy behaviours because of perceived threats to their health [247, 268], and the negative consequence on health has been identified as being a strong motivational factor of smoking cessation intention [269, 270]. Enhancing motivation

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is a crucial strategy of smoking cessation along with its potential to increase smokers' enthusiasm, sense of purpose, and willingness to quit [271].

Self-efficacy was defined as "*a sense of control over one's environment and behaviour*" [254]. It is relating to an individual's belief in their ability to effectively carry out an intended behaviour [252, 261, 272]. Whereas self-efficacy that drives smokers to resist smoking is critical to the success of smoking cessation [267], poor self-efficacy that reflects the inability to perform or to maintain abstention from smoking may be an important barrier of cessation and a trigger to relapse [254, 273, 274].

2.4.3   The Approaches of Behavioural Intervention

2.4.3.1   Brief Advice and Motivational Interview

Brief advice and motivational interview can be crucial triggers for smoking cessation [239]. As a counselling style, which helps smokers enhancing their motivation and self-efficacy and to explore and resolve their uncertainties about changing their smoking behaviour, motivational interviewing has been widely used to assist smokers to quit smoking [275, 276]. Compared with brief advice which involves a short intervention (usually lasting between thirty seconds and three minutes) for raising awareness of, and accessing smokers' willingness to engage in further discussion, the motivational interview is more in-depth and more formal [239, 275-277]. Nevertheless, since brief advice is usually delivered during a routine medical consultation, there is an opportunity for physicians to intervene with a huge number of smokers while involving very few resources. The cost effectiveness of brief advice is therefore considerable [239, 277].

2.4.3.2   Cognitive Behavioural Therapy

Cognitive Behavioural Therapy (CBT) is a psychotherapy widely employed to help people with many different types of psychological problems [278-281]. CBT works on changing maladaptive

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thinking patterns and the negative behaviours associated with them [282]. CBT combines two approaches – cognitive and behaviour therapies – and is often used for assisting smokers to quit smoking [282].

Smoking cessation CBT consists of two phases. The first phase focuses on the health consequences of smoking and preparation for the quit date, while it is usually followed by the second phase consisting of treatment modules facilitating skills training [235]. Smoking cessation professionals are usually involved in discussions with smokers to assist them to recognise and change inaccurate beliefs and maladaptive thinking patterns, to identify social or environmental cues that trigger the urge for cigarettes, to learn ways of coping with the difficulties and the tempting environments and situations, and to encourage smokers' positive outlook about their cessation [105, 283-285].

2.4.3.3 Follow-up Counselling

Intensive behavioural intervention was found to have short-lived effectiveness [235]. The reasons for the short-lived effectiveness might be the lack of continuous behavioural intervention sessions or support provided to or attended by early abstainers [235]. In accordance with the continuing care model, telephone-delivered counselling can be a feasible strategy to continuously support maintaining abstinence [240, 286]. Nonetheless, the major weakness of follow-up counselling, as well as CBT, is the cost of delivering intervention because of the need for intensive human resources.

2.4.3.4 Self-help Intervention

Self-help intervention, commonly delivered with the provision of self-help materials, has been widely utilised as a low-cost smoking cessation intervention. Traditionally, printed self-help materials, such as leaflets, are provided to smokers to motivate their cessation intention by informing them of the consequent harms of smoking and the benefits of cessation, as well as educating smokers about the withdrawal symptoms [287].

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Smoking cessation self-help materials might also be provided to lead smokers who are moving forward on their cessation trajectory, essentially by giving advice that is similar to what was typically given at smoking cessation clinics [288]. Self-help intervention has been reported to be beneficial to improving the smoking cessation rate, even if no additional effectiveness of pairing self-help intervention with other cessation interventions was found [289].

2.4.3.5 Motivational Supports

Family and social supports have been reported to be effective interventions that motivate behaviour changes and are important determinants of successful smoking cessation [290-292]. Studies also suggest that the provision of support and the inexistence of criticism from a spouse might be crucial for the success of smoking cessation [293, 294].

However, it leads to an important criticism that developing a smoking cessation behavioural intervention adopting an aggressive or confrontational style potentially produces negative responses which may consist of denial or resistance from smokers and reduce the effectiveness of intervention [295, 296]. It must therefore be noted that, while modelling an intervention, motivational messages but not criticisms are likely to be more effective in motivating and encouraging behaviour change.

2.4.4   Combining and Tailoring Behavioural Interventions

2.4.4.1 Combining Interventions

Many studies have been carried out to examine the effectiveness of smoking cessation interventions and the combinations of them. Even if there was lack of conclusive recommendations, the scientific evidence demonstrated that the combination of multiple intervention modes could give higher effectiveness [236, 239, 297-299].

2.4.4.2 Tailoring Intervention

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Tailoring involves developing an intervention in accordance with the specific characteristics and needs of the individual who receives the intervention. In accordance with the Trans-theoretical Model (TTM), smokers in different stages of behaviour change are expected to need different types of intervention to support their cessation [300]. Stage-based tailoring of interventions was argued to be a rational approach for enhancing the effectiveness [289].

A significant advantage of tailoring interventions is that it can make smokers more receptive to the information or advice being given because they may feel that the smoking cessation professionals care about their cessation attempt and that they will take their individual situations and needs into account while delivering intervention [288].

Though heterogeneous conclusions have been drawn from different studies, there was increasing evidence demonstrating the effectiveness of tailoring behaviour change interventions, including smoking cessation [236, 243, 289, 298, 300-306]. Scientific evidence also demonstrated the benefit of culturally tailoring interventions for smoking cessation [290, 307, 308]. Intervention tailoring is therefore a valuable lesson for modelling an effective smoking cessation mHealth regarding male smokers in Macao.

2.5 Smoking and Cessation Behaviours of Male Smokers in Macao

In terms of modelling an effective intervention specifically for male smokers in Macao, key issues include understanding how males' characteristics and culture-specific philosophies and beliefs underpin their smoking and cessation behaviours, and the motivations of their cessation assistance service usage. Nevertheless, after conducting systematic literature search, it was discovered that there has never been any scientific study regarding Macao males' smoking and cessation behaviours. Other literature search strategies are therefore needed to gain relevant knowledge.

2.5.1 Literature Search Strategies

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2.5.1.1 Databases Accessed and Search Criteria for Scholarly Literatures

Given that no articles were found regarding Macao's male smokers, the search was broadened to encompass Chinese male smokers and, further broadened, Asian male smokers. The search also included any issues about smoking beyond the aspects of smoking cessation behaviour.

While the search criteria are listed hereunder, the literature search and selection process as well as results are reported in Appendix 2-C. Considering the information rich nature of databases, as with previous searches, Cochrane Library, PubMed, and PsycINFO were purposely selected for this search. Since smoking behaviours commonly develop in adolescence, in order to have a comprehensive understanding of the issue, the studies involving adolescents were not excluded from the search. However, only articles published in the last five years were targeted.

Inclusion Criteria

- smoke OR smoking OR tobacco OR cigarette

AND

- gender OR sex

AND

- Chinese OR China OR Asian OR Asia

Exclusion Criteria

Articles in languages other than English or Chinese

Articles published in previous to 2008

2.5.1.2 Search for Other Scholarly and Grey Literatures

Because of the unavailability of research articles immediately related to Macao males' smoking, integrating relevant concepts collected from a variety of sources was necessary to gather a deep understanding of the topic. Textbooks which contain general but comprehensive contents were important sources. Relevant chapters of textbooks and scholarly publications and the bibliographies of primary studies cited in those chapters were retrieved and studied. Grey literatures were also

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reviewed for broader knowledge about cultural issues which were potentially related to Macao males' smoking and cessation behaviours.

2.5.2 Social Influences Associated with the Smoking and Cessation Behaviours of Males in Macao – A Narrative Review

While there is no study examining smoking or cessation behaviours of male smokers in Macao, there were numerous studies examining the influences associated with smoking and cessation behaviours of both genders in other Asian cultures. However, those issues potentially associated with Macao males' smoking and cessation behaviours, and these behaviours integrated with Chinese philosophies and beliefs, are narratively reviewed in the following subsections.

2.5.2.1 Social Influences Shared between Both Genders or across Various Cultures

Socialisation is the tendency for individuals' norms and behaviours to be influenced by the norms and behaviours of one's group and conforming to those of group members. Socialisation refers to individuals adapting ideas about social roles from other members of their society [309].

Smokers commonly initiate smoking behaviour during their transition to young adulthood [310-312]. Scientific studies have identified numerous social influences, which was defined as the effect others have on the attitude and behaviour of an individual or a group, associated with the onset of smoking [313, 314]. Curiosity and peer influence may be the most commonly shared influences of the commencement of smoking for both genders and across various cultures [44, 224, 310, 315-322].

Curiosity

Curiosity could be an irresistible force leading to impulsive behaviour. In order to satisfy their curiosity, adolescents may take up cigarette smoking if it is perceived to be low risk [320, 323]. Both the tobacco industry and families who smoke, particularly parents and elder siblings, serve to

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stimulate adolescents' curiosity about smoking [44, 310, 315, 317-319, 323-337]. In addition, exposure to cigarette packs was also found to associate with curiosity about smoking [315].

Peer Influence

Peer orientation is a globalising youth culture [338-340]. Under this youth culture, as explained with Social Learning Theory [341], peer groups have shared values and norms, where elder peers' behaviours were commonly imitated by the younger members of a group [334]. Smoking peers, particularly elders, could exercise their powerful influence to reflect group norms about smoking and to lead younger peers to initiate smoking [43, 44, 310, 318, 342-345]. On the other hand, adolescents who want to gain a sense of belonging and peer acceptance would tend to take up smoking [318, 346].

Although neither curiosity about smoking nor peers influence seems a culture specific issue for Macao's males on regarding their commencement of smoking, the issue may somehow be gender linked. In addition, culture specific factors may silently enhance the peer influence on smoking and cessation behaviours of Macao's smokers. These issues will be further discussed in later sections.

2.5.2.2 Masculinity – A Gender Specific Influence

As quoted by Morrow and Barraclough (2010) [347], Young defined gender as "*a shorthand term which encodes a very crucial point: that our basic social identities as men and women are socially constructed rather than based on fixed biological characteristics*". Social constructionism also explains gender difference being socially taught and acquired and views gender as the product of socialisation [309].

The majority of literatures examining gender differences in smoking have focused on traditional gender roles, and masculinity has becomes an overwhelming construct. Courtenay's theory of gender and health explained that *"...health-related beliefs and behaviours, like other social*

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practices that men and women engage in, are a means for demonstrating femininities and masculinities" [348]. Masculinity ideology informs the expectations for males to conform to certain socially sanctioned masculine behaviours and to avoid certain proscribed behaviours [349].

Masculinity Impacting Smoking Behaviour

Smoking is commonly seen as a symbol of masculinity, potency and bravery [62, 102, 317, 319, 347, 350-354]. Even though it is not a formal rite of passage, in many countries across different cultures, smoking has widely been considered to demonstrate masculinity and to be a sign one is approaching adulthood from adolescence [62, 224, 351, 352, 354]. Smoking also serves as a symbol of rebelliousness which is a rejection of adult authority interwoven with a tendency toward deviance linked with adolescents' desire to approach adulthood [42, 332, 355]. The marketing strategies of the tobacco industry were never gender-blinded and, by advocating smoking as being cool, the tobacco industry has strongly tied smoking to masculinity and rebelliousness enhancement [102, 347, 356].

While rebelliousness and curiosity about smoking have an impact upon both males and females, being 'cool' is much important for males than for females [357]. The effects of curiosity and a desire to display one's adulthood and 'coolness', thus presenting as manly, the motivation to smoke could serve to enhance masculine norms. In addition to maintaining smoking behaviours more often, males also seeking assistance less often because they are more confident in their ability to deal with their health problems than females if only because males do not want to be seen as weak [358]. Nevertheless, Chinese males' help seeking behaviour is also culturally linked, and the issue will be further discussed in later sections of this chapter.

Masculinity Motivating Smoking Cessation

Apart from bravery and invulnerability, masculinity can be expressed in other ways, such as forming an identity as protector or breadwinner, and motivated males' smoking cessation

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behaviours [359]. Scientific evidence showed that fatherhood is a strong predictor in motivating males' smoking cessation. Since fathers realise about their duty to protect their children, they may try to quit smoking in order to avoid their children's exposure to second- or third-hand tobacco smoke [102, 359, 360]. While this fatherhood identity may be in conflict with a male's autonomy as demonstrated by smoking, it can potentially be utilised to motivate fathers to attempt quitting smoking [360-362]. Additionally, the identity of fatherhood associated with smoking cessation behaviour may also be culturally linked, and it will be discussed in later sections in this chapter.

Males smoking behaviour has widely been explained with a hypothesis of gender inequity which commonly exists in many Asian societies, such as South Korea and some Muslim countries, in which there are social norms against female smoking and males have a higher social status and greater access to economic resources. However, in combination with the gender specific influences, such as masculinity which, as discussed above, appears across various cultures, they are unlikely the sole causes of the gender disparity in Macao's smokers. Culturally specific issues influencing Chinese, or more specifically, Macao Chinese males' smoking and cessation behaviours, potentially enlarge the gender inequality of smoking in Macao [42, 54, 55, 61, 62, 352].

2.5.2.3 Culture Specific Influences

Scientific studies have identified ethnic-related smoking differences [66, 363, 364]. For instance, nicotine metabolism, which has been found to differ across ethnical groups, physiologically influence tobacco dependence and hence smoking behaviour [364]. However, scholars reminded that it was important to seriously differentiate the term 'culture' from 'ethnicity' [66]. Ethnic labelling lumps people, who may have as many differences as similarities together, either by skin colour, language or region of origin [66]. Culture is a set of social norms influencing members in a particular group and can unconsciously shape their thinking patterns and behaviour [66]. To some extent, the above mentioned nicotine metabolism difference associated with cigarette smoking is

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not culturally but ethnicity related (genetic related) [365-367].

As well as ethnicity, culture can also be an influence associated with continuing smoking and construct additional cessation barriers [66, 363]. Social influences, which are strongly culture linked for Chinese males, may be a significant force associated with their smoking and cessation behaviours [329, 368].

Maintaining interpersonal relationships and social harmony is highly valued by Chinese people. Harmony ('*He*' in Chinese characters), defined as "*a pleasing combination or arrangement of different things*" [369], is an important concept in Chinese philosophies. It has been both a fundamental value and a prime rule embedded in Chinese culture for thousands of years [370-372]. The philosophical thinking '*harmony being most precious*' has been deeply embedded in Chinese culture [370, 372, 373]. Nevertheless, before discussing the association between social harmony and smoking, it is necessary to learn about the Chinese collectivistic culture and relevant philosophical concepts, including the '*five relationships*', the '*five constants*', '*face*', and '*relationship*', embedded in Chinese culture.

Collectivism and Social Harmony

One of the dimensions that sociologists use to contrast cultures is the degree of 'collectivism' versus 'individualism' [374]. In contrast with Western cultures where individualism has been emphasised, Chinese culture emphasises collectivism, which is inherent in a Confucian society, as is the case with a few other East Asian countries, such as Korea and Japan [290, 372, 374-380]. Nevertheless, it was further argued that, among all Asian cultures, Chinese culture was the most collectivistic and least individualistic one [381].

Under Confucian philosophy, it was emphasised that people did not exist independently to one another and an individual was defined by their relationship to the group [372, 382, 383] and that

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individual rights and personal interests have to be sacrificed for the collective good [382, 383]. In addition to Confucianism, Taoism (also named as Daoism) is another philosophical school embedded into Chinese culture for thousands of years. Laozi, the founder of Taoism, used to say "*when people do not have self-interest, they can fulfil their self-interest*" [384, 385]. This Taoist philosophical concept states that individuals must place serving the social interest before their individual interests [386].

Central to these philosophies is the concept that individuals are perceived as part of a network of social relations where their individual interests are often beneath those of the collective. This strong collectivistic culture has been reflected in the close personal relationships among Chinese and their heavy emphasis on social harmony as one of the most common and important ideal philosophies in Chinese collective society [377]. Social harmony is the feeling realised in the interactions of individuals within the society. In Chinese culture, the principle of social harmony implies aspirations toward a conflict-free, group-oriented system of social relations [377, 387]. Under such a collectivistic culture, socialisation and social harmony are highly prized and people who smoke have found it easier to exercise their influential power to affect the choices of others to continue smoking and to obstruct their smoking cessation [368].

When discussing Chinese social harmony, the Confucian principles of the '*five relationships*' and the politeness in the '*five constants*' must be included. As a hierarchical system, Confucianism focuses on the '*five relationships*' ('*Wu-lun*' in Chinese characters). The five cardinal hierarchical relations include the relations between emperor and subject (in modern society, between superior and subordinate in the workplace), father and son, husband and wife, elder and younger brothers, and friend to friend. Among these relationships, only the relationship between friends is equal, with the others all involving a set of defined roles and mutual obligations [388]. Under the '*five relationships*' system, traditional Chinese society has been built on a hierarchical basis with a clearly defined social and familial role, and everyone has their own position in a society [388-390].

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Guided by Confucian philosophical concepts, it is believed that, if each individual behaves properly to others according to their particular position, harmony can be achieved [372, 377].

The '*five constants*' ('*Wu-chang*' in Chinese characters) is an important ethical concept in Confucianism and guides the honest behaviour of Chinese. It is also called the '*Ren-Yi-Li-Zhi-Xin*' ethical system. In the system, '*Ren*' refers to benevolence or humanness, '*Yi*' to propriety, '*Li*' to politeness, '*Zhi*' to wisdom or knowledge, and '*Xin*' to sincerity [371, 372, 388, 391, 392]. Politeness within the '*five constants*' can be understood as (within the proper relationships) doing the appropriate things with the right people [375, 383].

Because of the importance of the '*five relationships*', maintaining equality with friends is highly important in Chinese society. As it is linked with politeness ('*Li*' in Chinese characters) in the '*five constants*', it is considered improper to do anything potentially damaging to the relationship equality between friends. This includes turning down a shared cigarette or refusing to smoke together with friends [324]. Nevertheless, in order to discuss how social harmony and politeness influence Chinese smoking behaviours, further discussion of other themes, including '*face*' and '*relationship*', is necessary.

The Chinese '*Face*' and '*Relationship*'

An important theme, '*face*' ('*Lian*' or '*Mian-zi*' in Chinese characters), has influenced the Chinese, especially Chinese males. Although the notion of '*face*' is applicable in many different cultures, it was argued that the manifestations were different and that the degree of concern much higher in the Chinese context [377]. A Chinese proverb stating that a person needs '*face*' just like a tree needs bark represents the importance of '*face*' for the Chinese [393].

Among the idiosyncrasies of Chinese culture, the concept of '*face*' is not easily understood by Westerners [393]. While "*[f]ace cannot be translated or defined*" [394] but was characterised as

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"*[a]bstract and intangible, it is yet the most delicate standard by which Chinese social intercourse is regulated*" [394]. In Chinese culture, '*face*' is other-directed and relational and can be understood as a mark of personal pride and dignity, reflecting the social position of one as recognised by others [395]. There are two implications of '*face*', consisting of: giving '*face*' to others, and saving one's own '*face*'. Avoiding losing '*face*' is applicable in both perspectives [396, 397].

Chinese communication behaviours which stress maintaining social harmony have been inspired and guided by the common belief in saving each other's dignity and the sacred social attribute known as '*face*'. Giving '*face*' and showing respect for one's social status and reputation in society is highly important. This concept of '*face*' requires that all parties involved in a communication transaction are obliged to save each other's '*face*' as a positive social value for achieving social harmony [398].

Even though the Chinese characters '*Guan-xi*' can be translated as relationship, connections or networking, it is, in fact, far more complex than the combination of all of these. '*Relationship*' is a practical aspect of politeness and an important concept for pursuing social harmony [387]. The concepts have been embodied in the Chinese moral consciousness and taken into account in daily social interaction [387]. It was argued that rarely does any aspect of social activity in Chinese culture not relate to politeness or relationship [399].

Social Harmony and Other Chinese Philosophical Concepts Associated with Smoking

Interpersonal relationships are guided by traditional values that reinforce the importance of group awareness and a sense of interdependence over individual concern in Chinese societies. Individual behaviour can be significantly influenced by others [326, 388]. Social influences were reported as one of the most important reasons for Chinese males continuing to smoke [329, 368]. While it is uncommon in Western culture, perceived peer smoking was found to be associated with the smoking behaviour of not only Chinese adolescents, but in male adults [368, 400-402].

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Cigarette sharing was found to have a strong link to gender disparity in smoking among Chinese and linked with barrier to smoking cessation [403]. Cigarette sharing is rarely seen in other cultures, but in China cigarette sharing is a male phenomenon and male exclusive social activity [44, 403, 404]. It was common in China, when males met each other, whether or not they had known each other beforehand, for one to give a cigarette to the other before they begin talking [405]. Cigarette sharing provides a strong social meaning to Chinese males and serves to give a sense of trust and brotherhood and is often involved in welcoming guests, showing intimacy, and avoiding giving offence to others [44, 351, 403-406]. These all worked on building social interaction and maintaining social harmony [44, 319, 403, 404]. Sharing implies respect and generosity and is also recognised as social politeness and giving '*face*' [406]. On the other hand, refusal of shared cigarette will not only cause the giver to lose '*face*', but also threaten the relationship [406, 407].

Not only sharing cigarettes, but also smoking together serves to construct social connections or '*relationship*'. In fact, it was found that, in Confucian societies such as Mainland China, South Korea, Vietnam, Taiwan etc. where collectivism and social harmony are emphasised, smoking together has been seen an invaluable avenue to cement social connections among males, to improve males' social identities, and be beneficial to business activities [319, 346, 347, 405].

Similar to cigarette sharing, which involves offering a cigarette for immediate consumption, cigarette gifting, which involves giving an unopened carton of cigarettes, is a common practice among Chinese for special occasions and major festivals. This activity is seen as politeness and associated with Chinese smoking behaviour [319, 403, 408].

Reciprocity is an unspoken commitment in an established relationship. In other words, relationship bonds individuals through the exchange of favour, while reciprocity is a complicated and multi-faceted concept. A person who fails to return favour for favour will be perceived as untrustworthy and this leads to losing '*face*'. From another point of view, a person who has been

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given '*face*' is expected to return it with favours [409]. Gifting, including cigarette gifting, is a key part of the reciprocity cycle.

In addition to adults' maintaining smoking, adolescent onset of smoking may be influenced by their Confucian beliefs. Although presenting homogenous behaviour in a peer group, such as smoking, might be simply seen by Western adolescents as 'ganging-up', the silent reason for the Chinese behaviour may be more complicated. Adolescents who grew up in Confucian societies or who were educated under Confucian philosophy, were more likely to adopt smoking under peer encouragement or peer pressure due to their concerns about the cultural norm of maintaining good interpersonal relationships and achieving social harmony [326].

Both cigarette sharing and gifting, as well as smoking together, influence smoking behaviour and construct additional smoking cessation barriers specifically among Chinese male smokers. Taking into consideration cultural differences and traditions and embedding those issues into the design of smoking cessation mHealth intervention is key to the effectiveness of the intervention.

Family Harmony and its Potential Effectiveness in Motivating Smoking Cessation

As discussed previously in this chapter, taking responsibility for protecting their children, being a father is commonly a strong predictor for motivating males' smoking cessation [102, 359, 360]. However, the effect of fatherhood on motivating smoking cessation is enhanced in Chinese males because of the high value they place on family harmony.

One of the key elements of Chinese culture is the value of family to individuals and the society. As embodied in the *Great Learning*, the first volume of the *Four Books* in the Chinese Classics, there was a famous old Chinese saying: "*when one's home is well put in order and with harmony in one's family, one may go on to render one's service to one's country and make one's contribution to the world*" [410]. In other words, when one's family can be regulated, one's state can then be well

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governed; and when all the states can be well governed, there will be peace and harmony throughout the world. A Chinese proverb "*a harmonious family brings prosperity in all things*" implies that one cannot have any significant achievement without a harmonious family [388]. Family harmony has been greatly emphasised in the Chinese culture.

In a family where the smoking behaviour of the male head is unwelcome or, more seriously, objectionable, Chinese males can be motivated to give up their self-interest or change their unfavourable behaviour, including abstention of their die-hard smoking behaviour, not only to protect children from the harm of second-hand smoke but also to maintain family harmony [388].

Help Seeking and '*Face'*

Regarding help seeking behaviour, such as seeking assistance with smoking cessation, Chinese and other Asians in Confucian societies, are generally more reluctant to overtly solicit support from others, when compared with the Westerners. An important reason may be that, as discussed previously in section 2.5.2.2, males are generally more confident about their ability to deal with difficulties and are not willing to be seen as weak. In addition, males might also worry about the potential negative relational consequences, such as disturbing the daily living of others and hence disturbing social harmony if their help seeking annoys others [411]. Another reason, which might be the most critical concern, was put that, when males sought assistance with smoking cessation they were worried about being criticised by others for their incapability and poor self-efficacy on smoking cessation which may lead to losing '*face'* [411]. '*Face'* concerns may hence be a crucial issue associated with the gender disparity of smoking cessation assistance service usage in Macao.

2.6   The Significance of Developing a Smoking Cessation mHealth

2.6.1   Tobacco Control - Macao Government Policy

In Macao, while the Tobacco Control Office was established for the overall coordination of tobacco control, efforts were concentrated mainly on monitoring violations of the new legislation about

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smoking in indoor smoking prohibition areas, which is related to the 'M' and 'P' components of MPOWER. Although resources have been allocated (by the Health Bureau) to providing free smoking cessation assistance services in the government-operated healthcare centres and financial subsidisation was given (by the Social Welfare Bureau) to SAGHA for the provision of free smoking cessation assistance for many years, the 'O' component has however been of less concern to the Tobacco Control Office and by the Government of Macao (please refer to Appendices 1-A and 1-B). Additionally, according to the findings from literature search, there is lack of scientific studies regarding smoking cessation assistance services and the development of these services in Macao.

2.6.2 The Gap in Knowledge

mHealth has been implemented in many healthcare areas and integrated as a tool for supporting behaviour change [117, 197, 198]. Smoking cessation mHealth interventions have already been found to be effective in increasing the quit rate of smoking in many studies, mostly conducted in the West [127, 130-135]. However, it was argued that only a few mHealth studies involved evidence-based treatments or followed cessation guidelines [221]. It was further argued that few published mHealth study literatures described their formative research in detail or in an easily accessible manner [221].

Gender disparities in smoking prevalence and smoking cessation assistance service usage have been reported in Macao [1, 6-10]. According to the findings from the literature search, the traditional philosophical concepts such as Confucianism and Taoism are deeply embedded, and social harmony as well as '*relationship*' are highly valued by Chinese people and interwoven with Chinese '*face*'. As with these culturally specific issues, the effect of social influences associated with male smoking can be enhanced and they are likely to influence Macao Chinese males' smoking behaviour and make their smoking cessation more difficult [329, 368, 400-402, 406, 407].

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An important lesson learnt from the 'txt2stop' programme launched in the United Kingdom was that smoking cessation mHealth intervention was transferrable from one country to another, when culture- and region-specific modifications were made [203]. This has implications for the current smoking cessation study in Macao regarding an effective mHealth intervention, meaning that it should be appropriately modelled cultural competence and gender sensitivity. It was believed that developing an intervention culturally tailored for Macao that assisted male smokers to quit smoking could be effective in addressing the public health issue of male smoking. To guide the modelling of an appropriate, culturally sensitive intervention, it is necessary to understand local circumstances and context.

However, there seemed to be a lack of research on transferring a smoking cessation mHealth into practice for Macao, and there is no evidence indicating that any smoking cessation assistance mHealth programme had been conducted or was being studied or developed in Macao (as reported in Appendix 2-A). There is also little understanding about the potential of developing a smoking cessation mHealth in Macao, indeed scientific studies about Macao's culture are rarely conducted. Crucially, there is no scientific evidence to inform the design and the delivery of intervention that is potentially effective in assisting Macao's male smokers in their smoking cessation.

Consequently, while scientific evidence about the effectiveness of smoking cessation mHealth trial programmes were provided by the studies conducted in other countries, there is sparse literature to inform the design and guide the implementation of smoking cessation mHealth in Macao.

2.6.3   Modelling of Smoking Cessation mHealth

A scientific study is needed for smoking cessation mHealth modelling, which is defined as conceptualising "*a set of ideas and numbers that describe the past, present, or future state of something*" [412]. For the study, it is necessary to gather understandings about all relevant issues related to smoking and the cessation behaviours of male smokers in Macao, including: the

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feasibility and acceptability of launching a smoking cessation mHealth intervention, and the preferable and potential effective designs for the intervention including both content and delivery.

Smoking cessation assistance intervention does not simply involve helping smokers to cease smoking but also to prevent relapse. Smoking cessation assistance and relapse prevention are nevertheless complex interventions, dealing with tobacco dependence and insight into the psychological domains involving changes of smokers' behaviours.

A general discussion about complex intervention is that in where a number of components interrelates each other and that, while a component may give synergistic effect, it may also counteract the effectiveness of other components and give negative synergy. In addition, social interventions are quite different from others, such as life science programmes, and are never highly reproducible [413]. It was argued that complex interventions were not easy to define, develop, document, standardise and reproduce, and that programme evaluation was also difficult [414, 415]. The design or modelling of complex interventions therefore requires a systematic approach with a strong rationale.

A theoretical perspective is important when modelling for complex social programmes. As Pawson et al. (1997) have suggested, programmes are theory [416]. Theory is a set of general and modifiable propositions helping to explain, predict, and interpret phenomena of interest [417]. Theoretical frameworks provide a way of accumulating knowledge across empirical studies, thus creating a basis for developing more effective interventions. A theory-informed intervention design is considered an appropriate option for developing complex interventions [418].

2.6.4 Aim and Objectives of this Study

The aim of this study is to explore and gain evidence for integrated components in relation to designing a gender sensitive and regional culture-orientated smoking cessation assistance mHealth

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in Macao. The objectives are:

(1)   to explore the perspectives of male smoking cessation service users in Macao in relation to their smoking behaviours and contemplating smoking cessation;

(2)   to explore the perspectives of smoking cessation service providers in Macao in relation to their male clients' smoking behaviours and contemplation of smoking cessation;

(3)   to define and understand the components of the intervention and their relationships through modelling or simulation techniques; and

(4)   to explore the working mechanism of mHealth intervention, the potential facilitators and possible barriers for both service users and service providers.

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Chapter Three: Methodology

In this chapter, the epistemology, that guides the choice of methodology, as well as the study design, data collection and analysis strategies are discussed.

3.1   Epistemological Positioning and Methodology

Epistemology can be defined as either "*the study of knowledge and justified belief*" [419] or "*the study of the nature of knowledge and justification*" [420]. Epistemology is understood as a theory of knowledge [421]. Positivism has dominated scientific studies for decades in the twentieth century by applying the same methodologies used in natural sciences to social science [422]. Post-positivism, which is not a rejection of the scientific method but rather a reformation of positivism to adopt the critiques [422], has emerged, while prediction and control are maintained as the aims of scientific study [423].

Methodology can be simply defined, as Kaplan (1964) stated, "*the study − the description, the explanation, and the justification − of methods, and not the methods themselves*" [424]. Methodology encompasses the methods of data collection, analysis and interpretation that serve the purpose of answering study questions [425, 426].

Methodology and epistemology are closely related, and the epistemological position the researcher chooses usually drives the choice of methodology [421, 427]. Scientists holding a positivist position commonly adopt quantitative methods, while the qualitative approach is always used in naturalistic inquiry [421, 428, 429]. Nevertheless, it was argued that the epistemological gap between quantitative and qualitative studies is just a myth, and that the complementary characteristics of positivism to post-positivist paradigms exists [430].

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Importantly, while each methodological approach has its own advantages and disadvantages over others, the choice of methodology depends on conditions such as the nature of the study problem, the type of study question, the control the study has over actual behavioural events, and the focus on contemporary as opposed to historical phenomena [431, 432]. It was argued that "*[q]ualitative knowledge is absolutely essential as a prerequisite foundation for quantification in any science…To rule out plausible hypotheses we need situation specific wisdom. The lack of this knowledge (whether it be called ethnography or program history or gossip) makes us incompetent estimator or programme impacts, turning out conclusions that are not only wrong, but often wrong in socially destructive ways*" [433].

In this study, there is an interest in exploring how smoking cessation mHealth can be best designed to assist male smokers in Macao to quit smoking. An intricate part of this will be to understand the potential barriers and facilitators. Since there is little understanding about the foundational knowledge needed to undertake a quantitative study regarding mHealth smoking cessation, there is a need to conduct a qualitative study first. Thus, this study has taken a post-positivist positioning and adopts a qualitative methodological approach.

3.2   The Medical Research Council (MRC) Framework

Since complex interventions are commonly employed in the area of public health and may produce significant health consequences, an appropriate framework is necessary to guide the complex intervention. For the purpose of helping researchers and research funders to recognise and to adopt appropriate scientific study methods, the Medical Research Council (MRC) Framework was initially published in 2000 and reviewed in 2008 [414, 418]. The framework has been highly influential in the design and evaluation of many healthcare services and interventions (including initially implementing in drug development) and is often cited as an authoritative guidance on methods [414, 415, 418].

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The MRC Framework divides the development and the evaluation of complex intervention into five

phases consisting of: the theoretical (or preclinical) phase, which includes theory exploration;

intervention modelling; exploratory trials; the main trial; and the implementation phase (Figure 3.1)

[414]. The framework claims that "*best practice is to develop interventions systematically, using the*

best available evidence and appropriate theory, then to test them using a carefully phased

approach, starting with a series of pilot studies targeted at each of the key uncertainties in the

design, and moving on to an exploratory and then a definitive evaluation" [418]. The newly

reviewed framework has additional strength, stating that "*a good theoretical understanding is*

needed of how the intervention causes change" which can efficiently address the issues of a

plethora of existing behaviour theories [414].

Figure 3.1   Sequential Phases of Developing Complex Interventions
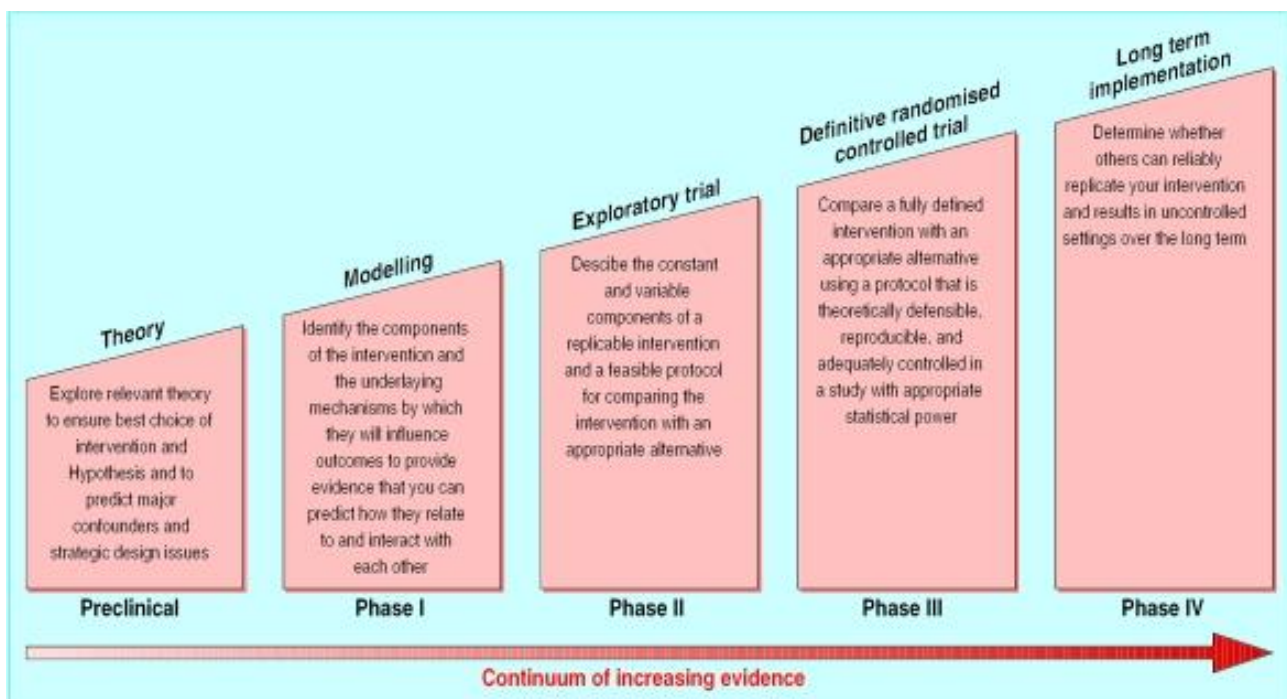
Source: Campbell, M., et al., *Framework for Design and Evaluation of Complex Interventions to
Improve Health.* BMJ, 2000. **321**(7262): p. 695.

Implementing the MRC Framework is a mixed method approach where qualitative and quantitative

studies can be integrated in those five phases. In practice, the five phases of the framework are an

iterative process, in which each phase answers a specific question that leads to the next phase [414].

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It also provides opportunities for correcting and refining the components of proposed interventions throughout the delivery of the phases. The confidence of policy makers and service providers on the appropriateness of the intervention can therefore be enhanced [414].

3.2.1 Adopting MRC Framework in Developing Smoking Cessation mHealth

Smoking cessation assistance is a complex intervention, involving behaviours, parameters of behaviours, and methods of organising and delivering those behaviours. The MRC Framework is capable of framing the design of and pre-evaluating the smoking cessation mHealth to determine whether its effectiveness may be affected by the external environment, the features of service providers, or the characteristics of users while the interaction with other assistance strategies may also exist [418].

This study incorporates the first two phases: the theoretical (or preclinical) phase and the modelling phase from the MRC Framework. It employs a qualitative design for gaining an understanding of components and possible effects in order to establish a theoretical basis and to model a smoking cessation assistance mHealth specifically for male smokers in Macao.

3.2.2 Rationale and Justification

A qualitative approach is appropriate at the early stage of intervention development when understandings about the contexts and intervention, including where the theoretical and practical details, are insufficient [433-435]. In this study, a qualitative approach is relied upon to gain deep understandings about the smoking behaviour and cessation barriers for male smokers in Macao and the potential components of a smoking cessation intervention that is expected to effectively assist them to cease smoking. Qualitative study can also give understandings of the opinions of participants about the feasibility and acceptability of launching a smoking cessation mHealth in Macao [433-435].

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3.2.2.1 The Theoretical (Preclinical) Phase

In the theoretical phase of the MRC Framework, a systematic search of relevant literatures and theories was employed, including into those outside the immediate area of interest, as reported in the previous chapter. Pawson et al. (1997) have suggested that programmes are theory [416]. Conducting the theoretical phase gives opportunities to explore the existing theories and scientific evidence about smoking and cessation behaviours and effective interventions assisting smokers to cease smoking which are essential to determining the potential effectiveness of smoking cessation mHealth in increasing quit rates and preventing lapse or relapse. This phase serves to develop a hypothesis of smoking cessation mHealth intervention. Since there is lack of theoretical basis for driving the existing studies, the theoretical phase is necessary in this study. This phase also allows for identifying the gaps in knowledge.

In addition to the established theory base, in the theoretical phase, the context was understood. Context is important, and the effectiveness of an intervention highly depends on the context. In this study, context includes the characteristics of the population, local specific issues consisting of social and cultural background, the available smoking cessation assistance services, and the tobacco control system as a whole, as well as the effectiveness of smoking cessation mHealth in other countries with different cultures. Understanding context is not only needed at the stage while modelling appropriate intervention, but is also necessary for predicting whether an intervention that was effective in one setting may work in other. It is particularly important in this study that the effectiveness of smoking cessation mHealth has been found in the west, but is yet studied for males in Macao.

The theoretical phase gave additional effectiveness in that the study questions could be better defined or refined. It also provided opportunities to sharpen and polish the study hypothesis. It might also serve to predict major confounders for the smoking cessation mHealth design that would

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result in meaningful improvisations in the existing smoking cessation assistance services currently provided in Macao [414].

3.2.2.2 The Intervention Modelling Phase

A qualitative approach is commonly involved in the modelling phase of the MRC Framework [414]. Miles (1994) argued that a qualitative study often has "*been advocated as the best strategy for discovery, exploring a new area, developing hypotheses*" [436]. In qualitative design, multiple realities will inevitably diverge, with the aim of the inquiry directed towards developing an idiographic body of knowledge in the form of working hypotheses that explain the individual cases or situations [437].

Bogdan and Taylor (1975) argued that "*[q]ualitative methods allow us to know people personally and to see them as they are developing their own definitions of the world*" [438]. In a qualitative study, a close communication between researcher and participants can be maintained which serves to build upon the strengths of the qualitative approach and include the richness and holism of the data leading to a strong potential for revealing complexity. Miles (1994) further stated that "*[s]uch data provide 'thick descriptions' that are vivid, nested in a real context, and have a ring of truth that has strong impact on the reader*" [436].

A qualitative strategy well suits the study that examines realities as multiple, constructed and holistic, instead of being singular, tangible and fragmentary [437]. The justification for adopting a qualitative approach in this study is also linked with a subjective, phenomenological post-positivist epistemological position that encompasses the viewpoints of single or group(s) of individual(s), which can be explored through a science of meanings, phenomenological insight and subjective processes [439]. In this study, as well as stepping through the qualitative avenue, the primary researcher can dig deeply in the personal meanings of smoking behaviour and cessation barriers from service users. The opinions of both service providers and users about launching a smoking

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cessation mHealth in Macao and its potentially effective components of the intervention can also be understood.

Consequently, by conducting the first two phases of the MRC Framework, a knowledge of existing evidence extracted from the theoretical phase of the study and an understanding of the perspectives from study participants can be obtained. The capability of these phases to gather richness and depth of data and to identify components of an intervention and the underlying mechanisms that may affect the outcome of intervention are associated with their potential to answer the study question [415].

3.3   A Case Study Approach

In a case study, the opportunity is provided to gather information from various participants that will help to decrease the possibility of distorted interpretations, that will, in turn, minimise the risks of inducing bias from social scientists with the participants [440, 441]. This strategy allows for multiple facets of the phenomenon to be revealed and understood and ensures that the study issues are not explored through a single but rather a variety of lenses [431, 432, 442-447]. Scientists are thus provided with a way to discover as complete an understanding about the real world as possible, and the confidence of a study can be increased [431, 432, 442, 448].

In this study, there is a need to gather understandings about the cultural influences associated with Macao males' smoking and cessation behaviours, as well as the design and acceptability and feasibility of the smoking cessation mHealth. The opinions given by both service provider and service user are essential to gathering relevant understandings. Additionally, following the second phase of the MRC Framework with conducting qualitative method in this study, quantitative studies will be used in the next few phases. Case studies are commonly designed to bring out details from the viewpoint of participants by using multiple approaches and sources of data [444]. With these capabilities, a case study approach suits the aim and objectives of this study.

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3.3.1 Case Selection

A case should be selected that aims at maximising what can be learned in the period of time available for the study [444]. The Smoking Abstention and Good Health Association (SAGHA) was founded in 1980 and is the ancestor of the smoking cessation agency in Macao. Over the past three and a half decades since its establishment, being financially subsidised by the Government of Macao, it has provided free smoking cessation assistance services that include pharmacotherapy and psychological counselling to smokers who seek cessation assistance [7]. Before the establishment of smoking cessation clinics in government-operated healthcare centres in 2006, SAGHA used to be the sole agency providing a free smoking cessation assistance service in Macao.

Although smoking cessation assistance services are currently provided on a free of charge basis by a few government-operated healthcare centres, most of the smoking cessation clinics are small in scale. For instance, the biggest government-operated smoking cessation assistance clinic is located in a small room in the Healthcare Centre Areia Preta (the setting of the smoking cessation clinic is shown in Appendix 3-A). Similarly, the smoking cessation clinic in Hospital Kiang Wu, a private hospital in Macao, is also located in a very small room in a corner in the hospital. The government-operated smoking cessation clinics have to share facilities and resources with other healthcare units [108, 449]. In addition, in those government-operated smoking cessation clinics, no walk-in clients will be served and smokers have to make an appointment before they visit.

Even though there is no updated data, the historical data between 2008 and 2010 shows that SAGHA served 80% smokers who sought smoking cessation assistance service in Macao [8, 450]. SAGHA is the largest and most widely used smoking cessation clinic in Macao. Because of its critical and unique characteristics, SAGHA was purposefully located in the case study.

3.3.2 Sampling Strategy

A purposive sampling strategy was employed and the most productive samples that had the

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potential to give rich, in-depth information to answer the study questions were targeted [451-456].

Due to the information rich nature, the major stakeholders of smoking cessation assistance mHealth intervention, consisting of both the service providers and users/smokers, were purposefully recruited [416]. Each group of stakeholders respectively views the mHealth intervention from different viewpoints and voices for professional or lay-expert of smoking and cessation [457]. More importantly, they would be the only people directly involved in the process of delivering the smoking cessation mHealth being developed.

Since SAGHA was the selected case, service providers consisting of frontline staff, administration and management members of SAGHA would be recruited. In addition, as the study was aimed at developing a smoking cessation mHealth specifically assisting male smokers to quit smoking, male smokers who sought the cessation assistance provided by SAGHA would be targeted.

Service users are crucial for providing information about the components of an acceptable, preferable and effective intervention assisting their smoking cessation and for expressing their viewpoints on the potential facilitators and possible barriers to their smoking cessation success [458-460]. In addition, they are lay-experts who can relate their life stories and offer opportunities to understand how traditions and cultural issues impact their smoking and cessation behaviours [459-461].

The frontline staff from SAGHA, being professionals who directly provide cessation assistance to their clients, were given opportunities to express their views on the needs of and the difficulties faced by their clients while quitting smoking. They were also expected to understand the smoking and cessation behaviours of their clients from their own viewpoints with professional knowledge and experience. Their perspectives on developing smoking cessation assistance mHealth and of the crucial components of an appropriate intervention are essential for modelling a feasible mHealth.

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Even though the managerial members of SAGHA are not directly involved in service provision, their roles are on a policy making level and lead to organisation development. The managerial members are responsible for determining the policy regarding the introduction of a new service. Endorsement from management is extremely important for adding mHealth into the scheme of a smoking cessation assistance service.

The administration members of SAGHA work neither on service provision nor policy making and contribute to service provision in a different way. Being a NGO that provides services free of charge, financial sponsorship is one of the most essential elements for its survival. Sufficient funding is nevertheless necessary for the provision of service. The administration members of SAGHA are involved in preparing proposals and writing reports, both of which are essential for fund raising. They are the experts with a deep understanding and good experience in identifying fundable, and therefore feasible, projects.

Consequently, while some of the members of SAGHA do not directly provide cessation assistance services, they can contribute and are eligible to give opinions from a variety of viewpoints for the development of an appropriate and feasible smoking cessation assistance mHealth. They can also serve to give opinions about how Chinese traditional philosophical beliefs and Macao's culture have an impact upon male smoking and cessation behaviours through the lens of outsiders/non-smokers.

