


Engaging and supporting young adults in smoking cessation: Insights from a mobile-based cessation program in China

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Abstract

Objective: Evidence-based smoking cessation treatments are underutilized by young adult smokers. This study explored young smokers' experiences with a mobile-based smoking cessation program that included a Quit & Win contest at a university in Zhuhai, China, aiming to identify key engagement and cessation mechanisms.

Methods: Twenty participants (aged 18–25 years) were selected through purposive sampling. Semistructured interviews explored participants' experiences, motivations, and perceptions of the intervention. Thematic analysis was used to identify major themes from interview transcripts.

Findings: Two main themes emerged: (1) strategies for enhancing program engagement, including the influence of campus-wide smoke-free environments, the appeal of the Quit & Win contest, and the use of peer counselors for recruitment; and (2) strategies for supporting smoking cessation, emphasizing the importance of a multifaceted approach. This approach included financial incentives as a motivator for quitting, sustaining cessation efforts with online group support, and building a therapeutic alliance with cessation counselors.

Conclusion: Mobile-based interventions, combined with peer support, financial incentives, and campus-wide smoke-free activities, can effectively engage young adults in smoking cessation. Future interventions should implement comprehensive programs that incorporate these elements to address the unique challenges faced by this population.

Keywords

smoking cessation, young adults, mobile-based intervention, Quit & Win contest, qualitative study

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Introduction

Smoking prevalence among young people has raised public attention. Most adult smokers initiate smoking or solidify their smoking habits from adolescence to young adulthood.^{1,2} This age range is crucial as individuals develop nicotine addiction and transition to becoming regular smokers. Early initiation increases susceptibility to nicotine addiction,³ making cessation difficult, leading to severe cumulative health risks and reduced life expectancy.⁴ In China, smoking rates among young people are particularly concerning, with 89% of middle-school students who have ever tried smoking having had their first cigarette aged 15

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years or younger.⁵ Although the China National Youth Tobacco Survey indicates a decrease in the prevalence of current cigarette use among young people,⁶ there has been an alarming increase in the use of new nicotine and tobacco products, such as e-cigarettes.⁷ Preventing young people from initiating and becoming addicted to tobacco products remains a top priority in tobacco control efforts in China.

Evidence-based smoking cessation treatments, such as individual counseling and pharmacotherapy, have been shown to be as effective in young adults as in the general adult population.⁸ Despite their proven effectiveness, these treatments are underutilized by young adult smokers. For example, studies in the United States have shown that young adults are more likely to attempt quitting without assistance⁹ and less likely to use cessation medications¹⁰ compared to older adults. This underutilization is influenced by perceptions that cessation services are time-consuming, inconvenient,¹¹ and stigmatizing.¹² Moreover, concerns about the cost of medications¹⁰ and misconceptions about the efficacy and safety of pharmacotherapy¹³ further deter young adults from seeking help. These barriers underscore the need for tailored cessation strategies that are both appealing and accessible to this population.

Mobile-based interventions offer a promising platform for overcoming the barriers.¹⁴ Given the widespread use of mobile phones among young adults, mobile-based interventions have the potential to reduce the stigma associated with seeking help, minimize time-related constraints, and provide a cost-effective approach to increase treatment utilization.

The “Quit & Win” contest,¹⁵ a well-established smoking cessation program that leverages financial incentives to promote quitting, could be effectively adapted for a mobile platform. The Quit & Win contest, originally developed by the Minnesota Heart Health Program in the 1980s, has been widely implemented at local, national, and international levels. Since 1994, an international version of the contest has been held every two years, involving as many as 80 countries. In mainland China, Quit & Win contests have been adopted since 1996,^{16,17} and in Hong Kong SAR, similar contests have been held since 2009.^{18–20} These contests provide participants with financial incentives and peer support, offering a promising model for smoking cessation, especially when adapted for mobile platforms.

University campuses, with familiar environments and peer support networks, offer an ideal setting for the implementation of such mobile-based cessation programs.²¹ By combining mobile platform, Quit & Win contest, and the campus setting, a comprehensive and engaging cessation strategy can be created, tailored to the unique needs of young adult smokers, ultimately enhancing participation and improving cessation outcomes.

While recent meta-analyses have demonstrated the effectiveness of mobile-based interventions,¹⁴ the Quit & Win contest,¹⁵ and school-based smoking cessation programs,²² the specific mechanisms and participant

experiences that promote engagement and cessation, particularly among young adults, have been rarely explored. This study aims to address this gap by investigating the processes and key factors of a mobile-based Quit & Win contest within a campus setting that contribute to initiating quit attempts and achieving smoking cessation among young adults. Through a qualitative approach, this study seeks to enhance our understanding of strategies for engaging and supporting young adults in smoking cessation, ultimately informing the development of more effective interventions for this population.

