

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 Abstinence 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.