SAGHA is not large, but it operates the largest and most widely accessed smoking cessation clinic in Macao. All service providers and the service users from different age groups and various occupations were invited to participate in this study. The arrangement, as discussed earlier in this chapter, served to provide different sources of data to achieve data source triangulation.

3.4   Method

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Qualitative interviews are one of the most widely employed methods and one of the richest sources of information in a case study design [432, 443, 462]. Yin (2003) stated: "*Overall, interviews are an essential source of case study evidence because most case studies are about human affairs. These human affairs should be reported and interpreted through the eyes of specific interviewees, and well-informed respondents can provide important insights into a situation*" [463].

One-to-one interviews were chosen with service users instead of focus groups, because with interviews participants are less likely to feel they have lost '*face*' by discussing their failed quitting experiences. For service providers, in one-to-one interviews, opportunities can be offered for them to freely give opinions instead of being coerced by managing superiors, which can occur in focus groups. Individual interviews also allow for convenience in relation to the time and place that can be negotiated between the interviewer and single interviewee [464]. Other strengths of a qualitative interview include: opportunity for the researcher to obtain a rapid understanding of key themes or issues, to dig deeply into specific topic, and to explore new themes; and to analyse the collected data for shaping questions for latter interviews [464-467]. Qualitative interviews have therefore been conducted in this study.

3.4.1   The Interview Schedules

3.4.1.1   Developing the Interview Schedules

To conduct in-depth interviews with participants from each group of service providers and service users, two interview schedules were developed through the processes guided by scholarly literatures, which sequentially include: identifying possible pieces of puzzles for answering the study questions; outlining question domains; consulting similar study literatures; brainstorming for all relevant questions; reorganising and regrouping questions to reduce and streamline questions and categories; and reviewing, refining, sequencing, and formatting the interview questions and categories [432, 467].

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The interview schedules were piloted with two people, who would not be involved in the subsequent interviews, including one male smoker (to pilot the interview schedule for service users) and one health professional (to pilot the interview schedule for service providers). In accordance with the feedback given by the pilot interviewees, both interview schedules were carefully refined. Also, as the data were being collected, data transcription and data analysis were undertaken, whereby redundant questions were removed and additional questions were added. This was done to enhance the quality of the data collected in the remaining interviews in order to best answer the research questions, and to achieve the aim and objectives of the study.

3.4.1.2 The Rationale for the Interview Schedules

In order to avoid placing sensitive or potentially controversial questions at the beginning of an interview, keeping the interviewer at ease and hence allowing the interview to flow smoothly, the interview questions were asked from the general to the specific [467]. The interview schedules for both service providers and service users were divided into several sections (the bilingual interview schedule for service providers is shown in Appendix 3-B, and the bilingual interview schedule for service users is shown in Appendix 3-C). The pre-planned interview schedules employed mainly open-ended, non-directive questions. Nevertheless, responses from the participants were probed deeply to encourage elaboration and content mining.

The core questions in both interview schedules were about participants' perspectives on smoking cessation assistance mHealth (Section 3 of the interview schedule for service providers and Section 4 of the interview schedule for service users). Questions in those sections would help to understand the perspectives from participants about the intervention currently provided and the opportunity for improving the intervention. The questions also served to inform the acceptability and feasibility of smoking cessation mHealth, the potentially effective components of the intervention, and the design and the delivery of the intervention, while the possible barriers to accessing the intervention could

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also be discovered. All answers from those questions could be referred to when modelling an appropriate smoking cessation mHealth that relates to the key research questions and aim of this study.

Questions about the cessation barriers for smokers were also crucial. The first subsection of Section 2 of the interview schedule for service providers and Section 2 of the interview schedule for service users was developed for digging deeply by asking follow-up questions (either scheduled or unscheduled) in order to understand the gender and culture specific issues associated with the cessation barriers constructed. These would be closely associated with the effectiveness of an intervention.

3.4.2   Ethical Consideration

As defined in the National Statement on Ethical Conduct in Human Research (2007), human research is "*research conducted with or about people, or their data or tissue*" [468]. Since this study was conducted with and about people, in order to "*protect the welfare, rights, dignity and safety of research participants; protect researchers' rights to conduct legitimate investigation; protect the reputation for Flinders University for research conducted and sponsored by the institution; and minimise the potential for claims of negligence made against any individual researchers and Flinders University*" [468], the study protocol was submitted to and reviewed and approved by the Social and Behavioural Research Ethics Committee of the Flinders University.

Informed consent was acquired from each participant before carrying out the interview (a copy of the consent form was given to each participant in the research package while an additional copy was prepared for having written consent). Before conducting the interviews, a verbal explanation of the study, guided by a verbal script, as attached in Appendix 3-G, was given to each participant. During the interview, no coercion of participants occurred.

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All audio records and transcriptions of interviews were treated as anonymous and confidential so that participants would not experience invasion of privacy or embarrassment. The audio recordings were transcribed by the primary researcher and no out-sourcing transcription service was appointed. The arrangement contributed to avoiding handing over data or information about participants and therefore to further ensured data security. All raw data and transcriptions were either saved as computer files and locked by security code, or stored in a locked filing cabinet. Nevertheless, the details of the strategies employed will be discussed in later sections of this chapter.

3.5   Data Collection

3.5.1   Participant Recruitment and Sample Size

Regarding participant recruitment, agreement was reached between the primary researcher and SAGHA (the signed agreement is shown in Appendix 3-D). SAGHA had agreed to provide all necessary assistance for recruiting their staff members and clients.

Potential participants, including the SAGHA staff, as well as the smokers who sought the smoking cessation assistance services provided by SAGHA were invited. Through SAGHA, all potential participants were provided with the bilingual research package, as presented in Appendix 3-E (for service providers) and Appendix 3-F (for service users, which differs only slightly from Appendix 3-E). They could then indicate their willingness to participate by responding to the primary researcher via telephone call, SMS, email, or through SAGHA.

Individual in-depth interviews were arranged at a location convenient to the participants. A shopping voucher valued MOP 150 (approximate AUD 17.50) was provided to each participant upon completing interview, as compensation for their time and any out-of-pocket expenses.

In the period of between December 2013 and May 2014, nineteen individual in-depth interviews, consisting of thirteen interviews with service users and six with service providers were conducted.

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The data collection ceased when a data saturation point was reached, meaning that no additional themes appeared to be emerging from subsequent data [454, 469].

3.5.2   Conducting Interview

Soon after the potential participants contacted the primary researcher and indicated their willingness to be involved in the study, the primary researcher phoned each potential participant to arrange the time and location of interview. SMS were sent to each potential participant in the service user group one day and then approximately two hours before the scheduled interview time, which is sufficient time for participants to prepare and transport themselves to the appointed interview location. This arrangement, in addition to reminding about the interview, could help to understand the participant's mobile phone usage pattern, and so to cross check their potential accessibility to mHealth. However, for service providers, only telephone calls were directly made to remind about interview appointments, but no SMS was sent since their mobile phone usage pattern is not a concern of this study.

All interviews were conducted in Cantonese, a dialect of Chinese and the mother language of all participants as well as the primary researcher who acted as interviewer. In order to give the most convenience to participants for attending the interviews, and more importantly, to ensure that the participant felt free and comfortable in the interview, all interviews took place at the participants' preference of a mutually agreed location, including the smoking cessation clinic of SAGHA or a quiet corner at the worksite of a service user. The majority of interviews were conducted in the meeting area in a NGO located at the city centre of Macao.

From the letter of introduction, the information sheet and the consent form from the research package previously given to all participants through SAGHA, participants were expected to learn that they would be involved in a study about modelling smoking cessation assistance mHealth – a mobile phone based smoking cessation intervention. However, to ensure that all participants had a

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deeper knowledge about what smoking cessation mHealth is, before conducting each interview, the primary researcher gave a brief introduction about smoking cessation mHealth and, additionally, during the individual interviews, a list of exemplary text messages (as attached in Appendix 3-H) and two smoking cessation apps, including the '*Quit Smoking App*' (named '戒煙達人' in Chinese) developed by the Tobacco Control Office of the Department of Health of Hong Kong Government (selected screenshots are shown in Appendix 3-I) and the '*Quit Smoking*' app, which is named '話戒就戒' in Chinese, developed by Pfizer Inc. (selected screenshots are shown in Appendix 3-J), were presented on a Smartphone (iPhone 5) to each participant.

All interviews were audio recorded digitally using the build-in app in a tablet (Lenovo A3000), and a Smartphone (iPhone 3) was used for back-up recording. The audio recording app in the tablet was set to the highest quality recording, while no such settings could be done with the iPhone audio recording app. After each interview, the audio records in both devices were zipped to set a security code lock and saved in both a computer and an external hard disc, which was locked in a cabinet. It means that four copies of an audio record for each interview were stored in two different hard discs.

While the majority of interviews were lasting for about 1 hour, the duration of interviews ranged from 49 minutes (interviewing a service user) to 2 hours and 18 minutes (interviewing a service provider who was very interesting in discussing the study topics and whose opinions were considered invaluable).

3.5.3 Transcribing

Soon after the completion of each in-depth individual interview, the audio recordings were transcribed verbatim into the Chinese written format by the primary researcher. To ensure the transcription's accuracy, all written transcripts have been reviewed twice against the audio recordings. Corrections in the transcripts were made during the review. The volume of interview

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transcripts amounted to 422,000 words in total (ranged from 12,700 to 39,000 words each, Chinese characters).

Apart from printing hard copies, which were stored in a locked filing cabinet, the transcript files were backed-up to an external hard disc which was also locked in a cabinet while the original copies were kept in a personal computer. Another copy of each transcript was saved to be used as working file for analysis.

3.6 Data Analysis

It was argued that every language and culture has expressions with meanings different than the obvious [426]. Since the mother language of all participants and the primary researcher is Chinese, all interviews were conducted and all transcripts were written in Chinese. In order to maintain all transcripts and analysis to be as true to the original speech patterns and opinions given, and to best reflect what participants said and actually meant, and to avoid missing any important meanings or concepts [426], the transcripts were kept in Chinese while conducting analysis. By applying this strategy, the researcher was able to take significant advantage of their native Chinese language. Despite the coding system being built in English by the primary researcher, the quotes were kept in Chinese until the end of analysis but were translated to and presented in English in the dissertation afterwards.

Analysis is an ongoing, iterative process beginning in the early stages of data collection and continuing throughout the study [470]. Initial data immersion took place immediately after each interview [467]. The audio recordings or transcripts were approached and re-approached during data collection period to make sense of what had been learnt and what still needed to be found out [471]. This strategy, as explained in the previous section in this chapter, would subsequently inform further data collection by shaping the questions to be asked.

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Miles (1994) stated: "*Valid analysis is immensely aided by data displays that are focused enough to permit viewing of a full data set in one location and are systematically arranged to answer the research question at hand*" [436]. Yin (2009) stated: "*data analysis consists of examining, categorizing, tabulating, testing, or otherwise recombining…evidence to address the initial propositions of a study*" [431]. Data analysis, a pivotal stage of the study, is a process that brings order, structure and meaning to the mass of collected data [472]. Systematic examination and arrangement of the data was conducted in the study for the purpose of increasing the researcher's understandings of those data and to meaningfully present the findings to others.

Several steps were taken in the process of systematic data analysis in this study. Immersion in the data was employed to comprehend its meaning [471]. Close reading the data generally without coding helped to identify emergent themes without losing the connection between concepts and their context [426, 470]. After the data was close read and understandings of the scope and contexts of findings were generalised, coding was employed next. This gave a formal system by which to organise the data, and uncover and document additional links within and between concepts and experiences that appeared within it [470].

3.6.1   A Parallel Mixed Coding Approach

Coding the text is the core process of qualitative data analysis. There are two major types of coding, including deductive coding and inductive coding, which is also named open coding [473]. In this study, a parallel mixed coding approach was used [436]. This approach made data analysis more than a hypothesis testing approach, but was not intended to be a pure grounded theory approach. Through the data analysis process, the lay experiences and opinions of participants could be understood and comparisons made between and within the transcripts, as part of the Constant Comparison Method [474, 475]. By applying this strategy, the theoretical contexts could be used deductively and data could be inductively approached to identify themes. The primary researcher

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was open to new themes that emerged by comparing all data collected. The theory was then revised with inductive aspects while the literatures were re-consulted and theories could be approached deductively to help explain certain themes [474, 476].

Detailed perusal of every line of the in-depth interview transcripts was performed to search for meaning and concepts. By conducting such line-by-line analysis, texts were assigned to one or more appropriate themes while additional themes would be generated when texts did not fit those existing themes. Texts assigned to different themes were highlighted in different colours on the Microsoft Word files of transcripts while brief descriptions were inserted as comments. The texts were then copied and pasted onto different tables of categories and themes that were created on a Microsoft Excel file.

In-depth interviews provided opportunities that allowed the subtle differences among sub-groups of participants to surface and be revealed. Constant comparison was carried out where each piece of data, which is usually in the form of in-depth interview on a certain theme, was then compared with, in addition to the existing themes, all other data collected from the same participant, other participants in the same group, and between groups. Both similarities and differences were explored in order to develop conceptualisations [477-479].

Themes and more abstract concepts were generated and organised into conceptual categories. While the coding system was revised and refined, a category would be combined or linked with others alongside the analysis process [480, 481]. However, the final categorisation was based on all themes and analysed as a whole. Appropriate quotes were selected for conveying the core themes or essence of categories [481].

Continuous and repeated comparison and inquiry into emerging themes were carried out, but ceased when the point of theoretical saturation was reached. This meant that no new data could be

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identified or assigned to existing themes, no new themes would appear to develop or refine the theory, and that the category was coherent or made sense to the study questions and objectives [426, 482].

3.6.2   Validity

Internal validity refers to the credibility of a study and whether the study results are credible or believable. In qualitative studies, as with the purpose of describing or understanding the phenomena of interest from the viewpoint of participants, the credibility is solely from the perspective of participants in the study. The internal validity of findings can therefore be legitimately judged by the participants in the study [483].

Upon the completion of data analysis, participants from both groups of service provider and service user were invited to review relevant findings extracted and give feedback about the accuracy and appropriateness of findings. The strategy was valuable to examine the internal validity of the study findings, while almost no clarification was raised by participants.

3.7   Chapter Summary

In this chapter, the epistemological positioning and the choice of methodology were explained, whereas the framework that guided the study method was discussed. The whole process including interview schedule development, participant recruitment, data collection and transcription, data analysis, and ethics consideration and the rationale of the study design were discussed in detail. These are important to make readers better understand the study and be more confident about the study results which will be discussed in later chapters.

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Chapter Four: Qualitative Results

In this chapter, participant characteristics are presented in the first section. In subsequent sections, the main themes gathered from the interviews, supported with illustrations from the original transcripts, are reported. The analysis was undertaken consider the study question, aim and objectives. Findings from the study that will be used for modelling the smoking cessation mHealth programme assisting male smokers in Macao to quit smoking are presented in this chapter under headings that reflect themes from the data.

The main themes identified were in relation to: (i) the influencing factors upon smoking and cessation behaviours; (ii) the gender and culture specific issues, including facilitators and barriers, to Macao males' smoking cessation; (iii) current smoking cessation interventions, their effectiveness and deficiencies; and (iv) smoking cessation assistance mHealth regarding Macao's male smokers, including the potential effectiveness and possible deficiencies. The components, design and delivery are also considered.

The cessation behaviours of male smokers in Macao are likely to be enhanced if the culturally specific philosophical beliefs are considered. Because of the deficiencies found in current interventions, smoking cessation assistance mHealth is proposed. The effective components of current available interventions identified in theme (iii) can be embedded into the modelled mHealth.

4.1   Participants' Characteristics

4.1.1   Service Providers

There were two male and four female participants in the group of service providers (SP), including one managerial member, two smoking cessation specialists, one psychologist, and two administrative staff. Although the number of participants from the group of service provider seemed

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not much, data saturation was likely reached with no additional themes appeared to be emerging from subsequent interviews. More importantly, all of the most relevant members from SAGHA involved in service providing have participated in this study.

All of them are Chinese adults under 65 years of age. Their working experiences in SAGHA ranged widely from 4 months to 33 years. As SAGHA is not a large organisation, having less than twenty staff members while six of them participated in this study, to ensure the confidentiality of participants' identities, no detailed information about the service providers will be listed herein.

4.1.2   Service Users

In the group of service users (SU), one participant was Macanese (that is a specific term defined as "*a native or inhabitant of Macao, especially one of mixed Chinese and Portuguese descent*" [484]') and the remaining participants were Chinese. As the study focused on male smokers, the majority of participants in service user group were males, one female smoker was however recruited. Recruiting the female smoker was mainly to try identifying significant disparity of smoking and cessation behaviour of female from male, while it was noted that single female smoker could only serve to provide a limited contribution to this purpose. Male service users were purposely selected according to their age in order to have a similar number of participants in each age group. The age of participants ranged from 26 to 67 years. The occupation of service users varied from jobless and blue collar to civil servants and professionals. The majority of those participants have secondary education level. Some of them were tertiary educated, while some had not proceeded past primary education. The participant characteristics in the service user group are summarised and presented on Table 4.1.

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Table 4.1   Participants' Characteristics - Service User Group

Participant pseudonym	Gender	Age group	Maximum level of education	Occupation	Origin (Stayed in Macao for)	Marriage status and family	Age of onset (yr.)	Currently smoking status	Mobile phone usage
A1	M	30-39	Tertiary	White collar	Mainland China (28 years)	Married / has a 2-yr-old daughter	21	Casual smoker	Smartphone
B1	M	40-49	Secondary	Gaming industry	Mainland China (3 years)	Married / has 2 little daughters (4 and 5 years old)	13	Maintaining non-smoking status	Smartphone
B2	M	18-29	Secondary	Blue collar	Mainland China (currently a foreign labour)	Married / has 2 boys	11	Maintaining non-smoking status	Smartphone
C1	M	30-39	Primary	Blue collar (currently on sick leave)	Mainland China (28 years)	Married / has 1 little son	16	Maintaining non-smoking status	Digital mobile
D1	M	>60	Secondary	Blue collar (currently on sick leave)	Mainland China (35 years)	Married / has 1 young son and 1 young daughter	21	Maintaining non-smoking status	Digital mobile
F3	M	30-39	Tertiary	Civil servant	Mainland China (20 Years)	Newly-married.	14	Reducing	Smartphone
I2	M	>60	Secondary	Blue collar	Mainland China (32 years)	Married / has 1 young son	<20	Smoking	Digital mobile
L1	F	40-49	Secondary	White collar (currently jobless)	Macao	Single	About 19	Smoking	Smartphone
N2	M	40-49	Secondary	Civil servant	Macao	Married / has 2 young sons	17	Reducing	Smartphone
Q1	M	30-39	Primary	Chef	Macao	Married / has 1 newborn son and another 3-yr-old boy	About 17	Smoking	Smartphone

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Participant pseudonym	Gender	Age group	Maximum level of education	Occupation	Origin (Stayed in Macao for)	Marriage status and family	Age of onset (yr.)	Currently smoking status	Mobile phone usage
S3	M	18-29	Secondary	Blue collar	Macao	Unmarried (living with parents and siblings)	18	Reducing	Smartphone
T4	M	18-29	Tertiary	Gaming industry	Macao	Married / has a baby	21	Smoking	Smartphone
Y4	M	50-59	Secondary	Gaming industry	Mainland China (30+ years)	Married / has 1 young son and 1 young daughter	18	Smoking	Smartphone

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4.2 Factors Influencing Smoking and Cessation Behaviours

Gathered from the data collected in individual interviews, a number of influencing factors were found associating with Macao male smokers' onset of smoking, and their motivations and barriers to smoking cessation. While those factors might broadly influence both genders across different cultures, the influences of those factors upon Macao's male smokers will compared with their Western counterparts in order to identify the culturally specific links between those factors and smoking cessation facilitators and barriers (the issues will be discussed in detail in section 5.1). These findings were essential for modelling a culturally specific smoking cessation mHealth regarding male smokers in Macao.

4.2.1 Onset of Smoking

The data revealed in the study informed a number of influential factors leading to Macao male smokers' onset of smoking. Peer socialisation was identified as an important theme.

4.2.1.1 Peer Socialisation

Peer Encouragement

Many participants claimed that peers were a critical influence to their onset of smoking. Participant C1 (SU) explained his peers' influence on the onset of his smoking when he was young: "*…all friends puffed…the major cause was that those persons whom I knew puffed…*". Participant N2 (SU) reported his experience of leading his friends to smoke: "*…as a youth, you know, I told my friends that smoking was gratifying, like that, I led few friends to smoke…*".

In addition to modelling smoking behaviour and advocating the benefits of smoking that they see, peers were also an important source of the first cigarette for adolescents. Participant B2 (SU) reported that when he initially adopted smoking, the cigarettes were sourced from peers: "*…they [(friends)] gave, at the beginning, they gave…*".

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Peer Pressure

Even if smoking might neither be desired nor intended, participants claimed that they would smoke when being challenged or under peer pressure. Participant F3 (SU) talked about his story while being encouraged to smoke: "...*he said 'just try, it doesn't matter, being an adult, has grown up as a man', like that...*". Participant S3 (SU) reported his experience of being challenged by a peer: "...*he ridiculed me that I didn't know how to puff...he gave me few more cigarettes...just puffed, ridiculed me?...*".

4.2.1.2 Curiosity

Curiosity about smoking was a common reason for initiating cigarette smoking raised by participants who did not experience smoking and had a desire to explore it. Participant Q1 (SU) explained the reason for his commencement of cigarette smoking: "...*just because of curiosity...I mean, didn't experience such kind of things...*". The viewpoints were affirmed by Participant X4 (SP): "...*they were just a kid, had to be curious, desired to experience...*".

4.2.1.3 Self-identity – Maturity

Rite of Passage

Youths see smoking as helping to strengthen their image of maturity and to enhance their social identities. Participant Y4 (SU) remembered his commencement of smoking: "...*having grown up as a man, I saw others puffed, just took it...*".

Smoking is Cool

The tobacco industry has always tried its utmost to market cigarettes and convince people that smoking is cool. Although tobacco advertising and promotion had been prohibited in Macao since 1996, the image of the 'Marlboro man' is still remembered. Participant N2 (SU) remembered: "...*Marlboro was presented in advertisements and movies...riding a horse was cool...yes, such advertisement existed at that time...*". Although Participant A1 (SU) initiated smoking at a

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relatively high age and his initiation of smoking was not stimulated by tobacco advertisements, he gave similar opinions: "*...males' taking cigarette...for the powerful feeling and prestige or while in bad mood...for most, the first puff is for those issues, the basic incentives are these...*".

4.2.1.4 Rebelliousness

Smoking was believed to give a highly visible display of rebellion against society, especially against parents. Participant B2 (SU) claimed, when his mother advised him not to smoke cigarette: "*...my Mom, she asked me not to puff, I said 'OK, you ask Dad not to then I won't'... I retorted like that...*". Rebellious adolescents and youths might, instead, tend to defy or even to disobey their parents and their wishes. Participant C1 (SU) explained: "*...having kind of thoughts at that time, why 'not to do anything'...instead I had kind of rebellious thoughts, 'sigh, just try', after tasted, I found it wasn't a big deal, seemed to be looked down...would do instead...*".

4.2.2 Motivational Factors Leading to Smoking Cessation

Similar to becoming a regular smoker, smoking cessation is a complex process involving transition through a series of stages before a smoker becomes an ex-smoker. A smoker must have a strong motivation to stimulate their cessation intention. While discussing cessation motivation, Participant N2 (SU) explained: "*...saying stop smoking, you need strong driving force...how come you will cease for no reason? You must cease for some reasons...*".

4.2.2.1 Health Issues

Smoking Associated Health Problems

While the motivations for smokers' cessation attempts varied widely among different smokers, that the perceived advantages outweighed the drawbacks to smoking cessation strongly motivated smokers to quit. In the study, concern about smoking associated health problem commonly triggered participants' cessation attempts. Participant O2 (SP) discussed the circumstance of their

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clients: "*...suddenly, they find that they have some physical problems, and the problems can be directly attributed to smoking, then they will try to quit, in fact, they are not afraid of smoking, they are afraid of death, yup, afraid of sickness...*". Participant B1 (SU) explained his circumstance: "*...while had taken cigarette, hmm, the heart beat more rapidly...I've got irregular heartbeat...the feeling was strong when I smoked...if smoking was not impacting, I think...I really wouldn't quit...*". Participant S3 (SU) also explained his current difficult circumstance: "*…really suffer from physical problem...too bad, gasping for breath very soon while climbing stairs...have to stop for gasping for breath...as a twenty-ager, incapable to climb stairs, isn't it kidding...at this stage, I am really afraid...*".

Physicians' Advice

Even if they were not suffering from smoking associated health problems, physicians' advice, which would raise health concerns, could motivate smokers' cessation intention. Participant C1 (SU) discussed his current cessation attempt: "*...recently, my lung suffered [non-smoking related] injury...my medical doctor advised me: 'if you keep smoking, any pulmonary surgery in the future may not be done', he told: 'you are better to cease'...*".

Alarmed by Diseases from Others Suffering

Smokers who experience health problems not only personally, but through a friend, relative or family member is also a strong motivation for smoking cessation. Some participants were alarmed by the serious diseases others suffered, and it motivated their intention to quit. For example, Participant Q1 (SU) was affected by the recent difficult circumstances of his friend and reconsidered quitting: "*...a friend has suffered from problem...it is a recent case, he was found getting lung cancer, about three fifth of his lung was cut out...*". Participant I2 (SU) also explained his concern: "*...some relatives were died from lung cancer...I am really afraid, must be afraid...*".

Perceived Possible Harmful Consequences of Smoking

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Anti-tobacco marketing strategies are effective for raising smokers' awareness of the possible harmful consequences of smoking and motivating smoking cessation. Smokers were motivated to consider quitting smoking, even though they were yet to suffer from any health problems. Participant T4 (SU) explained his thoughts on the matter: "*...[I realise] whenever I take any single cigarette, I mean, I am doing harm to myself...I try to quit is mainly...[because] I feel that smoking is harmful to me...*". Participant O2 (SP) discussed the motivations of their clients while watching an anti-smoking programme on the television: "*...some clients told...the smoking cessation advocating programme [presented on TV]...they told that [the shock messages presented on] those smoking cessation advocating programmes were really realistic...[they were shocked by] the black lungs [because of the real looking] and such yucky tar...they became worrying about their physical fitness [if they keep their smoking behaviour on] ...so they came to cease...*".

4.2.2.2 Social Environment

Non-smoking Peers

Non-smoking peers can positively influence smokers' intention to quit even if smoking peers encourage smoking. Participant Y4 (SU) explained that if he knew more non-smoking peers, he might not maintain his smoking habit: "*...if the companion didn't smoke, then I wouldn't smoke...birds of a feather always flock together anyway...*".

Peers can also support smokers' cessation in other ways. Participant B2 (SU), a foreign worker who lived in Mainland China and was temporarily staying in Macao to work, talked about his time in Macao: "*...additionally, here, many local colleagues aren't smoking, that is also an influence...we are now proud of our quitting, you know, I mean, it is an atmosphere right here...*". He further reported that he has influenced other smokers to attempt quitting "*...I have influenced others...three of my colleagues attempt to cease recently...*".

Second-hand Smoke is Objectionable

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Since the hazards of second-hand smoke have become commonly realised and the indoor smoking prohibition legislation has come into effect in Macao, smoking in public areas has become an objectionable behaviour.

Participant N2 (SU) explained: "*I become realising that smoking is so objectionable now, in the past, smoking in a cinema was not any issue, but now…for example, if you smoke cigarette on the street, someone who walks next to you will tell with their sign language that smoking is annoying…I think that smoking is so objectionable…like, in the airport…those smokers hide in the smoking room…it is so ugly…*". Participant C1 (SU) told of similar concerns: "*…but now…smoking on the street, you can see others' complain expressed from their eyes…it is so different from the past…*".

4.2.3 Cessation Barriers

Understanding the reasons for smokers maintaining their smoking behaviour as well as the cessation barriers and the high risk situation that triggers relapse is important for designing an appropriate intervention to assist their smoking cessation and relapse prevention.

4.2.3.1 Physiological Issues

Pleasure and Delight Feelings

Although Participant L1 (Female, SU) reported: "*…the first few puffs were definitely tasted bad…*", a number of participants still claimed that they enjoyed the feelings of pleasure and delight associated with smoking. For instance, Participant F3 (SU) reported: "*…seemed comfortable after smoking…felt exciting when smoked…I mean, seemed pleasure…*". Participant D1 (SU) quoted a Chinese proverb to explain the feeling: "*…having a cigarette after a meal, and you would surpass the immortals…*".

Refreshing and Stimulating Thinking

Even if the effect is always short in duration, some participants reported the feelings of refreshing

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and stimulating thinking from smoking. Participant I2 (SU) explained: "*...sometimes just for refreshing...at that time, needed to stay up all night...for refreshing...*". Participant W1 (SP) explained the circumstance in which a smoker looked to a cigarette for refreshment: "*...studied almost every evening...until ten to eleven O'clock or even later, sometimes he felt into sleep, the one sitting next to him said 'hey, take one for refreshing'...*".

Participant C1 (SU) explained: "*...while working but felt tired and asleep, would be refreshed by taking a cigarette...while playing in game centres...cos it needed brain work...also would be in casinos...I would while I was in deep thinking, needed to think...*". Participant B1 (SU) reported his thought that: "*...in some circumstances while facing difficulties...on business or whatever else, just puffed, I thought that smoking could stimulate thinking, I mean, helped for head clearing...*".

Nicotine Dependency and Appearance of Withdrawal Symptoms

Nicotine dependency commonly affects regular smokers. Smoking withdrawal symptoms would occur because smokers were no longer getting nicotine. While the withdrawal symptoms only appear shortly after smokers quit, the appearance of symptoms usually construct a critical barrier to smoking cessation.

Participants in the study claimed that smoking withdrawal symptoms made their cessation very difficult and they used to relapse within few days of quitting. Participant N2 (SU) shared his experience: "*...I couldn't concentrate on my work...even felt difficult to fall into sleep...I couldn't adapt at that time*".

Participant T4 (SU) reported his experience with depressive symptoms on his previous self-help 'cold turkey' cessation: "*...I used to attempt quitting by myself without seeking any assistance...I felt depressive...in a fairly bad mood, fairly downcast, fairly disheartened...*". Participant B1 (SU) reported his difficulties while quitting: "*...I felt serious emotional fluctuation...I couldn't control*

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*myself anyway…when I calmed down from mad, I took cigarette again, cos I felt guilty to families,
so guilty conscience, ceasing for what?…it was the withdrawal symptom of mine, I mean, I was
really in bad temper…".*

4.2.3.2 Perceived Benefits of Smoking

Smokers might tend to maintain their smoking habit and be unlikely to step into the contemplation
stage of changing smoking behaviour because of the perceived benefits of smoking.

Socialising

Being in good mood in a social event, especially when drinking wine, is commonly raised by
participants as a reason for maintaining their smoking behaviour. Participant C1 (SU) explained:
"…*also would drink if pleasant…I mean, would [be smoking] when felt pleasant…*". Participant S3
(SU) also explained: "…*taking a cigarette while drinking, it seems an unspoken consensus between
each other…*". Participant N2 (SU) discussed the smoking behaviour of his female friends: "…*I
have a group of friends…consisting of boys and girls, those girls…they don't smoke usually, while
in a gathering, they take cigarette, I asked them how come, they replied, 'just for fun'…*".

Enjoying Exclusive Benefit

Employees share a tacit agreement to take 'cigarette breaks'. It is a strong and exclusive benefit for
smokers and against non-smokers in a Chinese society where taking coffee break is not a common
practice. Even if it was not worth suffering from health damage, it seemed strong enough for a few
participants to maintain their smoking behaviour.

Participant C1 (SU) explained: "…*just like my job…construction, I mean, after working for a
certain time, felt tired, taking a cigarette seemed to have time to take a break…that was an
excuse…those craftsmen were smoking, if I didn't smoke, I kept non-stop working then…*".
Participant I2 (SU) memorised the situation of his rustication period in Mainland China decades

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ago: "*...it was embarrassing if I stopped working without smoking...it was the puff of cigarette for taking a break...*". Participant W1 (SP) affirmed this point of view: "*...how come there are so many smokers in Mainland China...no matter farmers, construction field workers, manufactory workers...others sit there for smoking, you keep working if not smoking, 'sigh, he can rest but I can't, I also puff then, sigh'...*". In order to enjoy the exclusive benefit, some smokers tend to maintain their smoking habit and will not consider quitting.

Time Killing

A few participants saw that smoking was a time killing activity. Boredom was raised by Participant B1 (SU) to explain why he was smoking so heavily while he was working in a pawnshop: "*...[I took] almost two packs of cigarette [everyday]...idly...we were boring to stay there for whole day...*". Participant J1 (SP) supported the point: "*...they stay there all day, what else to do, nothing interesting to do, they need to kill time...*". Participant W1 (SP) explained that some professional drivers saw smoking as a time killing activity: "*...the drivers have to wait for passengers, or [the drivers of] long distance transportation...they have to wait for loading and unloading goods...they are boring, then just puff...*".

4.2.3.3 Psychological Dependency

Aside from the physiological barriers, a number of psychosocial issues were also found to hinder smokers from quitting.

Anxiety and Stress Relief

Smoking is a common measure for smokers to relieve anxiety during stressful periods. It was cited as an important reason for a few participants who continued smoking cigarettes and was also claimed to be a critical barrier to their smoking cessation. For example, Participant T4 (SU) stated: "*...smoking makes you feeling a little bit relieving from tension, I mean, a little bit relieving emotion...*". Participant A1 (SU) reported: "*...after adopting the smoking habit...when I feel*

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stressed, I feel smoking helps me to relieve from tension…and I really feel relaxing as a result…".

The bomb of relapse may be detonated while the smokers are experiencing stressful circumstances. In this study, job related unpleasant feelings was cited as a crucial reason for relapse. For instance, Participant L1 (Female, SU) shared her experience: "*…sometimes was unpleasant on the job, eh, then, hmm, couldn't persist with, when felt stressful…*". Participant N2 (SU) reported his recent experience of relapse: "*…I have been abstained for more than one year…I relapsed, was very stressful…a while ago, there were some problems on my work…when you had something bothering you or something like that, you might just not care [anymore about smoking cessation]…*". Participant A1 (SU) explained: "*…while feeling stressful or being in bad mood, puff a lot, once lapse…can't stop then…once the gap has been opened, actually it will be endless…*".

However, Participant O2 (SP) explained the possible different critical situations from male to female: "*…depressing, unpleasant, stressful, those will lead to relapse…but for female, always being stressful, upsetting, unpleasant…while for male, because of duties…works, financial issues, something like that…*".

Self-anaesthetising

A number of participants tended to believe that tobacco smoking could give effectiveness of self-anaesthetising and they used to adopt heavy smoking for temporary escape from perceived unpleasantness or bad mood. For instance, Participant D1 (SU) reported: "*…just puffed much in a bad mood…I mean, vented the emotion with cigarette…I mean, made exciting…*". Participant B2 (SU) agreed: "*…desired to puff…while in bad mood…would puff much…*". Participant I2 (SU) reported similar feeling: "*…while unpleasant or something to my annoyance, then…puff more frequently…*".

4.2.3.4   Cessation is not Urged

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Unawareness of Harm and Diminishing Harm through Comparisons

Awareness of the hazards of smoking is an important motivation leading to smoking cessation. However, participants would stick to smoking because of their unawareness of the harmful effects of smoking. Participant A1 (SU) explained: "...*even if, eh, for whatever reason, I had tried [and adopted cigarette smoking], if I knew more [about the hazards of smoking], in fact, would motivate me to reduce or to quit sooner, and I wouldn't feel so difficult on quitting and wouldn't keep smoking that long...*".

Seeing smoking as a common habit with no harm attached, and not as a serious issue like drug taking, Participant T4 (SU) had never considered resisting smoking when he was young: "...*majorities were smoking there, at that time, no one might think that it was any issue...*". Participant D1 (SU) reported that smoking behaviours: "...*were not the same as those drugs or heroin takers...*".

Old Habits Die Hard

Many participants incorporated smoking into their daily activities and smoking has become part of their life. They would smoke cigarettes for no reason other than it was simply an old habit. Participant C1 (SU) said: "...*smoking seems just so habitual...like brushing teeth and cleaning face every day...all along while growing up...feel uncomfortable if I don't do that...*". Participant Q1 (SU) reported: "...*already adapted the habit, really feel a bit uncomfortable without...*". Participant L1 (Female, SU) mentioned that: "...*while playing computer game, only the right hand was occupied with the mouse, the left hand was quite free and nothing to do, just like that...*".

Involuntary Quitting Smoking

Involuntary, which means unintended and implies that smokers did not intend to quit, might be an issue to be considered. Smokers who sought smoking cessation assistance involuntarily and were only present due to the wishes of others', might be unlikely to quit successfully. Participant A1

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(SU) discussed his past quitting failure: "*…honestly, cos at that time, hmm, it was my wife wishing me to quit, but not a case that I desired to quit…why did I smoke? in fact I wanted such a feeling and satisfaction…why should I quit then?…I just got the gum [from the cessation clinic], had taken for two weeks, and never went there again to get…only for fulfilling her wish…*". Participant E1 (SP) explained: "*…there is no urgent need [to cease], eh, they have something superior to [quitting], or they feel [that smoking is] good by themselves…just turn a deaf ear to advice…*". Participant B1 (SU) explained: "*…if I didn't want to quit, being nagged by wife or mom wouldn't work…if someone doesn't have desire to quit, I mean, nothing helps…*".

4.2.3.5 Negative Forces against Smoking Cessation Efforts

Cessation Failure Experience

In this study, a frustrating experience of failure on previous cessation attempts was claimed as a barrier for the smokers' recent attempt. Participant B1 (SU) explained: "*…I had been attempting for so many times…still failed, felt remorse, which is, I was just like a dud…*". Participant Q1 (SU) explained: "*…since my second attempt…I felt frustrating, it seemed that I might not keep my smoking cessation carrying on…cos I have had countless attempts…really wanted to quit, but went to buy [cigarette] just in a few seconds…*". Participant E1 (SP) argued that smokers' intentions to quit might be eliminated with their failure experiences: "*…giving them frustrating experience…[they may think:] 'sigh, I must fail…if I must fail eventually…not to attempt then'…*".

Poor Self-efficacy

The self-efficacy that drives smokers to resist smoking again is always crucial to the success of smoking cessation. Poor self-efficacy that reflects the inability to persist with the smoking cessation attempt was claimed to be an important barrier and trigger to relapse. Participants told of a variety of mental issues that represented their poor efficacy and which impacted upon their cessation attempts. Participant Q1 (SU) said: "*…I can't insist on…all because of mental addiction, a mental issue…*". Participant C1 (SU) reported: "*…really, the private demon may come out, eh, no problem*

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with taking one…". Participant I2 (SU) explained: *"someone told [and I believed]…the body might not adapt…sometimes I really want to puff, hey, it is then an excuse…and if reduce like that, I won't feel so difficult…"*. Participant O2 (SP) explained the issue of poor self-efficacy in a different way: *"…just as lack of self-efficacy, some people's thoughts and desires are too strong, and their self-efficacy isn't strong enough to resist the desires…"*.

Strong Temptation Appearing During Smoking Cessation

Smokers who are trying to quit smoking but fail to inhibit the temptations around them may not experience success and easily suffer a relapse. In addition to adopting smoking behaviour, peer socialisation and peer pressure are also common sources of temptations and triggers to relapse. Participant C1 (SU) explained: *"…sometimes…in a gathering…joined those guys…I mean, while I saw others smoking… just felt uncomfortable and puffed then…"*. The viewpoint was affirmed by Participant R4 (SP): *"…temptation from friends…which is, while in a gathering, may join those smoking peers…chatting, having midnight snack and drinking…I mean, see others puff, they puff also…"*.

Participant Q1 (SU) complained: *"…those friends, many of them like to do opposite things, 'are you quitting? give you one [piece of cigarette]'…"*. Participant S3 (SU) also stated: *"…[friends told:] 'what a stupid cessation, just take it again'…devil they were…"*.

Lack of Support

Lack of support from families was claimed to be a negative force against smoking cessation by participants. Participants complained that their families not supporting their cessation gave them a feeling that they fought the battle alone and were not confident in their smoking cessation attempts. Participant C1 (SU) reported his desire to have family support: *"…families, just wish me to quit but have never said…'how are you doing? are you feeling difficult?' never asked me…"*. Participant Q1 (SU) also complained: *"…she [(my wife)] knows not much about encouraging other…"*.

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4.3   Gender and Culture Specific Issues Associated with Smoking and Cessation Behaviours

4.3.1   Seeking Social Harmony

Historically, Chinese have greatly emphasised collectivism and harmony. Cigarettes were used as social tools and facilitators engaging smokers. Chinese smokers commonly tended to believe that while smoking together, they could construct better and closer relationships with others, which was associated with maintaining social harmony.

4.3.1.1 Peer Harmony

Maintaining social harmony with peers was of high concern for the male smokers who participated in this study and it was found to be an important influencing factor on the onset of cigarette smoking. Participant T4 (SU) explained that smoking together seemed to have a sense of 'ganging up' to it and this led to his commencement of smoking: "…*friends puffed, just like that, at the beginning, I didn't puff, but saw them puffing and puffing…then I joined, puffed and puffed and adopted…it was ganging up in some sense…*". Participant D1 (SU) mentioned his story of the onset smoking when he was young: "…*knew many friends, we joined together…those smokers ganged up…taking a cigarette led congenial conversation, could talk in depth…which was, talking and ganging up, youths we were at that time…*". Participant I2 (SU) believed that smoking could be a tool of social intercourse: "…*those classmates, those friends, shared [cigarettes]…it [(smoking)] was just for social intercourse…*".

Similar to influencing the onset of smoking behaviour, peer relationships and seeking social harmony are also associated with why smokers maintain their smoking behaviour and why they feel it is difficult to cease. Macao smokers' concern about social harmony strongly influences their intention of smoking cessation, and constructs additional smoking cessation barriers, and can trigger lapse or relapse. Participant I2 (SU), a male smoker aged more than 60, explained: "…*must smoke*

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in social gatherings…don't join those guys? will they mock me: 'are you foolish, you seem autism'…I may lose all friends sooner or later…". Participant W1 (SP) talked the stories of their clients: "*…others smoke and offer cigarettes…just doesn't want to displease good friends or to refuse ganging up, then accepts the offer[ed cigarettes]…".* Participant O2 (SP) affirmed the point: "*…for males, they have strong determination…but they, saying that, they can't resist [temptations from] friends instead…".*

Participant F3 (SU) discussed his own difficulty with completely ceasing smoking while staying in Macao, even if he had the experience of successfully ceasing smoking for nine months when he studied his undergraduate degree away from Macao: "*…it is fairly difficult to completely quit…it is most difficult while drinking…like, I was drinking last night, and was lapse…after coming back to Macao, it is harder, more difficult, families smoke, and the close friends smoke also…occasionally, join for wine-drinking or dinner gathering, at such occasions, can't avoid from smoking…mostly influenced by the people around…".*

4.3.1.2 Workplace Harmony

Not only peers but co-workers or superiors could also critically influence smoking participants' smoking behaviour because of their desire to maintain good relationships with their co-workers or superiors. Participant X4 (SP) explained the influence of colleagues: "*…males must be because of the people around, for example, at worksite, those colleagues, may be that all of them are smokers, it must be seriously impacting…".* Participant R4 (SP) related a case in which one of their clients was working in a casino and sought to establish a closer relationship with colleagues by applying the means of smoking together: "*…he said that, [working] in the casino, if you didn't smoke, you would have no friend…you joined together to smoke and to drink, the relationship was anyway better and was becoming more closely…".* Participant J1 (SP) discussed the issue when referring to a case of their client: "*…he was in a meeting, he asked me: 'all superiors smoke and share*

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[cigarette] with you, will you take it then?'… it is embarrassing to refuse…". Participant O2 (SP) gave an example: "*…especially those security guards working at the entrances of [covered] car parks [of casinos], not only quite a large part of them smoke, they are difficult to quit smoking…the reason is, everybody smoke…".*

4.3.1.3 Social Harmony and Peer Pressure being Powerful Triggers of Relapse

Even after having attempted to quit, male participants felt uncomfortable staying away from smoking peers. Relapse was hence triggered. Participant C1 (SU) explained the embarrassing circumstance of not staying with smoking peers to avoid the temptation of smoking: "*…it is not polite to leave when others smoke…".* Participant O2 (SP) explained their clients' situation: "*…those groups of people are accustomed to join together, yep, someone feels embarrassing to tell others about own quitting attempt…has smoked together with same group of people for decades…males are more, females are less influenced by friends, it seems a bit different, male are more…".*

Participant Y4 (SU) explained his relapse experience: "*…others said, eh, 'take one', eh, it was embarrassing to turn them down…then relapsed, wished to quit, those close friends gave cigarette…sometimes, after drinking, others shared cigarette…addicted again…".* Participant T4 (SU) explained the cause of his previous relapse: "*…a friend was back from the United States…he was a smoker, I needed to accompany, and he gave me few pieces of cigarette every day, and me, just those few pieces cigarette led me to relapse…".*

Like adolescents' onset of smoking, adult male smokers' relapse is closely associated with peer pressure. Participant B1 (SU) shared his own story: "*…I was a riff-raff…all guys around were riff-raff too, were all gangsters, raking, drinking, having night life…since we had a lot of such kind of friends… 'let's go raking tonight', taking ecstasy, cigarette and wine, 'hey bro, I am quitting', 'go to hell!', then relapsed…".*

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Participant E1 (SP) discussed the possible circumstance of peers influence which commonly occurred to male smokers and caused their relapse: "*…going to the stairway, hiding somewhere, then, ask you to come and chat, and give you cigarette, then just relapse…'hey, you aren't a pal of mine', like, 'just ask you to take one but am turned down, you wasn't like that in the past, you have changed, hey, take one'…how is a real man, he may think he needs to shoulder, to treat friends fairly, all are brothers…the reason is that he wants to make a harmonious atmosphere in a group of persons…cos he wants to reach the point of compromising, to build up friendship, and he thinks it is an accelerator to reach…*".

4.3.2   Concern about '*Face*'

4.3.2.1   Negative Influence of Concern for '*Face*'

'*Face*' was found to have a crucial impact upon the smoking behaviour and strengthen the cessation barriers among male smokers in this study. The influence of masculinity upon Macao males' smoking and cessation behaviours was enhanced with their concern of '*face*'.

To avoid losing '*face*', male participants were not willing to be seen as fearing the hazards of smoking, especially while being challenged. Participant I2 (SU) discussed his own relapse story: "*…he said: 'you are a big man, don't you fear just a piece of cigarette', then I puffed, and then relapsed…*". Participant E1 (SP) shared similar viewpoint, while their clients were in a gathering or casual chatting: "*…males are more easily to relapse, cos they concern more about whose own 'face'…*".