Method

Study design

This study was part of a randomized controlled trial (RCT) that assessed the effectiveness of mobile-based smoking cessation support nested in a Quit & Win contest of Beijing Normal University, Zhuhai, China, conducted from March 2023 to June 2024. The design of the parent trial has been previously reported.²³ In this trial, 142 participants were recruited and randomized (1:1) into either the intervention group ($n = 71$), which received brief cessation advice, online group support, and personalized chat support from counselors for three months, or the control group ($n = 71$), which only received brief cessation advice and online group support. Biochemically validated abstinence rates at the six-month follow-up were 12.6%.

After the six-month follow-up, participants were invited to individual interviews to discuss their quitting experiences and provide feedback on the intervention. Ethics approval was obtained from the Institutional Review Board of Beijing Normal University (SSDPP-HSC-20230012), and all participants provided written informed consent prior to their participation. Participants were assured of their right to withdraw from the study at any time without consequences.

Participants

Eligibility for the RCT included individuals who were (1) aged ≥ 18 years, (2) current smokers who smoked ≥ 1 cigarette per day in the past three months, (3) exhaling carbon monoxide ≥ 4 ppm, (4) possessing a mobile phone capable of accessing WeChat (the intervention platform), and (5) motivated to quit or reduce smoking. Participants were excluded if they (1) were unable to provide informed consent, (2) had physical or cognitive communication difficulties.

Of the 142 participants recruited for the trial, 93 (66.4%) were university students. For this qualitative study at the six-month follow-up, 20 full-time university students were selected through purposive sampling. The selection process ensured diverse representation across age, gender, smoking history, nicotine dependence, and quitting status. This approach allowed for a comprehensive exploration of participants' experiences with the intervention.

A total of 20 participants were recruited for this qualitative study (12 men and 8 women), aged 18–25 years (mean age 22 years). All participants were university students with a high level of education (undergraduate degree or higher). Of these participants, 10 smoked only traditional cigarettes, while the other 10 used both traditional cigarettes and e-cigarettes. The average smoking duration was 3.3 years, and nicotine dependence ranged from light (11 participants) to mild-to-heavy dependence (9 participants). Participant characteristics are shown in Table 1, with individual details provided in Appendix Table S1.

Intervention

Table 2 provides an overview of the multicomponent mobile-based intervention, which included four key components. Full details of the intervention components are described in published protocols.²³

1. Brief cessation advice was provided at baseline. University students were trained as peer counselors to proactively approach potential participants, explain the

contest, invite them to participate, and deliver face-to-face cessation advice.

2. Online group support was provided for three months. Participants joined an online support group via WeChat (see samples in Figure 1), where they shared experiences, challenges, and successes, fostering mutual support among group members. To maintain motivation and track smoking status, participants were encouraged to join a daily smoke-free “punch-in” activity within the group. Those who reported being smoke-free received automatic encouragement, along with information on their number of smoke-free days and their ranking among other group members.
3. Personalized chat support from counselors was provided for three months. This support consists of individualized counseling and fixed messages (see samples in Figure 1). Trained counselors used the Transtheoretical Model and Behavior Change Techniques to tailor support according to each participant’s readiness to quit. The counselors helped participants develop quit plans, manage cravings, and stay motivated. Participants also received 24 fixed messages, with content and schedule informed by our prior mobile cessation studies.^{20,24–26}
4. Financial incentives were provided via the Quit & Win contest to increase participation and motivation. Participants who passed biochemical validation (salivary cotinine < 30 ng/mL or exhaled carbon monoxide < 4 ppm) received a monetary reward of 100 RMB (approximately US\$14).

Table 1. Participants’ demographics and smoking profile.

Characteristics	n (%)
Sex	
Male	12 (60.0)
Female	8 (40.0)
Age, mean (SD)	22 (2.4)
Education level	
Undergraduate	12 (60.0)
Postgraduate	8 (40.0)
Smoking duration (years), mean (SD)	3.4 (2.0)
Tobacco user types	
Exclusive cigarette user	10 (50.0)
Dual cigarette/e-cigarette user	10 (50.0)
Nicotine dependence level ^a	
Light	11 (55.0)
Moderate	3 (15.0)
High	6 (30.0)

^aMeasured by the Fagerstrom Test for Nicotine Dependence (FTND), a score of FTND ≤ 3 as light, 4–5 as moderate, and ≥ 6 as heavy dependence.

Data collection

Data were collected through semistructured interviews conducted after the completion of the six-month follow-up.

Table 2. Outline of intervention content.

