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The development of community-based smoking cessation interventions in Hong Kong

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Tobacco kills up to half of its users[1–3], yet one-fifth of the world's population is currently smoking[4]. The World Health Organization (WHO) has launched the Framework Convention on Tobacco Control (FCTC)[5] and the MPOWER policy package (Monitor, Protect, Offer, Warn, Enforce, Raise)[1] to guide country-level implementation of effective smoking cessation measures. Smoking cessation at any age has significant immediate and long-term health benefits[6], and 'Offer help to quit tobacco use' is one of the key components in MPOWER tobacco control strategy, highlighting the crucial role of primary health services in providing smoking cessation services[7,8].

Since 1982, Hong Kong has progressively integrated the legislation and enforcement, taxation, publicity and education, and smoking cessation services as a comprehensive tobacco control strategy[9]. The multi-pronged approach has gradually reduced the smoking prevalence among the population aged 15 or above from 23.3% in 1982 to 10.1% in 2018, and 9.1% in 2023[10]. However, there is still an enormous smoking-related burden given the 637,900 daily cigarette smokers in Hong Kong and accounts for over 7,000 premature deaths per year. In 2018, the Hong Kong Department of Health launched an initiative to prevent and control non-communicable diseases 'Towards 2025' and targeted to cut the daily cigarette smoking prevalence from 11.1% in 2010 to 7.8% by 2025[11].

Tobacco is highly addictive, and it is difficult for smokers with nicotine dependence to quit without assistance. Approximately two-thirds of adult smokers (68.0%) are willing to quit, but fewer than one-third of smokers who had previous quit attempts ever used evidence-based cessation treatments[12]. Further reduction in smoking prevalence is challenging as many remaining smokers are likely to be more 'hardcore' and thus find it more difficult to quit[13]. Our participants of nine territory-wide smoking cessation randomized controlled trials from 2009 to 2018 (except 2011, N = 9,837) also found that cigarette smokers in Hong Kong were having less quit attempts, becoming less motivated to quit, and perceiving lower self-efficacy in quitting in the recent decade[14]. Smoking cessation treatments could substantially increase quit rate but were largely reactive[15]. As few smokers would actively seek help to quit, proactive recruitment is increasingly important to connect smokers to available effective smoking cessation services in the community[15,16]. Our and the research of others have achieved improvements in developing community-based smoking cessation interventions, but most of the current community tobacco control practices remain on preventing smoking initiation through educational programs. Through analyzing the development and effectiveness of community smoking cessation interventions, we aim to provide theoretical and practical references for the implementation of community smoking cessation intervention in the future.

Community-based smoking cessation interventions mainly include pharmacological treatments to alleviate nicotine withdrawal symptoms and behavior interventions guided by social psychology models to enhance smoking cessation motivation and support smoking cessation attempts. Pharmacological treatment involves the use of several approved drugs to assist in smoking cessation, mainly provided to smokers who are willing to make a quit attempt. Behavioural interventions vary widely in the content and delivery methods and can be passively (e.g., calling Quitline) or proactively (e.g., advising patients to quit during a visit) provided. They may be delivered to smokers who were unmotivated or not interested in quitting. Pharmacological treatments were usually conducted in conjunction with behavioural interventions (e.g., counselling) to achieve improved cessation outcomes.

Pharmacological treatments in a community setting

Pharmacological treatments can be broadly categorized as nicotine replacement therapy (NRT) and non-nicotine pharmacotherapy. NRT provides additional nicotine to reduce the cravings and urges to smoke, and thus reduce the withdrawal symptoms during the process of quitting[17]. NRT was available in patches (absorbed through the skin) and chewing gum, lozenges, sublingual tablets, sprays, and inhalants (absorbed through the oral or nasal mucosa) in different dosages (according to the level of nicotine dependence)[18]. The therapy was widely available over the counter in many countries.

First-line non-nicotine pharmacotherapy includes the use of Bupropion and Varenicline. Bupropion is an antidepressant that blocks the norepinephrine and dopamine re-uptake in the neurocyte to counteract the negative psychological effect of nicotine withdrawal and replace the mood modulating effect of nicotine[19]. The drug was available over the counter and sometimes preferred by smokers who failed to quit using NRT in previous quit attempts[19]. Varenicline was recently approved as a prescription medication for smoking cessation. It is a partial agonist, selective for the nicotine acetylcholine receptor that leads to the release of dopamine and blocks nicotine from binding to the receptor, thus reduces the reinforcement of nicotine cravings. Pharmacotherapy is widely available in most countries and can generally increase the cessation rate by 5% to 15%[19], but the acceptance in the population is relatively low[20]. The provision of free medication starter kits (for 1 or 2 weeks) with a brief instruction might serve as a taste of cessation treatment and enhance the smokers' motivation and self-efficacy to quit. Others, and our RCTs found that providing the NRT sampling (NRT-S) was effective in increasing quit intention, motivation, and confidence of quitting, and facilitating quit attempts[21,22]. Further investigations are needed to explore whether the provision of NRT-S may promote the use of smoking cessation services (to receive the full cessation treatment) to achieve long-term abstinence.