4.3.2.2   Positive Influence of Saving '*Face*'

Male smokers believe that it is losing '*face*' if they fail to quit while they are willing and desiring to. For example, Participant F3 (SU) told of his concern: "*…I relapsed from every quitting attempt…those people around mocked me…*". However, from a positive perspective, in order to

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save '*face*', male smokers might try their utmost to keep up their cessation attempts and that would more likely lead to the success of smoking cessation. Participant B2 (SU) explained how telling others about his cessation attempt could be an enforcement of his cessation: "*...I think it will be very humiliating to tell about my relapse...I told my wife that I was quitting, I must be success to quit from, if I fail, how to tell her...it may be a counterattack, he [(my son)] said that I was stinky while smoking, I just quit, let him see I can...*". Participant N2 (SU) explained his concern with losing '*face*': "*...it seemed a sense that I couldn't lose...if you let others knowing that you are attempting to quit but fail...it is so ugly...if you tell then you fail, it is a losing face issue, yep, many people talk about you, many people mock you...*".

'*Face*' concerns led smokers to treat their quitting attempts in a specific way. Some chose not to tell others about their cessation attempts to avoid the risk of losing '*face*'. Participant W1 (SP) reported that one of their male clients would rather not to tell his family: "*...he [(the client)] told: 'I won't tell families until I will really be abstention'...*".

4.3.2.3 Politeness and '*Face*'

<u>Cigarette Gifting as Politeness</u>

The concepts of politeness and relationship have been interwoven in daily communication among Chinese people. Gifting presents is politeness and can be utilised to establish a relationship with the receiver. Gifting of premium cigarettes has additionally been a way to gain social approbation and dignity that are known as '*face*', for both giver and receiver.

'Thrift as a virtue' is commonly recognised as a traditional Chinese cultural value. Not wasting the gifted cigarette however became an explanation for smokers to rationalise their smoking behaviour, especially at the pre-development era in Mainland China when people were commonly poor. Participant D1 (SU) remembered that, when he was young, one of the reasons of maintaining his smoking behaviour was not wasting the gifted cigarettes: "*...some people gifted some high quality*

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cigarettes, bought from such as England, or America, liked those 555, Capstan, such kinds of high quality cigarettes, hey, [consuming is] better than wasting...". Participant Q1 (SU) shared his father's story of onset of smoking: "*...talking about the years of my father...relatives and friends, at that time, in festivals, they paid visit along with a chicken or a carton of cigarettes...no one smoked, he smoked all cigarette as a result...*".

Sharing a Cigarette is Symbolic

Cigarette sharing in Chinese society implies respect and generosity and is recognised as social politeness and giving '*face*'. Nonetheless, turning down a shared cigarette will not only cause the giver to lose '*face*', but also threaten the relationship. Participant D1 (SU) explained: "*...others offered [cigarettes], it was not giving face if not taking...*".

In Macao, the practice has however changed in recent years. Participant I2 (SU) explained: "*...in the past, shared cigarettes while smoking, but no more now, take and smoke themselves, I mean, the usual practice has been totally changed...since smoking has been prohibited everywhere, no cigarette sharing anymore...*".

Cigarette sharing is no longer a common ice-breaking or relation-building tool in modern Macao's society, but still remains in Mainland China. Participant S3 (SU) explained his experience while doing business in Mainland China: "*...it is really difficult [to turn down the shared cigarette] while in business gathering...the market in Mainland China are really huge...it is not polite if you refuse to take the shared cigarette...in front of him, sometimes he even lights [a cigarette] for you...it is really not polite [to refuse]...*". Participant S3 (SU) supported the viewpoint that cigarette sharing is understood as politeness and is common in Mainland China: "*...cos there are many foreign workers [from Mainland China, at worksites], they always share cigarettes...in Mainland, it is kind of politeness, cigarette sharing...*". Participant J1 (SP) also explained that it is improper manners to turn down an offered cigarette: "*...like in Mainland, offering cigarette, eh, it is a way of social*

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communication…it is not polite if you don't take the offered cigarette…".

4.3.3   Confucianism and the Male-parent-headed Family

4.3.3.1   The Superior Position of Males and Their Concern about '*Face*'

Gender inequality partially explains the gender bias of smoking prevalence rates, particularly in old people. For the older generation, wives commonly express their support, or at least lack of disagreement with, their husband's smoking. Participant Q1 (SU), whose father-in-law was a heavy smoker, shared and discussed his mother-in-law's viewpoint: "*…she said: 'all males smoke, no one is non-smoker'…I think at their era, all of her [(mother-in-law's)] friends around…all male relatives and friends were smokers…*". Participant O2 (SP) shared the story of one of their family members, an old male smoker, to explain his superior position in the family: "*…he took cigarette [indoor]…kept smoking there…his wife even bought cigarette for his consumption…*".

Grounded in Chinese feudalism, male-parent-dominated patriarchal society has been established and the power of the father-head in a family is commonly unchallengeable. It was found in this study that, in a male-parent-headed family, other's advice about cessation tended to be easily neglected or refused by the male head if it was not his wish. Participant B2 (SU) said: "*…my wife did advise [me to quit], but she had no way…cos I had been smoking since she knew me…*". Participant R4 (SP) explained the cases of some male smokers, especially older males, who strongly refused to quit: "*…some guys…wives wanted them to cease…husbands however refused to come [to the cessation clinic] and said: 'will die if cease smoking' …*".

The effect would be enhanced when the male smoker was concerned with saving '*face*'. For instance, Participant E1 (SP) quoted the case of an old male smoker who refused to quit even though he was suffering from serious health problems and was strongly urged to quit by his physicians and family members: "*…he got thrombosis and also had a puffy face, [the physicians from] the Hospital Kiang Wu and the Conde S. Januário Hospital advised him to cease…his wife*

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said harsh words to him [in the public]...his concern was about his desire of being esteemed, those

people [(his wife and children)] humiliated him, humiliated him in the public...". Being a family

head, to save '*face*', he would not do what he was told.

4.3.3.2 Responsibilities and Concerns of the Family Male Head

Setting an Example

Embedded in Confucianism, Macao Chinese place great importance on the family, and family was

traditionally seen as a training ground. Parents, especially the male parent, are expected to shoulder

the non-transferable responsibility of educating and to play role model to their children.

From a negative perspective, parental influence was found to be an important reason for smokers'

initiation of smoking during their adolescence in the study. By observing their male parents,

including fathers and grandfathers, smoking cigarettes, sons may interpret that smoking is a kind of

natural and acceptable behaviour. Participant A1 (SU) explained: "*...since I was a kid, my Dad*

smoked, I didn't sense it was any issue...". Participant F3 (SU) related his experience of asking for

cigarettes from his grandfather: "*...when I was a kid, I saw my Granddad puffing cigarette...then*

asked him to have a cigarette, and he would give...he thought I was just a kid, didn't know how to

puff, then gave me...". Participant W1 (SP) discussed the common phenomenon in the rural villages

in Mainland China: "*...some people in the rural villages started smoking just few years old...just*

few years old, were not ten or eight years old, their parents puffed, they followed to puff and

addicted to...". The parental influence on the initiation of smoking behaviour cannot be neglected.

As explained by Participant C1 (SU): "*...[I smoked because when I was young] my Dad also puffed,*

my elder sister also puffed...".

However, from the positive perspective, some participants reported that their quitting attempts were

mainly for setting a good example to their children. Participant O2 (SP) discussed the cases of their

male clients: "*...they have kids at home, which is, they don't wish to be observed [and then to be*

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imitated] by kids [about their smoking behaviour]…". Participant N2 (SU) explained one of the reasons of his cessation attempt: "*…cos I don't want, at one day, in case that my son takes cigarette, I ask him not to take while I keep taking cigarette…I don't want to ask my son not to smoke while I am smoking…I mean, the health of mine is less concerned than of my son…I mean, I would play a non-smoking role model to my son, I think it is most important…*".

Participant Q1 (SU) explained his concern: "*…yes, I don't want any undesirable message exposing to him [(my kid)], cos I saw my Dad smoking, then I could retort when I was reproached, couldn't I, I don't want him [(my kid)] to retort me, in fact…*".

Protecting Families from Harm

Aside from concerns about their own health, a number of smokers reported their awareness of the possible harmful influences of second-hand smoke upon their families. Participant Q1 (SU) reported: "*…to put down the cigarette is because of, firstly, my health, and secondly, the influencing to families…for the health of myself and families…*".

Concern regarding the hazards of second-hand smoke to their families would be an important motivation for Macao males' cessation attempts, as many of them recognise that they are bound by responsibility to take care of and protect their family. The theme of protecting family from the harm of second-hand smoke was commonly raised by participants from both groups of service providers and service users. For instance, Participant O2 (SP) discussed the concern of their clients: "*…for the health of families…there are kids at home…or may be newly born baby…the primary reason [of their smoking cessation] is that they think it [(smoking)] will impact the health of kids…*". Participant T4 (SU) explained his concern: "*…when I've got my baby, I don't want to puff, I mean, have stronger adverse feeling to cigarette…*". Participant F3 (SU), a newly married male smoker, explained the reason for his current quitting attempt: "*…we plan to bear children, were told that smoking was not good…*".

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Participants reported that, in the cases where they kept smoking, they took the measure of not smoking at home to minimise the harm of second-hand smoke to their families. Participant Q1 (SU) explained: "*...I am for my kids to reconsider this issue [(quitting)]...I won't puff unbridled while sitting at the family room...since I have kids at home, I narrowed the smoking area to be inside the toilet...the major reason is for protecting my families...*". Participant C1 (SU) described a similar smoking pattern: "*...before ceasing, I've got my child, I smoked just at the balcony, at a corner, faced out from the window, I wouldn't smoke at home...I mean, I would prevent [influencing families]...*".

However, Participant I2 (SU), a smoker aged more than 60 years old, spoke about how he kept smoking anywhere at home while being disliked by his wife: "*...she [(my wife)] nagged me that our apartment had been smoked yellowish...had cigarette smelling anywhere...and all cover the bed...*".

Participant J1 (SP) explained the possible reason such different attitudes regarding the traditional culture of the male-dominated family may have changed over these decades: "*...many [young] people...don't want to influence the kids...which is, want to be a good father...but in the past, people of last generation didn't have such sense...I mean, those seniors aged seventy or eighty don't have the sense, but saying now, people aged thirty or forty have the sense, they told us...[smoking] will influence others or families, wife and children'...*".

Families Expressing Dislike of Smoking

It was found that not only health but also the dislike of families was a concern and could potentially influence smokers' intention to quit. Participant B2 (SU), a foreign worker from Mainland China, discussed the motivation of his current cessation attempt: "*I got back home in the previous time...my son...one time, I was smoking and he came to me...I just blew him, and he said: 'Dad, you are stinky', I felt so upsetting and uncomfortable...*". Participant E1 (SP) explained similar

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circumstances told by their clients: "*...the families said...'you are stinky, I don't want to stay with you' or 'Granddad, you are stinky, I don't allow you kissing me', the circumstances like that...*". Participant O2 (SP) referred to a similar story told by their client: "*...families...what a downer, while smoked at home, they talked on and on without stopping...said I was stinky, didn't allow me to hug the baby... *". Participant C1 (SU) told his story: "*...[I was quitting] for my wife and children, at that time, we had some arguments...I separated from my wife, didn't divorce but separated, [I tried to quit just] for her...I mean to do something for her...*".

Financial Responsibilities of the Male Head

The belief about how males are breadwinners and females are housewives is grounded in the traditional Chinese family and was raised as a motivational factor in Macao males' cessation attempts. Participant B2 (SU), who is a foreign worker leaving from his home town in Mainland China and working in Macao in order to bear his responsibility as the breadwinner of the family, stressed his responsibility in the family: "*...families is more important than me, yep, cos I work so hard all for [earning money for] my family, [it is] simply like that...*".

Smokers would consider the possible financial impact on their families should they suffer from any serious smoking related health problem. This could motivate their smoking cessation. Participant W1 (SP) explained the possible consequence of suffering from a serious health problem: "*...being a, eh, breadwinner, if you down, the economic [situation] of your family will be impacted...must not lose the working capacity...*". Participant F3 (SU), a newly married male smoker, discussed how the financial responsibility he bears for his family motivates his cessation attempt: "*...especially having got married, well, I mean, anyway, a whole family, I've got a whole family to look after...*".

The theme may be extended to link with the financial burden of smoking. While spending on smoking is not commonly agreed as a cessation motivation, a few participants from the group of service users discussed their concern about the financial burden of smoking as they realised that

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smoking could be an expensive habit. It is more significant for smokers with financial stress than for others. Participant I2 (SU), who, from his job nature, was believed to have a low income, reported: "*…I mean, financial burden…a pack of cigarette [per day], sum up to hundreds Patacas monthly…*". Participant F3 (SU) explained: "*…[ceasing smoking] can save money also…yep, if you smoke a pack every day, few hundred [Patacas] a month…*".

However, Participant N2 (SU) disagreed that the cost of smoking had an influence on him: "*…everything is so expensive now [in Macao], spending thirty Patacas every day is really not much…I think, thirty Patacas isn't any issue…you can just buy the cheaper one, buy that costs ten Patacas if you want to…*". Participant A1 (SU) expressed a possible explanation that the price of cigarettes had yet to reach an unaffordable point: "*…if it is priced up to eighty Patacas, it may be impacting…for some people smoking is not essential, maybe, if they think that it is not worth, then those people will quit…*".

It was interesting to learn that Participant S3 (SU), the heaviest smoker participating in the study, rather tended to make his upmost effort and to work harder, in order to maintain his smoking habit without having to quit and be released from the financial burden. He said, if a pack of cigarettes is priced up to a hundred Patacas: "*…have to get one more job, otherwise I can't afford…*".

4.4   Smoking Cessation Intervention Currently Provided

Professional smoking cessation interventions were demanded by participants as they believed that those interventions would help them step through their smoking cessation journey smoothly. Participant B2 (SU) explained: "*…many people are really not unwilling to quit, but are unable to, you know…I am not able only relying on my own willpower…*".

The smoking cessation intervention provided by SAGHA consists of a combination of pharmacotherapy and behavioural intervention. They offer pharmacotherapy by providing

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transdermal nicotine patches, oral nicotine gum, and the internally developed sniffing solution composed of Chinese herbal medicine. The behavioural interventions offered by SAGHA are in the form of behavioural counselling, skill training and telephone follow-ups.

4.4.1 Pharmacotherapy

Among the interventions provided, some participants believed that nicotine replacement therapy was the most effective for assisting their cessation. For example, Participant B1 (SU) claimed that the nicotine patch was most helpful: "*...those patches...cos when I patched...the withdrawal symptoms were relieved...*". Participant B2 (SU) reported: "*...the effectiveness of the patches was pretty good...when not using [in previous attempts], at the beginning of quitting, it was very hard feeling...*". Participant N2 (SU) explained: "*...I didn't have such conviction to fight in the battle by myself...I thought the cessation patch was important...*".

However, some smokers may prefer the nicotine chewing gum or the sniffing solution. Participant C1 (SU) discussed his cessation experience: "*...the cessation gums that they gave...just took one while I desired to puff...it was important*". Participant S3 (SU) reported: "*...the sniffing solution was the best...when I desired to smoke, I sniffed the solution until I relieved from...the sniffing solution was useful...*".

4.4.2 Behavioural Intervention

Behavioural intervention was also provided by SAGHA to support smokers' cessation. Participant J1 (SP), as a service provider, discussed their efforts allocated to face-to-face behavioural counselling: "*...will chat with smokers...help to solve their problems...it is really important, and this is the most difficult issue...*". Participant B2 (SU) shared his experience of skill training to resist temptations: "*...they [(people from SAGHA)] told, I shall say 'no' confidently [to peers to refuse the shared cigarette]...*".

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Participants reported that telephone follow-ups were critical for supporting smoking cessation. Participant X4 (SP) stressed the importance of follow-up phone calls: "...*giving a phone call to remind them, they may feel that we are heartily...reinforcing their confidence, and they feel being supported...maybe some...have been giving up [and are smoking again], just because of the phone call...[they may think:] 'I determined to cease, what am I doing now?'...the phone calls are thus very helpful...even if they relapse...they may [be encouraged to] come again...somebody may need phone call more than medicine...*".

Participant O2 (SP) explained the effectiveness of those behavioural interventions: "...*giving certain influences...counselling...it is also needed to train skills for coping with emotional issues and solving problems...following up is helpful...reminding...and another advantage is that, someone relapses unconsciously, and feels embarrassing to come [to the cessation clinic again]...we phone and talk with him, he then comes again...which is pushing him into the preparation stage again...*".

4.4.3 The Deficiencies of Current Interventions

4.4.3.1 Pharmacotherapy

Although the cessation interventions currently provided by SAGHA are benchmarked with the generally recommended guidelines in many other countries, deficiencies and side effects still exist. For example, skin allergies, a common side effect, occurred to Participant Y4 (SU) while using the transdermal nicotine patches: "...*just patched on...sigh, got skin allergy...and had to remove just in a few hours...*". Participant S3 (SU) claimed that the nicotine chewing gum gave him feelings of nausea, which is also a common side effect: "...*it causes me to feel nausea, such cessation gum...*". Participant S3 (SU) also discussed the sniffing solution: "...*[the sniffing solution] can't be brought to the worksite, will be complained...smelling really bad...*".

Participant R4 (SP) explained that, due to the side effects and deficiencies, different clients present

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different preferences in cessation approaches: "*...some, for example, are suffering from skin allergy, don't patch but take gum...some dislike both but sniffing solution...some may feel chatting...help them to distract, and thus can cease without any medicine...*".

In addition to the side effects and difficulties of using pharmacotherapy, the cost was also a concern for participants. Participant W1 (SP) explained: "*...it [(NRT therapy)] is high costing, if it is not subsidised by the government, generally...can't afford individually...*". Participant Q1 (SU) reported a similar opinion: "*...honestly speaking, if the [NRT] service is not provided free of charge by SAGHA, those cessation patches cost hundreds Patacas per pack, I think many smokers are resisted...it can't be justified, it is even costing less to smoke than to use cessation patches...*".

4.4.3.2 Behavioural Intervention

Although follow-up, which is often achieved by making telephone calls to smokers, is claimed to be helpful for supporting smokers' cessation attempts, there are still some barriers to implementing the strategy. The circumstance discussed by service providers, and the differing concerns between service providers and users should be noted. For example, Participant O2 (SP) explained the difficulty of telephone follow-ups: "*...people may not be convenient to be phoned anytime, sometimes it was really embarrassing, we phoned but were answered 'I am busy' and were hanged up, or 'am sleeping', you know, [many people were] working on shift...it was really embarrassing...*". Participant J1 (SP) reported a similar concern: "*...sometimes we phoned smokers for following up their cessation progress, sometimes [was answered] 'I am working'...you might dislike if I phoned you unconsciously while you were busy...*".

It may be an alternative arrangement to ask smokers to phone SAGHA for a follow-up and behavioural counselling to prevent these embarrassing situations. However, in this study, as reported, it was noted that smokers did not intend to phone to SAGHA to seek behavioural counselling while there was no formal Quitline arranged by SAGHA. Participant O2 (SP), as a

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service provider, talked about their understanding of their clients: "*…[smokers] would never phone and ask, 'hey, I am now staying with other [smokers], what can I do'… they wouldn't…*".

4.4.3.3   Gender Specific Intervention being Unavailable

Despite of the existence of the large gender gap in the smoking prevalence rate, no gender specific cessation assistance is currently provided in Macao. Participant O2 (SP) explained: "*…we are only tailor-making different strategies for people having different needs, but will not tailor-make for male in this way, and for female in another way…*".

Nevertheless, the current cessation intervention may not be effective for assisting all smokers to successfully cease smoking. Participant Q1 (SU) commented: "*…I think none of those [strategies] is effective, if any, I must already have ceased…*". Participant X4 (SP) affirmed: "*…some people may, after having those therapies, feel ineffective, those patches and gum…and keep smoking…*".

4.4.4   Demand for Additional Intervention

4.4.4.1   Behavioural Intervention and Supportive Follow-up

Additional behavioural interventions were commonly demanded by participants. Participant F3 (SU) explained his need: "*…I think additional psychological service is needed…cos if you can't cope with the psychological barrier, you must fail to quit even if you want to…*". Participant B2 (SU) explained his demand: "*… 'smiling service'…they phone me and present consideration for me, it is good…in fact, spending few minutes gives strong support…*". Participant J1 (SP) affirmed the point of view: "*…someone reminds him periodically…at least he feels that…you work for him, at least you care him, follow him up…*".

Participant N2 (SU) needed to be monitored and he believed that it was more effective than the pharmacotherapy: "*…I think I need something to monitor me…such pressure is more powerful than those patches…*". Participant T4 (SU) discussed the circumstance of not being followed up in his

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previous cessation attempt: "*…like…the [government-operated] healthcare centre, I was there for once, they gave me…a big bag of [nicotine] gums, then I brought home, since then, no follow-up at all…I didn't take any single piece [of gum]…it was all because of lack of follow-up…I needed to be followed up physically and mentally…if I was able to [cease smoking by myself], I wouldn't seek assistance…if you failed to follow up, it was just wasting resources…*".

4.4.4.2 Skill Training

In addition to behavioural intervention and follow-up, service users demand additional skill training. Participant W1 (SP) explained that SAGHA routinely provided self-help material for skill training: "*…how to solve in case of facing difficulties…giving them information…while they have problems, they can learn and solve by themselves…*". Participant L1 (Female, SU) however reported her demand: "*…it is a mental addiction of mine, hmm, I think, if social workers can give me advice to deal with this issue, I think it is really useful for me…*".

4.5   mHealth as a Smoking Cessation Intervention

4.5.1   The Opportunity

Since mobile phones became commercial available in the 1980s, the mobile phone has become integrated into people's daily lives. Participant F3 (SU) told: "*…it is convenient and popularity…everyone owns mobile phone nowadays…everyone knows how to use…*". Participant E1 (SP) explained that the mobile phone has become the closest buddy of many people: "*…what we say BYOD [(bring your own device)]…it is an instrument close to us…it may be our buddy…it is an essential…*". Participant B2 (SU) discussed the popularity of mobile phone usage by everybody everywhere, especially for the young people: "*…young people don't read newspaper…for reading news, mobile phone, for watching movies, mobile phone, for contacting others, mobile phone, all mobile phone mainly…*".

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Participant B1 (SU) discussed the potential efficiency of smoking cessation mHealth linking it with the popularity of mobile phone ownership and usage: "...*in the modern society, it is so convenient to get information from mobile...so much information can be accessed from mobile, so many people use mobile...certainly part of them want...to quit smoking...demand induces supply...*".

Participant E1 (SP) realised that there was a great opportunity for smoking cessation mHealth: "...*the smoking cessation service provided by us is limited in our clinic...while mHealth can be extended to the whole world, all people knowing Chinese can use such service...we can't estimate how large the impact will be...*".

4.5.2 The Perceived Effectiveness and Advantages

Many participants gave positive responses about the perceived effectiveness of smoking cessation mHealth. For instance, Participant B1 (SU) discussed: "...*it is for enhancing willpower...even if you can only help one-tenth of smokers, you give ten percent of effectiveness...not everybody read newspaper every day, but bring mobile phone all day along with...you can fill the gap...*". He further commented that there was no harm to launching smoking cessation mHealth: "...*there is no harm...helping me to quit is just for my own good...*". Participant A1 (SU) discussed the potential effectiveness of mHealth: "...*like a 'Nanny'...she nags at me all the time...it is a bit annoying, but it works...I mean when I give loose to...if an app exists, in fact I will learn the problem of trying [(of relapse)], I won't escape from, I can't ...*".

Participant L1 (Female, SU) believed that there were a number of advantages of the smoking cessation mHealth: "...*feeling like being reminded by families, it is warm...at least it gives me feeling that someone cares me...it is really a good, a wholehearted and tailor-made assistance...you may feel annoying to be advised by families, but it is a mobile phone, just shut it down if you don't like, simple...hmm, low cost, yep, at least, it is not spending the time nor money of mine...*".

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4.5.2.1 Time and Human Resource Effectiveness

mHealth can be an effective strategy, in terms of time and human resources to deliver intervention. Participant O2 (SP) discussed, from the viewpoint of a service provider, the advantages of mHealth, in the form of delivering SMS, over the telephone follow-ups currently provided: "*...one of the advantages of SMS is that, have to read...must get mobile and read...in fact, the telephone follow-up is also for telling such contents...people may be unreachable by phone but may not by message...there are many people to be phoned...it can help saving our time and manpower...*". Participant X4 (SP) gave similar opinion that mHealth could help to relieve their workload: "*...we have to make many phone calls...if you have such an app or those messages, in fact, you are helping our routine work...*".

4.5.2.2 Avoiding Embarrassing Circumstances

In addition to reducing workload, Participant R4 (SP) believed that mHealth could help to avoid the embarrassing situation that they faced: "*...under the condition of not disturbing smokers, I think SMS is quite good...especially the working hours for Macao['s people] are really [irregular], I mean, sometimes we phoned...they just went off from work and were sleeping, it was so embarrassing...*". Participant J1 (SP) discussed both the issues of their workload and embarrassing situations: "*...we need to spend time to counsel our clients on phone...it [(mHealth)] additionally helps us to assist them...helps our work, I think it works, cos sometimes, face-to-face counselling may not be so welcome, using this strategy may be acceptable instead...*".

4.5.3 The Acceptability

While discussing the acceptability of launching smoking cessation mHealth, no participant in this study presented refusal. Participant B2 (SU) told: "*...I want to cease anyway...certainly I will try using, why not?...*". Participant T4 (SU) discussed: "*...it is not the main stream of smoking cessation assistance...it is just to assist you, to remind you, I mean, I don't think...there is any*

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disadvantage…it is an additional assistance…". Participant J1 (SP) viewed it through the lens of service provider: "*…I think in the long run, we need to develop the service…can provide, hmm, an additional element, an additional service…I think it is a progress…of our clinic, it is a trend of development…".* Participant J1 (SP) believed mHealth was generally acceptable, but also raised issues about accessibility for aged persons: "*…except from the elders who, hmm, don't know how to use and hence may not accept…generally, the young persons…I think they shall be willing to use…".*

4.5.4 The Design

In order to design and model an effective intervention, it is necessary to understand the needs and preferences of service users, as well as the concerns and limitations of service providers. In addition, to make the intervention feasible and useful, it is also necessary to understand the possible barriers and potential risks of launching mHealth.

4.5.4.1 Components of mHealth

When composed of preferred components, the mHealth programme would be more feasible and effective. Opinions from stakeholders are important for understanding the preferred components of mHealth.

<u>Warning about the Hazards of Smoking and Advocating the Benefits of Quitting</u>

Delivery of warnings about the hazards of smoking and advocating the benefits of quitting were suggested. Participant E1 (SP) suggested: "*…the hazards of smoking and, on the other hand, the benefits of quitting, eh, to analyse from different viewpoints…".* The contents were particularly demanded by smokers who were concerned about the health of themselves and their families.

Participant S3 (SU), the smoker who was scared by his current physical problem about gasping for breath while climbing stairs, suggested: "*…a picture of black lung, as real one…show him a*

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message suddenly, in both pictures and texts, the hazards of smoking…scaring him…similar to [the pictures printed on the] cigarette [packets] sold in Macao, it is impacting…”.

Participant B2 (SU), who tried to quit for his sons, suggested: “*…telling you that, if you smoke at home, then, the serious damages caused to kids, the critical harms caused to your wife…the impacts on your health, the impacts upon your families…”.* Participant C1 (SU) also reported the need for explaining the harmful impact of smoking upon families: “*…it is most important to let them know, smoking is harming the health of families…”.*

Nevertheless, Participant Q1 (SU) raised the issue of possible impact from negative contents: “*…those negative contents…will make it disgusting…encouraging will be better, I mean, at least, those positive messages will not be so nasty…otherwise, if it will be hated, [the effectiveness] will be discounted…”.* Participant T4 (SU) also suggested providing positive information: “*…after ceasing…what are benefits to health, any change on your life…”.*

For those smokers whose smoking cessation intention was built upon the wish to demonstrate a good example to children, the possible influences of their smoking behaviour on children may need to be included. For instance, Participant N2 (SU), who quitted to demonstrate a positive role model for his teenage sons, suggested: “*…I think a scaring message…say: ‘your children will smoke’ [is needed]…”.*

Skill Training and Educational Information Providing

Many participants suggested that mHealth could be an effective means for smoking cessation skill training and educational information providing. For example, Participant C1 (SU) reported his wants: “*…whether there is any strategy to reduce the feeling of desire while craving…to help in relieving from those difficulties…”.* Participant X4 (SP) discussed: “*…how to quit, more tips or strategies, if you fail to quit, may try the strategies…those strategies and tips will be effective…”.*

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Participant R4 (SP) discussed: "*...some may not know what withdrawal symptoms that we told are, I mean, maybe telling...they appear commonly during the cessation process...if I were a smoker trying to cease, I want to know informative stuff, maybe something helps me to cope with the uncomfortable feeling while ceasing...*".

Support and Encouragement

Support and encouragement are found to be important for smokers who, in particular, experience a lack of self-efficacy in their cessation attempts. Participant R4 (SP) discussed: "*...encourage them to persist with...cos sometimes those smokers know everything [about the hazards of smoking and benefits of cessation because of having several attempts previously]...encouragement is better...*". Participant F3 (SU) suggested: "*...reminding...quitting can save money, and is good for health, encouraging...to keep on...*".

Sharing Successful Stories of Cessation Winners

Participants believed that sharing successful stories of smoking cessation winners would help them to successfully quit in different ways. Firstly, they may learn the effective strategies used by the winners. Secondly, they may become more confident to quit smoking by learning of the successful cases of others. Participant T4 (SU) commented: "*...sharing the successful cessation experiences...of others, what strategies were used...there must be strategies leading to success...*". Participant E1 (SP) suggested: "*...we can try...to influence them by referring to successful cases...*". Participant B1 (SU) explained: "*...those real cases, that you can observed...it is a bit motivating...*".

Cessation Status Reminders and Monitoring

Smoking cessation status reminders and monitoring were both demanded by service users and suggested by service providers. Participant R4 (SP) explained: "*...remind them [about their cessation attempts]...especially during the initial stage of cessation, sometimes they would really*

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take up cigarette unconsciously…". Participant T4 (SU) affirmed this viewpoint: "*…no one monitors you on the way, at least an app exists…reminding you periodically…may give loose to at some occasions…don't be enticed by the puff of cigarette…at least sending you a message to remind you [that you are attempting to quit smoking]…*". Participant J1 (SP) explained the potential function of mHealth: "*…it seems an invisible people to monitor them…*". Participant N2 (SU) explained: "*…it is very important that someone monitors you…monitors and reminds you…and you will then not buy nor take…*".

<u>Follow-up Appointment Reminders</u>

Participants believed that mHealth could be utilised as a cessation assistance service appointment reminder. Participant J1 (SP) suggested: "*…you can remind…when the follow-up consultation appointment will be…*". Participant T4 (SU) explained the possible approach: "*…for example, it is 1 May today, I come for cessation assistance, then we make [an appointment]…on 10 May, then, on 9 May, in advance [to the appointment], you send a message, 'come again tomorrow'…for avoiding in case of forgetting the appointment…*".

<u>Data Collection Tool</u>

mHealth can also be utilised as a data collection tool. Participants in the study believed that the data collected could help service providers to design appropriate intervention for specific smokers. Participant T4 (SU) discussed: "*…maybe, recording how many puffs of cigarette he takes each day while attempting to cease…it is for the physician's information to follow up…if you want him to cease, you've got to have some measures to collect data to learn any change of his smoking behaviour…*".

4.5.4.2 The Delivery Mechanism

There can be two major mechanisms for the delivery of smoking cessation mHealth interventions, these are: users passively receiving messages, and actively searching for information. Participant

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Q1 (SU) preferred to passive approach and explained the advantage: "*...if it [(the message)] appears itself, I can read while having a bit spare time, I don't need to search myself...*". However, on the other hand, some participants believed that an active approach might be better. For example, Participant X4 (SP) discussed: "*...if all included in the app, maybe when someone wants to see, he can decide, for example, what to see today...*".

4.5.4.3 Presentation Consideration

<u>Text or Multimedia Message</u>

While discussing the presentation of messages or information, Participant E1 (SP) discussed in a broad sense: "*...cessation is quite a boring issue...so we need to make it [(mHealth)] relating to our lives, make it interesting...*".

Many of the participants prefer picture or multimedia messages rather than text messages. Participant N2 (SU) explained: "*...text [message] is in fact not effective...I will just have a quick look...it rings always...no matter audio or picture message is better than text message, I mean, there are so many [text messages]...they have become meaningless already...I may just have a quick look then leave it there...*". Participant L1 (Female, SU) stated: "*...if a message, eh, includes both pictures and texts, it makes stronger memory...*".

Participant A1 (SU), however, questioned the effectiveness of sending picture messages: "*...I think picture [messages] are not so effective...like the pictures printed on cigarette packets...I felt disgusting at the first time when I saw those pictures, eh, at the second time, [I think:] 'I know that, it is more or less the same'...just not to see, but it won't influence the consequence of maintaining my smoking habit...*".

Another issue raised was that picture messages could not be delivered with SMS, as explained by Participant T4 (SU): "*...if sending via SMS, it is difficult to show both pictures and texts...SMS is*

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nevertheless a text-only medium…".

A number of technologies are available to fulfil the demand for delivering picture instead of text messages. Delivering MMS may be a relatively simple way. However, the barrier to using MMS in Macao was raised, as Participant O2 (SP) explained the problem of sending MMS: "*…MMS seems to have yet developed…and in Macao, it seems, it can never be launched…*".

A number of instant messaging subscription services, such as WhatsApp, WeChat and Line, instead of an MMS service, could be utilised for delivering picture messages. The advantages of launching the instant messaging subscription services were noted. For example, Participant Y4 (SU) explained: "*…SMS costs but WeChat message doesn't…I mean, I don't want you to spend…*". Nonetheless, barriers and deficiencies of launching mHealth with those instant messaging subscription services should not be neglected. Participant O2 (SP) commented: "*…WeChat is much limited, you can't send if you aren't added [as friend]…a certain part of people don't have WhatsApp [account]…*".

<u>mHealth App</u>

Developing a smoking cessation app can be one of the possible approaches, and a comprehensive mHealth app is suggested. Participant E1 (SP) discussed the design considerations of an mHealth app in a broad sense: "*…I think, firstly, it must be informative…must be user friendly…and all data and contents must be useful and updated, eh, so I think those three 'U's are very important…there are so many various short movies, videos and apps around the world, why must the smokers use ours but not others?…ours must be attractive enough…if the information are comprehensive, updated, novelty feeling, can do what others can't, I think they are the keys for the success or failure of the [mHealth] app…*".

Participant X4 (SP) suggested developing a comprehensive app: "*…I think it needs to include*

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everything, various information…comprehensive app…shall include all I want, it shall not like, I can learn the hazards of smoking in one app, while for learning tips, I need to download another…those skills, local services…and those not being assumed, are needed to be included in the app…". Participant B1 (SU) reported a similar opinion: "*…give me whole series [of information]…after I read, if I am interesting in quitting, you need to let me know where I shall go, both phone number and location, service hours [of the cessation clinics] and everything altogether…I will try immediately, it is the first step to success[ful quitting]…".* The additional advantage of using an app was discussed by Participant Q1 (SU): "*…it is good for all if messages popped up automatically from an app, cos tele-companies bill for SMS sent, but only data transmission will be counted while using an app…both work in a similar way, same messages…".*

However, Participant B1 (SU) commented on the possible barriers of using an mHealth app and discussed the advantages SMS: "*…if SMS sent, I will read…many people even don't know how to download [mobile app], but they must read the SMS, they must know, eh, a SMS comes…but I won't download those stuff [(mobile apps)] for no reason…".*

<u>Potential Alternative Approach</u>

The barriers to accessing mobile apps, including the available instant message subscribing apps and any mHealth app developed specially for delivering smoking cessation intervention, were raised both by service providers and users. They saw major barriers being that someone may not have a Smartphone, or may not know how to use the app. Participant T4 (SU) stated: "*…app may be impracticable, which is…those elders, they really don't know how to use the app…".* Participant O2 (SP) explained: "*…elders may not use Smartphone…I think those sixty to seventy years old…seventy to eighty years old, generally don't have Smartphone…they won't be not having mobile phone, eh, cos they need [mobile phones] for contacting…".* Participant F3 (SU) discussed: "*…elders are not keen to pursue those [modern technologies]…such group of people may be ignored…".*

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Participant I2 (SU), a smoker aged more than 60 years, mentioned his own limitation: "...*my [mobile] is just a 2G one...those 3G, I don't know how to use...*". Participant C1 (SU), who was in the age group of 30-39 and had experience of using a Smartphone, but had turned back to use the older model mobile phone recently, reported: "...*I can only be reached by SMS...*". For the service users who are not capable of accessing MMS or an app, they may only be served with the delivery of SMS. Participant J1 (SP) explained: "...*sending SMS is the initial step...can start from the initial step, cos the Health Department is also applying this strategy [for other mHealth services]...*".

A possible additional disadvantage of using an mHealth app should also be considered. Participant O2 (SP) discussed the issue: "...*I can control the app with my own autonomy, when I don't want to read, I won't, and it in fact isn't effective...*". Participant O2 (SP) commented that: "...*for app, I don't read unless I want to, if it annoys me again, I delete it...delete the whole app...*".

<u>A Combined Approach</u>

In order to reach equilibrium between pros and cons of the 'basic' approach, say delivering SMS, and the 'advanced' approaches which may consist of delivering multimedia message via MMS or mobile apps and/or developing a smoking cessation mHealth app, Participant E1 (SP) suggested combining those approaches: "...*SMS can't be personalised and less interactive...is a one way stuff...[we] can combine each other [(SMS and app)]...cos mobile app can't work without internet connection, I can't use due to the functional limitations of my mobile phone...I would suggest [to have a combined approach]...maybe more costly...*", and the participant further commented: "...*we shall seek the common ground, to make it massed and to be used by all...as a group of people [(who are not using Smartphone)] need to be taken care...*".

Participant X4 (SP) suggested a similar arrangement: "...*app will be more effective for young, maybe for those aged forty to fifty, who may not know how to use app, it is needed to employ this [(strategy − sending SMS)]...*". Participant R4 (SP) discussed: "...*app is the best in the case*

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of…being able to go online…along with the trend of changing…cos more and more people know how, I mean, to connect to the internet…SMS is also OK, but only for who don't know how to connect to internet…".

Barriers for Particular Users

Another circumstance may construct additional barriers for smokers' accessing mHealth and it may cause them to be excluded from the service and discount the overall efficiency of mHealth. Participant R4 (SP) explained: "*…elders…maybe, sometimes, even don't know how to read SMS…will have obstructions…*". The circumstance is mentioned by Participant D1 (SU), a participant from the group of service users aged more than 60 years: "*…fairly seldom [to read SMS], cos I need to wear glasses to read…I don't know much about the internet, people at my age know very few about it…aww, I am seldom to read [SMS], really, only occasionally, when I note, sometimes it has been too late, few days after, is not valid anymore…*".

Participant R4 (SP) suggested a potential solution: making telephone calls manually to serve the users who are unlikely to be reached by any smoking cessation mHealth intervention (for instance, Participant D1, SU): "*…parallel running, maybe…when they have any problems, they phone us, or we phone them occasionally…to ask about their progress, I think it is OK…*".

4.5.4.4 Frequency and Time of Delivery

Delivery Frequency

Another issue is the frequency and time of mHealth intervention delivery. As discussed by participants, the preferred delivery frequency is widely divided. Participant S3 (SU), the heaviest smoker in the study, preferred to have an mHealth message every 5 minutes because he would often smoke one cigarette in about 5 minutes. For others at the action stage of smoking cessation, the preferred intervention delivery frequency ranged from four times a day (suggested by Participant L1, Female, SU) to twice a week (opinion given by Participant I2, SU).

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It is not easy to determinate the most appropriate delivery frequency, as explained by Participant T4 (SU): "*...cos everybody has different smoking patterns, how can you determine the delivery frequency, if too much is given, it annoys, just shut it off...*". It is however unlikely to be welcomed if the intervention is delivered very frequently. Participant R4 (SP) discussed this in detail: "*...if I were a smoker, I mean, I must dislike if I receive everyday...can keep longer lasting if [the intervention is] delivered less frequently...just like the alarm clock, sometimes can't be woken up while get used to hear [the alarm]...will be fond to read at the beginning, but while it lasts for a while...maybe just close it before reading...I think delivering more frequently at the beginning is OK...when he knows almost everything but you keep telling, it is annoying...cos message makes sounds...sometimes the working and resting patterns are different [from one user to another]...there are quite a lot of junk marketing messages...if it [(mHealth)] is [delivered] like that, it seems an additional marketing message in some sense...*".

Time of Delivery

Regarding the time of delivery, the opinion from Participant L1 (Female, SU) was the concern that: "*...say, during working hours, the boss will dislike cos it [(the message)] is of noisy...*". Participant N2 (SU) suggested a solution: "*...you may develop an app, then ask them to do self-setting...if messages are being delivered, it is better to let them to make their own choice, don't pre-set all...*". However, it was a concern that service users may not be willing to do self-setting on the app, as explained by Participant J1 (SP): "*...will he do it accordingly?...like, 'I am so busy, still need to do setting'...I think they won't do it actively...it's better not to bother them...*".

4.5.4.5 Tailor-made Intervention

A tailor-made or deeply individualised intervention can increase the information being self-relevant and therefore may increase the likelihood that the intervention can motivate users to have behaviour change. The issues about tailoring and individualising smoking cessation mHealth messages were hence discussed.

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Although Participant Y4 (SU) argued: "*...why does it need to be tailor-made...all have the sole objective, which is quitting smoking, everyone may have different difficulties, I mean, the sole aim is smoking cessation...*", many participants believed that tailor-made intervention would better suit different smokers with different situations and objectives of cessation. For instance, Participant F3 (SU) explained: "*...not everyone cease for the same reason...the needs may be...somewhat different...tailor-made is better...*". Participant A1 (SU) discussed his preference: "*...I don't really care about the common issues for everybody, if it is self-related, I must be more concerning...care more about...*". Participant F3 (SU) explained: "*...to say the reasons of cessation in your heart...to say the words in your heart, you must feel comfortable to listen...*". Participant S3 (SU) also stressed the importance of individualisation: "*...the messages really reach the point...health problems, I mean, may make your house smell bad, families dislike the bad smelling of you...*". Participant R4 (SP) discussed: "*...may need to consider case by case, stress may be the reason of smoking for some people, then...may address the issue of stress...maybe someone doesn't want anything...if you send a lot of information, it is really annoying...*".

Progress Sensitive Intervention

Participants believed that progress sensitive intervention could be effective. For example, Participant J1 (SP) explained: "*...cos we expect that he will have different withdrawal symptoms at different stages...for example, at the first week...feels upset, flighty and impetuous, eh, like, 'you need to stick to ceasing', maybe at the second week...may have another emotional reaction...I mean, to send different contents at different stages...*". Participant A1 (SU) also explained: "*...the app may know you better than yourself...'you will have such feeling at that particular period', yep, I really have, it understands me so well, and then I will read the tips given, and avoid to do that, I mean it can be effective...*". Participant O2 (SP), as a service provider, discussed SAGHA's current progress sensitive counselling approaches, which are believed to be transferable to the development of mHealth intervention: "*...I think, at the first week, it is mainly to strengthen his determination...a*

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fortnight afterwards, it is mainly to maintain…after one and a half to three months, we then discuss

relapse prevention…".

Time Sensitive Intervention

Regarding the delivery time, time sensitive intervention was demanded. Participant Q1 (SU)

explained: "…*I mean, if it can, the messages shall be set being delivered at the time while*

craving…". Participant J1 (SP) explained: "…*if you know his background, then you can, at the*

appropriate moment, give him a reminder, like, if he [usually smokes] at six o'clock, then you can

send him a message 'hey, don't smoke'…". However, Participant T4 (SU) questioned the feasibility

of time sensitive intervention for each individual service user: "…*it is really difficult to…match*

your timeline perfectly…can do approximately…".

Gender Specific Intervention

Some participants mentioned that gender specific intervention is needed. For example, Participant

O2 (SP) discussed: "…*for female, can be tips for health…for male, can be remind more tips about*

avoiding temptations…[males have] more social activities, you can them more about how to deal

with [temptations] in such situations…female may have much vexation, much mental issues, eh,

how to cope with vexation…".

However, Participant X4 (SP) gave an opposing opinion: "…*I think…I won't, deliberately, send*

these to males and send those to females, cos I think it should be comprehensive, really including

everything…".

Culture and Region Specific Intervention

There are a variety of cessation mHealth apps and interventions available worldwide. To develop

smoking cessation mHealth in Macao, it may be cost-saving to refer to the existing apps at the

design stage. However, it is necessary to learn if cultural and local issues should be put into

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consideration while modelling an effective intervention. The data collected from participants are thus analysed and reported.

The localised contents may consist of local smoking prohibition legislation and the smoking cessation services available, as discussed by Participant X4 (SP): "*…must be modified…maybe including relevant legislations…maybe, where the smoking prohibited areas are in Macao…mustn't copy everything [from other apps]…relating to Macao…for example, where the cessation assistance services are available…some local services…may learn from the content…*". Participant E1 (SP) discussed the localisation and culture considerations: "*…consist of some local elements…modify the interface and the colour used, eh, cos, the colour preference of Orientals may be somehow different from of Westerns…I think the contents are more or less the same…to do repackaging…*".

However, Participant J1 (SP) argued: "*…I think cessation is more or less the same anywhere…*". Participant W1 (SP) reported a similar opinion: "*…generally, no need to have much modification or revision…the content developed by others should be quite correct and pertinent…*".

4.5.5   Concerns about Technology Renewal and Resources Involved

4.5.5.1 Technology Renewal

Technology renewal is one of the keys for the sustainability of an mHealth intervention. Participant E1 (SP) discussed the critical issue of technology renewal and the risk to the sustainability of an mHealth programme: "*…saying that, from our era of ICQ, to MSN, to the existence of QQ…in fact, many instant communication technologies have been drowned…and now, saying that WeChat and Line, eh, Facebook is even facing critical challenges…the updating and renewal of technology…even if it is the most heated one today, it may be substituted by others tomorrow…and the whole idea will be almost totally overwhelmed…the content can be kept constant but the*

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presentations are many...whether it appears in the form of an app, or is embedded into WeChat, QQ, or Facebook...the nature is constant...whether we are able to shift from one social communication platform or technology to another, it is very important [to the sustainability of mHealth]...flexibility is really important...".

4.5.5.2 Human Resources

Human resources is another important concern for service providers. Participant R4 (SP) discussed the human resource issue: "...*I think we are lack of manpower...to take care each client, I think, really need manpower to take care of them...".* It was however argued that less human resources would be needed with an app delivering smoking cessation mHealth. Participant X4 (SP) stated: "...*if you implement an app...rely on them [(service users)]...to press [(to do setting)], to learn...I think, in term of human resource, it will be better...if various messages need to be sent manually to different clients periodically, it is a human resources issue...".*

In addition to the executive human resource, turnover of technologically trained staff may have a big impact upon the sustainability of an mHealth programme. Participant E1 (SP) discussed the issue of the drain of information technologies: "...*if the administrator quits...no one to maintain...the sustainability [of the mHealth programme]...will be reduced...maybe, on the halfway, no one continues to develop...it [(the programme)] will be died...developing and updating, maintaining [are all important issues]...".*

4.5.5.3 Financial Resource

Although Participant W1 (SP) believed that the issue of human resources might be easily solved: "...*to hire more people to work together...just to hire people to come work...",* this potential solution relies heavily on the supply of financial resources. Participant Q1 (SU) explained: "...*money can make the world go around...technological issues can thus be solved...".*

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On the other hand, from the viewpoint of service users, the acceptability of mHealth depends heavily on their out-of-pocket costs. Participant Q1 (SU) explained: "*…it is most important that it is free of charge…hard to say if it costs…*". Participant N2 (SU) questioned the potential effectiveness of intervention if it costed him money: "*…if it costs, honestly…I haven't used, I don't know if it is good…*". However, Participant L1 (Female, SU) explained that, weighing up the possible medical expenses, she should be willing to pay only if it were affordable: "*…I think if it costs hundreds Patacas, hmm, I will accept, cos the benefit is worth more than hundreds Patacas…smoking cigarettes for two months costs more than that…it is definitely worth in the long run, I mean, will spend more on medical consultations in the future [otherwise]…*".

For developing and implementing an intervention, financial resources are a critical aspect. Nevertheless, the majority of participants believed that the cost of developing and delivering smoking cessation mHealth should be borne by the government and not by smokers or SAGHA. For instance, Participant T4 (SU) explained: "*…it [(smoking associated health problem)] eventually will become a social responsibility…medical services must be subsidised by the government eventually…smoking cessation…is not an issue of one or two months…but two or three years…it is really hard to justify forcing a non-profit-making NGO to follow you up for two or three years…*". Participant E1 (SP) discussed: "*…finance is certainly a big issue, everything costs…support from the government is very important, cos for driving public health policy, in fact, it is impossible to request…NGOs to pay from their own pockets, cos it is a social issue…the government levies tobacco tax…it really shall be…borne by the government…*". Participant L1 (Female, SU) commented: "*…health for all, it [(the government)] gains…*".

Since the Government of Macao has a huge amount of surplus in recent years, Participant J1 (SP) was confident in raising funds from the government and addressed the financial issue: "*…if we launch this, hmm, service…I think I may try to apply [funds]…the government owns a huge amount of surplus…just to see how do you apply…*".

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4.5.6   Possible Deficiencies of Smoking Cessation mHealth

4.5.6.1   Possible Negative Impacts

The possible negative impacts of designing smoking cessation mHealth are worthy of consideration. Content that does not consist of the word 'smoking' was preferred because it was worried that it would serve as a trigger for relapse. Participant B2 (SU) discussed this possible effect, which may be the most important drawback of smoking cessation mHealth: "...*for example, for me, I am working and don't desire to smoke, receive a message [which is related to smoking or cessation], I remember smoking...may thus relapse...*". Participant R4 (SP) reported a similar concern: "...*sometimes, some people may be...very successful, are able to shift their own attention [from smoking to others] and have already ceased, still always to be reminded about the word 'smoking'...I think it gives a bit negative effective...*".

Participant O2 (SP) discussed another possible issue that would make mHealth unacceptable: "...*for those people who don't want to let others know about their quitting, sending message may not be acceptable, cos they are afraid of [the messages] being noticed by others...*".

4.5.6.2   A Smoking Cessation mHealth cannot Work Efficiently without Strong Motivation

Motivation may be the most important factor in a successful smoking cessation. No matter how well the mHealth is designed and implemented, without the strong motivation of the smoker, it will not be effective in assisting them to successfully quit smoking. Participant B1 (SU) explained: "...*if a guy doesn't quit heartedly, even to show him a newspaper everyday, to hand him a cessation handbook will be useless, he doesn't want to read...when it is not demanded, it will be useless even if you provide aggressively...*". Participant F3 (SU) stated: "...*willpower...accounts for a large proportion...no matter how good the stuff is, it is useless if he doesn't [have willpower]...*". Participant L1 (Female, SU) argued that smokers will never quit successfully if they are not really willing to: "...*if I am not willing to quit, I won't install [the app], even though it was installed, I*

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won't read [the messages delivered], or I just delete soon after reading, it must be meaningless but

just annoying…".

Smoking cessation intention and motivation are expected to be the key issues when being provided with smoking cessation intervention. As discussed by Participant F3 (SU): "*…to remind you not to forget what you quit for…don't forget the reasons of your quitting …*", it may be the core of messages to be delivered by smoking cessation mHealth which will strengthen their intention of smoking cessation.

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Chapter Five: Discussion

Scientific evidence to inform the design of a gender sensitive and regional culture oriented smoking cessation assistance mHealth in Macao was gathered by conducting interviews, analysing data, and integrating findings from literatures and data collected from interviews. This is the first study in Macao to explore male specific smoking and cessation behaviours. This is also the first study to explore the design, as well as the working mechanisms, of a smoking cessation assistance mHealth programme in Macao. Additionally, the acceptability and feasibility of the mHealth programme from the points of view of both service providers and users were also explored in this study.

In this chapter, the influencing factors potentially causing the gender disparity of smokers' smoking and cessation behaviours in Macao are discussed in early sections and the discussion focuses on gender and culture specific influences for Macao's males and leads to the following discussion. The potential of implementing a smoking cessation mHealth programme and the design and working mechanism of a gender and culture sensitive mHealth intervention regarding male smokers in Macao (the major issues of this study) are discussed afterward. The intellectual rigour and limitations of this study and recommendations for future studies are discussed before closing.

5.1   Gender Disparity in Smoking and Cessation Behaviours

The large gender disparity of smoking prevalence has resulted in the high incidence of smoking and low success rate of smoking cessation among males in Macao. The large gender disparity in smoking cessation service usage may be attributed to males considering quit smoking less often or being less willing to access smoking cessation assistance service. To address the public health issues of male smoking in Macao, there is a need to comprehensively understand the motivations for their smoking cessation, the driving forces behind accessing cessation assistance services, and the possible barriers to their successful smoking cessation, in relation to modelling an mHealth

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smoking cessation programme that motivates their smoking cessation intention and assists with their smoking cessation. Nonetheless, understanding the reasons for their maintaining smoking habits and the influencing factors of their commencement of smoking are not less important.

As learnt in the current study, many participants from the group of service users adopted the smoking habit in their adolescence. Scientific evidence showed that smokers who started smoking in adolescence were found to have a more difficult time quitting as those smokers were more likely to develop high levels of nicotine dependence than the smokers who started smoking later in life [485-487]. Macao's male smokers face similar difficulties in their smoking cessation attempts, and there is therefore a need to understand the reasons for males' onset of smoking.

Importantly, the influencing factors leading to the onset of smoking in Macao's adolescence remain once entering adulthood and are associated with Macao male adults' maintaining their smoking habit, the difficult situations of their smoking cessation and triggers to relapse. These factors can result in Macao's male smokers considering quitting less often, not being motivated to take action to quit, or failing in smoking cessation. Understanding these issues will help to model an effective smoking cessation mHealth intervention to encourage them to consider quitting, taking action on their cessation attempts, and to help them cope with difficult situations during their cessation process and avoid triggers to relapse.

5.1.1 Possible Reasons for the Gender Disparity in Smoking and Cessation

There were many reasons cited by smoking participants for their commencement of smoking and the barriers to their smoking cessation found in the current study. For example, curiosity about smoking was a broadly cited reason for participants' commencement of smoking (relevant data was reported in section 4.2.1.2). Tobacco control studies often invokes binary distinctions, such as masculinity to femininity and Western to Eastern. As learnt from the literature reported in section 2.5.2.1, curiosity is commonly found in both Western and Eastern societies and has an impact upon

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both genders [224, 310, 315-317, 319-322, 328, 333, 335]. Even if curiosity was found to influence participants in the study, it is unlikely to be a cultural or gender specific issue for male smokers in Macao.

Similarly, 'old habits die hard' was raised by participants as a critical barrier to their smoking cessation (results are presented in section 4.2.3.4). Smoking being a habit is also a commonly cited barrier to smoking cessation for both male and female smokers that is found in many scientific studies from various cultures [488-492]. It may be neither a culture nor gender specific barrier to smoking cessation.

5.1.1.1 Self-identity Regarding Maturity and Masculinity

Self-identity of maturity and masculinity was found to be an important influence on males' smoking and cessation behaviours in this study. Peer encouragement was commonly reported as the direct igniter of participants' experimenting with smoking cigarettes in their adolescence (as reported in section 4.2.1.1). Smoking being cool is also a critical influencing factor, especially for adolescents, and the image of the Marlboro man had a significant impact upon their smoking behaviour (study data were presented in section 4.2.1.3). The belief that smoking is cool encouraged male participants' uptake of cigarettes, although some of them claimed that they did not enjoy them, but tolerated the taste in their initial commencement of smoking.

The literature showed that, by observing adults smoking, in particular those who were of the same gender, not only was curiosity about smoking stimulated, but adolescents were also be given a sense that smoking was a pleasurable adult activity [319, 351, 352]. Adolescents tend to believe that smoking enables them to express and reaffirm their self-identity of maturity [324, 327, 336, 352, 354]. Even if scholars argued that there was no solid evidence about tobacco advertising exerting a direct influence on the adoption of smoking during adolescence [493], the image of smoking being cool created by tobacco advertising has nonetheless been embedded into peoples' minds [315, 317,

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327, 329, 336]. The effect of adolescents' self-identify of maturity was, however, enhanced by advertising from the tobacco industry [315, 317, 327, 329, 336].

More importantly, male smokers claimed that they decided to take up cigarettes because they have grown up to be a man. It implies that not only self-identity of maturity, but also a masculine identity was of high concern for male participants during their adolescence. In other words, they were not only keen to demonstrate their adulthood but, importantly, their manhood. The finding affirms what scholars have said, that male adolescents' masculine identity is linked with their self-identity of maturity [494].

Grounded in masculinity, gender norms have a significant impact upon male behaviours [349]. A male's propensity for smoking has been interpreted to represent that male's alignment with masculine ideals, referred to as 'hegemonic masculinity', that signifies strength and invulnerability to illness and disease [62, 495].

Masculinity did not only influence male participants in their adulthood but the impact was initiated during their adolescence. Participants saw cigarette smoking as a symbol of masculinity where smoking was used as a metaphor for potency and bravery in their adolescence. The definitions of cigarette smoking to them and the insecurity of their masculine and mature identity significantly influenced their smoking behaviour and led to their commencement of smoking.

The effect of a self-identity of maturity and masculinity in relation to smoking are different from males to females and demonstrating masculinity is only desired by males [349]. Male adolescents' desire to demonstrate their masculinity and manhood can potentially be used to explain the phenomenon of gender disparity in smoking and cessation behaviours. Masculinity being associated with smoking is nevertheless an important gender specific issue.

5.1.1.2 Rebellion and Insecurity about Own Maturity

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Another crucial attribution for adopting smoking behaviour is adolescents' rebellion. It was argued that Asian adolescents generally respect and obey elders in comparison with their Western counterparts [318]. However, in this study, rebellion was still an important keyword raised by participants to explain their commencement of cigarette smoking (relevant findings are presented in section 4.2.1.4). Participants from the service user group claimed that their desire to demonstrate adulthood, which is also referred to as self-identity of maturity (discussed in the previous section), motivated their taking up cigarette smoking. However, no one ever mentioned the association between their rebelliousness and insecurity about maturity in relation to their smoking behaviour.

Rebellion is often referred to "*refusal to obey rules or accept normal standards of behavior, dress, etc.*" [496]. Alongside adolescents' growing-up, being insecure about their own maturity can result in their rebellion, as with their desire to develop an identity independent from their parents and a capacity for making independent decisions [497]. Rebellious adolescents tend to refuse to follow instructions and do the opposite of what is requested.

Smoking has long been linked with adolescent rebellion against authority. Rebellious adolescents, including the participants in the study, chose to take up of cigarette smoking to exercise their independence and freedom and to represent their authority to make their own choices in order to secure their self-identity of maturity [497, 498]. This can explain the participants' claim that their uptake of cigarette smoking was because of their rebelliousness, as reported in section 4.2.1.4.

5.1.1.3 Do the Driven Forces of Adolescent Onset of Smoking Remain and Have an Impact upon Male Adult Smokers in Macao?

Upon moving into adulthood, the need to demonstrate masculinity or manhood and exercise rebellion to represent one's own authority by smoking cigarettes should no longer be meaningful. If smokers realise that smoking has a negative impact upon their health and that the benefits of smoking cessation outweigh the benefits of smoking, they shall no longer be attached to smoking

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and intend to quit smoking. In cases where the influencing forces that encourage smoking have been completely eliminated, if the only issue to be addressed is that of physiological dependence on nicotine, smoking cessation shall not be a critical challenge.

However, Macao male smokers' cessation has never been such a case. In this study, it was reported by both service providers and users that many smokers had attempted to quit many times, but still failed and that they were at high risk of triggers to lapse or relapse.

It was found in this study that when smokers' move into adulthood, the need to demonstrate masculinity through cigarette smoking seems not have been eliminated as expected. Male adult smokers still intend to maintain their smoking behaviour to demonstrate their masculinity. The masculinity associated with adult smoking behaviours could be a culture and gender specific issue for Macao's males and might construct additional smoking cessation barriers for them. This issue is crucial for modelling an effective smoking cessation mHealth intervention regarding Macao's male smokers and assisting their smoking cessation. The issue will be discussed in depth later in this chapter.

5.1.2   Chinese Socialisation Associated with the Smoking and Cessation Behaviours of Males in Macao

While gender role theories, such as masculinity, have commonly been used in many scientific studies to explain the gender disparities in particular behaviours, those theories may not be sufficient to explain the gender inequality of smoking and cessation behaviours of Macao's smokers.

In this study, peer socialisation was found to be a consistent and important influence associated with males' smoking behaviour. In Western societies, peer influence has generally become less observable upon reaching adulthood [499]. However, peer influence to males' smoking behaviour

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seems not to have been eliminated in Chinese societies where male smoking was still reported as primarily a social activity in many scientific studies [329, 368, 400-402]. Although peer socialisation associated with adults' smoking can also be found in other Asian cultures [329, 500], the reasons may be somewhat culturally different for Macao's males when compared with other Asian males. The philosophical concepts of Confucianism and Taoism, as well as Macao's culture, where Chinese '*face*' may be the core issue, are likely to be enlarging the gender inequality of smoking and cessation behaviours in Macao.

5.1.2.1 Social Harmony

<u>Social Harmony and Smoking Together</u>

The desire to maintain social harmony, which is emphasised in Chinese culture, can reasonably explain why smoking participants were attached to smoking, why they felt it was difficult to cease, and why they faced a high risk of triggers to lapse or relapse.

At the onset of adolescence, people commonly demonstrate increased conformity to peers [338-340]. Across the adolescent years, their self-regulatory skills improve and peer conformity declines. By the time adolescents move forward into adulthood, their skills in making independent decisions and resisting peer influences have increased steadily [499]. Adults are consequently expected to be more able to make independent decisions cognitively and socially.

The effect of fear of social ostracism declines as adolescents grow up. The imagery of smoking is perceived to smooth the way to peer acceptance is also expected to fade out in adulthood [501]. However, the findings of this study did not tell the same story. Peer influence and peer pressure were found not to abate as expected in the participants' adulthood.

Male smokers reported that they were not willing to stay away from their smoking peers (for instance, the data collected from Participant C1 (SU) and reported in section 4.3.1.3). It was mainly

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because they put the need to maintain social harmony with peers at a higher priority, when compared with avoiding the possible negative health impacts of smoking. They claimed that staying away from peer groups, where peers are smoking cigarettes together, was an impolite attitude and believed that it would cause harm to the relationships between each other.

Their attitude can be explained by applying the beliefs of the Chinese. Cigarettes were commonly described as social tools and facilitators of engagement between Chinese smokers [502, 503]. Chinese smokers generally believed that they could get more positive social responses from each other when smoking together [502]. Additionally, in accordance with the concept of '*five relationships*', equal positions are required between friends [388]. Respecting traditional philosophical concepts, participants tended to treat peers fairly and regarded them being positioned equally to one another. Smoking together is invaluable in maintaining peer harmony between smokers and is emphasised in the collective Chinese society. These beliefs however encouraged smokers to smoke in smoking peer groups.

Social Harmony and Smoking Cessation

It was a worrisome issue for smoking participants in this study that their smoking cessation attempts could damage peer harmony (relevant data were reported in section 4.3.1). Since smoking cessation involves refusal to smoke together with peers, the refusal may be interpreted as impoliteness or, more seriously, as a social confrontation in Chinese society [324]. Comparatively, for Westerners, it may be seen as minor and an issue that is quickly and easily forgotten. However, for the Chinese, failure to maintain politeness, which comes from the philosophical concept of '*Li*' of '*five constants*', emphasised in Confucianism may cause serious problems. The worries of permanently damaging peer harmony have always lingered in the mind of Chinese males [504]. This issue could construct additional smoking cessation barriers for Chinese smokers.

Nevertheless, on the other side of the social harmony coin, it was also found in this study that

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smoking cessation could be motivated and encouraged by non-smoking peers (relevant data were recorded in the subsection titled 'Non-smoking Peers' in section 4.2.2.2). In a non-smoking peer group, maintaining social harmony with peers by smoking together is no longer meaningful. More importantly, as noted by smokers, second-hand smoke has become commonly social objectionable and has been credited to the anti-tobacco marketing efforts in recent decades. The risk of damaging social harmony with non-smoking peers by presenting opposing or objectionable behaviour shall not be ignored by smokers. In order to maintain social harmony with non-smoking peers, in a similar sense to smoking together with smoking peers, smokers may be motivated to quit smoking.

Consequently, maintaining social harmony with peers, as prioritised by Macao's males, can critically influence their smoking behaviour in two completely different ways. In order to maintain peer harmony with their smoking peers, male smokers in Macao are encouraged to maintain their smoking behaviour while additional smoking cessation barriers are also constructed. However, in order to maintain peer harmony with non-smokers, they rather tend not to smoke in a non-smoking peer group. An old Chinese saying: "*Things of a kind come together; People of a mind fall into the same group*" can be used to explain their behaviours.

5.1.2.2 '*Face*' and '*Relationship*'

It was found that prioritising peer harmony has an impact upon Macao males' smoking and cessation behaviours. However, giving '*face*' to and maintaining '*relationship*' with peers are likely the core philosophical beliefs of Macao's males that are linked with their concern for peer harmony and critically influencing both their smoking and non-smoking behaviours.

'*Face*' and Peer Relationships

In the current study, participants reported that it was an embarrassing situation to turn down the shared cigarette and it made smokers' smoking cessation very difficult. To not only refuse smoking together, but to also refuse the shared cigarette is considered impolite manners by Chinese smokers,

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especially since cigarette sharing is known as a social custom and an ice-breaking measure of the Chinese [505]. It was because of smokers' belief that it is an issue of losing '*face*' of the giver. In addition to having an impact upon the social harmony of a peer group, it would also result in '*relationship*' damage, which is a very serious issue in Confucian society.

According to the literature, '*face*' has been emphasised in Chinese culture, although the concept of '*relationship*' has also been embedded in other Confucian societies such as of Korea. Nonetheless, the circumstance of worrying about losing '*face*' and damaging '*relationship*' associated with smoking is not commonly found in Western cultures. It is therefore likely to be a culture specific issue and has to be considered when modelling a culture sensitive mHealth regarding male smokers in Macao.

'*Relationship*' and '*Face*' in the Workplace

Maintaining social harmony and '*relationship*' in the workplace has a significant meaning when viewed through the Chinese lens. In the Confucian paradigms of '*five relationships*', the social hierarchy of superiority and subordination is considered natural and proper [372]. In workplaces, benevolence, referred to as '*Ren*' of the Confucian philosophy of '*five constants*', is a proper manner of superiors to their subordinates, as well as between co-workers [388]. Benevolence is understood as superiors loving their subordinates or as a person loving their co-workers. Benevolence is an important measure for maintaining the '*relationship*' in the workplace. However, the core concern is likely to be more complicated than '*relationship*' maintaining, but the concepts of '*face*' and reciprocity are also involved.

In this study, as discussed by Participant J1 (SP) and presented in section 4.3.1.2, male smokers' unwillingness to refuse smoking together with superiors or co-workers can be interpreted as smokers tending to both give '*face*' and avoid loss of '*face*'. However, although it has not been mentioned by participants, as with embracing the concept of reciprocity [409], the unspoken reason

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for such behaviour was likely to be that smokers desired to satisfy their own interests, which may involve having favours returned by others, including from superiors and co-workers.

From the perspective of superiors, to some extent, allowing subordinates to enjoy the exclusive benefit of taking a cigarette break represents their superior status in the workplace [396]. It can be interpreted as gaining '*face*'. The favour-giver (the superior in the workplace) gives favour in exchange for gaining '*face*', while the favour-receiver (the subordinate) shall however give back '*face*' for having desired a favour return. Exchanging favour with '*face*' continuously in the reciprocity cycle is commonly used in workplaces under Chinese culture [409].

Additionally, from the viewpoint of subordinates, as well as enjoying the exclusive benefit of taking a cigarette break, as stated in section 4.2.3.2, there is likely to be another benefit for them. Neither being '*face*' nor '*relationship*' related, a cigarette break is an excellent environment for smokers to have a gossip. It gives opportunities to exchange information, which will be valuable for demonstrating their duty, between smokers within the gossip group.

All of these concerns, including maintaining '*relationship*', gaining reciprocal benefits, and having opportunities for information exchange encourage Macao's male smokers to continue to be attached to their smoking habit.

Business Etiquette and '*Relationship*'

Findings from this study, as presented in the subsection named 'Sharing a Cigarette is Symbolic' of section 4.3.2.3, provided evidence that an additional smoking cessation barrier for Macao's smokers could be constructed with the need to maintain relationships with their Mainland Chinese business partners.

'*Relationship*' is a crucial means in the business world, particularly in Chinese societies. Establishing and maintaining social interactions and personal relationships are crucial and are the

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foundations of commercial enterprises and business acumen so endemic in Chinese society [506, 507]. It is not difficult to understand that businessmen are not willing to damage the relationship with their business partners, as it may consequently cause harm to their business and so the profit gained. With the rapid rates of economic development in Mainland China over the last three decades, revenues from the commercial activities with the enterprises in Mainland China have greatly increased in Macao. Because of its possible significant impact, maintaining relationships with Mainland Chinese business partners is commonly prioritised by the businessmen in Macao.

Even if cigarette sharing has become uncommon in Macao society, it is still a powerful social tool in Mainland China [405]. Cigarette sharing with Chinese businessmen implies that they hold their business partners in high regard, therefore conferring some '*face*' on their partners and enhancing affection and obligation [508]. It is particularly important for the businessmen in Macao who need to establish social interaction and maintain relationships with their Mainland Chinese business partners.

The concepts of politeness, '*relationship*' and '*face*' in Confucianism are applicable and highly important to explain the smoking and cessation behaviours of male smokers in Macao and to answer the question of why additional smoking cessation barriers are constructed. In a social environment where smoking together or cigarette sharing presents politeness and respect and so are '*face*' giving, the significance of smoking behaviour might be extended beyond an individual's needs or interests and become attached to the '*relationship*' and so to business and other benefits. For those smokers who are attempting to cease smoking but are unwilling to stay away from smoking peers or to turn down the cigarettes offered, critical challenges to their smoking cessation are likely to be created.

Traditional Chinese cultural values that are pervasive in Chinese society, such as Macao's, and smoking culture, such as presenting respect to others, being polite or friendly, maintaining

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relationships and social harmony, and developing business relationships, need to be understood and embedded into a culture and gender specific mHealth intervention for improving its potential effectiveness.

5.1.2.3 Masculinity-based '*Face*'

Even if the definition of masculinity differs across time, culture and among individuals, the norms in traditional masculinity, in both Western and Eastern societies, encourage males to take risks and not show weakness [353]. Nevertheless, the influence of masculinity on Macao Chinese males' smoking and cessation behaviours may be enlarged with their concern of '*face*'.

<u>Masculinity and '*Face*' in Relation to Smoking and Cessation Behaviours</u>

According to the data collected in this study, some smokers claimed that they lapsed or relapsed on their smoking cessation journey because they were uncomfortable about peers' challenges. As reported by Participant I2 (SU) and presented in section 4.3.2.1, peers derided his attempts to quit smoking because he feared the harmful effects of smoking. This claim is underpinned by males' unwillingness to be seen as weak (such as fearing the harms caused by smoking), which leads to losing their masculine '*face*'.

Another important impact that Chinese masculine '*face*' has upon smoking relates to males' desire to holding high autonomy, in particular in their families [397]. Being the family head, in order to demonstrate their high autonomy, Chinese males are commonly not willing to do what they are told, only what they want. This is because they have a feeling that they are not respected and it leads to their losing '*face*'. According to the case discussed by a service provider reported in section 4.3.3.1, the old man desired to save '*face*' because of his own psychological needs. As reported, he is rich, and enjoys a good reputation, and a high status in society. In order to maintain his public image, he has to save his '*face*'. Because he felt that his family made him lose '*face*' in public when they, for his own health, advised him to quit smoking with harsh words, he would not accept their advice but

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continued his smoking behaviour. The reason he presented such an attitude is mainly for the purpose of saving his masculinity '*face*', and maintaining his public image and his superior position within his family.

Masculinity and '*Face*' in Relation to Help Seeking Behaviour

Chinese males are generally not willing to do anything which makes them seen to be inferior or weak, since it is a critical threat to their '*face*' [395, 397]. To some extent, Chinese males are less likely to feel comfortable seeking help. Some participants reported that they have tried to self-quit smoking, but not sought assistance previous to the current cessation attempt (for example, Participants T4 (SU) and B1 (SU), as reported in section 4.2.3.1). The reason is likely to be that they do not wish to be seen as incapable of self-management and to be seen as inferior to others and consequently losing '*face*' [395, 397].

Another reason for male's unwillingness to seek smoking cessation assistance may be that they worry about the potential negative relational consequences of help-seeking. The negative consequences may include, as raised in the literature, annoying the daily life of others and so disturbing social harmony [411]. However, a more important worry for Chinese males is likely to be that their requests for help will be turned down, which leads to losing '*face*'. To avoid the possible embarrassment and the threat of losing '*face*', they therefore do not tend to seek help from others, especially from whom they know.

Adolescents' Masculine '*Face*'

The rebellious attitude of adolescents and youths are commonly observed in many modern societies across different cultures. However, in comparison with their Western counterparts, the power of '*face*' may enlarge the effect of rebellious smoking behaviour in Macao Chinese male adolescents. For participants who were challenged by their peers for not knowing how to smoke cigarettes, as presented in the subsection titled 'Peer Pressure' in section 4.2.1.1, the reason for their

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commencement of smoking was likely to be because of their concern for '*face*' rather than peer pressure.

From adolescents' point of view, doing the most popular things is a good way to save '*face*'. In other words, adolescents are not willing to be seen as unable or incapable to do what others can, such as smoking cigarettes, and it is a critical threat to their '*face*'. This finding agrees with scholarly literature that adolescents love their '*face*' and tend to be less likely to have proper judgment about their attitude and behaviour while confronted with the threat of losing '*face*' [397].

5.1.3   Cultural Beliefs Motivating Smoking Cessation Intention

A number of behavioural and psychological theories explained the concepts of human behaviours. Behavioural intention and motivation mediate the relations to social norms incorporating normative, perception of the behaviour of others, and perceived social support or pressure in favour of or against the execution of behaviour (including smoking cessation). It is significantly crucial to understand the cultural beliefs motivating Macao's male smokers to quit smoking, in addition to those associated with their smoking and cessation behaviours, to model an effective smoking cessation mHealth for them.

The smokers participating in this study reported a variety of motivations for their smoking cessation, as presented in section 4.2.2.1 in the previous chapter. They realised that smoking cessation is associated with health and consequently with longevity. They intended to avoid the hazards of smoking and considered quitting smoking because they did not want to die early or become ill. Life extension associated with smoking cessation is a tangible means of representing the reduction of the mortality risk of smoking. The finding of this study that negative health consequences are a strong motivational factor of cessation intention affirms with the literature [269, 270].

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The philosophical concepts of Confucianism and Taoism embedded into Chinese people mean that they tend to believe that the equilibrium between '*Yin*' and '*Yang*' or among '*five elements*' ('*Wu-xing*' in Chinese character) are ways to achieving natural harmony and so to health and longevity [509-511]. Notwithstanding that the desire to be healthy is widely cited by participants as the motivation of their smoking cessation, none of them mentioned the relationship between natural harmony and health, or that smoking was a way against natural harmony. This finding implies that health concerns are unlikely to be a culture specific motivational factor influencing Macao's male smokers to consider smoking cessation. Nevertheless, the culture specific motivations for their smoking cessation will be discussed in the following subsections.

5.1.3.1 Male-parent-headed Family in Chinese Society

The value of family to Chinese people and society may be the most central to Chinese culture [512, 513]. However, because of having imported and transformed Chinese culture, Macao's family system has transformed from the traditional Chinese feudal one [514]. In Macao, the female's position has been rising from the past, both in the society, as well as within the family. Additionally, traditional Chinese family values including filial piety and obedience to parents, especially to the male head, are less observed in modern Macao's families. Adolescents behave rebelliously in comparison with in the past. Nonetheless, the familial concept remains in modern Macao's families, and is the norm for males whose families may still have a significant impact upon their cessation behaviour, both positively and negatively.

<u>The Superior Position of the Family Male Head</u>

Gender inequality, which is often attributed to the social norms and the higher social status of male members in a family in many different societies [61, 62], may partially explain the gender disparity in the smoking prevalence rate, particularly among older people in Macao.

From the data collected in this study, as presented in section 4.3.3.1, a few participants reported

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their tendency to ignore or refuse their family members' advice about smoking cessation. Their superior position in the family, as guided by Chinese patriarchal concepts, has a negative impact upon Macao males' smoking cessation behaviour.

In accordance with the Confucian '*five relationship*s' concept that explains the relationships of emperor-subject, father-son, husband-wife, elder-younger brothers and friend-friend, the power and the right to rule belong to the superiors where father is superior to son and husband is superior to wife [375, 388, 515]. In a traditional feudal society such as in China, the male-parent-dominated patriarchal family has been established and the male head is regarded as the unchallengeable authority [375, 515]. Being the family head, the male receives respect and obedience from the subordinate people including sons and wife [388]. To present their exclusive authority, male heads tend to ignore or refuse advice given (including advice about smoking cessation) if they are not preferable.

The Responsibilities of the Family Male Head

The male's superior position in a family should be by no means a dictator. Male heads are expected to reciprocate with love, goodwill, support and affection towards their family members [515]. A strong sense of responsibility to the family is cherished as a significant virtue among Chinese males. The lingering Confucian stress on the responsibilities of the male parent head however still exist in modern Macao's families.

Financial Responsibilities

Concerns about the financial burden of smoking were raised as a motivational factor for smoking cessation in this study (as reported in the subsection titled 'Financial Responsibilities of the Male Head' in section 4.3.3.2). Financial burden is also a commonly cited reason for smoking cessation in other cultures [516], and for Chinese males, there is particular focus on the male's responsibility in the family.

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The traditional role of the male head in a Chinese family is as breadwinner and that of females is the housewife [388, 389]. The male parent in a traditional Chinese family has the responsibility to take care the whole family financially. To some extent, smoking was perceived as a financial burden upon the whole family. Some smokers in the current study reported that they intended to cease smoking because they realised, as the heads of their families, their financial responsibilities to the families, in particular since the price of cigarettes has significantly increased in recent years [84-87]. This finding can be linked to one of the MPOWER strategies – raising taxes on tobacco [53]. Raising taxes, which is not in the scope of this study, will consequently result in the increase of cigarette prices and can facilitate smokers' quitting.

In addition to being released from the financial burden of smoking, participants in this study discussed another important financial issue motivating their smoking cessation. Participants were concerned that, if they suffered from a serious health problem, their families would be in a critical financial crisis. Importantly, the inability to take of their family financially will be seen as inferior to others and is therefore very likely to be a crucial threat to their masculine '*face*'.

Smokers' financial considerations in relation to smoking and cessation can be addressed in modelling the smoking cessation assistance mHealth intervention for male smokers in Macao.

Educating and Example Setting

It was found in the current study that participants attempted to quit because they wanted to set an example for their children (the findings were reported in the subsection titled 'Setting an Example' in section 4.3.3.2). The phenomena can be explained through the Chinese cultural belief that, in addition to their financial responsibilities, male parent head is also responsible for many other aspects including the behaviour of family members [513]. Even if setting an example is a commonly cited reason for smokers' cessation attempts in other cultures [516, 517], it is particularly crucial in Chinese societies because of the constraints of Confucian philosophy.

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From the order of Confucian '*five relationships*' (please refer to the subsection titled 'Collectivism and Social Harmony' in section 2.5.2.3), it is noted that the core familial relationship is not between husband and wife, but rather between father and son. In accordance with the *Three Character Classic*, the embodiment of Confucianism being a roadmap for child-education, it would be the fault of fathers if they did not properly educate children, but only fed them [518]. In a traditional Chinese family, the father is expected to shoulder the responsibility to educate and act as a role model for their children [515, 519]. Importantly, Chinese males tended to believe that incapability to properly educate children could be a serious threat to their '*face*'. Participants would therefore attempt to quit smoking for the purposes of, on one hand, setting a non-smoking example for their children and, more importantly, on the other hand, avoiding the threat of losing '*face*'.

It is interesting to discuss another cultural factor motivating Macao males' smoking cessation. One of the male participants explained that he was worrying about what his son would say to him if he ever saw his son smoking and advised him to stop. The silent reason for his worry about his son's response was likely to be his wish to save '*face*' and, as the male parent head in the family, dignity. Again, '*face*' was to have a critical impact upon the smoking cessation behaviour of a Macao's male.

Protecting Families

As presented in the subsection titled 'Protecting Families from Harm' in section 4.3.3.2, it was found that, because participants realised the hazards of second-hand smoke, they attempted to cease or at least, avoid smoking at home in order to protect their families from the harm of second-hand smoke. While their attitude might not be predictable using the concepts of the traditional male-parent-headed family where the preference of the male parent will always be prioritised, it could however be partially explained by applying the concepts of familism emphasised in the Confucianism [512, 520].

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Many Chinese males recognised that they were bound by responsibility to protect their family from harm, particularly their children [512, 520]. Concern for the health of families would hence be an important motivation in Chinese males' smoking cessation attempts. From another point of view, more importantly, in the case of a family member suffering from any health problem attributed to second-hand smoke, as the family head, a male's inability to protect his family could cause serious threat to their '*face*'. The effort put into protecting families in combination with the concern for '*face*' can therefore have a significant effect on Chinese male's motivation to cease smoking.

Concerning Family Affection

In the current study, it was found that the family affection, in particular that of children, is a major influence that motivates smokers' cessation attempts (as reported in the subsection named 'Families Expressing Dislike of Smoking' in 4.3.3.2).

Since the male parent is the family head in Chinese society and holds unchallenged authority over the family, the male head is not expected to care about the affection of his family members. However, the unspoken reason for their attitude concerning the affection of families may be their desire for maintaining family harmony, which has been emphasised in traditional Chinese culture [388]. To further examine the issue through a Chinese cultural lens, being the family head, the inability to maintain family harmony will also cause a serious threat to the '*face*' of the male head.

The Need for Family Support

Saving '*face*' is always an important consideration for Macao Chinese males. In order to avoid the embarrassing circumstance of the possible failure of smoking cessation, it was found in this study, as presented in section 4.3.2.2, that male smokers were not willing to let their smoking cessation attempts be known. Additionally, as with their concerns for '*face*' (as discussed previously in this chapter), males are less willing to seek assistance with their smoking cessation.

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However, support has been found to be effective in facilitating smoking cessation [260], and spouse support was found to improve the effectiveness of smoking cessation assistance interventions for Chinese smokers [521]. In cases where no one else knows about a smoker's cessation intention, the family may serve as the sole source of support given to the smoker. It is however a worrisome issue that participants' complaints about lack of support from families (as reported in section 4.2.3.5) was likely to make their smoking cessation more difficult.

Maintaining a harmonious relationship with families is highly important for having family support. In a harmonious family, good opportunities are provided to honestly discuss the concerns and difficult situations with each other, which can help to reach an understanding or compromise with families more easily. The thoughts about taking the advice of or seeking help and support from families being a possible '*face*' losing issue may be changed through effective family communication.

Family harmony, which has been emphasised in traditional Chinese culture, can therefore have a positive influence on males' smoking cessation. Maintaining family harmony shall be emphasised when modelling the smoking cessation mHealth to lead Macao's male smokers into the action stage of smoking cessation, and assist them to cope with the difficulties on their smoking cessation journey.

5.1.4   All are '*Face*' Related Issues

Being the family head, in order to demonstrate his unchallenged autonomy, males tend to neglect or refuse the advice given by families. One of the possible reasons for neglecting or refusing advice, in particular from his wife, is that males do not generally want to be seen to be weak or inferior to their wives. It is not difficult to understand how, by embracing Confucian concepts, none of the Chinese males were willing to be seen as 'henpecked'. In order to avoid being judged as such and more importantly, to save '*face*', males generally tend to demonstrate their high autonomy in the

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family and refuse to do what they are told or advised.

On the other hand, it is interesting to note that, in order to be a competent family head, males frequently tend to shoulder many responsibilities, as set by social norms, including setting an example for and properly educating their children, financially taking care the whole family, protecting their family from harm, and maintaining family harmony. As the family head, males' inability to shoulder their commonly expected responsibilities is, however, a critical issue and likely to lead to loss of '*face*'.

In order to save '*face*' or to avoid losing '*face*', it is not surprising that Macao Chinese males present with their specific smoking and cessation behaviours. All of these male smoking and cessation behaviours are '*face*' driven. While these issues do not appear to be gender or culture linked, when viewed through the lens of '*face*', they are all in fact highly gender and culture specific.

'*Face*', more specifically masculinity-based '*face*', not only influences Macao Chinese males' smoking cessation behaviour, but is found to be the core and most important gender and culture specific influence associated with their smoking behaviour. Masculine '*face*' is linked with maintaining harmony and relationships with peers, superiors and co-workers in the workplace, and with business partners, as discussed previously in this chapter. In order to make the intervention culture and gender specific and to improve its potential effectiveness, '*face*' therefore needs to be embedded into the smoking cessation mHealth intervention during modelling.

5.2   Public Health Interventions of Smoking Cessation

On the path from smoking to non-smoking, smoking cessation assistance interventions can serve smokers by enhancing the motivational effects, encouraging behaviour change, helping them to step through the transition path smoothly, assisting them to overcome the cessation barriers encountered

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on the way, and consequently to successfully abstain from smoking.

It was argued that making behaviour changes can be difficult, while maintaining that changed behaviour is even more difficult [522]. In fact, behavioural movement that spirals between smoking and non-smoking appears frequently in early abstainers. Therefore, not only assisting smoking cessation, but maintaining non-smoking behaviour is also important for smokers who want to abstain from smoking. Opportunities appearing for mHealth on relapse prevention include encouraging non-smoking behaviour maintenance and assisting ex-smokers to reduce or remove the risks of being exposed to unfavourable social environments, which has a significant impact upon the spiral movement between a smoking and non-smoking status. In order to model an effective intervention, it is necessary to explore the components of relapse prevention in addition to smoking cessation. The following sections will deeply discuss the potential opportunities that exist to improve the smoking cessation intervention when combining mHealth with the intervention currently provided in Macao.

5.2.1   Smoking Cessation Interventions

Smoking cessation is always a critical challenge for smokers. Studies show that three out of four current smokers either wish to or have tried to cease, but only about one fourth succeed in abstaining from smoking [244, 245]. There are many barriers to smoking cessation and many smokers need assistance on their attempts. Referring to MPOWER, 'Offering help to quit tobacco use' is an important component, and the key strategies of smoking cessation assistance intervention could include pharmacotherapy and behavioural intervention.

5.2.1.1 Pharmacotherapy

Data collected in this study from both service providers and users, as reported in section 4.2.3.1, share similarities with what the literature, showing that many smokers have developed a physiological addiction to nicotine [523]. Participants reported that the appearance of withdrawal

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symptoms often caused their lapses and failures of smoking cessation. The findings affirm with literature that, although the withdrawal symptoms usually appear shortly after smokers quit, the appearance of withdrawal symptoms often causes smoking cessation to be very difficult [523, 524].

A number of smoking participants reported that they relied on the pharmacotherapy, which is prescribed primarily with the aim of reducing the severity of cravings and to ameliorate the withdrawal symptoms, and that they believed that it is most effective for assisting their smoking cessation (relevant data were recorded in section 4.4.1). In accordance with the scientific evidence, pharmacotherapy has been proven to increase the chance of success when quitting smoking when compared with unassisted smoking cessation [525, 526].

As learnt in the study, a combination of NRT, in the form of the transdermal patch and chewing gum, was routinely offered by SAGHA to nicotine dependent smokers. While neither bupropion nor varenicline is currently prescribed, a sniffing solution composited from Chinese herbal medicine internally developed by SAGHA has been provided to smokers.

The rationale for using a combination of pharmacotherapy is that, as affirmed by the literature, different smokers had different responses to different forms of pharmacotherapy offered, and therefore different effectiveness of different pharmacotherapy may likely be found [527]. Smokers who failed smoking cessation with one medication might find another medication more effective [527]. For example, some smoking participants reported the transdermal patch being the most effective while another participant preferred to sniffing solution. Scholars argue that it is rational to make as many medications available as possible in order to improve the potential success rate of smoking cessation [527].

Even if smoking withdrawal symptoms can be reduced upon the prescription of pharmacotherapy, it may not suit all smokers and a number of deficiencies in pharmacotherapy were raised by

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participants (relevant results were presented in section 4.4.3.1). Importantly, even though participants commonly claimed that pharmacotherapy is an effective intervention to help relieve smoking withdrawal symptoms, it never implies that other smoking cessation interventions are not needed. In fact, the psychological issues of smoking cessation may be more critical for some smokers, and more difficult to be overcome when compared with the physiological withdrawal symptoms. In such cases, behavioural interventions are needed.

5.2.1.2 Behavioural Interventions

Behavioural interventions are used mainly when aiming to overcome the psychological difficulties of smoking cessation. Stressing the importance of motivation and self-efficacy, considering the barriers to and benefits of quitting, subjective norms, attitudes, and cues to action are the keys of smoking cessation behavioural intervention [232]. It was argued that behavioural interventions alone may not have a significant effectiveness upon smoking cessation. However, scientific evidence showed that a combination of behavioural counselling and pharmacotherapy produced the best results for smoking cessation [236, 297, 528]. By referring to the recommended clinical guidelines, in additional to providing pharmacotherapy, behavioural interventions are currently used by SAGHA.

Cognitive Behavioural Therapy

Cognitive Behavioural Therapy (CBT), in the form of face-to-face counselling when smokers attend the cessation clinic and, via telephone when cessation specialists follow up the cessation progress of their clients, are currently used by SAGHA. CBT strategies, commonly involving education about the cessation process and skill training development, can help smokers with better relief from their psychological difficulties without cigarettes and to overcome their psychological smoking cessation barriers [105, 283-285, 529, 530].

By referring to the commonly cited reasons for participants maintaining their smoking habit and the

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difficult situations they face, as reported in section 4.2.3, CBT can be an effective smoking cessation intervention assisting them to become more capable in avoiding the strong cues and temptations and to prevent the triggers to lapse and relapse [105, 283, 284, 530]. By using problem-solving strategies, smokers can develop skills to adapt to difficult social environments and situations and to avoid relapse during social events, especially while in peer group gatherings.

Additionally, smokers can be trained to change the first thought when they begin to feel stress from 'smoke a cigarette' into 'get fresh air' or 'take a walk'. It can also be helpful for smoking participants who claim that smoking cigarettes can be refreshing and thought stimulating, similar to what the literature showed [105, 284, 285]. Smokers who see smoking as being a way to take a break and have a gossip time, as reported in the results chapter, could also be encouraged to take a coffee or tea break instead. Similarly, for the participants who used smoking as a time killing activity, the same effectiveness can be achieved by having a cup of coffee or tea.

In the aspect of relapse prevention, learning from relapses is a cognitive exercise and highly important for preventing further relapse. As learnt from the current study, many smoking participants have attempted but failed smoking cessation many times and they seemed not to learn from their previous experience. CBT strategies can be very useful, and smokers can be encouraged to analyse their past relapse experiences by focusing on the reasons for relapse and to avoid committing the same mistakes [105, 284].

However, such extensive effectiveness does not imply that CBT is an impeccable psychological smoking cessation intervention. Its human resource intensive nature may be the most critical disadvantage in using CBT. It is nevertheless a significant concern for SAGHA, which is a NGO under the financial umbrella of the Government of Macao and has limited human resources.

<u>Self-help Intervention</u>

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As learnt from this study (presented in section 4.4.4.2), printed self-help materials prepared by the Government of Macao are routinely provided to all smokers when they attend the smoking cessation clinic of SAGHA, notwithstanding that those self-help materials can also be collected from other sources. Self-help intervention is an important element of a low-cost anti-smoking social marketing approach. As with this characteristic, self-help intervention is a valuable tool for SAGHA when providing smoking cessation assistance. Additionally, due to its wide-reaching power, a huge number of individual smokers can be served at the same time. Self-help intervention is scalable and the overall effectiveness is therefore considerable. These may be the most attractive advantages of employing self-help intervention from the viewpoint of service providers.

It is noted that perceived embarrassment is an important barrier and influence on help-seeking behaviour [531]. Embarrassment is however less likely to occur from self-help intervention than from other behavioural interventions such as face-to-face counselling. Being embarrassment-free is therefore a significant advantage of self-help interventions from the point of view of service users.

Similar to other behavioural interventions, the delivery of self-help interventions can stimulate a smoker's cessation intent. Communication messages embedded into self-help materials can raise awareness of smoking-associated health risks and of the benefits of smoking cessation. Smokers can be motivated to change their smoking behaviours, and that can potentially lead to a downward trend in the overall smoking prevalence rate.

However, providing information about the harmful effects of smoking, the beneficial outcomes of smoking cessation, and tips on smoking cessation to smokers is only a basic self-help smoking cessation intervention. It was argued that tailored self-help materials have been shown to increase the rate of successful smoking cessation [206]. However, in Macao, only limited tailored self-help materials have been made available for adolescent, male, female, and pregnant smokers (the currently available printed smoking cessation leaflets are presented in Appendix 5-A).