Behavioral interventions in a community setting

Community-based behavioral interventions mainly include offering self-help materials[23], behavioral counseling[24], competitions[25], financial incentives[26], and social support[27] with the employment of various techniques, methods, and theoretical frameworks. A recent network meta-analysis of 33 Cochrane systematic reviews (including 312 RCTs with 250,563 participants) found that offering individual or group counseling and guaranteed financial incentives had a high-certainty of evidence on smoking abstinence for 6 months or longer, while the efficacy of non-guaranteed incentives (i.e., competitions) remained uncertain[28]. Behavioral interventions delivered by community health advisors (Odds Ratio [OR] 1.34; 95%CrI 0.94 to 1.92; eight RCTs) showed a higher effect than those delivered by physicians (OR 1.11; 95%CrI 1.88 to 1.40; 61 RCTs), pharmacists (OR 1.16; 95%CrI 0.45 to 2.99; four RCTs), and nurses (OR 0.92; 95%CrI 0.68 to 1.27; 18 RCTs)[28]. Our community-based trials in Hong Kong also showed that lay advisors (e.g., nursing students) with a short period of training can effectively promote the use of community cessation services and increase smoking abstinence at a low cost[29–31].

Brief smoking cessation advice (e.g., 5As: Ask, Advise, Assess, Assist, Arrange; AAR: Ask, Advise, Refer) involves a range of client-centered, short-duration (3 to 10 min), low-cost behavioral intervention models with strong clinical evidence, applicable to most smokers, including adolescents, pregnant women, the elderly, and various racial and ethnic minority groups[32]. However, these brief advice models are primarily designed for clinical settings and delivered by healthcare professionals. In community settings, health advisors generally lack specialized knowledge and skills in cessation counselling and have limited contact time with smokers, necessitating a more simple and straightforward brief advice model to advance community-based smoking cessation. In Hong Kong, we developed and validated the feasibility and efficacy of the AWARD model (Ask, Warn, Advise, Refer, and Do-it-again)[33] taking reference from the clinical practice guidelines in treating tobacco use and dependence[34]. The AWARD has made substantial simplification of the 5As/5Rs and integrated with the use of the absolute risk of death from smoking to facilitate the intervention delivery by non-healthcare professionals (e.g., nursing students). Currently, it is the most widely used and low-cost brief smoking cessation advice model in community settings.

According to research, the most effective part of brief intervention models is referring smokers to smoking cessation services for behavioral and pharmacological treatments. In Hong Kong, only 2.7% of smokers have used smoking cessation clinic services. To enhance the intervention effect, we further emphasized the 'Refer' content in the AWARD model, proactively helping smokers choose free smoking cessation services in their communities and contacting the service providers to notify the smokers of their appointments (i.e., active referral). Through a large-scale RCT test, we found that the AWARD model with enhanced active referral was more effective in increasing the use of cessation services and the smoking abstinence than using the AWARD model alone[29]. However, only 29.1% of smokers who accepted active referrals successfully used smoking cessation clinic services, mainly due to conflicted schedules or lack of interest. We further added a small monetary reward (HK$300, ≈ US $38.5) to the active referral intervention, which was found to further promote the use of cessation services and increase the smoking abstinence[31]. Incentivizing the service use may help smokers to overcome some barriers (e.g., low interest) and costs (e.g., travel) of the use. A larger amount of financial incentives (over US$500) could be more attractive[35], but the scale and sustainability of the project is relatively limited.

Taking advantage of the prominent information and communication technologies and growing penetration of mobile devices, mobile health (mHealth) interventions are gaining rapid attention in smoking cessation studies. MHealth interventions are now a part of the WHO's strategies to develop a series of convenient, scalable, and sustainable projects that have population-wide impact to advance tobacco control across the globe[36]. These interventions are generally guided by social psychology models (e.g., stages of change theory, social support theory, cognitive-behavioral therapy) and delivered via multi-media platforms (e.g., text messages, social media, smoking cessation apps, instant messages) using real-time graphics and text information to enhance motivation to quit, provide smoking cessation methods, or offer behavior support tailored to individual smoking characteristics and cessation history[37]. Our qualitative interviews with 21 community-recruited smokers showed that instant messaging (e.g., WeChat, WhatsApp) as a commonly used and convenient mobile health (mHealth) platform, showed high feasibility and acceptability for providing chat-based smoking cessation support[38]. Subsequently, large-scale RCTs in many countries[37], including in mainland China[39,40] and Hong Kong[30] have confirmed that chat-based cessation support, whether combined with brief advice or not, can effectively increase smoking abstinence. However, the effect size regarding the intensity and content of mHealth interventions (e.g., length and frequency of messages, duration of intervention), usage methods, and operating platforms warrant further research.

Conclusions

China has a large smoking population, and the additional medical expenses caused by smoking account for 7.24% of total medical expenses[41]. Smoking cessation services are largely available, but the usage rate is low, leaving a huge implementation gap for promoting community-based smoking cessation. Medication treatment can effectively improve smoking cessation rates but with limited acceptance in the population. Brief smoking cessation advice, as an important part of behavioral interventions, has been adapted and validated for community environments (e.g., the AWARD model) and can be provided by non-healthcare professionals to different smoking populations in the community setting. Combining proactive referral models and monetary rewards can effectively enhance motivation to quit, promote the use of smoking cessation clinic services, and improve smoking abstinence. mHealth interventions are scalable and cost-effective, and holds potential to provide more personalized behavioral and psychosocial cessation support through various interactive platforms. With the rapid development of mobile communication and internet technology, social media platforms are expected to develop into more sophisticated online smoking cessation communities. Specifically, different social media platforms offering different application prospects could be strategically used for disseminating anti-smoking information - such as Instagram for motivational content and Facebook for support groups. Social media may also facilitate real-time data monitoring to track the smoking population and campaign effectiveness. Lastly, online public health campaigns could be used to promote tobacco denormalization and prevent smoking initiation, potentially involving influencers for wider reach.

Author contributions

The authors confirm contribution to the paper as follows: study conception: Zhao S, Wang MP; draft manuscript preparation: Zhao S.

Both authors critically revised and approved the final version of the manuscript.

Data availability

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

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Conflict of interest

The authors declare that they have no conflict of interest.

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