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5.2.1.3 The Rationale of Combining Interventions and Involving mHealth

The combination of interventions currently approached by SAGHA includes pharmacotherapy, cognitive behavioural therapy, and self-help intervention, while an important element of self-help intervention, Quitline, is unavailable in Macao.

No single intervention is perfect. A combination of interventions has been found to be more effective than using a single intervention alone in many scientific studies [236, 239, 297-299]. Additional interventions may complement the existing ones and hopefully have synergistic effects. mHealth is expected to be a potentially effective element that can fill the blanks in the combination of interventions and be valuable for improving the overall effectiveness of smoking cessation interventions, which is linked with the 'O' component of MPOWER for male smokers in Macao.

5.2.2 Special Opportunities for Gender and Culture Specific Behavioural Interventions

As with the existence of gender and culture specific influences upon smoking and cessation behaviours of Macao's male smokers, the standardised interventions may not necessarily be the most effective strategy to assist them to quit smoking.

In this study, social harmony is found to be of high concern for Macao's males, and '*face*' is likely at the core. It is therefore projected that putting the issues of harmony and '*face*' into serious consideration at the modelling stage will make the smoking cessation mHealth intervention gender and culture sensitive and likely to be more effective in assisting male smokers in Macao to cease smoking.

5.2.2.1 Concerns about Harmony

As discussed previously in this chapter, peer harmony, social harmony and family harmony are great concerns for male smokers in Macao.

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Creating a Non-smoking Harmonious Atmosphere and Maintaining Social Harmony

As the concept of collectivism has been emphasised in the Confucian philosophy, the Chinese tend to believe in existing dependently upon each other in society [372, 375, 382, 383]. The smokers who participated in this study did observe the social negatives of smoking from many non-smokers (data are presented in the subsection titled 'Second-hand Smoke is Objectionable' of section 4.2.2.2). While smokers were concerned with maintaining social harmony with smoking peers, they also realised that maintaining a smoke-free environment is an important means to establishing a harmonious society. Especially the hazards of second-hand smoke, which can have very harmful consequences to others, are commonly realised and smoking has become more generally objectionable by non-smokers.

There is an old saying in Confucian philosophy "*what you do not want done to yourself, do not do to others*". Embedding the concept into discussions on the issue of smoking, if smokers do not want to suffer from any smoking associated health problems, they must not smoke cigarettes and produce second-hand smoke to others.

As with the common interests that smokers and non-smokers live in harmonious society, ignorance of the harmful effects of second-hand smoke has never been appreciated. Smokers must understand that their smoking behaviour does potential damage to social harmony. It can explain why some smoking participants reported feeling uncomfortable about the negative response to their smoking behaviour from others. In line with this notion, perceived social norms favouring quitting can be utilised as one of the culture specific implications of smoking cessation mHealth.

Family Harmony

With the economic development of society and the rise in status of females, in combination with cultural transition, the unchallengeable position of the family male head is no longer guaranteed in modern Macao's society. Because the harmful effects of smoking have become commonly realised,

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unhealthy behaviour, such as smoking, of the male head may be objected to by families, based upon concerns for the health of the smoker, as well as that of their families. To prevent causing conflicts and so an inharmonious atmosphere in the family, smokers may tend to avoid opposing the desires of their families and so are motivated to attempt smoking cessation (relevant data was recorded in the subsection titled 'Families Expressing Dislike of Smoking' of section 4.3.3.2 and discussed in the subsection titled 'The Responsibilities of the Family Male Head' of section 5.1.3.1 in this chapter).

For the purposes of seeking social harmony, loving families and maintaining family harmony, smokers can feel uncomfortable being the producers of second-hand smoke which can have very harmful effects upon others. The theme of the 20th World No Tobacco Day in 2007 was "*smoke-free inside*", while the slogan used in Mainland China was "*establishing smoke-free environment, constructing harmonious society*". Concerning the importance of constructing a harmonious society, it is necessary to include both social harmony and family harmony when modelling an effective smoking cessation mHealth intervention regarding male smokers in Macao.

The Myth of Smoking Together and Peer Harmony

Although peer harmony may involve friendliness, neither harmony nor friendliness means uniformity. More importantly, uniformity does not mean that things always harmonise. Confucius used to explain the difference between harmony and uniformity by stating "*the gentleman aims at harmony, and not at uniformity*" [532].

An old Chinese saying "*seeking common grounds and reserving differences at the same time*" represents the Chinese virtue of benevolence and implies that uniformity is not a must. Instead, under Confucianism, harmony presupposes differences and harmony must be achieved through differences [533]. In other words, without tolerance of the existence of difference, harmony cannot be achieved [533]. In this sense, maintaining peer harmony with smokers does not mean having to

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smoke cigarettes together, but rather allowing the existence of non-smokers in the peer group. This is an important concept to be embedded into a smoking cessation mHealth intervention regarding male smokers in Macao.

The Myth of Cigarette Sharing and Peer Harmony

Mainland Chinese have the view that cigarette sharing represents politeness and that cigarettes are an ice-breaking tool [405, 406]. However, as discussed above, respecting the existence of difference has been emphasised in Confucianism philosophy. To discuss the issue of peer harmony associated with smoking from this point of view, turning down a shared cigarette means neither impoliteness nor the creation of an inharmonious atmosphere, but agreeing to the existence of difference.

Cigarette smoking can lead to health damage to both smokers and others around them. It is understandable that Western smokers do not tend to share cigarettes because they respect others' wishes and choice not to smoke, and do not want to harm the health of others. That cigarette sharing represents politeness and respect is just a myth. It is, rather, impoliteness to encourage others to engage with unhealthy behaviour just in order to reach the point of uniformity without allowing for the existence of difference. In modern society, including Macao's, smokers are however expected to change their beliefs and represent friendliness by respecting others' own wishes and choices. This is also an important issue that needs to be embedded into the smoking cessation mHealth intervention in Macao.

5.2.2.2 The Potential Effective Motivations for Smoking Cessation

As reported by the smokers who participated in the study and presented in the subsection titled 'Non-smoking Peers' in section 4.2.2.2, they were currently influencing others to attempt quitting. This finding affirms evidence gathered from other scientific studies that smoking cessation tends to occur as a sort of domino effect [534]. The smoking cessation attempt of one smoker was found to influence to the next one to. The cascade effect was found to be more significant in a small

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organisation where co-workers were more closely tied [534].

It is encouraging to find that peer socialisation may not only negatively lead to the initiation of smoking and create temptations of triggers to relapse, but also to positively motivate the intention of smoking cessation. It is expected that both non-smokers and ex-smokers are capable of actively motivating their peers' smoking cessation. Since the influencing effect of peer socialisation is strong for Macao's males, the power of peer socialisation can be utilised in launching smoking cessation intervention.

5.2.2.3 Linking '*Face*' with Smoking Cessation for Males in Macao

As reported in section 4.3.2.2, smokers claimed that they could lose '*face*' if they failed to cease smoking because of their poor self-efficacy. The proverb: "*deeds, not words*" is especially meaningful for Chinese, stating that a person has to do what they have otherwise it is a '*face*' losing issue. Concern for '*face*', including saving '*face*' and avoiding losing '*face*', is nonetheless a strong force enhancing the self-efficacy of Chinese people.

Making Smoking Cessation Intent Well-known to Others

Telling others about the intent to cease smoking can be effective in two ways. Firstly, in order to avoid losing '*face*', in particular for males, smokers are encouraged to keep at their cessation efforts until reaching the point of successful abstention. To some extent, a smoker seems like a soldier on the battlefield having no way to turn back, only to go forward.

Secondly, peers are expected to understand that there is no impoliteness if one does not smoke cigarettes together or turns down the shared cigarette. Additionally, on the other side of the coin, learning about a smoker's cessation intent, but still encouraging them to smoke cigarettes together or share a cigarette is considered impolite manners. An important concept, that there is nothing good or bad to '*face*' as long as one does not give harm to others' interests, must be presupposed for

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achieving effectiveness.

Success is a Highlight of '*Face*'

Smoking cessation has been understood as a critical challenge to one's self-efficacy and an extremely difficult task to achieve. In line with this notion, persisting on a smoking cessation attempt and having the courage to refuse smoking together or to turn down the shared cigarette on their journey of smoking cessation represents strong self-efficacy.

To some extent, smoking is not cool enough, but being successful in smoking cessation can be advocated as being much cooler, which is a means to gain '*face*'. Presenting strong self-efficacy and capability of completing a tough task can nonetheless attract admiration from others, including families, and can potentially lead to a more harmonious family.

Keeping away from Smoking Peers

The appearance of withdrawal symptoms, such as shedding tears and nasal drip as well as yawning, are awkward [523]. To avoid awkwardness and, more importantly, to avoid losing '*face*' to peers, it may be good advice to smokers to keep away from smoking peers while they are walking on their avenue of smoking cessation.

The effectiveness is expected to be two-fold. Smokers can avoid losing '*face*' an awkward appearance to be seen by their smoking peers. Smokers can also avoid the strong temptations created by smoking peers and hence to avoid triggers to lapse or relapse.

The Myth of Cigarette Gifting and '*Face*' Giving for the Chinese

Cigarette gifting is somehow still seen as politeness in Mainland Chinese societies [406, 535]. However, since the hazards of smoking have been commonly realised with the anti-tobacco marketing efforts in recent years, cigarette gifting is no longer a guaranteed politeness in the modern Macao's society. Quite the opposite: it may be seen as giving harm to the health of others.

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The cigarette giver may wish to present politeness to the receiver for the purpose of a desired return in the reciprocal cycle. However, the risk of being seen as harming the receivers leads one onto the horns of a dilemma and an embarrassing circumstance. To remove the possible negative influence of cigarette gifting, it shall be advocated that cigarette gifting is no longer a '*face*' giving and polite practice, but potentially a threat to '*face*'.

5.3   Designing and Developing a Smoking Cessation mHealth for Male Smokers in Macao

Similar to other behaviour interventions, the components as well as the contents of smoking cessation mHealth are the drivers of smoking behaviour change [536, 537]. In this section, the third objective of this study, consisting of defining and understanding the components of the intervention and their relationships through modelling or simulation techniques, is the focus. As this study aims mainly at modelling a smoking cessation mHealth intervention assisting male smokers in Macao, this section is highly important.

Because smoking cessation mHealth is a relatively new strategy and scant scientific evidence can be referred to for modelling an mHealth intervention specifically for male smokers in Macao. Effective behavioural interventions using other modalities, such as Quitlines and self-help printed materials, can be referred to.

Because of its grounding in behaviour change theory and the nature of ongoing contact similar to how mHealth intervention works, Quitline is a referable intervention for modelling the mHealth. However, there is no operational content of a regional specified Quitline being available because of the lack of such an assistance service in Macao. The contents of Quitlines used in other countries are nevertheless needed to be culture and gender specifically amended. While the self-help printed materials currently available in Macao, as shown in Appendix 5-A, were gender specifically tailored, they were not tailored to address the silent Macao's male specific smoking issues,

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including their concerns about harmony and '*face*'. Evidence-based content amendments of other smoking cessation interventions are thus needed to model the smoking cessation mHealth intervention.

5.3.1 The Components of Smoking Cessation mHealth for Male Smokers in Macao

5.3.1.1 General Components

Referring the study data collected from service users, it was found that psychological support and motivating messages were necessary if a smoking cessation mHealth intervention were to be successful. This finding affirms with the literature stating that psychological support and motivation are crucial components of behavioural change interventions [253]. They are particularly crucial for the smokers who lack self-efficacy in their smoking cessation. In addition, as found in this study, mHealth is expected to be an effective measure for smoking cessation skill training and educational information provision, which are recommended strategies for encouraging changes in smoking behaviour identified in the literature [538].

The components of a smoking cessation mHealth intervention may thus include: firstly, warning about the hazards of smoking similar to printed self-help materials explaining the beneficial outcomes of quitting, and providing educational information about withdrawal symptoms (which is especially necessary for those smokers who do not have proper knowledge about the hazards of smoking); secondly, similar content to the currently available behavioural counselling and skill training where CBT is needed (as discussed previously in this chapter in section 5.2.1.2); and thirdly, psychological supporting and motivating messages as referred to in the suggestions from the literature and the demands of participants in the service users group in this study. In addition, reminder messages delivered to remind smokers to avoid unfavourable social environments, and hence the temptations of triggers to relapse, are also necessary. Furthermore, as raised by study participants, mHealth can be utilised to remind smokers to always bear in mind the reasons for their

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own cessation attempt, which is highly important to encourage smokers to persist with their cessation efforts.

The findings of this study, as discussed by Participant T4 (SU) and reported in the subsection titled as 'Data Collection Tool' in section 4.5.4.1, agrees with the literature stating that mHealth can be employed as a data collection tool [539]. The data collected from service users via the smoking cessation mHealth can help service providers to model and further develop appropriate and effective interventions for particular smokers.

In this study, the findings also support the argument raised in other scientific studies that mHealth can be used to remind service users about their smoking cessation assistance service appointments. mHealth has been found to be effective for healthcare appointment adherence (relevant data are presented in the subsection titled as 'Follow-up Appointment Reminders' in section 4.5.4.1) [197, 198]. In fact, appointment-reminding mHealth, in form of delivering SMS to appointed clients on the previous day to their medical consultation appointment, is currently a routine practice of government-operated primary healthcare centres and speciality outpatient departments of the Conde S. Januário Hospital, the only public hospital in Macao.

5.3.1.2 Harmony and '*Face*' are at the Core

Harmony and '*face*' should be the core issues to be embedded into the model of an effective smoking cessation intervention specifically for male smokers in Macao, because of their close associations with male smoking behaviour and cessation barriers.

To address the issue of peer harmony associated with smoking, the anti-drug advocacies developed by the Narcotics Division of the Security Bureau of the Hong Kong Government are transferable. Although, as claimed by smokers (results are presented in the subsection titled 'Unawareness of Harm and Diminishing Harm through Comparisons' in section 4.2.3.4), smoking is a less harmful

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behaviour compared with drug taking, a key concept of those advocacies is still applicable when addressing the issue of peer harmony seeking associated with smoking. The key message brought out from those anti-drug advocacies was: "*one does not have to prove friendship or love by taking drugs*" (key screenshots of a television anti-drug video are shown in Appendix 5-B, and a selected anti-drug poster is shown in Appendix 5-C). Interpreting the key concepts of smoking cessation intervention, a key message that smoking cigarettes together does not prove peer harmony can be emphasised in the smoking cessation mHealth intervention.

Skill training needs to be stressed in a smoking cessation mHealth intervention. Interpreting the results of the current study, skill training contents, referring to Chinese traditional wisdoms and teachings, and considering the particular circumstances of smokers, should be focusing on addressing the issues of '*face*' and harmony. For example:

- maintaining peer harmony does not mean doing the same as others in a peer group, but alternatively, respecting the difference between each other in the group;

- both social and family harmonies imply respect for the concerns and likes/dislikes of others, especially if individual behaviours, such as smoking, will have harmful impacts upon others;

- turning down a shared cigarette does not mean impoliteness or cause loss of '*face*' to the giver, whereas cigarette sharing may instead imply impoliteness because of the possibility of causing health problem to others;

- cigarette-gifting is neither '*face*' giving nor polite. The cigarette giver may in fact be seen to be bringing harm to others, which may potentially damage the relationship or friendship between one other;

- smoking does not mean cool or gaining '*face*', however success in smoking cessation is rather a highlight of '*face*';

- on an individual level, harmony implies maintenance of the equilibrium status of the body

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(between '*Yin*' and '*Yang*', and among '*five elements*'); maintaining unhealthy behaviour, such as smoking, will break the equilibrium status of the body and may lead to health problems.

Additionally, it is important to encourage smokers to keep in close touch with non-smokers as well as ex-smokers who have succeeded in abstention from smoking. The effectiveness will be, on one hand, that non-smoking peers can motivate and support smokers' smoking cessation by sharing their life stories and experiences (as raised by participants and presented in the subsections titled 'Non-smoking Peers' in section 4.2.2.2 and 'Sharing Successful Stories of Cessation Winners' in section 4.5.4.1). On the other hand, it is also meaningful for smokers to reduce the opportunity to maintain close relationships with smokers in their smoking peer group. It can help the early abstainers avoid the strong temptations of triggers to lapse or relapse. In addition, it can also serve to save '*face*' since the appearance of losing '*face*' from withdrawal symptoms such as shedding tears, etc. will not be seen by smoking peers during social gatherings.

Nevertheless, it is necessary to seriously consider the opinion given by Participant Q1 (SU) that the contents of mHealth intervention should be positive and encouraging rather than negative or shocking in order to avoid the negative impacts that will potentially discount the effectiveness of intervention (finding was recorded in the subsection titled 'Warning about the Hazards of Smoking and Advocating the Benefits of Quitting' in section 4.5.4.1). Moreover, as suggested by participants and presented in section 4.5.6.1, it is also needed to note that the words 'smoking' ('煙' in Chinese character) or 'cigarette' ('菸' in Chinese character) shall not be included in the supporting or motivating messages in order to avoid their trigger effects.

5.3.2 Technology and Delivery Media

Smoking cessation mHealth intervention can be delivered via a variety of technologies including SMS and MMS, while instant text or picture messages as well as video clips can be embedded in

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smoking cessation apps, such as the 'Quit Smoking app', or delivered via instant messaging apps such as WhatsApp, WeChat, and Line etc.

5.3.2.1 Advantages and Limitations to be Considered

Each delivery media has advantages over others. For instance, as stated by participants and recorded in the subsection titled 'mHealth App' in section 4.5.4.3, a mobile app can provide comprehensive information in a variety of forms to users. With a MMS, much more content can be relayed in a video clip in a few seconds compared with a SMS which can only deliver a 160-character text message each time. An SMS is unlikely to be capable of sharing successful stories, which was suggested by participants (relevant data was presented in the subsection titled as 'Sharing Successful Stories of Cessation Winners' in section 4.5.4.1).

However, SMS, in comparison with other communication media, has its advantages, including instant transmission and low cost for both service providers and users. An outstanding advantage of the SMS over printed materials, which are also a low-cost self-help intervention, is that there is a smaller chance of intervention being misplacing because the intervention messages will be delivered directly to users' mobile devices. There is also a smaller chance of being an invasion to the daily lives of users, in comparison with telephone calls, which can be inconvenient for users.

To determinate proper delivering media, both the preferences of service users and the concerns of service providers need to be considered. However, the limitations of both service users and providers discussed by participants are also important concerns. The limitation that service users might not own a Smartphone was realised in this study, as reported in section 4.5.4.3. In order to avoid those smokers being excluded from the smoking cessation assistance services, and potentially widening health inequities, mHealth intervention involving any technology only available for Smartphone owners is unlikely to be appropriate.

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From the viewpoint of service providers, as presented in section 4.5.5.1 'Technology Renewal', it is worrisome that rapid technology transformation may be likely to make the programme outdated on a regular basis. It seems that intervention involving the most updated technology is not the most appreciated by service providers. It is because using an intervention that involves the most updated technology is expected to cost much more than the intervention using only commonly available technology and, in addition, a huge amount of resources will be needed to keep the mHealth abreast of technology renewal.

Another consideration is relating to the out-of-pocket monetary cost to service users. A few smokers reported that they were willing to pay for a smoking cessation service if it could really help them successfully abstain from smoking, while some smokers were not willing to bear the cost (data were reported in section 4.5.5.3). Nonetheless, it seems not really proper to design an intervention at a cost to users in the early phases of programme development (which are, in accordance with the MRC framework, the phases of exploratory trial and main trial), because during these phases, the effectiveness of the intervention has yet to be evaluated and cannot be guaranteed.

Delivering both SMS and MMS are unidirectional costing services in Macao that charge message senders but not receivers. However, MMS can only be delivered to Smartphone owners while the difficulties of using MMS in Macao (as reported in section 4.5.4.3) should also be considered. As with these considerations and limitations, delivery of MMS may therefore not be appreciated by both service providers and users.

While designing an mHealth app, in addition to Smartphone ownership being essential to access the intervention, mobile data transmission that will be at the cost of service users is involved. Therefore, developing a mobile app as the delivery media of mHealth intervention in a pilot programme does not sound appropriate.

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5.3.2.2 Can a Combination of Media be the Way Out?

A combined approach was suggested by a few service providers, the experts in providing smoking cessation intervention in Macao (relevant data were presented in the subsection titled 'A Combined Approach' in section 4.5.4.3). However, financial resources involved in conducting a combined approach are needed when putting into consideration whether a combined approach will cost much than any single approach. While the programme was developed through a rigorous scientific study, the potential risk of losing resources invested into an intervention at its modelling and trial phases is still worrisome (i.e. the intervention may not work as effectively as expected).

Care must be taken to balance preferences and demands with the crucial concerns and limitations of both service providers and users in order to ensure that the intervention is reasonably modelled and based upon scientific evidence. Putting the demands, preferences and limitations of service users as well as the concerns about technology transformation and the financial and human resources of service providers into comprehensive justification, it is rational to suggest modelling the smoking cessation mHealth, at its trial phases, to be a SMS one. The rationale for this suggestion lies in the literature that makes clear the importance of the cost effectiveness of using text-based smoking cessation mHealth on top of existing smoking cessation interventions [230].

5.3.3 'Surface' Tailored versus 'Deep' Individualised Intervention

In the current study, as presented in section 4.5.4.5, deep, individualised interventions are more preferable to service users and are expected to be more effective than standardised or minimally tailored intervention. This is supported by scientific evidence that tailor-made or individualised interventions increase the self-relevance of information and increase the likelihood that users attend to read and understand, and therefore can be motivated to change their behaviour [289, 540-542].

According to this finding, to have higher effectiveness, it is meaningful to model the smoking cessation mHealth in a way that involves deep individualisation or a certain level of tailoring.

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However, the financial and human resources involved are important considerations to deeply individualising mHealth intervention for each individual smoker. It is because programming software for delivering individualised mHealth intervention to each user is more complicated and therefore more time and human resource intensive and more costly than a standardised or minimally tailored intervention.

Putting service providers' concerns about financial and human resources into consideration, and individualising smoking cessation mHealth intervention for each single smoker may not be realistic. In responding to the demands of service users, 'surface' tailoring which involves matching intervention materials and messages to the appearance and language of service users is, however, necessary. A further 'deeper' tailoring of smoking cessation mHealth intervention incorporated psychological and other environmental temptation-related components to various groups of users is expected to be meaningful for improving their overall effectiveness. It is thus suggested to group similar service users, and to deliver a series of 'surface' tailored messages to each group of users.

5.3.3.1 Tailoring Components

To be an effective intervention, it is necessary to motivate smoking cessation, to help remove possible barriers, and to address the issues of strong temptation and high risk of triggers to lapse or relapse. The literature showed that smokers in different stages of behaviour change needed different intervention components assisting their smoking cessation [300]. It gives reasonable optimism about using a progress-sensitive tailored mHealth intervention. There is a need to consult the quitting curve while modelling a progress-sensitive tailored smoking cessation intervention. This is where most smokers relapse within the first 2 days after quitting smoking and the relapse curve begins to bottom out at 7 days [543].

In order to model a 'surface' tailored as opposed to a 'deep' individualised intervention, it is necessary to group users based on the progress of their smoking behaviour change along the

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quitting curve. Creating different content paths for different groups of smokers, similar to what was employed in another scientific study [200], can potentially increase the effectiveness of the intervention. In this study, progress sensitive tailored intervention was appreciated by participants from the service users group, and service providers expected that it could give better effectiveness (relevant findings were presented in section 4.5.4.5).

5.3.3.2 Delivery Time Tailoring

As preferred by both service providers and users who participated in this study (data were presented in the subsection titled 'Time Sensitive Intervention' in section 4.5.4.5) and supported by scientific evidence which was discussed previously in Chapter Two [207, 222], a time sensitive intervention or 'just-in-time' delivery of intervention is appreciated. This means delivering messages when the user needs them.

Delivering time tailored mHealth can also contribute to minimising the possible embarrassing circumstance that occur when conducting telephone follow-up at the inconvenience of service users, particularly for those smokers who work shifts. Time tailored intervention in accordance with the smoking habits and life patterns of each group of users is consequently suggested.

5.3.3.3 Grouping Criteria for Delivering 'Surface' Tailored Intervention

Properly grouping service users is needed to enhance the effectiveness of the 'surface' tailored mHealth intervention. The criteria for grouping service users is suggested, including: the nature of the user's job, which includes whether they work shifts and their working hours; their life pattern; their motivations for smoking cessation attempts; their barriers to smoking cessation; their most critical temptations for triggers to lapse and relapse; and the status of cessation progress of each individual service user.

5.3.4 Unidirectional versus Bidirectional Messaging Intervention

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Another issue to be considered while modelling the intervention is regarding whether a unidirectional or bidirectional message is being delivered. As suggested by participant T4 (SU) and presented in the subsection with the title 'Data Collection Tool' in section 4.5.4.1, mHealth can be used as a tool to collect the data regarding changes in smoking behaviour which is can be useful for smoking cessation specialists to design appropriate interventions assisting particular smokers to quit. However, this can only be achieved by employing bidirectional, but not unidirectional messaging intervention.

By using bidirectional messaging intervention, both 'push' and 'pull' strategies are used and both service providers and users engage in delivering SMS where SMS inputted by service users can be captured manually or automatically by the intervention software and responded to [200]. However, by using a unidirectional messaging intervention, only service providers are involved in the delivery of SMS to service users and only the 'push' strategy is used.

In addition to serving as a data collector, scholars argue that bidirectional messaging could potentially increase service users' commitment to the intervention. It is because service users could feel that they were playing an active role in the intervention rather than only passively receiving messages [200].

On the other hand, even though using a bidirectional messaging intervention can have more beneficial outcomes, similar to the above argument regarding surface tailored or deep individualised intervention, the financial and human resources involved in designing and implementing the intervention are critical concerns. As messages sent by service users have to be captured and responded to (either automatically by computing software or manually by service providers), more resources must be involved in designing and implementing a bidirectional messaging intervention compared with a unidirectional messaging intervention. It may be more feasible to model a unidirectional messaging intervention rather than investing more resources into a bidirectional

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messaging intervention programme which is at the trial phase of development and in which the effectiveness has yet been proven or evaluated.

Nevertheless, as well as being delivered by service providers, bidirectional messaging intervention can be launched paired with a 'Quit Buddy', as arranged in other scientific studies [134, 135]. In a pair, both buddies are attempting to quit smoking, and can send text messages to each other for social support. However, the possible risk of a negative impact must be carefully noted, for example one in the pair may relapses, and this may influence the paired buddy to relapse. Generally looking around the smoking cessation clinics in Macao, consisting of SAGHA, the smoking cessation clinics operated in primary healthcare centres, and the full-fee paying clinic belonging to the private hospital, as discussed in Chapter One and Chapter Three, it is likely that none of the clinics has sufficient manpower to closely monitor the cessation progress of every client to avoid the appearance of these types of negative influences. It may therefore not be worth launching the 'Quit Buddy' system because of the possible risk.

Nevertheless, after the smoking cessation mHealth intervention modelled in this phase is trialled and the effectiveness evaluated in the subsequent phases of the MRC Framework, the pilot mHealth intervention can be modified from one delivering unidirectional SMS to a more complicated and higher costing one. It can be modified to be a bidirectional 'deep' individualised intervention, in which more advanced technologies and more resources will be involved, but consisting of similar components and delivery mechanisms. It may also be beneficial to develop and launch a combination of interventions, in which both text and picture messages will be delivered and further, where a mobile phone app can be involved.

5.3.5 Frequency and Time of Delivery

The next consideration is the appropriate frequency and duration of the delivery of mHealth intervention. According to the data collected in the current study, it is unlikely to be easy to

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determinate the frequency and duration of intervention delivery. However, a common agreement was reached, as presented in section 4.5.4.4, which also agreed with the literature [200, 202, 544], that the delivery of mHealth intervention shall not be overwhelming and burden users to the point where they no longer read the messages received.

Regarding the delivery frequency, referring to the strategy applied in a similar study, it is possible to set a delivery schedule based on the user's status on the quitting curve, which was discussed previously in section 5.3.3 [200]. The delivery schedule can be set, similar to other scientific studies, so that high intensity interventions are delivered at the early quit days, followed by a gradual reduction [200, 206, 545].

The duration of intervention may not be easy to determine, since some smokers may successfully abstain from smoking very soon but some may need assistance for a longer duration before their complete abstention. In order to understand the needs of different users, it is suggested to carry out periodical follow-ups in order to learn the current smoking status of the service user before discontinuing the delivery of mHealth intervention.

5.4   How does Smoking Cessation mHealth Work? How can it Work Better?

A highly important task before launching smoking cessation mHealth is, as guided by the fourth study objective, exploring the working mechanisms of mHealth intervention, and the potential facilitators and possible barriers for both service users and providers on intervention delivery. They are meaningful for modelling the intervention design in order to improve the potential effectiveness and to minimise the possible weakness of the intervention. The confidence about launching mHealth intervention can thus be enhanced.

5.4.1   The Working Mechanisms of Smoking Cessation mHealth

Embedding shared advantages with self-help intervention that include its low cost, low requirement

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for human resources, and wide reaching and embarrassment-free nature, mHealth is expected to be an effective strategy for smoking cessation assistance.

Referring to the data collected in this study, as reported in section 4.5.4.1 and discussed in section 5.3.1.1, smoking cessation mHealth intervention can be used to provide messages to smokers to raise their awareness about smoking associated health risks and the benefits of smoking cessation and therefore motivate smokers to take action to quit smoking. mHealth can be used to facilitate skill training for smokers coping with the difficulties of their smoking cessation and helping them to avoid the temptations of triggers to lapse or relapse. On the journey of smoking cessation, mHealth can also work on reminding and monitoring a smoker's cessation status, encouraging and supporting them to persist with their cessation efforts, and refreshing their difficulty coping skills. It is particularly important for Macao's male smokers who commonly have strong temptations and who are socially influenced by smoking peers, and have low intention to seek smoking cessation assistance.

Nevertheless, it is not suggested to design and implement the mHealth to be an alternative smoking cessation intervention, substituting the pharmacotherapy, cognitive behavioural therapy, or self-help printed materials currently provided to assist smokers on their smoking cessation. Instead, mHealth can complement those interventions and enhance their effectiveness and is launched as an additional self-help intervention.

In addition to the shared advantages of self-help interventions, one of the most important advantages of using mHealth over providing printed self-help materials to smokers is that, mHealth intervention can be provided in a continuing mode anytime and anywhere. Since the service hours of the smoking cessation clinic of SAGHA, as well as those of other smoking cessation clinics in Macao, cannot be highly flexible to fully satisfy the demands for behavioural intervention from all service users, the delivery of mHealth intervention can serve to support smokers who are unable to

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have face-to-face counselling very often.

While it has not been mentioned by service users, smoking cessation service providers reported an embarrassing circumstance, as presented in section 4.4.3.2, that they might contact their clients via telephone to follow up their cessation progress at an inconvenient moment for their clients. As discussed previously in section 5.3.3.2, mHealth is very likely to be feasible for avoiding such embarrassing circumstances, particularly for smokers in Macao where a certain part of the workforce work in irregular hours.

In comparison with another self-help smoking cessation intervention which involves smokers searching for information from the Internet, mHealth presents a significant advantage. Everybody can upload information onto the Internet, and many of them are not smoking cessation professionals. It is however worrisome that the information uploaded onto the Internet and found by smokers may be inefficient, incorrect or, even worse, have a negative influence on smokers' cessation efforts. Nevertheless, by using mHealth, evidence-based, systematic and specific information prepared by professionals are delivered. The potential risk of learning incorrect information or, even worse, being negatively influenced by self-searched information from the Internet does appear more unlikely if mHealth intervention is used.

5.4.2 The Acceptability and Feasibility of Smoking Cessation mHealth Intervention

Reasons for optimism about launching smoking cessation mHealth in Macao include the perceived effectiveness and advantages found in this study, as discussed previously in the current chapter. mHealth was also found to be generally acceptable mainly because it was expected to cause no harm.

The service users reported the deficiency and insufficiency of current smoking cessation services and their demands for additional intervention. The service providers also reported the limitations of

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their manpower and expected that, by using mHealth, the scope of the services they provided could be enlarged without involving much of their manpower. These findings reasonably enhance the confidence about the needs and the feasibility of developing a smoking cessation mHealth in Macao.

5.4.3 The Possible Barriers and the Potential Solutions

In order to improve the feasibility and the potential effectiveness of the smoking cessation mHealth, it is necessary to identify the possible barriers and, if possible, to minimise or to remove them.

5.4.3.1 The Possible Barriers for Users Accessing Smoking Cessation mHealth Intervention

The ownership of a device is unlikely to be a barrier for smokers to access mHealth services, since it was found in this study that all participants, including those who were older than 60, owned mobile phones. Although a few participants in the service user group did not own Smartphones but only the old model mobile phone, it will not be a barrier for them to access mHealth if, as suggested previously in this chapter, unidirectional SMS mHealth will be launched. It should however be noted that the inability of using advanced technology may be a crucial barrier to accessing the service if advanced technology, for instance, MMS or mobile app, will be involved in the intervention.

More importantly, as discussed by participants in both groups of service providers and users (relevant data was recorded in the subsection entitled 'Barriers for Particular Users' in section 4.5.4.3), the mobile phone usage pattern of some service users, in particular the elders, who are less able or less willing to access the advanced functions of mobile devices, may potentially be a major barrier. This literacy issue was in fact raised by a smoker who participated in the study and reported that he always misses the SMS messages sent to his mobile phone. Under such circumstances, he is less likely to be served by smoking cessation mHealth even if the intervention were delivered via SMS. The overall effectiveness of mHealth may therefore be affected [123].

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Another important concern regarding user's access to smoking cessation mHealth was the cost charged for their usage of the service, as reported by service users and presented in section 4.5.5.3. A plausible argument was that, for particular smokers who quit smoking for the purpose of saving money, if a smoking cessation service costs them much more than smoking cigarettes, it could critically discourage their quitting attempts.

5.4.3.2 The Possible Barriers for Providers Launching Smoking Cessation mHealth Intervention

Service providers reported that the insufficiency of human resources was of great concern, as was technology renewal. The availability of human resources is closely related to the accessibility of financial resources. As reported by service providers (relevant data was presented in section 4.5.5.3), they can hire more professionals to launch the service only if SAGHA has more sufficient financial resources.

Addressing the issue of technology renewal can also be less difficult if sufficient financial resources are supplied. The concern of service users about the out-of-pocket costs of using the service, as discussed in the previous section, can also be solved with sufficient financial supply. The core of these issues is therefore mainly a financial issue.

5.4.3.3 The Potential Solutions Addressing the Issues

Raising Funds for the mHealth Smoking Cessation Intervention Programme

SAGHA, as a NGO, has heavily relied upon the financial supply from the Government of Macao for the provision of smoking cessation services. It is necessary to put efforts towards raising funds to address the issues that can be solved with financial resources.

In order to raise funds, it is however necessary to enhance the confidence of policy makers about the potential effectiveness of the intervention. This study, designed and conducted rigorously, can provide scientific evidence that serves to convince policy makers to allocate resources to launching

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the smoking cessation mHealth intervention programme regarding the subsequent phases of the MRC Framework. However, a detailed and convincing report written in Chinese or Portuguese, the formal languages in Macao, that refers to this dissertation, is needed to fight for financial subsidisation and to help the intervention to be trialled and experimented upon and to become reality.

Special Arrangement for Particular Users

Mobile phone subscription *per capita* in Macao has been ranked the first globally, and it was found that all participants in this study owned mobile phones. However, it does not guarantee that smoking cessation mHealth can reach all service users. Although it is rare, because of personal limitations, as discussed previously, which may include lack of knowledge, incapability of accessing modern technologies, and infrequency of mobile phone use, some smokers may not be effectively served by using mHealth. In order to cover those smokers with appropriate smoking cessation assistance, special arrangements and special considerations are needed.

It was suggested by service providers that, as presented in the subsection titled 'Barriers for Particular Users' of section 4.5.4.3., parallel approaches could be used in conjunction with other behavioural interventions for particular smokers. For example, those smokers could be reached via telephone to deliver similar interventions to what smoking cessation mHealth provides. Since the number of those particular users may not be large, it is likely to be feasible for service providers to arrange special services for them individually for the purpose of achieving health equality.

5.4.3.4 Circumstances in which Smoking Cessation mHealth Intervention may not Work

Even though past quitting attempts were reported to be a strong predictor of smoking cessation intention [308], history of quitting attempts does not guarantee the success of smoking cessation. This is especially true when smokers cannot learn the key to relapse prevention from their experiences [546, 547]. Critically, in this study, as reported in the subsection with the title of

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'Cessation Failure Experience' in section 4.2.3.5, the frustrating experience of smoking cessation failure was instead claimed to be a possible barrier for smokers' recent attempts.

For those smokers, it is unlikely that smoking cessation mHealth or self-help intervention can work well because, with frustrating experiences, they are likely to lack the self-confidence to quit. In these cases, face-to-face cognitive behavioural therapy and skill training are most important and cannot be excluded to enhance their confidence, to motivate them to take quitting action again, and to equip them to resist the temptations of triggers to relapse.

5.5   Study Rigour

The current study, employing a qualitative method, incorporates the first two phases, consisting of the theoretical phase and the modelling phase, of the MRC Framework which has been suggested for guiding the development of a complex intervention.

Major stakeholders consisting of both service providers and service users to be involved in the study helped to achieve data source triangulation, and returning to the data collected over and re-examining the analysis results confirmed the categories, themes and linkages. Transcription samples were reviewed against the audio recordings to establish that the data recorded in writing was accurate.

5.6   Limitations and Recommendations

The design of the current study would have benefited from a Macao's male user group, as a comparison for what the males were reporting. The single female participant in this study is clearly not enough and can only serve to provide a limited comparison. Being a case study approach, the most crucial limitation of the current study may be its limited generalisability. It is difficult to claim that a case study of one individual or group is representative of others [442]. This case study may thus not easily be generalised to the whole population consisting of both male and female smokers

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and the smokers being served by other smoking cessation clinics [431].

However, the strength of this study is that data were collected from the largest smoking cessation clinic in Macao, while the service scale of the remaining smoking cessation clinics operating in Macao is relatively very small. It is valuable to partially offset the limitation, and generalisation of findings from the current study to other smoking cessation clinics in Macao is unlikely to be difficult to achieve. Additionally, since the majority of population, and so male smokers, in Macao are in the same region and from the same culture, findings of this study conducted in SAGHA are likely to be applicable to the male smokers from other smoking cessation clinics in Macao. Nevertheless, before generalising the mHealth intervention to serve female smokers in Macao, another study needs to be conducted in order to gather scientific evidence regarding female smokers in Macao.

According to the opinions given by both service providers and users, smoking cessation mHealth is a generally acceptable intervention because of its potential effectiveness and lack of potential to harm. Regarding its feasibility, the critical concerns and possible barriers in using the intervention raised by the major stakeholders have been deeply discussed and potential solutions have been raised. The smoking cessation mHealth intervention is expected to be feasible if the issues are appropriately addressed.

It is consequently recommended to employ the next few phases of the MRC Framework which involves quantitative studies for trialling and experimenting with the modelled smoking cessation mHealth intervention and for evaluating the effectiveness of the intervention.

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Chapter Six: Conclusion

Smoking is a critical public health issue. Smoking cessation assistance interventions, which are linked with the 'O' component of MPOWER, including pharmacological, behavioural interventions or a combination of both, were reported to be effective measures in assisting smokers to quit in comparison with no intervention. Scientific evidence showed the effectiveness of mHealth, as a behavioural smoking cessation intervention, in Western societies.

The current study found that mHealth is also an acceptable, feasible and potentially effective smoking cessation intervention for male smokers in Macao. However, in this study, culturally specific issues have been found to construct additional smoking cessation barriers for them. In order to improve the potential effectiveness of the smoking cessation mHealth, cultural issues are needed to be addressed and to be embedded into the components of mHealth intervention. In this chapter, the contribution and implications of study findings will be discussed.

6.1   Review of Major Findings

A number of smoking cessation motivations as well as barriers for Macao's male smokers were identified in the current study. Their smoking behaviour and attempts to quit were found to be broadly influenced by their social environment.

Previous literature, based on other cultures and societies, have reported a number of social environmental factors that have a significant impact upon males' smoking and cessation behaviours. However, for Macao's males, in the current study, the social impacts were found to be enhanced by certain Confucian concepts in which the '*face*' issue was likely to be the core. For example, in order to save '*face*', adolescents tended to tolerate the objectionable taste of smoking that is often associated with their commencement of smoking cigarettes under peer pressure. In order to give '*face*' to or avoid loss of '*face*' in peers, male smokers are commonly unwilling to refuse smoking

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together with peers in social gatherings or to turn down the shared cigarette. They are also unlikely to be willing to take the advice about smoking cessation given by families, particularly by their wives because they do not want to be seen as 'henpecked', which is a serious threat to their '*face*'. Male smokers are less willing to seek smoking cessation assistance because of the possibility of leading to lose their '*face*'.

Saving '*face*' for Macao's males is linked with maintaining social harmony, relationships and politeness, and avoiding the embarrassment of losing '*face*'. These attitudes socially construct additional smoking cessation barriers, increase the risk of triggers related to relapse, and lower the intention of attempting to quit.

mHealth was reported by participants in the study as being an acceptable, feasible and potentially effective intervention for encouraging smoking cessation of male smokers in Macao. However, since '*face*' was unlikely to have been a critical concern of Western smokers, the issue of '*face*' is not embedded in the smoking cessation mHealth developed in Western societies. There is thus a need for modelling a smoking cessation mHealth intervention specifically for male smokers in Macao, and saving '*face*' would be the most important component to be embedded in the intervention for the purpose of enhancing its potential effectiveness.

Standardised intervention cannot fulfil the demands of all male smokers in Macao, in accordance with the findings of the current study. However, with the consideration of the availability of resources of service providers, 'deep' individualised intervention for each individual smoker may not be feasible. 'Surface' tailored interventions for various groups of service users was therefore alternatively suggested in the trial phase of mHealth development.

The components, delivery medium, presentation, time and frequency, duration as well as critical concerns and possible drawbacks of delivering a smoking cessation mHealth intervention have been

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unfolded in the previous chapter. The design of a smoking cessation mHealth specifically for Macao's male smokers was consequently informed. For example, to be an appropriate intervention, in terms of the accessibility by the majority of service users, a SMS mHealth is recommended. While putting the human and financial resources of service providers into consideration, a unidirectional rather than a bidirectional text messaging mHealth, using the 'push' strategy, is suggested.

6.2   Theoretical Contribution

This is the first study exploring the gender and culture specific influences of smoking and cessation behaviours for male smokers in Macao where culture specific issues were considered in relation to gender. The major theoretical contribution of this study lies in its effort to identify how traditional Chinese philosophical concepts have an impact upon the smoking and cessation behaviours of Macao's males. The concepts of Confucian philosophy, such as social harmony, politeness, relationship and '*face*', which have been embedded in Chinese culture for thousands of years, were found to have a silent but critical impact upon the smoking and cessation behaviours of male smokers in Macao.

Findings from this study are valuable for constructing the theoretical foundation when modelling an appropriate, regional culture orientated, and gender sensitive smoking cessation assistance mHealth that is expected to contribute to a decline in the high smoking prevalence rate among males in Macao, thus reducing the substantial risk for many health outcomes to them as well as non-smokers and benefiting the community as a whole. It can also contribute to making up the component 'O' in the implementation of MPOWER and improve the overall effectiveness of tobacco control in Macao.

The findings can also potentially make an additional contribution in improving other behavioural smoking cessation interventions, such as CBT currently used, in assisting Macao's male smokers to

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quit smoking. In addition, this study is anticipated to generate an important transferable lesson to other mHealth programmes incorporated into other health promotion or prevention interventions in Macao.

The current study identified culturally specific issues influencing Macao males' smoking and cessation behaviours. The current study also found smoking cessation mHealth being both acceptable and feasible and potentially effective in assisting their smoking cessation. These findings have implications both for practice and research in Macao and perhaps in other regions or countries because it recognises the interaction between cultural and gender influences in relation to smoking cessation programmes.

6.3   Implications of this Study

6.3.1   Developing a Smoking Cessation Assistance mHealth in Macao

Findings of the current study construct fundamental but important understandings in relation to developing a potentially effective smoking cessation assistance mHealth in Macao. The results of this study can inform future investigations regarding the next few phases of the MRC Framework, including exploratory trial, main trial, and the implementation phase.

Throughout the delivery of these later phases of the MRC Framework, the components, the design and the delivery of smoking cessation mHealth modelled in this study can be corrected and refined [414]. It consequently provides invaluable scientific evidence to develop an effective smoking cessation mHealth intervention that can assist Macao's male smokers with successfully quitting. Upon the completion of these phases for developing the smoking cessation assistance mHealth and once the effectiveness of the mHealth is proven, the intervention can be launched as a routine practice in SAGHA. The effective mHealth intervention can then be further marketed in other smoking cessation clinics in Macao, including clinics operating in the healthcare centres and in the

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private hospital.

Nevertheless, one of the most important contributions of the current study is that it provides evidence to convince policy makers to allocate resources to studies, including the following phases of the MRC Framework and to launching the modelled smoking cessation assistance mHealth intervention. All are essential to making the smoking cessation assistance mHealth become reality in Macao.

6.3.2 The Transferability of Smoking Cessation mHealth to Other Regions or Countries

These findings have implications in relation to traditional Confucian philosophy embedded into the cultures of other regions and countries including, for example, Mainland China, Hong Kong, Taiwan, Japan, Korea, Singapore and Vietnam. There is optimism about the potential transferability of the smoking cessation mHealth developed in Macao to these regions and countries (minor modification may be needed). It is especially valuable for Mainland China, Hong Kong and Taiwan, where Chinese is the formal and common language, and Confucianism has had a strong influence on smoking related cultural issues for males.

Nonetheless, between Mainland China, Hong Kong and Taiwan, smoking cessation mHealth is likely to be most valuable in Mainland China where the smoking prevalence rate of males is extremely high (52.9%) and smoking cessation services, particularly free of charge services, are fairly scarce [39, 548]. Importantly, because of the huge population, which accounts for almost one-fifth of the world population [549], the number of male smokers in Mainland China is projected as extremely large. Effective smoking cessation intervention that assists Mainland Chinese male smokers to successfully quit smoking can significantly contribute to the decrease in the number of smokers and therefore to the improvement of public health worldwide.

6.3.3 The Need for Modelling Smoking Cessation mHealth to Assist Female and Adolescent

Modelling a Smoking Cessation Assistance mHealth
(Mobile Phone Based Health Intervention)
for Male Smokers in Macao

Smokers in Macao

While the current study is aimed at modelling a smoking cessation assistance mHealth regarding male smokers in Macao, it has implications for proposing other studies for extending the utilisation of mHealth to other populations.

From the cross-sectional data, it was noted that the smoking prevalence rate of female has significantly increased in recent years in Macao [4]. The high prevalence rate of adolescent smoking in Macao is also worrisome [4, 6]. Since the current study mainly targets male smokers, another study is needed to examine whether the modelled smoking cessation mHealth intervention can be equally as effective for female and adolescent smokers in Macao.

Appendices

Appendix 1-A – The Tobacco Control Legislations and Measures in Macao

The Previous Legislations and Measures

Despite the first tobacco control law, Macao's Decree-Law No. 3/83/M, being approved in 1983, it was not effectively implemented. Upon the '*Regime of Smoking Prevention and Limitation*' of Macao's Decree-Law No. 21/96/M coming into full effect in 1996 and the revised articles becoming effective in December 1998, all kinds of cigarette advertising and promotion were banned and enforcement agencies were proposed to impose stronger penalties. With effect from 1 January 2000 of Macao's Decree-Law No. 4/99/M, a tobacco tax has been levied since then. The Decree-Law has been reviewed and amended in 2009, 2011 and 2015 to raise the tax rate.

Regarding the effort put onto smoke-free policy, smoke-free measures have been implemented in all government offices since 2001, and the policy has been optionally extended to the workplaces of some non-governmental organisations. In addition to smoke-free workplaces, smoke-free campus and smoke-free restaurant policies have been implemented. However, tobacco use in those sites is not prohibited by formal decree.

The Implementation of FCTC in Macao

China signed the FCTC as early as 10 November 2003. On 28 August 2005, the FCTC was approved at the 17th session of the Standing Committee of the 10th National People's Congress. China has become the 89th country to ratify the FCTC on 11 October 2005. The FCTC officially came into force in China on 9 January 2006, and a declaration was made at the same time on the prohibition of the introduction of tobacco vending machines. In March 2011, China further promised to ban smoking in public places in an 'all-around manner' in its 12th Five-year Plan, and it was the first time that China included an anti-smoking measure in its five-year plan.

On 11 October 2005, the Government of China informed the Secretary-General of the WHO of the following:

In accordance with the provision of article 153 of the Basic Law of the Hong Kong Special Administrative Region of the People's Republic of China and article 138 of the Basic Law of the Macao Special Administrative Region of the People's Republic of China, the Government of the People's Republic of China decides that the WHO Framework Convention on Tobacco Control and the declaration made by the People's Republic of China on the prohibition of the introduction of tobacco vending machines shall apply to the Hong Kong Special Administrative Region and the Macao Special Administrative Region of the People's Republic of China.

The FCTC and the declaration made by Government of China shall apply to Macao according to the Chief Executive Announcement No. 15/2006 of Macao. However, since the existing tobacco control legislations failed to satisfy the social development and the requirement of the FCTC, the legislations was reviewed and revised.

The Legislation Process of the new Tobacco Control Decree-Law

After going through a formal procedure in accordance with the Rules of Procedure of the Legislative Assembly, the '*Regime of Tobacco Prevention and Control*' of Macao's Decree-Law No. 5/2011, named in Portuguese '*Regime de prevencao e controlo do tabagismo*', passed the final reading on 18 April 2011 and came into effect on 1 January 2012 in Macao.

According to the law, smoking is prohibited in a list of designated in-door areas from 1 January 2012, but only a partial smoking ban was implemented in casinos. Casinos were required to build a smoking area with a size not larger than 50% of total public area by 1 January 2013. However, before the smoking areas are built, smoking is not prohibited in casinos.

In addition, bars, dance halls, saunas and massage parlours have been granted a three-year grace period from when the full smoking ban was applied in 1 January 2015. An advertising and promotion ban is continually implemented but point-of-sale display is still permitted under regulation. New sales requirements for tobacco products such as labels, packages and the maximum

level of tar came into effect from 2013.

For further information, the following references shall be consulted:

1. *Macao's Decree-Law No. 9/2015*, The Legislative Assembly, Editor. 2015, Government Printing Bureau: Macao. p. 565-6.
2. WHO. *Parties to the WHO Framework Convention on Tobacco Control*. 2015 4 March [cited 2015 April 8]; Available from: http://www.who.int/fctc/signatories_parties/en/.
3. *Macao's Decree-Law No. 11/2011*, The Legislative Assembly, Editor. 2011, Government Printing Bureau: Macao. p. 2860-1.
4. *Regime of Tobacco Prevention and Control of Macao's Decree-Law No. 5/2011*, The Legislative Assembly, Editor. 2011, Government Printing Bureau: Macao. p. 1138-54.
5. *The Opinion Report No. 2/IV/2011*. 2011, The Legislative Assembly of Macao: Macao. p. 1-74.
6. Ian, S.T., *Lawmakers Finish Marathon Discussion on Anti-tobacco Bill - But Still No Consensus on Casino Smoking Areas*, in *The Macau Post Daily*. 2011: Macao. p. 05.
7. *International Trend in Tobacco Control* 2010 24 November [cited 2011 17 September]; Available from: http://www.tco.gov.hk/english/infostation/ infostation_ittc.html.
8. *Macao's Decree-Law No. 7/2009*, The Legislative Assembly, Editor. 2009, Government Printing Bureau: Macao. p. 767-8.
9. *Consultation Document for the Revision of Legislation on Tobacco Control. 2007*, Health Bureau - Government of the Macao Special Administrative Region: Macao. p. 1-7.
10. *Chief Executive Announcement No. 15/2006*, The Office of the Chief Executive, Editor. 2006, Government Printing Bureau: Macao. p. 2560-92.
11. *Report of the Regional Committee for the Western Pacific (Fifty-Second Session)*. 2001, WHO: Manila. p. 1-249.
12. *Macao's Decree-Law No. 4/99/M*, The Legislative Assembly, Editor. 1999, Government Printing Bureau: Macao. p. 7709-40.
13. *Report of the Regional Committee for the Western Pacific (Fiftieth Session)*. 1999, WHO: Manila. p. 1-217.

Appendix 1-B –

The Primary Functions of the Tobacco Control Office

1. Propose guiding principles of tobacco prevention policies in accordance with the recommendations of international organizations;

2. Coordinate in the united operations of tobacco control;

3. Assist the responsible entities of no-smoking venues in order to ensure compliance with the tobacco prevention and control regulations.

4. Ensure quality control of tobacco products for public consumption according to the framework of laws and regulations;

5. Promote health information and educational activities related to the harms of tobacco consumption and the importance of smoking cessation;

6. Disclose to consumers the ingredients and their quantities used in the manufacture of tobacco products;

7. Propose and promote the measures of tobacco prevention and control, and evaluate the effectiveness of the relevant implementation;

8. Prepare follow-up and evaluation report on tobacco consumption;

9. Handle the procedures arising from the penalty system under the regulations of the tobacco prevention and control;

10. Monitor the compliance with the regulations of tobacco prevention and control.

Source: The Health Bureau, Macao (http://www.ssm.gov.mo/News/smokefree/en/main.aspx)

Appendix 1-C – Literature Search on WiseSearch (in order to learn the effort allocation from the Tobacco Control Office and the Government of Macao)

The news articles published during the first half-year since the new tobacco control legislation came into force were targeted, and WiseSearch was accessed for the search. The filters applied and the criteria selected for the search were:

Region - Macau

Database - WiseSearch, WiseSearch Pro and WiseWeb

Media - Hou Kong Daily, Jornal Do Cidadao, Jornal Informacao, Jornal Va Kio, Macao Daily News (those are the top five popular journals in Macao)

Scope - Headline

Similar words - Search with similar words

Keywords - (smoking OR smoke OR tobacco[1] OR 煙[2] OR 菸)

Period - 1 January 2012 - 30 June 2012

457 news articles listed were retrieved and read. 71 news articles were immediately excluded because of their irrelevance to smoking or tobacco control or being non-local news. However, 242 out of the leaving 386 news articles, which were 62.7%, reported the number of smokers to be fined who were smoking in the prohibition areas. Nevertheless, the majority of the remaining 144 relevant local news articles were relating to either promotional activities for the new legislation or discussions of further raising of the tobacco tax. Only a few were related to other tobacco control strategies.

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[1] Since the Chinese name of the Tobacco Control Office, "預防及吸煙控制辦公室" and the abbreviation of the name, "控煙辦" contained the character "煙" which was included in the search, it was neither needed to include name, "預防及吸煙控制辦公室" nor the abbreviation, "控煙辦" in the search.

[2] "煙" is the Chinese character of smoke; the term of smoking in Chinese, "吸煙" or "抽煙" contain the character of "煙", and therefore it is not needed to be included in the keywords for searching.

When visiting the website of the Tobacco Control Office[3], it was found that all new posts during the first half-year since the enforcement of the new tobacco control legislation were to report the progress of on-site inspection and the numbers of people who were fined for smoking in the prohibition areas.

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[3] The Health Bureau. *What's New?* Content Outline of Tobacco Control Information Website 2012   [cited 2012 14 September]; Available from: http://www.ssm.gov.mo/News/smokefree/ch/main.aspx.

Appendix 1-D – The Organisational Structure of the Government of Macao
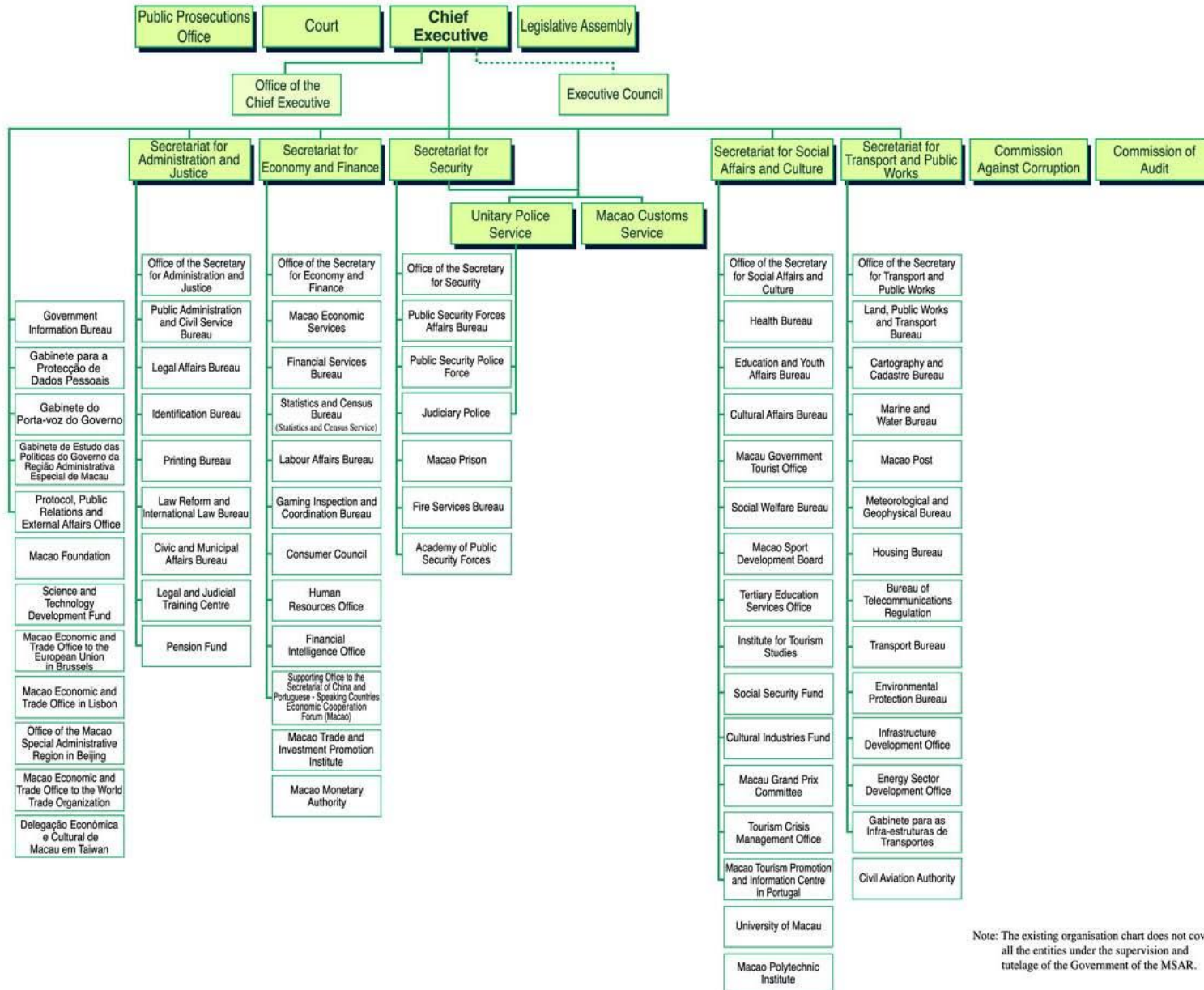
Note: The existing organisation chart does not cover all the entities under the supervision and tutelage of the Government of the MSAR.

Appendix 2-A – Literature Search for Smoking Cessation mHealth Projects

Search of Smoking Cessation mHealth Studies in the worldwide

<u>Cochrane Library</u>

Being a comprehensive database of systematic reviews and meta-analysis, it was expected that some valuable review articles that cover the specific topic could be found in Cochrane Library. Search in Cochrane Library was undertaken in early 2013, and the criteria applied include:

Search -	'Search All Texts' was selected
Words to be searched -	(((((((((mhealth) OR mcessation) OR ehealth) OR telemedicine)) OR ((mobile OR cell*) AND phone))) OR (txt OR pxt OR sms OR mms OR text messag*))) AND (smok* OR tobacco OR cigar*))
Result filter -	'Cochrane Reviews – Review' and 'Other Reviews'

23 review articles were listed on the search results. Among those articles, 1 was written in German, 9 review articles were not smoking cessation related, and 2 smoking cessation review articles were neither mobile- nor web-based interventions. 12 articles were hence excluded. 6 articles reviewing smoking cessation interventions that included mHealth were identified and deeply reviewed in the study[1]. Additionally, 5 articles reviewing studies about computer- or web-based smoking cessation interventions were retrieved in order to understand the developing progress of smoking cessation

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[1] Free, C., et al., *The Effectiveness of Mobile-health Technology-based Health Behaviour Change or Disease Management Interventions for Health Care Consumers: A Systematic Review.* PLoS medicine, 2013. **10**(1): p. e1001362.
Chen, Y.-F., et al., *Effectiveness and Cost-effectiveness of Computer and Other Electronic Aids for Smoking Cessation: A Systematic Review and Network Meta-analysis.* Health Technology Assessment, 2012. **16**(38): p. 1-205.
Whittaker, R., et al., *Mobile Phone-based Interventions for Smoking Cessation.* Cochrane Database of Systematic Reviews, 2012. **11**.
Cole-Lewis, H. and T. Kershaw, *Text Messaging as a Tool for Behavior Change in Disease Prevention and Management.* Epidemiologic Reviews, 2010. **32**: p. 56-69.
Fjeldsoe, B.S., A.L. Marshall, and Y.D. Miller, *Behavior Change Interventions Delivered by Mobile Telephone Short-message Service.* American Journal of Preventive Medicine, 2009. **36**(2): p. 165-73.
Krishna, S., S.A. Boren, and E.A. Balas, *Healthcare via Cell Phones: A Systematic Review.* Telemedicine Journal and E-health, 2009. **15**(3): p. 231-40.

interventions by applying advanced technology[2].

An additional search was conducted in Cochrane Library to search newly published articles that were not covered by the review articles. In the search, the same criteria were applied but 'review' was removed and, since one of the review articles reviewed smoking cessation mHealth studies published up to 29 September 2012, the published date was set between September 2012 and March 2013. However, no additional article could be found.

PubMed

Consisting of a large number of citations for biomedical literature, PubMed is an appropriate database for the search of literatures in the study area. Similar to the search conducted in the Cochrane Library, but 'MeSH Terms' instead of a few similar keywords was applied in the search.

Considering that mHealth smoking cessation intervention is the core of the study, it was worth allocating an energetic effort to find all relevant articles. Without limiting the date of article publishing, and all articles published in the date covered by the review articles found in the Cochrane Library were also searched to ensure that no article was missed. The searching criteria were:

Words to be searched -   ((((mHealth OR eHealth [MeSH Terms])) OR (mobile phone OR cell phone [MeSH Terms])) OR (sms OR mms OR text message [MeSH Terms])) AND (smok* OR tobacco [MeSH Terms])

Species -   Humans

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2   Brown, J., *A Review of the Evidence on Technology-based Interventions for the Treatment of Tobacco Dependence in College Health.* Worldviews on Evidence-based Nursing, 2013. **10**(3): p. 150-62.
    Cushing, C.C. and R.G. Steele, *A Meta-analytic Review of eHealth Interventions for Pediatric Health Promoting and Maintaining Behaviors.* Journal of Pediatric Psychology, 2010. **35**(9): p. 937-49.
    Tait, R.J. and H. Christensen, *Internet-based Interventions for Young People with Problematic Substance Use: A Systematic Review.* Medical Journal of Australia, 2010. **192**(11): p. S15.
    Shahab, L. and A. McEwen, *Online Support for Smoking Cessation: A Systematic Review of the Literature.* Addiction, 2009. **104**(11): p. 1792-804.
    Walters, S.T., J.A. Wright, and R. Shegog, *A Review of Computer and Internet-based Interventions for Smoking Behavior.* Addictive Behaviors, 2006. **31**(2): p. 264-77.

Languages -   Chinese & English

Ages -   Adult: 19+ years

95 articles were listed on the search result, whereas 1 review article was an updated review to another. Abstracts of 94 articles were explored in order to identify the relevance to the study while irrelevant articles would be excluded.

36 articles were immediately excluded because of their irrelevance to the study. 9 articles regarded to smoking but were neither related to smoking cessation nor mHealth nor eHealth. Another 5 articles reported smoking cessation interventions but the interventions used were neither mHealth nor eHealth. Those 14 articles were hence disregarded. Another 8 articles related to eHealth or mHealth but were not related to smoking cessation. In addition, a filter was set as 'Adult: 19+ years', there were still 3 studies involving only adolescents who were not the target population of the study and were also excluded. After justifying the relevance, 62 out of 95 articles were excluded.

The remaining 33 articles were identified and full texts were then retrieved and reviewed. However, some of them might be found to be non-referable and would not be cited in the dissertation.

Inclusion and Exclusion of Articles	No. of Articles	
	Excluded	**Total**
Search Results		95
(-) Being updated by another	1	
(-) Irrelevant to smoking or mHealth / eHealth	36	
(-) Related to smoking but neither to smoking cessation nor mHealth / eHealth	9	
(-) Related to smoking cessation but not to mHealth / eHealth	5	
(-) mHealth / eHealth intervention but not applied in smoking cessation	8	
(-) Adolescents studies	3	
(-) Total Excluded Articles		(-) 62
Review Articles Identified		33

PsycINFO

As smoking cessation mHealth is a potential psychological intervention to smoking behaviours, it was necessary to conduct literature search on psychological database. PsycINFO, a database covering the professional and academic literatures in psychology and related disciplines, was an appropriate source of psychological literature.

PsycINFO was accessed via the Flinders Library gateway. A similar strategy as the search conducted on PubMed was applied to the search on PsycINFO while the function of 'Map Term to Subject Heading' was selected.

Search criteria - ((mHealth OR mcessation OR eHealth OR telemedicine) OR (mobile phone OR cell phone OR cellular phone) OR (txt OR pxt OR sms OR mms OR text messaging)) AND (smok* OR tobacco OR cigar*)).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]

Limits -   Population Groups: Humans

                Languages: English Language

                Age Groups: adulthood <age 18 yrs and older>

92 articles were listed on the search result. However, if applying the same criteria to the search, but limited with Chinese language instead of English, no articles were listed. The same technique as previously described was used to identify candidate articles, whereas 46 articles had been found from the previous search on PubMed, regardless the relevance to the study. After exploring the abstracts of remaining 46 articles, it was found that 11 articles were irrelevant to the study and were excluded. 1 article was related to smoking but not to smoking cessation, mHealth or eHealth. Although 5 articles reported the studies of smoking cessation interventions, they were irrelevant to mHealth or eHealth. 1 article reported mHealth used on other areas of behavioural intervention and was therefore also excluded. Consequently, 28 candidate articles would be reviewed.

Inclusion and Exclusion of Articles	No. of Articles	
	Excluded	**Total**
Search Results		92
(-) Duplicated from the PubMed search		(-) 46
(-) Irrelevant to smoking or mHealth / eHealth	11	
(-) Related to smoking but neither to smoking cessation nor mHealth / eHealth	1	
(-) Related to smoking cessation but not to mHealth / eHealth	5	
(-) mHealth / eHealth intervention but not applied in smoking cessation	1	
(-) Irrelevant Articles to be Excluded		(-) 18
Candidate Articles		28

Search of Local Smoking Cessation mHealth Study

As observed and upon consulting professionals in the area, it was learnt that no smoking cessation mHealth intervention is currently provided in Macao. However, the understanding was needed to be affirmed with solid evidence. Systematic search of literatures, including scholarly publications and grey literatures, was therefore carried out. Similar criteria but an additional limitation '(AND (Macao or Macau))' were applied to the searches on Cochrane Library, PubMed and PsycINFO. As expected, no article could be found.

The societies and populations of Macao and Hong Kong share a number of commonalities including ethnicity, culture, life pattern, and the major language and dialect, whereas the populations also share same mass media information. Evidence from the neighbouring region, Hong Kong, is therefore believed to be highly referable if local information is insufficient or unavailable. '(AND Hong Kong)' instead of '(AND (Macao or Macau))' was thus applied to search. However, only 1 article which had been excluded from the list of candidate articles in previous search found in PubMed.

Wanfang Data

Wanfang Data, an affiliate of the Chinese Ministry of Science & Technology, has been the leading e-resource for studies in China and a gateway to access a wide range of literatures about Chinese culture, medicine, business, and science[3]. It is therefore believed to be an appropriate database to search literatures written in Chinese.

In the database, keywords in Chinese were applied to the search. While searching '移動醫療', '流動醫療', '手機醫療', '移動健康', '流動健康' and '手機健康' that are the possible translations of mHealth or mobile health in Mainland China, 85, 7, 3, 14, 3 and 0 articles were found in the category of medicine and health respectively. Among those articles, only 1 article reported the

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[3]   *Wanfang Data*. 2013, Wanfang Data Co., Ltd: Beijing, China. (http://www.wanfangdata.com.cn/)

prospect of a smoking cessation project conducted in Hong Kong but the project was not mHealth related. A few articles discussed the potentials and opportunities of developing mHealth generally. However, none of the articles was smoking cessation specific.

When searching '手機應用' which is the Chinese term for mobile application, 11 articles were listed. However, all articles were irrelevant to the study area regarding tobacco smoking. When searching ('短信' AND ('煙' OR '菸')), that are text message, smoke and cigarette respectively in Chinese, 3 articles were listed. The opportunities of smoking cessation mHealth were discussed in 1 article. In another 2 articles, the feasibility and the short-term effectiveness of an adolescent smoking cessation programme by applying information communication technologies including mobile text message, other instant message and via internet in Shanghai, China were reported[4]. Even if it is closely related to the study area, because of solely adolescents being involved in the programme, the articles were only read but were not referred to.

Hong Kong Macau Periodicals Network

The Hong Kong Macau Periodicals Network[5], a database comprises Chinese and bilingual, i.e. English and Chinese, periodicals published in Hong Kong or in Macao, was a proper tool for searching local research articles.

No articles could be found on this database with searching either one of the terms of mHealth or m-Health, but 1 information technology related article was listed by applying '移動醫療' which is the Chinese term for mHealth. However, by applying the terms of eHealth or e-Health, 2 articles including 1 in English and 1 in Chinese were found. 5 articles (4 English and 1 Chinese articles) were listed while searching telemedicine. Nevertheless, none of the articles were smoking related.

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[4]   Shi, H.J., et al., *Feasibility of Adolescent Smoking Cessation Intervention by Using Information Communication Technologies(ICT).* Chinese Journal of School Health, 2010. **31**(12).
      Shi, H.J., et al., *Short-term Effectiveness of an Adolescent Smoking Cessation Program by Using Information Communication Technologies.* Chinese Journal of School Health, 2010. **31**(12).
[5]   *Hong Kong Macau Periodicals Network*, in *Hong Kong Macau Periodicals Network*. 2013, The Chinese University of Hong Kong: Hong Kong. (http://hkmpnpub.lib.cuhk.edu.hk/search.jsp)

<u>Health Science Journal of Macao</u>

To ensure that no local scholarly article would be missed from the literature searches, the only local health science journal, Health Science Journal of Macao was accessed. However, publication of the Journal had been discontinued since 2010. All volumes of this quarterly published journal were explored on the Journal's websites[6], where all volumes published in and after 2007 could be retrieved. Nevertheless, no mHealth related article could be found.

<u>WiseSearch and Websites of Relevant Organisations</u>

It was realised that only research articles provide proper information for scholarly study. However, due to the long publishing process, although online publications can be, and often are, updated more readily than print, published articles may not report the most current study. In order to learn if any relevant study is underway and any grey article is going to be published, WiseSearch was accessed. Additionally, websites of relevant organisations, including the Health Services Bureau, the Social Welfare Bureau, the Hospital Kiang Wu and the SAGHA were consulted to ensure the inexistence of grey literature. No article related to smoking cessation mHealth project in Macao was found.

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[6] *Health Science Journal of Macao*. [PDF files] December 2010 [cited 2013 15 February]; Available from: http://www.ssm.gov.mo/docs/2199/2199_799502c1eaf342289dd3dbf0c3a3d444_000.pdf.

Appendix 2-B – Literature Search for Smoking Cessation Behavioural Interventions

Processes and Results of the Search

<u>Cochrane Library</u>

Smoking cessation intervention has been a well-studied area. At the beginning of literature search in the area, it was aimed at identifying review articles. In order to broaden the search, 'All Text' instead of keywords was searched. The following criteria were applied in the search.

Search -	'Search All Text' was selected
Words to be searched -	((behavio* therapy) OR (behavio* intervention) OR (behavio* treatment)) AND ((smok* OR tobacco OR cigar*) AND (cessation OR quit))
Search limits -	'Cochrane Reviews – Review' and 'Other Reviews' were selected
	Cochrane Library Online Publication Date: between Jan 2008 and Mar 2013

113 articles were listed on the search result but 2 of them were duplicated in the others. 1 article was included in the previous search of mHealth literatures. Nevertheless, all remaining 110 articles were explored with caution to avoid carelessly discarding any valuable review articles. Nevertheless, 63 articles were found to be completely irrelevant to the study area and were disregarded. 3 articles reviewed adolescent studies and were hence excluded. There were 16 articles reviewing other behavioural interventions, but they were not related to smoking cessation even if 3 of them applied mHealth or eHealth strategies. 4 articles reviewed other studies about smoking, but not cessation intervention. Another 10 articles were excluded because they reviewed smoking cessation intervention solely applying pharmacological therapy or other alternative strategies, but not behavioural interventions. However, 14 review articles remained.

The next task aimed at identifying the review articles that would be valuable for this study from

these 14 review articles and afterwards, to identify relevant studies being reviewed and reported in the review articles. However, it was also necessary to search literatures reporting other relevant studies published in the remaining time to date. Full texts of the above mentioned 14 articles were retrieved and studied very carefully. However, 7 of them reviewed studies beyond the five-year-time-limit, while another 1 article reviewed smoking cessation studies in different nature. Nonetheless, 6 review articles were identified. 3 of those articles reviewed the studies up to 6 July, 19 August and 4 September 2012[7]. It was rational to limit the next stage of search of literatures published from June 2012.

An additional search on Cochrane Library was carried out. Whereas 'review' was removed from the criteria, and the published date was set as between June 2012 to March 2013. Nevertheless, no article could be found.

PubMed

The search was conducted with applying the criteria that:

Words to be searched -	((behavio* therapy [MeSH Terms]) AND ((smok* [MeSH Terms]) AND (cessation OR quit*)))
Publication dates -	2012/06/01 – 2013/03/31
Species -	Humans
Languages -	Chinese & English
Ages -	Adult: 19+ years

50 articles were listed on the search result. The same strategies as previously reported were used for

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[7] Lindson‑Hawley, N., P. Aveyard, and J.R. Hughes, *Reduction versus Abrupt Cessation in Smokers Who Want to Quit.* The Cochrane Library, 2012.
Stead, L.F. and T. Lancaster, *Combined Pharmacotherapy and Behavioural Interventions for Smoking Cessation.* Cochrane Database of Systematic Reviews, 2012. **10**.
Stead, L.F. and T. Lancaster, *Behavioural Interventions as Adjuncts to Pharmacotherapy for Smoking Cessation.* Cochrane Database of Systematic Reviews, 2012. **12**.

selecting candidate literatures. Among those articles, 13 were found to be related to smoking cessation behavioural intervention and were hence included while others were disregarded for the reasons listed hereunder.

Inclusion and Exclusion of Articles	No. of Articles	
	Excluded	Total
Search Results		50
(-) Articles found in previous searches	3	
(-) Irrelevant to smoking, cessation or behavioural intervention	10	
(-) Smoking issues studies but not smoking cessation intervention	11	
(-) Behavioural interventions for other issues but not for smoking cessation	2	
(-) Pharmacotherapy to smoking cessation	7	
(-) Other alternative therapies to smoking cessation	4	
(-) Total Excluded Articles		(-) 37
Candidate Articles		13

PsycINFO

By applying the following criteria on the search, 22 articles were listed on PsycINFO.

Search criteria - ((behavio* therapy OR behavio* intervention OR behavio* treatment) AND ((smok* OR tobacco OR cigar*) AND (cessation OR quit))).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]

Limits - Population Groups: Humans

Languages: English Language

Year Published: 2012 – 2013

Age Groups: adulthood <age 18 yrs and older>

If Chinese instead of English was selected, no article was found. The same technique as reported previously was used to select candidate literatures, and 7 candidate articles were identified.

Inclusion and Exclusion of Articles	No. of Articles	
	Excluded	**Total**
Search Results		22
(-) Articles found in previous searches	2	
(-) Irrelevant to smoking, cessation or behavioural intervention	3	
(-) Smoking issues studies but not smoking cessation intervention	3	
(-) Behavioural interventions for other issues but not for smoking cessation	3	
(-) Pharmacotherapy to smoking cessation	3	
(-) Other alternative therapies to smoking cessation	1	
(-) Total Excluded Articles		(-) 15
Candidate Articles		7

Appendix 2-C – Literature Search for Smoking and Cessation Behaviours among Male Smokers in Macao

Processes and Results of the Search

Cochrane Library

Similar to the previous searches, Cochrane Library was first accessed aiming at identifying review articles. While conducting a search of 'Search Title, Abstract, Keywords' with ((smok* OR tobacco OR cigar*) AND ((gender OR sex) AND (Asia* OR Chin*))) in the previous five years, no review article could be found. When the search of literature was extended without limiting the published year, still no review article could be found. As there was no review article about gender specific factors associated with smoking in Asia or China, the search would need to be further broadened in order to dig other review articles.

When the search limit of 'AND (Asia* OR Chin*) was removed and the criteria reset to be 'Search Title, Abstract, Keywords' with ((smok* OR tobacco OR cigar*) AND (gender OR sex)) without limiting the published year, 3 Cochrane reviews and 8 other reviews were found. However, by exploring those 11 review articles, it was found that 4 of them were completely irrelevant to the study area while 1 article was associated with other smoking topics, but neither to smoking behaviour nor cessation intervention. In addition, 3 articles reviewed the pharmacotherapy of smoking, but not behavioural intervention, while another 1 article was psychiatric population specific. Even though 2 review articles were found relating to the study, they could however not be seen as the target review articles but only references because the studies reviewed in the articles were beyond the previous five years.

While further broadening the search to be 'Search Title, Abstract, Keywords' with ((smok* OR tobacco OR cigar*) AND ((gender OR sex) AND (Asia* OR Chin*))) but removing 'review', 57 trial articles were listed. However, the majority of articles were completely irrelevant to the study. Only 1 article which reported the study of smoking cessation intervention tailoring for Koreans who

partially share the Confucian philosophical concepts with Chinese was believed to be valuable in the study[8].

PubMed

The search in PubMed applied the criteria:

Words to be searched -	(((smok* [MeSH Terms]) OR (tobacco [MeSH Terms])) AND ((gender [MeSH Terms]) AND ((Asia* [MeSH Terms]) OR (Chin*[MeSH Terms]))))
Publication dates -	2008/01/01 – 2013/03/31
Species -	Humans
Languages -	Chinese & English

8 articles were listed on the search result. While 1 article was found to be irrelevant to the study area, 7 articles would be referred to in the study.

PsycINFO

By applying the following criteria to the search on PsycINFO, 143 articles were listed.

Search criteria -	((smok* OR tobacco OR cigar*) AND ((gender OR sex) AND (Asia* OR Chin*))).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
Limits -	Population Groups: Humans
	Languages: English Language
	Year Published: 2008 – 2013

The same technique used to identify candidate articles as previously discussed and 49 candidates were identified. The search result is shown below.

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[8] Kim, S.S., S.-H. Kim, and D. Ziedonis, *Tobacco Dependence Treatment for Korean Americans: Preliminary Findings.* Journal of Immigrant and Minority Health, 2012. **14**(3): p. 395-404.

Inclusion and Exclusion of Articles	No. of Articles	
	Excluded	**Total**
Search Results		143
(-) Articles found in previous searches	1	
(-) Irrelevant to smoking, cessation or behavioural intervention	71	
(-) Smoking issues studies but not smoking cessation intervention	18	
(-) Non-Asian population related	4	
(-) Total Excluded Articles		(-) 94
Candidate Articles		49

Appendix 3-A – The Smoking Cessation Clinic in the Healthcare Centre Areia Preta
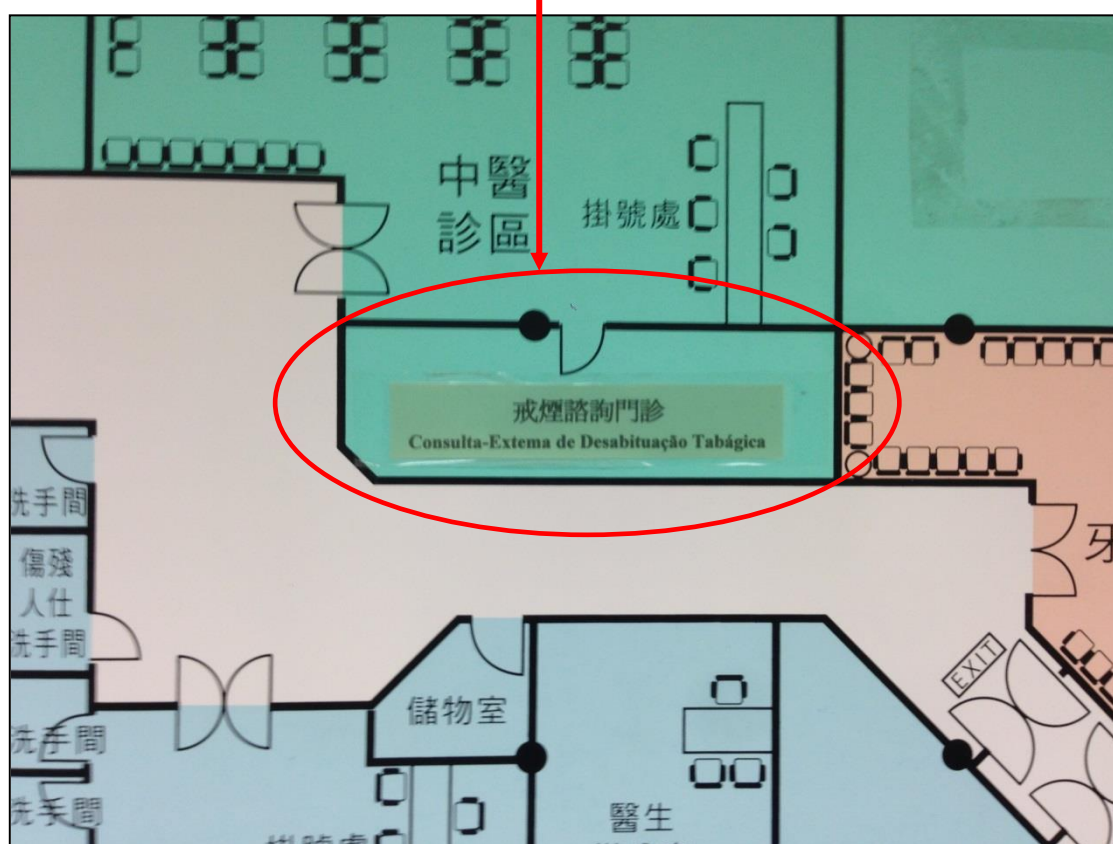
The floor plan of the 2/F of the Healthcare Centre Areia Preta –
The Smoking Cessation Clinic is shown in the red circle
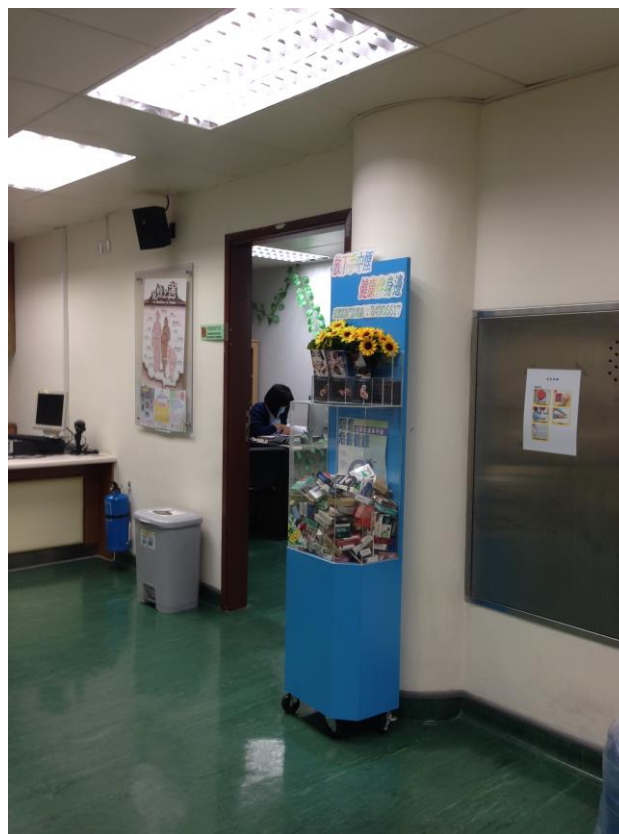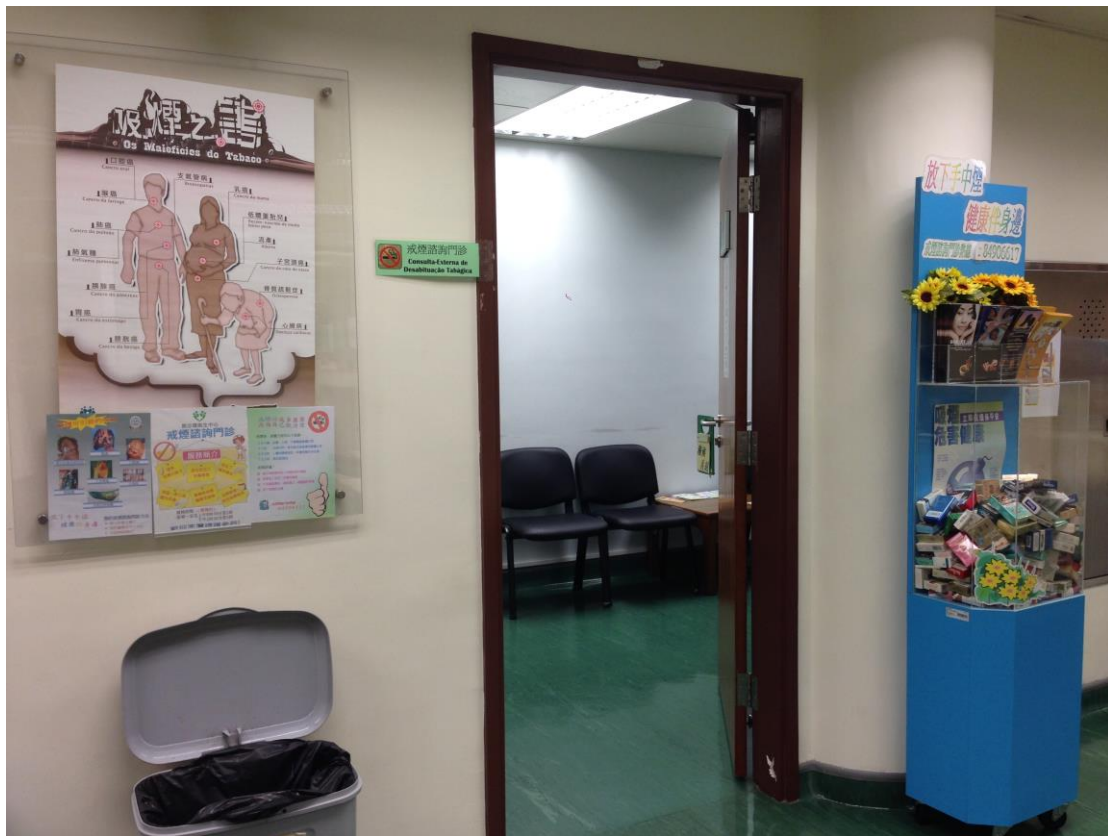
The Smoking Cessation Clinic is located in a small room, and
only one community nurse is full-time working for the clinic

Remark: The Healthcare Centre Areia Preta has fully occupied the whole four-floors building

Appendix 3-B

個人深入訪談－服務供應者

半結構性（大約60分鐘）

Service Providers Individual In-depth Interview
Semi-Structure (approx. 60 minutes)

背景資料（服務供應者）〔*為分析受訪者在戒煙機構擔當不同的崗位而有不同的關注點及考慮因素，即是：管理層與前線服務供應者的考慮因素可能不同/相同*〕

Background information (of service providers) [*for analysing if participant who plays different role in the smoking cessation agency having different focuses / perspectives, i.e. the concern of management may be different from / the same as of front line service provider*]

請從列表中選擇一個化名，為保護你的身份，所有相關記錄將會以此化名標示。

Please choose a pseudonym from the list and the chosen pseudonym will be applied to label all relevant record for protecting your identity.

1. 請問你為戒煙保健會服務了多久？

   How long have you worked for SAGHA?

2. 請問你在戒煙保健會的角色(所在的崗位)？

   What is your role in SAGHA?

第一節－服務使用者的特徵（從服務供應者的角度）〔*為瞭解文化及性別差異以及吸煙者戒煙的可能障礙*〕

Section 1 - Characteristic of service users (from the viewpoint of service providers) [*for understanding the cultural and gender differences and the possible barriers of smoking cessation for smokers*]

戒煙行為

Cessation behaviour

3. 就你的理解，你們的服務對象到戒煙保健會戒煙的普遍原因是甚麼？（***如果受訪者沒有回應，提示如下****：家庭壓力？健康的考慮（為自己及家人，誰？即是：配偶、父母、子女）？在家庭中樹立榜樣（即是：吸煙並不是孩子的好榜樣）？別人勸告及例子，誰？費用？工作地點、公共交通工具、其他室內公眾場所、家裡不准吸煙？其他？*）

   ➤ 照你所知，你們的男女服務對象有沒有不同的戒煙原因？

   What is your understanding, of common reasons why your clients come to SAGHA to cease smoking? (***Prompt followings if the participant doesn't bring it up***: Family pressure? Health concern (for self and family members, whom? i.e. spouse, parents, kids)? Setting example in the family (i.e. smoking is not setting a good example for kids)? Advice and example from others, whom? Cost? Restrictions on smoking in workplace, on public transportation, in other public indoor place, at home? Others?)

> As you know, are there different reasons between your male and female clients?

4. 在向戒煙保健會求助之前，你們的服務對象最常使用甚麼方法戒煙（*如果受訪者沒有回應，提示如下*：意志力？行為控制方式（遠離吸煙者、分散精神、做運動、飲茶或其他）？醫學方法（例如尼古丁替代療法、中藥、針灸）？家人支持？其他戒煙產品？其他？）

> 你認為你們的服務對象早前所使用的戒煙方法，男與女有沒有不同？

What methods are the most often used by your clients before they seek assistance from SAGHA? (***Prompt followings if the participant doesn't bring it up***: Will power? Behaviour approach (stay away from smokers, distract, do exercises, drink tea and so on)? Medical measures (like nicotine replacement, Chinese traditional medicine, Chinese acupuncture)? Family help? Commercial cessation products? Other?)

> Do you think there are any differences between your male and female clients regarding the methods used in their previous cessation attempts?

5. 按照你的理解，甚麼情況最影響，令他們再吸煙（在他們先前嘗試戒煙時）？

如果受訪者沒有回應，提示如下：

- 在社交場合（例如：和其他吸煙者在一起，在男人與男人談話時對方遞煙等）？
- 收煙作禮物？
- 當感覺緊張、負面、情緒低落、或孤單？
- 當感覺正面或興高采烈，或在娛樂時（例如：看運動比賽等）？
- 打麻將/玩撲克牌（為賭博）、賭馬、在賭場賭博？
- 心癮發作？

> 照你所知，就以上討論的令他們再吸煙的情況，你們的男女服務對象有沒有不同？

As your understanding, what are the most influential situations that caused their relapse (in their previous attempts)?

Prompt followings if the participant doesn't bring it up:

- Social situations (e.g., in the company of other smokers, cigarette sharing with peers in man's talk etc.)?
- Cigarette gifting?
- When feeling stressed, negative, down, or alone?
- When feeling positive or elated, or during entertainment (e.g. watching sport etc.)?
- When playing Mah-jong / cards for money, betting on horse racing, or gambling in casino?
- Inner cravings?

> As you know, is there any difference between your male and female clients regarding the above-discussed situations caused their relapse?

6. 你所知的令他們再吸煙的最大原因是甚麼？

*如果受訪者沒有回應，提示如下：*自我控制不足？受其他煙民影響？缺乏戒煙方法？煙癮發作時缺乏支持？家人支持不足？其他？

題目： '在澳門一間戒煙機構為設計及建模移動醫療戒煙支援服務進行研究'

研究員（訪問員）：梁淑嫻

> 照你所知，就再吸煙的主要原因，你們的男女服務對象有沒有任何不同？

What is your understanding of what caused their relapse mostly?

Prompt followings if the participant doesn't bring it up: Low self- control? Influence of other smokers? Lack of available cessation methods? Lack of support while craves? Little family support? Other?

> As you know, is there any difference between your male and female clients regarding the major reasons of their relapse?

7. （*就上述幾題*）你如何知道？（**提示**：*由你的經驗所得？你有沒有問過你們的服務對象/ 從他們那裡收集數據？*）

(*for the above questions*) How do you know? (**Prompts on**: From your experience? Do you ask / collect data from your clients?)

手提電話的使用〔並不預期可以得到確切答案〕

Mobile phone usage [*no certain answer is expected*]

8. 你是否知道你們的服務對象的手機/智能手機的擁有情況？即是：你們的服務對象平均每人有多少個手提電話(號碼)?

Do you know the mobile phone / Smartphone coverage of your clients? i.e. on average, how many mobile phone subscriptions per person among your clients?

9. 你對你們的服務對象，用於戒煙輔助或一般衛生有關的手機使用情況有沒有任何概念？

> 你如何知道？

> 你們的男女服務對象有沒有分別？

Do you have any idea about your clients' mobile phone usage in relation to smoking cessation assistance or health in general?

> How do you know?

> Is there any difference between your male and female clients?

第二節 − 目前的戒煙支援服務〔為瞭解從服務供應者的角度來看，目前所提供的服務是否有效及足夠，有否任何進一步發展的需要〕

Section 2 - Current cessation assistance services [*for understanding, from the viewpoint of service providers, if the services currently provided are effective and sufficient and if any further development needed*]

10. 為協助人們戒煙，戒煙保健會目前提供哪類干預(服務)？你們有否提供針對性別的服務？如有，你能否告訴我一些關於該些服務如何發揮作用的事情？

What kind of interventions do SAGHA currently provide to help people quit smoking? Do you provide gender-tailored services, and if so, can you tell something about how they are supposed to work?

11. 你認為目前所提供最有效的戒煙干預(服務)是甚麼？

> 以甚麼來說？（例如：成功戒煙率？成本效益？可取得性(無障礙)？易用(用法簡單)？其他？）

> 為甚麼？

What do you think are the most effective smoking cessation interventions currently provided?

> In terms of? (e.g. Cessation rate? Cost-effectiveness? Accessibility? User friendliness? Others?)
> Why?

12. 你是否可以告訴我，如果服務對象要求為克服他們嘗試戒煙時所遇到的困難（例如：緊張、煙癮、朋輩壓力等）而提供額外協助，會怎麼樣(發生甚麼事情)？

> 為甚麼？如何發揮功用？例如：他們可以如何克服困難？

Can you tell me what happens if the client requires additional assistance service to cope with the difficulties (e.g. stress, crave, peer pressure etc.) with their smoking quit attempts?

> Why and how can it work? For example, how do they cope with the difficulties?

第三節 – 對移動醫療戒煙支援服務的觀點〔*這是面談的最重要部分且需要深入討論；為瞭解服務供應者對包括有效的移動醫療戒煙支援服務的組成內容以及組成內容之間的關係的觀點*〕

Section 3 - Perspectives on cessation assistance mHealth [*this section is the most important part of the interview and needs to be discussed in detail; for understanding the perspectives from service providers including the components and the relationship between components of an effective smoking cessation mHealth intervention*]

13. 關於使用手機到醫療服務中，你知道些甚麼？

What do you know about the use of mobile phones in healthcare services?

14. 你知道任何關於移動醫療應用到提供戒煙支援的事情嗎？（*其他提問方法：你對'移動醫療'戒煙支援有沒有任何概念？*〔*如果受訪者對移動醫療（用到提供戒煙支援服務上）沒有任何概念，將向他們解釋關於移動醫療戒煙支援服務是：*先進的手機技術可以用來向吸煙者發送激勵的**(激發積極性)**、支持的訊息及資料，為他們克服在嘗試戒煙時面對的困難（並向他們展示市面為其他研究而設計的移動醫療應用程式/文字訊息）*，為的是給受訪者對移動醫療的一般概念，以便可以對隨後的問題提供合理的意見/觀點*〕。

Is there anything you know about mHealth involved in smoking cessation assistance provision? (*alternative*: Do you know anything about cessation assistance 'mHealth'?)[*If the participant does not have any idea about mHealth (to be used on the provision of smoking cessation assistance), it will be explained to them about smoking cessation assistance mHealth, that* **advanced mobile phone technology can be used for the delivery of motivational and supportive messages and information to smokers for them to cope with the difficulties faced while their cessation attempts (market available mHealth apps / text messages designed for other relevant studies will also be shown to them)**, *for giving the participant general idea*

about mHealth and so they can give sensible opinions / perspectives on the following questions]

15. 你可否就移動醫療如何有效提供戒煙支援發表你的意見？

Can you provide your opinion on how effective mHealth is in relation to providing cessation assistance?

➢ 你認為移動醫療服務應如何發送，為甚麼？（例如：發送手機短訊、多媒體訊息、WhatsApp或微信訊息；由手機應用程式自動彈出提示/資料；發送錄音或錄影(錄像)；與輔導人員即時對話等）

- 你為甚麼認為這種方式有效（*提示：可取得/無障礙*）？

- 在你們的男女服務對象之間，是否可能有任何不同的需求？

- 這是基於你提供服務給你們的對象的經驗？你個人的觀察/想像？你們的服務對象的反饋？從服務對象收集任何數據？

How do you think the mHealth intervention should be delivered and why? (e.g. Sending SMS, MMS, WhatsApp or WeChat messages, Notifications / Information automatically released from mobile apps, Delivering pre-recording audio or video, Real time conversation with counsellors etc.)

- Why do you think the form being effective (***Prompt***: accessibility)?

- Is there any possible different need between your male and female clients?

- Is it basing on your previous experience on providing service to your clients? Your own observation / imagination? Feedback from your clients? Any data collected from your clients?

➢ 如果提供移動醫療協助你們的服務對象嘗試戒煙，你認為他們會如何反應？（即是：移動醫療是否會被接受？是否有需求？）

- 為甚麼？

- 就移動醫療的可接受性來說，在你們的男女服務對象之間是否有任何差異？

How do you think your clients would respond if mHealth was provided to assist them with their smoking quit attempts (i.e. Will mHealth be acceptable/unacceptable and needed/not needed)?

- Why?

- Is there any difference, in terms of the acceptability of mHealth, between your male and female clients?

➢ 你認為甚麼類型的激勵/支持的資料/訊息對幫助你們的服務對象戒煙有效？〔*為訂定干預組件(組成內容)；此問題需詳細討論*〕

如果受訪者沒有回應，提示如下：

- 戒煙準備及技能教導－為你們的服務對象說明戒煙所需作的身心自我準備的步驟，以及對戒煙過程有幫助的特別技能；

- 戒煙的好處－提醒你們的服務對象，變為非吸煙者可以為自己及家人的健康、社交、及財政上帶來的好處；

題目： '在澳門一間戒煙機構為設計及建模移動醫療戒煙支援服務進行研究'

研究員（訪問員）：梁淑嫻

- 克服及相關策略－在心癮發作時提示及鼓勵你們的服務對象避免吸煙；

- 不適和困難－提醒你們的服務對象，他們因戒煙過程而可能會遇到的不適是正常的，並提醒他們如何克服該種不適；

- 鼓勵－為你們的服務對象繼續不吸煙、拒絕收煙作禮物及在社交聚會推卻遞來的煙（或遠離吸煙者）而提供激勵及支持；

- 再吸－（如果再吸）討論規範的脫軌情況及如果重回正軌；清晰戒煙的原因並再次承諾戒煙。

跟進問題：你們的男女服務對象是否發送不同的干預組件(內容)？

What kind of motivational / supportive information / messages do you think will be effective to help your clients' quitting? [*for identifying the intervention components; this question needs to be discussed in detail*]

Prompt followings if the participant doesn't bring it up:

- Preparing to quit and skills teaching – Describing steps for your clients to take in preparing themselves (mentally and physically) to quit smoking and specific skills to aid in the quitting process;

- Benefits of quitting – Reminding your clients the health-related, social, and financial benefits of their becoming a non-smoker;

- Coping and coping strategies – Advising and encouraging your clients to avoid smoking during an inner craving;

- Discomfort and difficulties – Reminding your clients how they may see their discomfort associated with the quitting process as normal and how to cope with such discomfort;

- Encouragement – Offering motivation and support to your clients to continue with quitting and to refuse cigarette gifting or cigarette sharing during social gathering (or to stay away from smokers);

- Relapse – (if relapse) Discussing the norms of slipping and how to get back on track; Clarifying reasons for quitting and to recommit

Follow-up question: Are there any differences in the intervention components delivered between your male and female clients?

➢ 你認為協助你們的服務對象戒煙/避免再吸最重要的組件內容是甚麼?為甚麼（重要）？它們如何發揮作用？

What do you think the most important components helping your clients' cessation attempts / avoiding relapse? Why (do they important)? How are they supposed to work?

➢ 如果因應個別吸煙者的戒煙進度（根據戒煙狀況），而發送不同的內容（即是：激勵及支持的訊息及資料），你認為怎樣？

提示：

題目：‘在澳門一間戒煙機構為設計及建模移動醫療戒煙支援服務進行研究’

研究員（訪問員）：梁淑嫻

- 戒煙前－戒煙準備、技能教導、提示戒煙的好處；
- 戒煙初期－提示心癮發作時的克服方法和策略，不適和困難的克服技能；
- 戒煙後期－鼓勵，以及如何處理作為一個非吸煙者的問題（處理緊張情緒、心情、體重增加）的技能教導；
- 脫軌/再吸－鼓勵將來再次嘗試戒煙。

Do you think if different components of cessation intervention (i.e. motivational and supportive messages and information) delivered in different stages (in according to the quitting status) for individual smoker?

Prompts on:

- Pre-quit – preparing quitting, skill teaching, and advising benefit of quitting;
- Early quit – advising coping and coping strategies for inner craving, discomfort and difficulties coping skills;
- Late quit – encouragement and skills teaching to deal with issues that arise as a non-smoker (e.g., handle stress, moods, weight gain);
- Slip/relapse – encouraging to try quitting again in the future

➢ 可否告訴我一些關於有潛在效力的干預內容之間的關係的事情？*提示：*這些內容是否必須按序提供（根據你們的服務對象的戒煙進度）？抑或是某些（例如：勸籲遠離其他煙民，拒絕遞來及送禮的煙）應發送較長時間及較頻密？前面的內容(組件)能否加強後者的效用？發送後面的內容又能否為你們的服務對象提供反思前者的機會？

Can you tell me something about the relationships between the potential effective intervention components? ***Prompt on***: Do they have to be provided consequently (in according to the cessation status of your clients)? Or should some components (e.g. advising your clients to stay away from other smokers, and to refuse cigarette sharing and cigarette gifting) be delivered for longer and more often? Can the former components enhance the effectiveness of the later? Can the delivery of later provide opportunities to your clients to have reflection on the former?

➢ 最適當的發送頻率如何？（例如：每天/每週/每月多少次？）*跟進問題：*如果根據個別吸煙者處在再吸曲線的不同點(不同的戒煙進度)，以不同頻密程度發送，你怎麼想？（*提示：*因應個別吸煙者的戒煙進度，以不同的頻率發送，例如：初期較多隨後較少？或初期較少隨後較多？）

How does the delivering frequency being most appropriate? (e.g. How many times daily / weekly / monthly?) ***Follow-up question***: What do you think if different frequencies at different points of the relapse curve for individual smoker? (***Prompt***: different frequencies in according to the cessation status of individual smoker, e.g. more often at the early stage? Or less often at the early stage and more later?)

➢ 你認為提供移動醫療干預需為時多長才會為協助你們的服務對象戒煙取得合理的效

果？

How long do you think the mHealth intervention would need to be provided to have a reasonable level of effectiveness to help your clients quit smoking?

16. 如果戒煙保健會把在西方國家設計的移動醫療戒煙應用程式/計劃，不經改動引入到澳門，你覺得怎樣？*提示：需否考慮任何文化性/地區性的因素？為甚麼？*〔*此問題需詳細討論*〕

What do you think if SAGHA introduce the existing cessation mHealth app / program designed in Western countries to Macao without modification? *Prompt on*: Should any cultural or regional specific issues be considered? Why? [*this question needs to be discussed in detail*]

17. 你認為移動醫療與戒煙保健會目前提供的服務有甚麼關係？*提示：移動醫療能否提升現時的服務的成效？在哪方面？*

What do you think mHealth in related to the cessation services currently provided by SAGHA? *Prompt on*: Can mHealth improve the effectiveness of current service? In what way?

18. 戒煙保健會推進移動醫療戒煙服務的可能障礙會是甚麼？*提示：人力資源？時間？缺乏培訓（為前線服務提供者）？技術的可用性？財政資助？服務對象的接受性低（提示：你們的服務對象所需付的費用？他們的知識水平？他們的手機擁有情況？他們使用手機的習性，即是：除打電話外，從不/很少使用手機）？跟進問題（針對服務對象的問題）：你是否認為你（或戒煙保健會的其他服務供應者）能促使你們的服務對象使用移動醫療？如何及為甚麼（為甚麼不）？*

What will be the possible barriers for SAGHA approaching cessation mHealth? *Prompt on*: Human resources? Time? Lack of training (for frontline service providers)? Availability of technology? Funding? Low acceptability of clients (*Prompts*: Cost from the pocket of your client? Their literate level? Their mobile phone subscription ownership? Their mobile phone usage pattern, i.e. never / seldom use their mobile phone other than making phone call)? *Follow-up question* (for clients' issues): Do you think you (or other service providers of SAGHA) can facilitate your clients using mHealth – how and why (why not)?

➢ （*除服務對象的問題以外*）你認為甚麼可以促使移動醫療戒煙服務易於發送？*提示：政策制定者（政府）的支持（例如：更多財政資助）？技術發展（外部取得/內部開發）？（為前線服務供應者）安排適當的培訓？如何實現？*

(*Other than clients' issues*) What do you think being potential facilitators making delivery of cessation mHealth easily? *Prompts on*: Supports (e.g. more funding) from policy makers (Government)? Technology development (outsourcing / in-house development)? Organising appropriate training (for frontline service providers)? How to achieve?

結尾

Closing

最後，有沒有任何你認為到目前為止仍未談及，而你想加入的內容？

Finally, is there anything else you would like to add that you feel we haven't covered so far?

Appendix 3-C

個人深入訪談 - 服務使用者

半結構性（大約**60**分鐘）

<u>Service User Individual In-depth Interview</u>
<u>Semi-Structure (approx. 60 minutes)</u>

背景資料

Background Information

請從列表中選擇一個化名，為保護你的身份，所有相關記錄將會以此化名標示。

Please choose a pseudonym from the list and the chosen pseudonym will be applied to label all relevant record for protecting your identity.

1. 請問你的職業/專業？

    What is your occupation / professional status?

2. 請問你所完成的教育程度？（例如：小學/初中/高中/大學/研究所）？

    What level of education have you completed? (e.g. primary / junior school / high school / undergraduate tertiary / postgraduate)?

3. 請問你在哪裡出生?（例如：澳門？國內(大陸)？香港？其他地方－哪裡？）

    Where were you born? (e.g. Macao? Mainland China? Hong Kong? Other - where?)

    ➢ （對非澳門出生者）請問你何時（幾歲時）移居澳門？

        (*for whom were not born in Macao*) When (at what age) did you migrate to Macao?

4. 請問你的婚姻狀況（單身、已婚/同居、離婚/分居、鰥寡）？

    What is your marital status (single, married / living with partner, divorced / separated, widowered / widowed)?

5. 你是否介意告訴我你的年齡？

    Would you mind to tell me how old are you?

6. 請問你是否有手機？有多少部手機(多少個手機號碼)？是智能手機嗎？

    Do you own a mobile phone? How many mobile phone subscriptions do you have? Is it (are them) Smartphone(s)?

7. 請問你使用手機的方式？（*提示：*撥打電話？發送及接收短訊/多媒體訊息/WhatsApp訊息/微信訊息？打機？上網？使用其他流動應用程式(手機Apps)?*跟進問題：*例如？常用甚麼流動應用程式(手機Apps)？）

    ➢ 如果有，多常使用（例如：有時，幾乎每天，每天，整天都用）？

    In what ways do you use your mobile? (**Prompts on**: Making phone call? Sending and receiving SMS/MMS/WhatsApp messages/WeChat message? Playing games? Exploring on the Internet? Using other apps? **Follow-up questions**: Such as? What kind of apps are you always using?)

    ➢ How often, it at all (e.g. sometimes, almost everyday, everyday, all the day)?

題目：'在澳門一間戒煙機構為設計及建模移動醫療戒煙支援服務進行研究'

研究員（訪問員）：梁淑嫻

第一節 – 吸煙行為

Section 1 - Smoking behaviours

我現在想要問你一些關於你的吸煙行為的事情

Now, I want to ask you something about your smoking behaviour.

8. 請問你目前平均每天吸多少枝煙（<10枝，10-20枝，>20枝）？

   On average, how many cigarettes per day do you currently smoke (e.g. <10; 10-20; >20)?

9. 你在幾歲開始養成吸煙習慣（即是：每天都吸煙）？（其他提問方法：你開始慣常吸煙的歲數？/你慣常吸煙多少年了？）

   At what age did you start to smoke regularly (i.e. at least one tobacco product / cigarette a day)? (*alternative*: Age you started regular smoking? / How many years have you smoked regularly?)

10. 你可否解釋一下，你為甚麼開始吸煙（即是：你為何養成在日常生活中吸煙的習慣）？

    （*如果受訪者沒有回應，提示如下*：從試吸第一口煙開始？因為緊張？沮喪(意志消沉)？吸煙可以刺激思維、使你精神集中、及增加體力？社交聚會（別人遞煙）？做個真男人（吸煙很型(酷)）？（*如果受訪者在國內長大*）受毛主席/鄧小平的偉人形象影響？在成長過程中受長輩影響（甚至鼓勵）（誰）？*跟進問題*：

    ➢ 當你還是一個小孩/少年時，你曾否幫家中長輩買煙？

    ➢ 當你還是一個小孩/少年時，你曾否在家中取得香煙？由誰那裡？如何取得？（例如：他們給的？你自己拿的？）

    〔*為瞭解文化及傳統因素，以及性別角色對吸煙行為的影響*〕

    Can you explain why did you start smoking (i.e. why did you adopt smoking as your regular behaviour in your daily living)? (***Prompt followings if the participant doesn't bring it up***: Since the first try? Because of stress? Depression? Smoking stimulating thinking and concentration and increasing energy? Social gathering (Cigarette sharing)? Being a real man (Smoking is cool)? (*for whom grew up in Mainland China*) Being influenced by the great images of Mao and Deng? Being influenced (or even motivated) by other elders (whom?) when you grew up? ***Follow-up questions***:

    ➢ Have you even helped the elders in your family buying cigarette for them when you were a kid / teenager?

    ➢ When you were a kid / teenager, have you gotten cigarette in your family? From whom? How? (e.g. giving by them? you took the cigarette by yourself?)

    [*for understanding the cultural and traditional issues and gender roles influence their smoking behaviour*]

11. 吸煙對你有甚麼意義（吸煙意味著甚麼）？〔*為瞭解他們的吸煙信念，此問題需深入討論*〕

    ➢ 對你的日常生活有益抑或有害？（*提示*：影響你的健康？影響你家人的健康，誰（例

如：配偶、父母、子女）、如何影響？影響你的社交生活？使你放鬆？使你精神集
中？其他？）

➢ 為甚麼？

What does smoking mean to you? [*for understanding their belief of smoking; **this question needs to be discussed in detail**]

➢ Helpful or harmful for your daily living? (**Prompts on***: Affecting your health? Affecting the health of your family members, whom (e.g. spouse, parents, kids) and how? Affecting your social life? Making you relax? Making you concentrated? Other?)

➢ Why?

第二節 – 戒煙行為

Section 2 - Cessation behaviours

12. 請問你以前曾否嘗試戒煙？

➢ 多少次？

➢ 你最多能停止吸煙多久？

➢ 請問你嘗試戒煙的原因？

如果受訪者沒有回應，提示如下：

- 家庭壓力（由誰）？

- 健康的考慮（為自己及家人，誰？即是：配偶、父母、子女）？（*跟進問題：（如果是為家人）以甚麼方式？（如果是為配偶）你的妻子在懷孕嗎？（如果是為子女）你的孩子多大？（如果是父母）他（們）在生病嗎？甚麼病？*）

- 在家庭中樹立榜樣？即是：吸煙並不是孩子的好榜樣（你的孩子多大？*跟進問題（如有少年子女的）：兒子還是女兒？他（她）（任一個）在開始吸煙嗎？*）

- 別人勸告及例子，誰，為甚麼？

- 費用？

- 工作地點、公共交通工具、其他室內公眾場所、家裡不准吸煙？

Have you ever made an attempt to stop smoking before?

➢ How many times?

➢ How long, it at all, were you able to abstain from smoking?

➢ Your reasons for trying to stop smoking?

Prompt followings if the participant doesn't bring it up:

- Family pressure? (from whom?)

- Health concern (for self and family members, whom? i.e. spouse, parents or kids)? (**Follow-up questions**: (*if family members*) in what means? (*if spouse*) is your wife currently pregnant? (*if kids*) how old is (are) your kid(s)? (*if parents*) does/do he/she/they get sick? what kind of?)

- Example setting in the family? i.e. smoking is not setting a good example for

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kids? (how old is (are) your kid(s)? ***Follow-up questions*** *(with teenaged son(s) / daughter(s)):* Son (s) or daughter (s)? Is he/she/any of them starts smoking?)

- Advice and example from others, whom and why?
- Cost?
- Restrictions on smoking in workplace, on public transportation, in other public indoor place, at home?

13. 你曾使用甚麼策略(方法)幫助自己戒煙？（*如果受訪者沒有回應，提示如下：*意志力？行為控制方式（遠離吸煙者、分散精神、做運動、飲茶或其他）？醫學方法（例如尼古丁替代療法、中藥、針灸）？家人支持（誰）？其他戒煙產品（哪類）？其他？）

What strategies have you used to help you in your attempts to quit smoking? (***Prompt followings if the participant doesn't bring it up***: Will power? Behaviour approach (stay away from smokers, distract, do exercises, drink tea and so on)? Medical measures (like nicotine replacement, Chinese traditional medicine, Chinese acupuncture)? Family help (by whom)? Commercial cessation products (what kind of)? Other?)

14. 你認為哪種(些)方法最有效或最有用？它們對你如何發揮作用？為甚麼？

Which methods do you think was most effective or useful? How did they work for you? Why?

15. 請問你戒煙的障礙或再吸煙的原因是甚麼？

➢ 甚麼情況對你的影響最大，使你煙癮發作並因此而再吸煙？

如果受訪者沒有回應，提示如下：

- 在社交場合（例如：和其他吸煙者在一起，在男人與男人談話時對方遞煙等。*跟進問題：*你曾否嘗試推卻遞給你的煙？為甚麼？）
- 收煙作禮物（誰送的？為甚麼送？例如：過節時孝敬長輩/上司，當有人想與你建立關係時？*跟進問題：*你曾否婉拒收禮？為甚麼？）
- 當感覺緊張、負面、情緒低落、孤單？
- 當感覺正面或興高采烈，或在娛樂時（例如：看運動比賽等）？
- 打麻將/玩撲克牌（為賭博）、賭馬、在賭場賭博？
- 心癮發作？

What were the barriers to cease or reasons for your smoking relapse?

➢ The most influential situations that caused you to crave smoking and therefore to relapse?

Prompt followings if the participant doesn't bring it up:

- In social situations (e.g. in the company of other smokers, cigarette sharing with peers in man's talk etc. ***Follow-up questions***: Have you even tried to refuse the offer of cigarette sharing? Why?)
- Cigarette gifting (from whom? what for? e.g. gifting for elders / superiors in festivals, when someone intends to build relationship with you? ***Follow-up***

questions: Have you even declined the gift? Why?)

- When feeling stressed, negative, down, or alone?
- When feeling positive or elated, or during entertainment (e.g. watching sport etc.)?
- When playing Mah-jong / cards for money, betting on horse racing, or gambling in casino?
- Inner cravings?

第三節 – 受訪者對移動醫療的理解/經驗

Section 3 – Participants' understanding / experience on mHealth

16. 關於手機與醫療的關係，你可否說一些甚麼？（例如：你曾否收到衛生中心或山頂醫院門診發給你的手機短訊，提醒你預約時間？）*如果沒有，跳到第四節*

    Is there anything you can tell me about mobile phone in relation to healthcare? (e.g. have you even received SMS from healthcare centres or governmental outpatient clinics for reminding your medical appointments?) *If nothing, skip to Section 4*

17. 你可否告訴我任何關於移動醫療的東西？*提示：你有甚麼使用移動醫療的經驗？移動醫療對你來說有用抑或沒用？*

    Can you tell me anything about mHealth? *Prompts on*: What were your experiences on using mHealth? Do you think mHealth being useful or useless for you?

18. 你可否告訴我任何關於使到手機到提供戒煙服務的事情？*如果沒有，解釋以下內容後，跳到第四節*〔*如果受訪者對移動醫療（用到提供戒煙支援服務上）沒有任何概念，將向他們解釋關於移動醫療戒煙支援服務是：**先進的手機技術可以用來向吸煙者發送激勵的(激發積極性)、支持的訊息及資料，為他們克服在嘗試戒煙時面對的困難**，為的是給受訪者對移動醫療的一般概念，以便可以對隨後的問題提供合理的意見/觀點*〕。

    Can you tell me anything about the use of mobile phones in smoking cessation services provision? *If nothing, explain the following and go to Section 4* [*If the participant does not have any idea about mHealth (to be used on the provision of smoking cessation assistance), it is necessary to explain to them about smoking cessation assistance mHealth, that* **advanced mobile phone technology can be used for the delivery of motivational and supportive messages and information to smokers for them to cope with the difficulties faced while their cessation attempts**, *for giving the participant general idea about mHealth and so they can give sensible opinions / perspectives on the following questions*]

第四節 – 對移動醫療戒煙支援服務的觀點〔*為瞭解服務使用者對包括有效的移動醫療戒煙支援服務的組成內容以及組成內容之間的關係的觀點；**這是此項研究最重要的章節***〕

Section 4 – Perspectives on cessation assistance mHealth [*for understanding the perspectives from service user including the components and the relationship between components of an effective smoking cessation mHealth intervention; **it is the most***

important section of the study]

19. 你能否告訴我關於戒煙保健會目前為支持你戒煙而向你提供的協助？你想要任何額外的支持嗎？

    Can you tell me something about the SAGHA assistance currently provided to you in supporting your cessation attempts? Any additional support do you want to have?

20. 除戒煙保健會目前提供給你的戒煙協助以外，你有興趣定時，在你的手機中接收一些引導(激勵)及支持你戒煙（或提醒你，你正在嘗試戒煙）的額外資料/訊息嗎？*（需向受訪者解釋這是移動醫療戒煙支援服務）*

    ➢ 你喜歡以甚麼方式提供戒煙應用程式/項目到你的手機中（例如：發送手機短訊、多媒體訊息、WhatsApp或微信訊息；由手機應用程式自動彈出提示/資料；發送錄音或錄影(錄像)；與輔導人員即時對話等）

    ➢ 你為甚麼認為這種方式有效？

    ➢ 使用移動醫療戒煙服務（即是：透過你的手機獲取資料/接收訊息）有任何優點嗎？

    提示：可取得(無障礙)？方便（在任何時間/任何地方）？

    In addition to the cessation assistance currently offered to you by SAGHA, would you be interested in receiving additional information / messages provided periodically to you onto your mobile phone for motivating and supporting your cessation attempt (or for keeping you being reminded about your cessation attempting status)? **(*it is needed to explain to participants that it is 'mHealth' smoking cessation intervention*)**

    ➢ In what way would you prefer the smoking cessation app/program delivered onto your mobile phone? (e.g. Sending SMS, MMS, WhatsApp or WeChat messages, Notifications / Information automatically released from mobile apps, Delivering pre-recording audio or video, Real time conversation with counsellors etc.)

    ➢ Why do you think the form being effective?

    ➢ Are there any advantages on using cessation mHealth (i.e. having information / receiving messages through your mobile phone)? ***Prompt on****:* Accessibility? Convenience (at anytime / anywhere)?

21. 你認為甚麼類型的激勵/支持的資料/訊息有效幫助你戒煙？為甚麼？〔*為訂定干預組件(組成內容)*〕

    如果受訪者沒有回應，提示如下：

    - 說明為戒煙而需作的身心自我準備的步驟，以及對戒煙過程有幫助的特別技能；
    - 提醒你，變為非吸煙者可以為你及家人的健康、社交、及財政上帶來的好處；
    - 在心癮發作時提示及鼓勵你避免吸煙；
    - 提醒你因戒煙過程而可能會遇到的不適是正常的，並提醒你如何克服該種不適；
    - 為你繼續不吸煙、拒絕收煙作禮物及在社交聚會推卻遞來的煙（或遠離吸煙者）而提供激勵及支持；
    - （如果再吸）討論規範脫軌的情況及如果重回正軌；清晰戒煙的原因並再次承諾

戒煙。

What kind of motivational / supportive information / messages do you think may be effective for helping your cessation attempt? Why? [*for identifying the intervention components*]

Prompt followings if the participant doesn't bring it up:

- Describing steps to take in preparing (mentally and physically) to quit smoking and specific skills to aid in the quitting process;
- Reminding you the health-related (to you and your family), social, and financial benefits of becoming a non-smoker;
- Advising and encouraging you to avoid smoking during an inner craving;
- Reminding how you may see your discomfort associated with the quitting process as normal and how to cope with such discomfort;
- Offering motivation and support to you to continue with quitting and to refuse cigarette gifting or cigarette sharing during social gathering (or to stay away from smokers);
- (*if relapse*) Discussing the norms of slipping and how to get back on track; Clarifying reasons for quitting and to recommit

22. 你認為協助你戒煙/避免再吸煙最重要的組件內容是甚麼？為甚麼（重要）？它們如何發揮作用？

What do you think the most important components helping your clients' cessation attempts / avoiding relapse? Why (do they important)? How are they supposed to work?

23. 可否告訴我一些關於有潛在效力的干預內容之間的關係的事情？*提示：這些內容是否必須按序提供（根據你的戒煙進度）？抑或是某些（例如：勸籲遠離其他煙民，拒絕遞來及送禮的煙）應發送較長時間及較頻密？前面的內容(組件)能否加強後者的效用？發送後面的內容又能否為你提供反思前者的機會？*

Can you tell me something about the relationships between the potential effective intervention components? ***Prompt on:*** Do they have to be provided consequently (in according to your own cessation status)? Or should some components (e.g. advising you to stay away from other smokers, and to refuse cigarette sharing and cigarette gifting) be delivered for longer and more often? Can the former components enhance the effectiveness of the later? Can the delivery of later provide you opportunities of reflection on the former?

24. 你想手機訊息發送多寡(多頻密)（每日、每週、每月）？為甚麼？*跟進問題：如果根據你的戒煙進度（即是：處於不同階段），以不同頻密程度發送，你怎麼想？例如：初期較多隨後較少？或初期較少隨後較多？*

How often would you want this mobile phone message sent (daily, weekly, monthly)? Why? ***Follow-up questions:*** What do you think if different frequencies in according to your cessation status (i.e. at different stages)? e.g. more often at the early stage and

less later? Or less often at the early stage and more later?

25. 你會否喜歡移動醫療服務為你度身訂做(量身裁設)？（例如：它們是根據你先前嘗試戒煙但再吸的經驗而設計（例如：如果你是在社交場合再吸，提醒你在社交聚會中推卻遞來的煙或婉拒送禮的煙的技巧）？你可以自行決定接收訊息/資料的時間？只有文字或是圖文訊息？有聲或是無聲？）

Would you like mHealth services being tailored on your own needs? (e.g. They are designed with basing on your relapse experience in your previous attempts (e.g. if you relapsed in social situation, reminding the skills of refusing cigarette sharing in social gathering or of declining cigarette gifting)? You can determine the time of receiving messages / information? Text only or graphical message? Sound or soundless?)

26. 如果提供移動醫療，你願意使用嗎？
   ➢ 如果免費提供？
   ➢ 如果你要自負費用？
   （如果答案是否定的話）**跟進問題：**
      - 有甚麼可以令你更願意使用移動醫療？（*其他提問方法：有甚麼措施會激發你使用移動醫療的意願？*）
      - 有任何潛在的障礙嗎？你為甚麼視那些為此類計劃的障礙？
      - 使用移動醫療戒煙服務有甚麼缺點嗎？為甚麼？
   〔*此問題需詳細討論以瞭解使用移動醫療的潛在促進因素及障礙*〕

Are you willing to use mHealth if it is available?
➢ If it is provided free of charge?
➢ If it is only provided on your own cost?
(If negative answer given) **Follow-up questions**:
   - What would make you more willing to use mHealth? (*alternative*: What measures will stimulate your willingness of using mHealth?)
   - Are there any potential barriers and why do you see them as barriers with this type of program?
   - Are there any disadvantages of using cessation mHealth? Why?
   [**these questions need to be discussed in detail** *for understanding the potential facilitators and barriers of using mHealth*]

27. 如果戒煙保健會提供移動醫療戒煙支援服務，對你來說可取嗎？**提示：**對你取得移動醫療有任何重大障礙或促進因素嗎（即是：你清楚懂得如果使用你的手機取得移動醫療，例如接收及讀取短訊、使用手機應用程式嗎？）
   ➢ 會有甚麼促進因素/方式令移動醫療更好地配合你的需要（*其他提問方法：移動醫療如何設計來配合你的需要*）？
   〔*此問題需詳細討論以瞭解使用移動醫療的潛在促進因素及（可能有的）可能障礙，以及潛在問題*〕

If mHealth cessation assistance will be provided by SAGHA, what would accessing

mHealth be like for you? **Prompts on**: Any critical barriers or facilitators for you accessing mHealth (i.e. you know well how to use your mobile phone on accessing mHealth, such as receiving and reading messages, using mobile apps)?

➢ What will be the facilitators / aspects that make mHealth working better to suit your need (*alternative*: How will the mHealth intervention design be suiting your need)?

[**this question needs to be discussed in detail** *for understanding the potential facilitator and (probably) possible barriers and latent concerns of using mHealth*]

28. 你認為移動醫療對你意味著甚麼（及與你成功戒煙的關係）？

➢ 在甚麼方面？如何？

➢ 為甚麼？

What do you think mHealth means to you (and in relation to your successful cessation attempt)?

➢ In what way? How?

➢ Why?

結尾

Closing
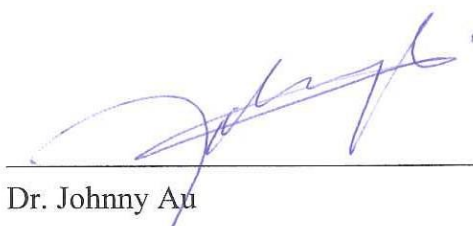
最後，有沒有任何與戒煙輔助相關的，但你認為到目前為止仍未談及，而你想加入的內容？

Finally, is there anything else you would like to add that you feel we haven't covered so far in relation to smoking cessation assistance?

Letter of Permission

I have seen and understood the research entitled "A Study to Design and Model Smoking Cessation Assistance mHealth in a Macau Smoking Cessation Agency" that Ms. Sok Han Leong is undertaking, in relation to the proposed study to investigate mHealth being applied for smoking cessation assistance.   I agree for Ms. Leong to have access to our clients and staff for the purpose of recruiting participants for her Doctor of Public Health dissertation, in order that she completes her course requirements.   I also agree for some of our staff to assist Ms. Leong with the recruiting of clients because it is unethical for Ms. Leong to directly access our client database.

Dr. Johnny Au
Director General
Smoking Abstention & Good Health Association

書面許可

本人已知悉並瞭解梁淑嫻女士正在進行的一項題為"在澳門一間戒煙機構為設計及建模移動醫療戒煙支援服務進行研究"的研究,此項目是對應用移動醫療到戒煙支援進行研究。本人同意梁女士為完成其公共衛生博士論文的要求而招募本機構的戒煙服務對象及工作人員參與研究。鑑於梁女士在論理上不許直接取得客戶數據庫的資料,為此,本人同意本機構的工作人員為梁女士招募本機構的戒煙服務對象提供協助。

戒煙保健會
理事長
歐家輝博士

Sr. Lecturer George Tsourtos, PhD
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CRICOS Provider No. 00114A

LETTER OF INTRODUCTION

Dear Sir/Madam

This letter of introduction is written by Dr. George Tsourtos, Senior Lecturer of Public Health at Flinders University (Australia). This letter is to introduce Ms Sok Han Leong who is a Doctorate student in the Discipline of Public Health at Flinders University. Sok will produce her student card, which carries a photograph, as proof of identity.

Sok is undertaking a study entitled "A Study to Design and Model Smoking Cessation Assistance mHealth in a Macau Smoking Cessation Agency" which is a part of her study in the Doctor of Public Health program.

Sok would be most grateful if you would volunteer to assist in this study, by granting an interview which covers certain aspects of this topic. A shopping voucher valued MOP 150 will be provided to you as participant reimbursement for any travel expenses incurred and time spent participating. The interview is estimated to be approximately 60 minutes.

Be assured that any information provided will be treated in the strictest confidence and none of the participants will be individually identifiable in the study report. You are, of course, entirely free to discontinue your participation at any time or to decline to answer particular questions.

The interview will be audio recorded. As Sok intends to make an audio recording of the interview, she will seek your consent, on the attached form, to record the interview in preparing the study report, on condition that your name or identity is not revealed. It may be necessary to make the recording available to authorised administrative staff for transcription, in which case you may be assured that such persons will be advised of the requirement that your name or identity not be revealed and that the confidentiality of the material is respected and maintained.

Any enquiries you may have concerning this study should be directed to me at the address given above or by telephone on +61 8 7221 8418, by fax on +61 8 7221 8424 or by email (george.tsourtos@flinders.edu.au).

Thank you for your attention and assistance.

Yours sincerely

George Tsourtos, Senior Lecturer, PhD
Discipline of Public Health

> *This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 6304). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on +61 8 8201 3116, by fax on +61 8 8201 2035 or by email human.researchethics@flinders.edu.au*

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CRICOS Provider No. 00114A

介 紹 信

尊敬的先生／女士

這封介紹信是由（澳洲）弗林德斯大學公共衛生學科高級講師 George Tsourtos 博士所撰寫，這封信是為引介梁淑嫻女士，她是弗林德斯大學公共衛生學科的博士生，她會出示印有照片的學生證作為身份證明。

她正在進行一項題為"在澳門一間戒煙機構為設計及建模移動醫療戒煙支援服務進行研究"的研究，這是她修讀公共衛生博士的研究計劃的一部分。

如果你自願參與協助這項研究，接受涉及這個主題的某些方面內容的訪談，她將會不勝感激，並會提供一張價值一百五十澳門元（MOP 150）的購物券作為閣下參與面談的交通費用及面談時間的補貼。預計訪談大約進行 60 分鐘。

保證所提供的任何信息將會被嚴格地保密，沒有參與者將在研究報告中被單獨識別。你當然可以完全自由地在任何時候終止你的參與或拒絕回答任何具體問題。

訪談將會進行錄音。由於她打算為編制研究報告而對訪談進行錄音，她會在後附的表格上徵求你的同意，前提是你的姓名或身份不會被披露。如錄音需要交予獲授權的行政人員進行轉錄，請閣下放心，該等人員將被告知有關不可披露閣下姓名及身份的要求，而內容的機密性必須獲尊重及維持。

如對本研究有任何查詢，你可直接透過上列地址、電話：+61 8 7221 8418、傳真：+61 8 7221 8424、或電子郵件（george.tsourtos@flinders.edu.au）聯絡我。

感謝您的關注和協助。

尚此。

（簽名如英文版本所示）

George Tsourtos　　高級講師　　哲學博士
公共衛生學科

> 這個研究項目已獲弗林德斯大學社會和行為研究倫理委員會批准（項目編號：6304）。如需更多關於計劃的倫理批准資料，可透過電話+61 8 8201 3116、傳真+61 8 8201 2035、或電子郵件 *human.researchethics@flinders.edu.au* 與委員會執行主任聯絡。

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CRICOS Provider No. 00114A

Flinders
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INFORMATION SHEET

Title: 'A Study to Design and Model Smoking Cessation Assistance mHealth in a Macau Smoking Cessation Agency'

Researcher (Interviewer):
Ms Sok Han Leong

Description of the study:
This project is part of the researcher's academic study (Doctor of Public Health) and is supported by the Discipline of Public Health of Flinders University (Australia). This project is designed for developing a smoking cessation assistance service via mobile phone usage in Macau.

Purpose of the study:
This study will help to gather evidence and to understand components informing the design of a gender sensitive and regional culture orientated smoking cessation assistance service with the utilisation of mobile phone technology in Macau.

What will I be asked to do?
You are invited to attend a one-on-one face-to-face interview, with the researcher who is a current Doctor of Public Health student of Flinders University. The researcher will ask you a few questions about your opinions on the preferred and efficient model of a smoking cessation assistance service with the utilisation of mobile phone technology. The interview is estimated to be approximately 60 mins. The interview will be audio recorded. The audio record will be transcribed by the researcher and kept on a computer file. The transcribed computer file and the audio record will be stored with security code for 12 months after the completion of the study and then destroyed. Your participation is completely voluntary and you will be free to change your mind about participating at any time.

What benefit will I gain from being involved in this study?
There may be no direct benefit to you associated with this study but the sharing of your opinions may improve the planning and delivery of future smoking cessation programs.

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Will I be identifiable by being involved in this study?
We do not need to record your name and you will be anonymous. Once the interview has been recorded, transcribed and saved as a computer file, the voice file will then be destroyed at the end of the study. All records containing personal information will remain confidential and no information that could lead to your identification will be released. We will treat any information provided in the strictest confidence and no-one will be individually identifiable in publications from this research project. To ensure your confidentiality we will maintain a central database of participants that is only available to the research team members and we will ask you to choose a pseudonym. The recording and transcript of your interview will be labelled with this pseudonym to protect your identity, as we may be making the recording available to authorised secretarial assistants for transcription, or to the supervisors (Dr George Tsourtos and Dr Lillian Mwanri, both located at Flinders University, Discipline of Public Health), as well as the researcher.

Are there any risks or discomforts if I am involved?
There are no risks anticipated by the researcher or her supervisors but if there are discomforts please raise them with the researcher. You are not obligated to respond to any questions that make you feel uncomfortable. Free counselling services will be arranged if you need. Please contact the researcher on (853) 66401839 for arranging the counselling service.

How do I agree to participate?
Participation is voluntary. You may answer 'no comment' or refuse to answer any questions and you are free to terminate and withdraw from the interview at any time without effect or consequences. A consent form accompanies this information sheet. If you agree to participate please read and sign the consent form and give the consent form to the researcher.

How will I receive feedback?
If you are interested, the written transcript of what was discussed in your interview will be given back to you to check. You will be able to make changes if you think it is not an accurate record of the conversation, or you wish to remove any part of the transcript you are not comfortable with. In addition, the outcomes from the project will be summarised and given to you by the researcher if you would like to see them.

Thank you for taking the time to read this information sheet and we hope that you will accept our invitation to be involved.

A-47

梁淑嫻女士

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CRICOS Provider No. 00114A

研 究 資 料 表

題目： "在澳門一間戒煙機構為設計及建模移動醫療戒煙支援服務進行研究"

研究員（訪問員）：
梁淑嫻女士

研究說明：
本項目是研究員的學術研究（公共衛生博士）的一部分，且獲得（澳洲）弗林德斯大學公共衛生學科的支持。本項目的設計旨在，在本澳開發運用手提電話提供的戒煙服務。

研究目的：
本研究為在澳門運用先進的手提電話技術到一項顧及性別差異並以本地文化為導向的戒煙服務的設計收集證據並瞭解服務的內容。

我將被要求做甚麼？
你將被邀請參與進行一次由現攻讀弗林德斯大學公共衛生博士的研究員所進行的單對單、面對面的訪談。研究員會向你提問一些關於你對在澳門運用手提電話技術到戒煙服務的理想及有效模式的意見的問題。預計訪談大約進行 60 分鐘，訪談將被錄音。錄音將由研究員轉錄並儲存成電腦檔案，而轉錄的電腦檔案及錄音將會以密碼上鎖，並保存十二個月，至研究完成後將會被銷毀。你的參與完全是自願的，且你可以隨時任意改變參與的意願。

我將因參與這項研究而有甚麼得著？
你未必會因是項研究而直接受惠，但分享你的意見或可改進將來戒煙項目的計劃及提供。

我會在參與的這項研究中被識別嗎？

我們無需記錄你的名字，且你將會被匿名。訪談進行的錄音將會在記錄、轉錄及儲存成電腦檔案後，在研究終結時被銷毀。所有包含個人資料的記錄將會保密，沒有資料會令你的身份被暴露。我們會以絕對保密的方式處理所提供的任何資料，沒有人會在本研究計劃的著作中被個別辨識。為確保你的身份的機密，我們有一套只有研究小組成員可以取得的參與者的中央資料庫，我們會要求你選擇代號。由於我們為了讓獲授權的助理人員進行轉錄工作而可能把記錄交給助理人員，或指導教授（George Tsourtos 博士及 Lillian Mwanri 博士，兩人均位處弗林德斯大學公共衛生學科）以及研究員，為保護你的身份，訪談記錄及轉錄檔案將會以代號標示。

如果我參與，是否會有任何風險或不適？

研究員及其指導教授預計你的參與沒有風險，但你如果有不適，請向研究員提出。你沒有義務回應任何令你感覺不適的問題。如果你有需要，將為你安排免費的諮詢服務，請與研究員聯繫（電話：(853) 66401839），以便作出安排。

我怎麼同意參與？

參與是自願的。你可以回答"無可奉告"或拒絕回答任何問題，你可以在任何時間自由終止和退出訪談而沒有影響或後果。研究資料表隨附知情同意書，如果你同意參與，請閱讀及簽署該知情同意書並將之交給研究員。

我將如何獲得反饋？

如果你有興趣，你的訪談討論內容的書面轉錄將交回給你檢查。如果你認為並非對話的正確記錄，或如果你欲刪除令你不適的轉錄內容，你可以作出修改。此外，如果你想要參閱，研究員將會把此項目的結果作出總結並交給你。

感謝你抽空閱讀此研究資料表，我們希望你能接受我們的邀請並參與。

CONSENT FORM FOR PARTICIPATION IN RESEARCH
(by interview)

A Study to Design and Model Smoking Cessation Assistance mHealth
in a Macau Smoking Cessation Agency

I ………

being over the age of 18 years hereby consent to participate as requested in the 'Letter of Introduction' and 'Information Sheet' for the research project on "A Study to Design and Model Smoking Cessation Assistance mHealth in a Macau Smoking Cessation Agency".

1.   I have read the information provided.

2.   Details of procedures and any risks have been explained to my satisfaction.

3.   I agree to audio recording of my information and participation.

4.   I am aware that I should retain a copy of the Information Sheet and Consent Form for future reference.

5.   I understand that:

   - I may not directly benefit from taking part in this research.

   - I am free to withdraw from the project at any time and am free to decline to answer particular questions.

   - While the information gained in this study will be published as explained, I will not be identified, and individual information will remain confidential.

   - I may ask that the recording be stopped at any time, and that I may withdraw at any time from the session or the research without disadvantage.

6.   I **agree/do not agree*** to the audio record and the transcript of my participation being made available to other researchers who are not members of this research team, but who are judged by the research team to be doing related research, on condition that my identity is not revealed.   ** delete as appropriate*

7.   I have had the opportunity to discuss taking part in this research with a family member or friend.

Participant's signature…………………………………………**Date**………………………

I certify that I have explained the study to the volunteer and consider that she/he understands what is involved and freely consents to participation.

Researcher's name…*Sok Han Leong*………………………………….…................…

Researcher's signature…………………………………………**Date**………………………

NB: *Two signed copies should be obtained. The copy retained by the researcher may then be used for authorisation of Items 8, as appropriate.*

---

8. I, the participant whose signature appears below, have read a transcript of my participation and agree to its use by the researcher as explained.

Participant's signature……………………………………Date…………………....

參與研究的知情同意書

(訪談方式)

> "在澳門一間戒煙機構為設計及建模移動醫療戒煙支援服務進行研究"

本人………

超過18歲,現同意應《介紹信》和《研究資料表》的要求參與題為 "在澳門一間戒煙機構為設計及建模移動醫療戒煙支援服務進行研究" 的研究項目。

1. 我已閱讀所提供的資料。

2. 就程序和任何風險的詳情,我已獲得滿意的解釋。

3. 我同意就我的資料和參與進行錄音。

4. 我知道我應該保留一份研究資料表及知情同意書的副本以供日後參考。

5. 我理解:

    - 我可能不會直接受惠於成為這項研究的一部分。

    - 我有自由隨時退出此項目,或拒絕回答具體問題。

    - 如同解釋,即使在這項研究中獲得的資料將被公布,我不會被識別,個人信息將保密。

    - 我可以在任何時候要求中止錄音,且可以在訪談或研究的任何時候退出而不會帶來不利影響。

6. 我**同意 / 不同意***讓錄音及轉錄提供給不屬於這個研究小組的其他研究人員,而該研究人員經研究小組判斷為在進行相關研究的情況下,但前提是我的身份不會被披露。   *刪去不適用者*

7. 我已有機會就參與成為這項研究的一部份而與家人或朋友討論。

參與者簽名……………………………………………………… 日期…………………………

我證明我已向自願參與者解釋過這項研究,並考慮到他/她明白何謂涉及和自由同意參與。

研究員姓名…*梁淑嫻*………………………………………………………………………

研究員簽名……………………………………………………… 日期…………………………

註: *應取得兩份已簽名的文本,在適用的情況下,由研究員所保留的文本可能被用於項目8的授權。*

8. 本人，以下簽署的參與者，已閱本人的參與轉錄，並同意由研究員使用如同闡述的內容。

參與者簽名﹒﹒﹒日期﹒﹒﹒﹒﹒﹒﹒﹒﹒﹒﹒﹒﹒﹒﹒﹒﹒﹒﹒

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CRICOS Provider No. 00114A

LETTER OF INTRODUCTION

Dear Sir/Madam

This letter of introduction is written by Dr. George Tsourtos, Senior Lecturer of Public Health at Flinders University (Australia). This letter is to introduce Ms Sok Han Leong who is a Doctorate student in the Discipline of Public Health at Flinders University. Sok will produce her student card, which carries a photograph, as proof of identity.

Sok is undertaking a study entitled "A Study to Design and Model Smoking Cessation Assistance mHealth in a Macau Smoking Cessation Agency" which is a part of her study in the Doctor of Public Health program.

Sok would be most grateful if you would volunteer to assist in this study, by granting an interview which covers certain aspects of this topic. A shopping voucher valued MOP 150 will be provided to you as participant reimbursement for any travel expenses incurred and time spent participating. The interview is estimated to be approximately 60 minutes.

Be assured that any information provided will be treated in the strictest confidence and none of the participants will be individually identifiable in the study report. You are, of course, entirely free to discontinue your participation at any time or to decline to answer particular questions.

The interview will be audio recorded. As Sok intends to make an audio recording of the interview, she will seek your consent, on the attached form, to record the interview in preparing the study report, on condition that your name or identity is not revealed. It may be necessary to make the recording available to authorised administrative staff for transcription, in which case you may be assured that such persons will be advised of the requirement that your name or identity not be revealed and that the confidentiality of the material is respected and maintained.

Any enquiries you may have concerning this study should be directed to me at the address given above or by telephone on +61 8 7221 8418, by fax on +61 8 7221 8424 or by email (george.tsourtos@flinders.edu.au).

Thank you for your attention and assistance.

Yours sincerely

George Tsourtos, Senior Lecturer, PhD
Discipline of Public Health

> *This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 6304). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on +61 8 8201 3116, by fax on +61 8 8201 2035 or by email human.researchethics@flinders.edu.au*

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高級講師 George Tsourtos, PhD

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CRICOS Provider No. 00114A

介 紹 信

尊敬的先生／女士

這封介紹信是由（澳洲）弗林德斯大學公共衛生學科高級講師 George Tsourtos 博士所撰寫，這封信是為引介梁淑嫻女士，她是弗林德斯大學公共衛生學科的博士生，她會出示印有照片的學生證作為身份證明。

她正在進行一項題為"在澳門一間戒煙機構為設計及建模移動醫療戒煙支援服務進行研究"的研究，這是她修讀公共衛生博士的研究計劃的一部分。

如果你自願參與協助這項研究，接受涉及這個主題的某些方面內容的訪談，她將會不勝感激，並會提供一張價值一百五十澳門元（MOP 150）的購物券作為閣下參與面談的交通費用及面談時間的補貼。預計訪談大約進行 60 分鐘。

保證所提供的任何信息將會被嚴格地保密，沒有參與者將在研究報告中被單獨識別。你當然可以完全自由地在任何時候終止你的參與或拒絕回答任何具體問題。

訪談將會進行錄音。由於她打算為編制研究報告而對訪談進行錄音，她會在後附的表格上徵求你的同意，前提是你的姓名或身份不會被披露。如錄音需要交予獲授權的行政人員進行轉錄，請閣下放心，該等人員將被告知有關不可披露閣下姓名及身份的要求，而內容的機密性必須獲尊重及維持。

如對本研究有任何查詢，你可直接透過上列地址、電話：+61 8 7221 8418、傳真：+61 8 7221 8424、或電子郵件（george.tsourtos@flinders.edu.au）聯絡我。

感謝您的關注和協助。

耑此。

（簽名如英文版本所示）

George Tsourtos　　高級講師　　哲學博士
公共衛生學科

> 這個研究項目已獲弗林德斯大學社會和行為研究倫理委員會批准（項目編號：6304）。如需更多關於計劃的倫理批准資料，可透過電話+61 8 8201 3116、傳真+61 8 8201 2035、或電子郵件 *human.researchethics@flinders.edu.au* 與委員會執行主任聯絡。

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CRICOS Provider No. 00114A

INFORMATION SHEET

Title: 'A Study to Design and Model Smoking Cessation Assistance mHealth in a Macau Smoking Cessation Agency'

Researcher (Interviewer):
Ms Sok Han Leong

Description of the study:
This project is part of the researcher's academic study (Doctor of Public Health) and is supported by the Discipline of Public Health of Flinders University (Australia). This project is designed for developing a smoking cessation assistance service via mobile phone usage in Macau.

Purpose of the study:
This study will help to gather evidence and to understand components informing the design of a gender sensitive and regional culture orientated smoking cessation assistance service with the utilisation of mobile phone technology in Macau.

What will I be asked to do?
You are invited to attend a one-on-one face-to-face interview, with the researcher who is a current Doctor of Public Health student of Flinders University. The researcher will ask you a few questions about your smoking and cessation experiences and your opinions on the preferred model of a smoking cessation assistance service with the utilisation of mobile phone technology. The interview is estimated to be approximately 60 mins. The interview will be audio recorded. The audio record will be transcribed by the researcher and kept on a computer file. The transcribed computer file and the audio record will be stored with security code for 12 months after the completion of the study and then destroyed. Your participation is completely voluntary and you will be free to change your mind about participating at any time.

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What benefit will I gain from being involved in this study?

There may be no direct benefit to you associated with this study but the sharing of your experiences and opinions may improve the planning and delivery of future smoking cessation programs.

Will I be identifiable by being involved in this study?

We do not need to record your name and you will be anonymous. Once the interview has been recorded, transcribed and saved as a computer file, the voice file will then be destroyed at the end of the study. All records containing personal information will remain confidential and no information that could lead to your identification will be released. We will treat any information provided in the strictest confidence and no-one will be individually identifiable in publications from this research project. To ensure your confidentiality we will maintain a central database of participants that is only available to the research team members and we will ask you to choose a pseudonym. The recording and transcript of your interview will be labelled with this pseudonym to protect your identity, as we may be making the recording available to authorised secretarial assistants for transcription, or to the supervisors (Dr George Tsourtos and Dr Lillian Mwanri, both located at Flinders University, Discipline of Public Health), as well as the researcher.

Are there any risks or discomforts if I am involved?

There are no risks anticipated by the researcher or her supervisors but if there are discomforts please raise them with the researcher. You are not obligated to respond to any questions that make you feel uncomfortable. Free counselling services will be arranged if you need. Please contact the researcher on (853) 66401839 for arranging the counselling service..

How do I agree to participate?

Participation is voluntary. You may answer 'no comment' or refuse to answer any questions and you are free to terminate and withdraw from the interview at any time without effect or consequences. A consent form accompanies this information sheet. If you agree to participate please read and sign the consent form and give the consent form to the researcher.

How will I receive feedback?

If you are interested, the written transcript of what was discussed in your interview will be given back to you to check. You will be able to make changes if you think it is not an accurate record of the conversation, or you wish to remove any part of the transcript you are not comfortable with. In addition, the outcomes from the project will be summarised and given to you by the researcher if you would like to see them.

Thank you for taking the time to read this information sheet and we hope that you will accept our invitation to be involved.

梁淑嫻女士

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CRICOS Provider No. 00114A

研 究 資 料 表

題目："在澳門一間戒煙機構為設計及建模移動醫療戒煙支援服務進行研究"

研究員（訪問員）：
梁淑嫻女士

研究說明：
本項目是研究員的學術研究（公共衛生博士）的一部分，且獲得（澳洲）弗林德斯大學公共衛生學科的支持。本項目的設計旨在，在本澳開發運用手提電話提供的戒煙服務。

研究目的：
本研究為在澳門運用先進的手提電話技術到一項顧及性別差異並以本地文化為導向的戒煙服務的設計收集證據並瞭解服務的內容。

我將被要求做甚麼？
你將被邀請參與進行一次由現攻讀弗林德斯大學公共衛生博士的研究員所進行的單對單、面對面的訪談。研究員會向你提問一些關於你的吸煙及戒煙經驗、以及你對在澳門運用手提電話技術到戒煙服務的理想模式的意見的問題。預計訪談大約進行 60 分鐘，訪談將被錄音。錄音將由研究員轉錄並儲存成電腦檔案，而轉錄的電腦檔案及錄音將會以密碼上鎖，並保存十二個月，至研究完成後將會被銷毀。你的參與完全是自願的，且你可以隨時任意改變參與的意願。

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我將因參與這項研究而有甚麼得著？

你未必會因是項研究而直接受惠，但分享你的經驗及意見或可改進將來戒煙項目的計劃及提供。

我會在參與的這項研究中被識別嗎？

我們無需記錄你的名字，且你將會被匿名。訪談進行的錄音將會在記錄、轉錄及儲存成電腦檔案後，在研究終結時被銷毀。所有包含個人資料的記錄將會保密，沒有資料會令你的身份被暴露。我們會以絕對保密的方式處理所提供的任何資料，沒有人會在本研究計劃的著作中被個別辨識。為確保你的身份的機密，我們有一套只有研究小組成員可以取得的參與者的中央資料庫，我們會要求你選擇代號。由於我們為了讓獲授權的助理人員進行轉錄工作而可能把記錄交給助理人員，或指導教授（George Tsourtos 博士及 Lillian Mwanri 博士，兩人均位處弗林德斯大學公共衛生學科）以及研究員，為保護你的身份，訪談記錄及轉錄檔案將會以代號標示。

如果我參與，是否會有任何風險或不適？

研究員及其指導教授預計你的參與沒有風險，但你如果有不適，請向研究員提出。你沒有義務回應任何令你感覺不適的問題。如果你有需要，將為你安排免費的諮詢服務，請與研究員聯繫（電話：(853) 66401839），以便作出安排。

我怎麼同意參與？

參與是自願的。你可以回答"無可奉告"或拒絕回答任何問題，你可以在任何時間自由終止和退出訪談而沒有影響或後果。研究資料表隨附知情同意書，如果你同意參與，請閱讀及簽署該知情同意書並將之交給研究員。

我將如何獲得反饋？

如果你有興趣，你的訪談討論內容的書面轉錄將交回給你檢查。如果你認為並非對話的正確記錄，或如果你欲刪除令你不適的轉錄內容，你可以作出修改。此外，如果你想要參閱，研究員將會把此項目的結果作出總結並交給你。

感謝你抽空閱讀此研究資料表，我們希望你能接受我們的邀請並參與。

CONSENT FORM FOR PARTICIPATION IN RESEARCH

(by interview)

> A Study to Design and Model Smoking Cessation Assistance mHealth
> in a Macau Smoking Cessation Agency

I …………………………………………………………………………………………………

being over the age of 18 years hereby consent to participate as requested in the 'Letter of Introduction' and 'Information Sheet' for the research project on "A Study to Design and Model Smoking Cessation Assistance mHealth in a Macau Smoking Cessation Agency".

1. I have read the information provided.

2. Details of procedures and any risks have been explained to my satisfaction.

3. I agree to audio recording of my information and participation.

4. I am aware that I should retain a copy of the Information Sheet and Consent Form for future reference.

5. I understand that:

    - I may not directly benefit from taking part in this research.

    - I am free to withdraw from the project at any time and am free to decline to answer particular questions.

    - While the information gained in this study will be published as explained, I will not be identified, and individual information will remain confidential.

    - Whether I participate or not, or withdraw after participating, will have no effect on any treatment or service that is being provided to me.

    - I may ask that the recording/observation be stopped at any time, and that I may withdraw at any time from the session or the research without disadvantage.

6. I **agree/do not agree*** to the audio record and the transcript of my participation being made available to other researchers who are not members of this research team, but who are judged by the research team to be doing related research, on condition that my identity is not revealed.   *** delete as appropriate**

7. I have had the opportunity to discuss taking part in this research with a family member or friend.

Participant's signature………………………………………**Date**………………….

I certify that I have explained the study to the volunteer and consider that she/he understands what is involved and freely consents to participation.

Researcher's name…*Sok Han Leong*…………………………………...............

Researcher's signature……………………………………**Date**………………..

NB: *Two signed copies should be obtained. The copy retained by the researcher may then be used for authorisation of Items 8, as appropriate.*

8.   I, the participant whose signature appears below, have read a transcript of my participation and agree to its use by the researcher as explained.

Participant's signature……………………………………Date…………………....

參與研究的知情同意書

(訪談方式)

"在澳門一間戒煙機構為設計及建模移動醫療戒煙支援服務進行研究"

本人……

超過18歲，現同意應《介紹信》和《研究資料表》的要求參與題為"在澳門一間戒煙機構為設計及建模移動醫療戒煙支援服務進行研究"的研究項目

1.　　我已閱讀所提供的資料。

2.　　就程序和任何風險的詳情，我已獲得滿意的解釋。

3.　　我同意就我的資料和參與進行錄音。

4.　　我知道我應該保留一份研究資料表及知情同意書的副本以供日後參考。

5.　　我理解：

- 我可能不會直接受惠於成為這項研究的一部分。

- 我有自由隨時退出此項目，或拒絕回答具體問題。

- 如同解釋，即使在這項研究中獲得的資料將被公布，我不會被識別，個人信息將保密。

- 無論我是否參與，或在參與後退出，對提供給我的任何治療或服務均沒有影響。

- 我可以在任何時候要求中止錄音，且可以在訪談或研究的任何時候退出而不會帶來不利影響。

6.　　我**同意／不同意***讓錄音及轉錄提供給不屬於這個研究小組的其他研究人員，而該研究人員經研究小組判斷為在進行相關研究的情況下，但前提是我的身份不會被披露。　　　　　　　　　　　　　　　　　　　*刪去不適用者*

7.　　我已有機會就參與成為這項研究的一部份而與家人或朋友討論。

參與者簽名………………………………………………………………… 日期…………………………

我證明我已向自願參與者解釋過這項研究，並考慮到他／她明白何謂涉及和自由同意參與。

研究員姓名…*梁淑嫻*……………………………………………………………………………………

研究員簽名………………………………………………………………… 日期…………………………

註：　應取得兩份已簽名的文本，在適用的情況下，由研究員所保留的文本可能被用於項目8的授權。

8.　　　本人，以下簽署的參與者，已閱本人的參與轉錄，並同意由研究員使用如同闡述的內容。

參與者簽名……………………………………………………………… 日期…………………........

Verbal Script

I am doing a study entitled "A Study to Design and Model Smoking Cessation Assistance mHealth in a Macao Smoking Cessation Agency". This study is part of my Doctor of Public Health program. I will be attempting to develop a mobile phone based health interventions, namely mHealth, in the area of tobacco control to be used to support smokers stop smoking and preventing relapse. This proposed study is designed to gather evidence and identify components that inform the design of a gender sensitive and culture orientated smoking cessation assistance mHealth mobile phone application in Macao, where smoking rates remain very high for young male smokers. I would like to conduct an interview with you which will be approximately 60 minutes to gain your thoughts and perspectives on this important issue but I need your informed consent should you decide to participate. Therefore, could you read the research information package to gain more detail about what the project is about and what your role would involve. The research package involves: a letter of introduction, information sheet and consent form. If you agree to participate in the interview please sign the consent form.

I would like to stress that your participation is voluntary and you have the right to withdraw at any time, even if you provide informed consent. All information collected in the interview will be stored securely in a de-identified form and will remain confidential at all times.

I totally understand and respect your decision should you choose not to participate. If you have any questions or are unclear about what the study involves, please feel free to ask me at anytime – my contact details are included in the information package.

讀稿

我正在進行一項題為"在澳門一間戒煙機構為設計及建模移動醫療戒煙支援服務進行研究"的研究,這是我修讀公共衛生博士的研究計劃的一部分,我嘗試在控煙領域內,為支持吸煙者戒煙及預防再吸,發展一項建基於應用手提電話,稱為移動醫療的衛生干預。鑑於澳門年輕男性的吸煙率仍維持高企,本研究設計是為在澳門運用手提電話到一項顧及性別差異並以文化為導向的移動醫療的設計收集證據並瞭解服務的內容。我希望與你進行一次為時大約 60 分鐘的面談以瞭解你對這個重要題目的意見及觀點,但我需取得你決定參與的知情同意。因此,請你閱讀研究資料包的內容以取得更多有關此項研究的詳情以及你所扮演的角色,研究資料包內有:介紹信、研究資料表、及知情同意書。如果你同意參與面談,請簽署知情同意書。

我希望強調,你的參與是自願的,即使你交了知情同意書,你也有權在任何時間退出。所有在面談中所收集到的資料將以不記名的方式被安全儲存,且在任何時間保持機密。

即使你選擇不參與,我完全理解並尊重你的決定。如你對這項研究有任何疑問或對研究內容有不清晰,請隨時向我提出－我的聯絡詳情已在資料包中。

Appendix 3-H – Exemplary Text Messages

➢ 今天就是了！今天是你的戒煙日，丟掉所有煙，從今天起不再吸煙，你一定做得到！

This is it! - QUIT DAY, throw away all your fags. TODAY is the start of being QUIT forever, you can do it!*

➢ 快訊！一氧化碳已經開始離開你的身體了！

Quick result! Carbon monoxide has now left your body!*

➢ 煙癮平均只會為時五分鐘，忍一下，慢慢飲一杯飲品，直至煙癮消失。

Cravings last less than 5 minutes on average. To help distract yourself, try sipping a drink slowly until the craving is over.*

➢ 煙癮仍然很大？不要擔心，明天會好些的！記著，保持自己身心忙碌。

Cravings still strong? Don't worry tomorrow will be easier! Keep your mind & hands busy.*

➢ 真的閒著沒事做的話，打電話找朋友聊幾句或者傳短訊給他們吧。

If there is a moment in which you have nothing readily to hand, you can also distract yourself by using your cell phone for calling somebody or sending a text message to someone.**

➢ 你可以在平時慣常吸煙的時候令自己忙碌一點，以避免吸煙。例如，在休息時間或者等巴士時嚼香口膠或者傳短訊。

Maybe you can avoid smoking cigarettes in situations in which you usually smoke by keeping yourself busy. For example, when having a break or waiting for the bus it can be extremely helpful to have a chewing gum or write an SMS.**

➢ 非吸煙者比吸煙者平均長壽 7-12 年。再次考慮戒煙吧！

Smokers live an average of 7–12 years less than nonsmokers. Consider quitting again!***

Remark: For participants' reading convenience, only Chinese exemplary text messages, which were translated from English, were presented.

Source:

*   Free, C., et al., *Smoking Cessation Support Delivered via Mobile Phone Text Messaging (txt2stop): A Single-Blind, Randomised Trial.* Lancet, 2011. **378**: p. 49-55.

**   Haug, S., et al., *Efficacy of a Text Messaging (SMS) Based Smoking Cessation Intervention for Adolescents and Young Adults: Study Protocol of a Cluster Randomised Controlled Trial.* BMC Public Health, 2012. **12**(51): p. 1-7.

*** Ybarra, M.L., et al., *Design Considerations in Developing a Text Messaging Program Aimed at Smoking Cessation.* Journal of Medical Internet Research, 2012. **14**(4): p. e103.

Appendix 3-I – Selected Screenshots of the '*Quit Smoking App*'

Progress

Health Info.

煙達人　戒煙熱線

戒煙方法

秘訣

戒煙藥物

進度　戒煙知多點　抗煙癮　明星話你知　設定

QUIT　Quitline
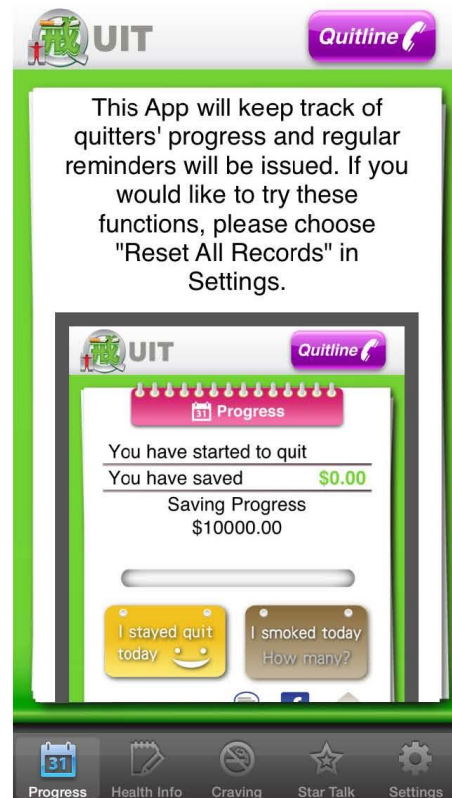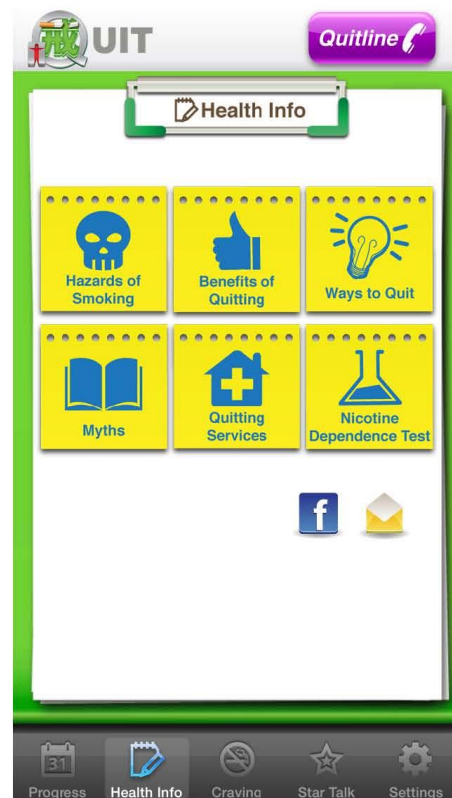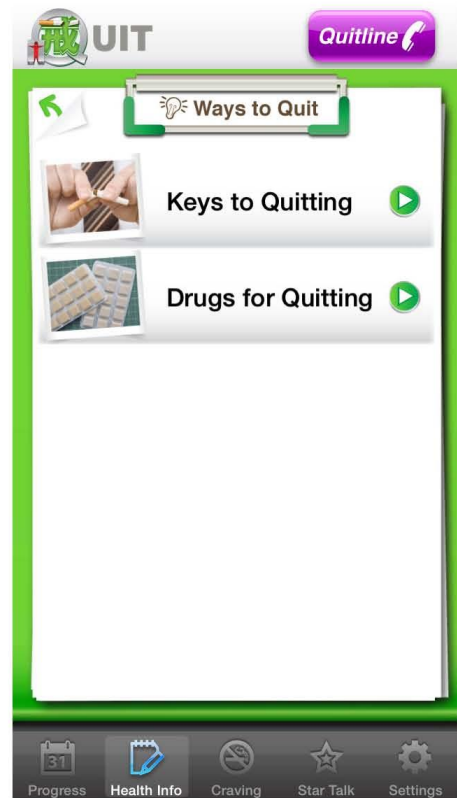
Ways to Quit

Keys to Quitting

Drugs for Quitting

Progress　Health Info　Craving　Star Talk　Settings

Ways to Quit

煙達人　戒煙熱線

秘訣

怎樣戒煙才好呢？

- 第一步是制訂一個適合自己的計劃。
- 首先決定是否需要任何形式的意見或輔助。我們的戒煙熱線 1833 183 專業的醫護人員和戒煙藥物都是你的好幫手。
- 選擇一個特別的日子去開展戒煙計劃。
- 若你想馬上行動，今天就是最佳的日子！
- 把戒煙的決定告訴家人、好友和同事，好讓他們一同…你。
- 在戒煙日之前，嘗試…

進度　戒煙知多點　抗煙癮　明星話你知　設定

QUIT　Quitline

Keys to Quitting

Wondering how to quit?

- The first step is to make a plan that will work for you.
- First decide if you are going to get advice or support of any kind. Our hotline 1833 183, healthcare professionals and medications are some good sources of support.
- Set the quit day on a special day.
- If you want to do it right away, today is the best day
- Tell your family, frien colleagues your dec

Progress　Health Info　Craving　Star Talk　Settings

Keys to Quitting

戒煙達人 | 戒煙熱線 📞

🔙 💡戒煙藥物

退癮徵狀

部分戒煙者在戒煙初期會因身體
的尼古丁水平下降而產生一些短
暫的生理不適，此稱為「退癮徵
狀」，當中包括：

- 頭暈、頭痛
- 疲倦易怒、精神不集中
- 喉乾舌燥、咳嗽
- 失眠
- 容易飢餓、食慾增加等

一般而言，退癮徵狀會
至三星期，以首個星期

進度 | 戒煙知多點 | 抗煙癮 | 明星話你知 | 設定

QUIT | Quitline 📞

🔙 💡Drugs for Quitting

Withdrawal symptoms

Once a smoker refrains from
smoking, he/she may experience
short-term discomfort when the
nicotine inside his/her body starts
to metabolize out of the body.
This is called "withdrawal
symptoms":

- Dizziness, headache,
- Tiredness, poor concentration,
- Dry mouth and throat, cough,
- Insomnia
- Hunger, increased a
  etc.

Progress | Health Info | Craving | Star Talk | Settings

Drugs for Quitting

戒煙達人 | 戒煙熱線 📞

🚭抗煙癮

有壓力時	不開心時	聚會/應酬時
無聊時	有退癮徵狀時	看見他人吸煙時
飯後	起床時	睡前

進度 | 戒煙知多點 | 抗煙癮 | 明星話你知 | 設定

QUIT | Quitline 📞

🚭Craving Relief

Stressed	Unhappy	Social Gathering
Bored	Withdrawal Symptoms	Around Smokers
After Meal	Out of Bed	Before Bed

Progress | Health Info | Craving | Star Talk | Settings

Craving Relief

Craving Relief - Social Gathering
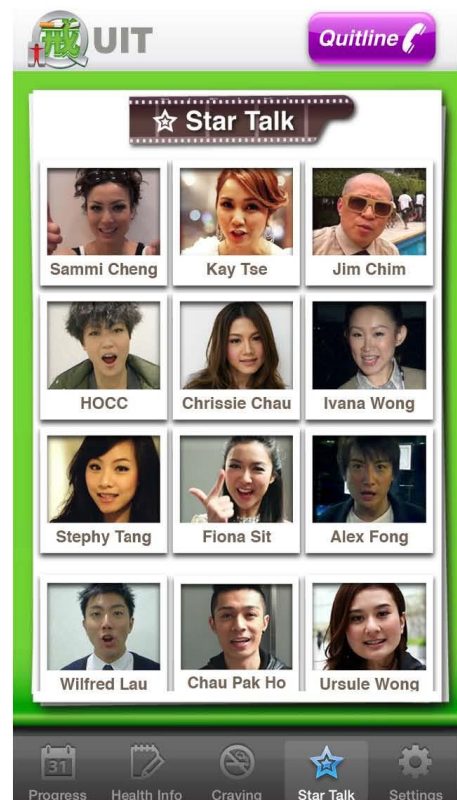
Star Talk

Remark: Only Chinese version of the app was presented to participant, while the English screen were also captured and shown here accordingly.

Appendix 3-J – Selected Screenshots of the '*Quit Smoking*' app

Self evaluation

Quitting and job performance improvement

Performance improvement in various industries

Performance improvement in construction industry
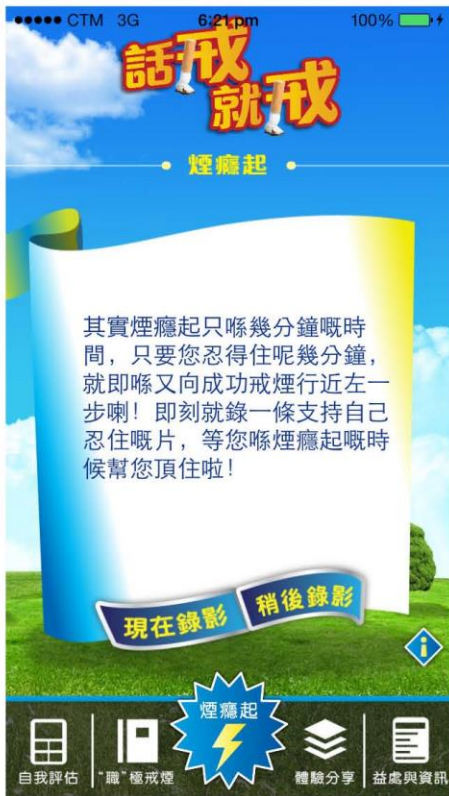
Craving relief

Experience sharing

Experience sharing

Benefits of quitting and cessation services
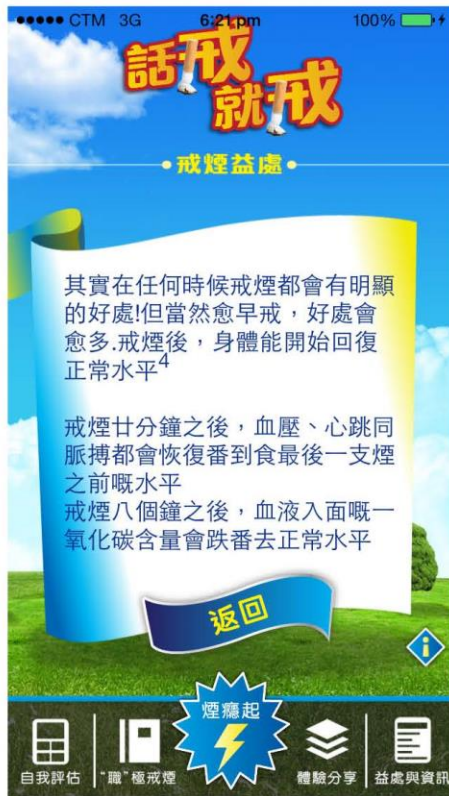
Benefit of quitting

Cessation services

Remark: Only Chinese contents are available in the app.

Self-help Leaflet – for Male

踏出戒煙第一步
Dar o primeiro passo para deixar de fumar

- 下定決心並保持意志堅定；
- 訂下一個戒煙日期，並爭取家人和朋友的支持及幫助；
- 棄掉所有香煙、煙灰缸及打火機；
- 盡量遠離香煙及有人吸煙的地方；
- 聯絡衛生局戒煙門診。

- Seja determinada e mantenha a sua convicção;
- Estabeleça uma data para deixar de fumar e obtenha o apoio necessário junto dos seus familiares e amigos;
- Desfaça-se de cigarros, cinzeiros e isqueiros;
- Tente manter-se afastada do tabaco e dos locais de fumadores;
- Contacte a Consulta Externa de Desabituação Tabágica dos Serviços de Saúde.

重拾迷人光澤
戒煙就是好選擇
Para revitalizar a sua beleza, abster-se de fumar é uma boa escolha

衛生局
戒煙門診
Serviços de Saúde
Consulta Externa de Desabituação Tabágica

戒煙熱線
Desabituação Tabágica, Linha Directa
2848 1238

澳門特別行政區政府衛生局
Serviços de Saúde do Governo da Região Administrativa Especial de Macau

吸煙真相妳要知…
Factos e verdades sobre o tabagismo…

吸煙不能減肥
很多愛美的女性都以為吸煙可以變瘦，因而想藉由吸煙去減少食慾來保持窈窕，但研究報告指出吸煙與減肥並沒有什麼關係。吸煙只能使健康肌肉減少，讓吸煙者誤以為達到「減肥」效果，但實際上，脂肪仍然繼續堆積，而肌肉的流失更會加大吸煙者的身體損害。

吸食淡味、薄荷味或生果味等的煙草產品是否危害較少？
研究証實，不論何種口味的煙草產品對身體皆有害。由於淡味煙草產品內的尼古丁含量較低，因此吸食此種煙草產品的人往往需要吸食更多的煙草支數來補充體內所需的尼古丁，對身體所產生的危害比吸食一般的煙草產品更為嚴重。

吸煙影響胎兒發育和提早更年期
女性在懷孕期間吸煙容易導致胎兒早產、體重不足、嬰兒猝死或流產。另外亦有研究証實女性吸煙與子宮頸癌有極大關係。吸煙也會增加患上骨質疏鬆症的風險和提早更年期的到來。

煙仔 = 皮膚殺手！
吸煙會降低血液的帶氧能力、減少維他命C吸收、抑制女性荷爾蒙分泌和膠原蛋白的產生。因此吸煙的女性通常膚色暗沉，皮膚缺乏彈性。毛孔相大，皺紋亦較多，尤其是眼角和嘴角等地方。故此，吸煙將導致妳出現早衰的徵兆。

Fumar não ajuda a reduzir o peso
Muitas mulheres pensam que fumar reduz o peso e fumam porque desejam reduzir o seu apetite com vista à manutenção de um corpo magro; contudo, estudos revelam que o tabagismo nada tem a ver com a perda de peso. Fumar apenas reduz a qualidade de músculos saudáveis levando, por isso, os fumadores a pensar que perdem peso, no entanto, a acumulação de gordura mantém-se e a perda contínua de músculo saudável prejudica a saúde do fumador.

Tabaco suave com sabor a mentol ou a fruta é menos prejudicial à saúde?
As pesquisas revelam que, independentemente do sabor, todo o tabaco à prejudicial à saúde. O tabaco suave contém menos nicotina e, dessa forma, os seus fumadores necessitam de um maior número de cigarros para compensar a quantidade de nicotina necessária à sua satisfação, sendo por isso ainda mais prejudicial que o tabaco normal.

Fumar interfere no desenvolvimento do feto e antecipa a menopausa.
Fumar durante a gravidez pode provocar o parto prematuro, perda de peso, morte súbita infantil e aborto. Por outro lado, as pesquisas revelam que o cancro cervical nas mulheres está relacionado com o hábito de fumar. O hábito de fumar também aumenta o risco de osteoporose e menopausa precoce.

Tabaco = assassino da pele!
O hábito de fumar reduz a capacidade de transporte de oxigénio no sangue assim como a absorção da vitamina C, inibindo a secreção de hormonas femininas e a produção de colagénio. Portanto, as mulheres fumadoras têm uma cor de pele mais escura e menos flexível, os poros dilatados e mais rugas, especialmente nas áreas dos olhos e boca. O hábito de fumar provoca sinais de envelhecimento prematuro.

美麗小貼士
與其嘥咁多時間同金錢去做facial又或者購買昂貴護膚品，不如戒煙啦！

Dicas de beleza:
É melhor deixar de fumar do que gastar dinheiro em produtos de beleza facial ou produtos de cuidados de pele caros!"

Self-help Leaflet – for Female
A-75

如果身邊好友請你食煙，你懂得如何SAY NO嗎？
以下有五種方法供你參考：
Se os teus amigos te oferecem um cigarro,
sabes DIZER NÃO?
Cinco dicas para recusar o cigarro:

拒煙五招
Cinco dicas para recusar o cigarro

堅決拒絕
「唔好客氣，我唔食煙㗎！」
「我唔食啦，我唔想食！」

以退為進
「唔好啦，我好細個，我唔敢試啲！」
「我屋企止好嚴㗎，被阿媽知道實�
死㗎！」
「唔食啦，我驚被Miss見到記過呀！」

誠意勸告
「唔好食啦，食煙對身體唔好㗎，
你係我好朋友，我唔想你有事呀！」

遠離現場
「突然好急想去廁所，個所係邊？」
「我臨起有D嘢要做，閃先！」
「我唔記得咗我約左人，遲到㖭，下次先講。」

轉移話題
「係喎，你有無聽過阿邊個首新歌？好好聽㗎！」
「我聽講某某間鋪以家打緊折，你趣時得閒陪我去shopping㗎？」
「唔喺，你book左場打波未呀？」

Recusa resoluta
"Obrigado, mas eu não fumo!"
"Não fumo, nem quero fumar!"

Ganhar tempo
"Desculpa, sou tímido(a) e não tenho coragem para experimentar!"
"Receio desagradar à minha mãe!"
"Desculpa, receio ser notado ao fumar pelo professor!"

Persuasão e boa fé
"Deixa de fumar, fumar não faz bem à saúde. És o meu melhor amigo e eu não quero que te metas em problemas!"

Afasta-te
"Vou à casa de banho. A propósito, onde fica a casa de banho?"
"Tenho coisas a fazer, tenho de me ir embora agora!"
"Esqueci-me que tinha um encontro, desculpa tenho de me ir embora já!"

Desvia o assunto da conversa
"Conheces aquela música que está muito em voga?"
"Ouvi dizer que há uma loja em saldos, queres vir comigo fazer compras?"
"Já te candidataste, através da internet, para participares numa equipa de futebol?"

前路由你主導
拒絕被煙仔擺佈
O futuro é traçado por ti próprio,
recusa ser desencaminhado pelo cigarro

衛生局
戒煙門診
Serviços de Saúde
Consulta Externa de Desabituação Tabágica

戒煙熱線
Desabituação Tabágica, Linha Directa
2848 1238

澳門特別行政區政府衛生局
Serviços de Saúde do Governo da Região Administrativa Especial de Macau

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前路由你主導，拒絕被煙仔擺佈
O futuro está nas tuas mãos, não te deixes controlar pelo tabaco!

**唔好以為食煙好有型，
其實在別人眼中你只係一個
到處放毒氣的殺人兇手！**

二手煙含有4,000多種的有毒化學粒子和氣體。人體吸入二手煙後會馬上感到眼睛不適、頭痛、咳嗽、喉部疼痛、暈眩或嘔心等；長期吸入更有機會患上呼吸道疾病、心臟病甚至癌症。唔想害己害人，咁就千祈唔好食煙啦！

Não penses que fumar é cool, na verdade as outras pessoas pensam que és um assassino que liberta gases tóxicos!

O fumo ambiental de tabaco contém mais de 4,000 espécies de partículas químicas tóxicas. A exposição ao fumo ambiental de tabaco causa irritação nos olhos, dor de cabeça, tosse, irritação de garganta, tontura ou náusea; a inalação a longo prazo torna-te mais susceptível a doenças respiratórias, doenças cardiovasculares e até cancro. Não prejudiques a tua saúde ou a dos outros, não fumes mais!

Fumar não é saudável!

Fumar não é saudável e é um desperdício de dinheiro, provoca o amarelecimento dos dentes, mau hálito, envelhecimento precoce da pele, reduz a função motora e causa até impotência, etc. A nicotina conduz à dependência e é altamente viciante, até mesmo o hábito de fumar diariamente um ou dois cigarros é o suficiente para conduzir ao vício do tabaco, levando-te a fumar cada vez mais e não sendo capaz de deixar de fumar. E assim, perderás a tua liberdade!

**全澳門有八成人唔食煙，
無煙生活先至係潮流！**

2008年調查指出，全澳門有82.7%的人是不吸煙的，吸煙的人只佔極少數。公共場所禁煙已經是世界趨勢，很多吸煙者在了解煙草的禍害後都決定戒煙。無煙生活先至係潮流，以家個個人都講緊戒煙，你仲走去食煙，好Out啩~！

Mais de 80% das pessoas em Macau são não-fumadores, uma vida sem tabaco é uma tendência de Moda!

De acordo com uma pesquisa efectuada em 2008 constatou-se que 82.7% da população de Macau são não-fumadores, sendo os fumadores uma minoria. A proibição de fumar em lugares públicos é já uma tendência global e muitos fumadores optaram por deixar de fumar depois de se informarem sobre os efeitos nocivos do tabaco. Logo, não fumar é um estilo de vida moderna, ser não-fumador é tendência de Moda e se tu fumas e os teus amigos te aconselham para deixares de fumar, então estás fora da tendência de Moda!

食煙百害而無一利！

食煙沒有任何好處，除咗浪費金錢之外，食煙仲會令你牙黃口臭、皮膚衰老、運動機能降低、甚至性無能等等。而且煙草中的尼古丁成癮性極高，就算每天只食一兩支都足以令你上癮，最後變咗越食越多，唔食唔得，從此無晒自由！

> **我地唔係三歲細路哥，
> 明知有毒嘅糖
> 我哋又點會食？**
>
> Já não somos crianças, por isso não tocamos em doces tóxicos!

懷孕期間吸煙的危害：

- 自然流產
- 早產
- 嬰兒體重過低
- 胎兒和新生兒死亡
- 胎盤合併症
- 出血的意外

香煙引致環境的損害：

- 污染空氣
- 引起火警

疾病預防控制中心

吸煙之害

澳門特別行政區政府衛生局

吸煙之害

香煙煙霧混合了約4700種不同的有毒物質，煙霧中有氣體和多種濃縮物。

氣體的成份有一氧化碳、阿摩尼亞、丙酮、甲醛等。

濃縮物除尼古丁和焦油，還含有43種致癌物質。

1. 一氧化碳：經肺進入血液，它在血液中與氧競爭，並且較易與血紅蛋白結合，影響了身體器官組織的氧化作用。

2. 尼古丁：是一種令吸煙成癮的物質。

3. 焦油：對呼吸系統做成慢性的刺激，同時被認為是一種引致肺癌的重要物質。

吸煙對個人的危害：

- 令牙齒變黃和脆弱，還會做成口臭
- 提早出現皺紋和衰老
- 降低肺的功能和引致咳嗽、聲音沙啞、肺氣腫、支氣管炎
- 引致肺癌和其他器官的癌症，如：口腔、咽喉、膀胱等
- 使骨質疏鬆情況惡化
- 引致男性性無能和生育能力下降
- 導致和加重心臟病（如心絞痛和心律不整）和動脈粥樣硬化，容易引致中風和血管栓塞
- 縮短預期壽命

Self-help Leaflet – Hazards of Smoking

新生兒出生後暴露在
香煙煙霧中會

增加其患嬰兒猝死症的危險

對兒童的影響

支氣管炎

肺炎

出現哮喘和哮喘
情況惡化

中耳感染，這是
引致兒童耳聾的
常見的原因

疾病預防控制中心

二手煙

頭痛　心臟病
癌症　喉嚨痛
咳嗽　流產
過敏

澳門特別行政區政府衛生局

二手煙

二手煙是個人與吸煙者處
於同一地方，吸入空氣中
的煙霧，這煙霧包括吸煙
者吸煙時呼出的煙和香煙
燃燒時產生的煙霧。

二手煙的影響

對被動吸煙者的影響

短期

眼睛和鼻的刺激

喉嚨痛

咳嗽

嘔吐

眩暈

頭痛

過敏和心臟的問題增加

中長期

呼吸能力下降

呼吸道的感染

動脈粥樣硬化

心肌梗塞

癌症

**不吸煙的孕婦暴露在
二手煙的環境下**

影響胎兒的發育

流產、死胎的機會增加

Self-help Leaflet – Hazards of Second-hand Smoke

Appendix 5-B – Key Screenshots of a Television Anti-drug Video

Would he go through hell for you?

Or is he giving you hell?

Is your buddy covering your back?

Or is he stabbing you in the back?

Do you have die-hard friends?

Or would they stand by and watch you die?

Hold it!
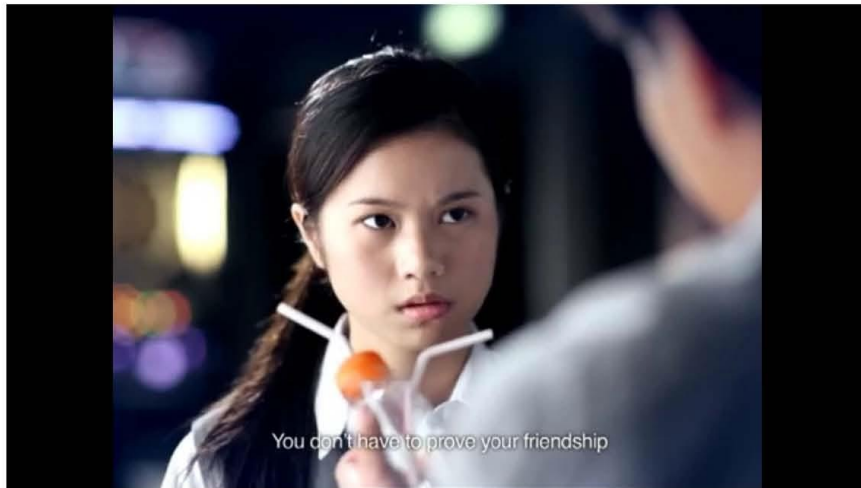
You don't have to prove your friendship

and love by taking drugs

Stand Firm! Knock Drugs Out!

Appendix 5-C – A Selected Anti-drug Poster

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