Component	Description
Brief cessation advice	Peer counselors approached participants, explained the contest, invited them to join, and provided on-site cessation advice.
Online group support	Online group support via WeChat for sharing experiences and challenges, with daily smoke-free punch-in activity and automated encouragement.
Personalized chat support	Personalized chat support from trained counselors, tailored using TTM and BCTs based on readiness to quit.
Financial incentives	A monetary reward of 100 RMB for participants who successfully quit smoking.

TTM: transtheoretical model; BCTs: Behavior Change Techniques.



Figure 1. Samples of online group support and personalized chat support.

Semistructured interviews were conducted to attain an in-depth understanding of the participants' lived experiences. The interview was guided by open-ended questioning, encouraging meaningful discussion. An interview guide (see supplement 1) with open-ended questions began with a brief overview of the participant's quitting experience, participants' experiences with each component of the intervention, the challenges they faced, and the factors they perceived as most helpful in their smoking cessation efforts. The question order was determined by the flow of the interview. Each interview lasted approximately 45–60 min and was conducted by 2 research staff in a private setting to ensure confidentiality. Data saturation was achieved when no new themes or insights emerged from the interviews.

Data analysis

Data were analyzed using thematic analysis, a qualitative approach that identifies, analyzes, and reports themes within the data.²⁷ Two researchers (XW and CS) independently coded the data to ensure intercoder reliability. The coding process began with line-by-line coding of the interview transcripts, which allowed the researchers to immerse themselves in the data and identify recurring patterns. A list of initial codes was manually generated to capture key concepts, which were then cross-referenced against the original data to ensure accuracy. Discrepancies in the codes were discussed and resolved through consensus meetings between the researchers. The initial codes were then grouped into broader categories and clustered into major themes. The team conducted a disconfirming case analysis to ensure that outliers or divergent cases were considered, enhancing the robustness of the findings. NVivo 12 software was employed to facilitate data organization and systematic coding, which ensured

consistency throughout the analysis. Themes were then finalized, with names and descriptions clearly outlining their significance. Participant quotes were used to illustrate these themes, and pseudonyms were used to protect participants' identities.

Results

Using thematic analysis, the experiences and perspectives of young adults were categorized into two overarching themes: strategies for enhancing program engagement and strategies for supporting smoking cessation.

Theme 1: Strategies for enhancing program engagement

Campus-wide smoke-free environment. The campus setting played a crucial role in fostering a sense of community and collective participation, which was instrumental in motivating participants to persist in their quit attempts. In addition to the Quit & Win Contest, various campus-wide activities such as the "Health for the Future" Smoke-Free Promotion Competition and the "Smoke-Free Ambassador" Competition created a supportive atmosphere that encouraged students to quit smoking. Participants highlighted the importance of the collective environment in their cessation efforts.

One participant noted that the involvement of many people around them made quitting feel more achievable.

If a lot of people around you are participating in this activity, I think quitting would be much easier. (ID13, Male-22 years old)

Another participant emphasized the emotional and psychological support provided by the campus environment.

The most significant aspect is the influence of those around you. The emotional support from the environment gives you the strength to keep going. (ID14, M-18)

Engagement through the Quit & Win contest. The Quit & Win contest was perceived as novel and engaging, capturing the interest of participants who might lack strong motivation to quit smoking. The contest's format, integrating both competition and community, was particularly appealing to young adults.

One participant highlighted that curiosity was the primary reason for his participation, adding an element of excitement to the quitting process.

I thought the contest was quite novel because I had never seen anything like this before. Holding such an event on campus was interesting. Quitting smoking with a competitive element was unique. (ID8, M-18)

The supportive atmosphere within the contest made the experience more engaging for participants.

Peer encouragement among university students, knowing that you're participating in this activity, makes it interesting and creates a supportive atmosphere. (ID11, Female-23)

For some participants, the contest provided the motivation to attempt quitting for the first time, even if their intention to quit had been low before.

I had never intentionally tried to quit smoking before, but since the school organized such a contest, I was willing to give it a try. I didn't start with the belief that I had to succeed, but just taking that first step was meaningful to me. (ID15, M-25)

Leveraging peer counselors for effective recruitment. The use of peer counselors—university students trained as lay counselors—proved to be an effective strategy for recruiting participants and fostering engagement. The peer counselors' similar age and background made them approachable, which was crucial for participants' willingness to engage with the program.

A participant described how an unexpected encounter with a peer counselor influenced their decision to join the contest.

I had just finished lunch in the canteen when a peer counselor approached me. He somehow knew I smoked and asked if I wanted to join the quit-smoking contest. That's how I decided to give it a try. (ID13, M-22)

Another participant recounted how a senior student encouraged them to join the program.

I was lighting a cigarette when a senior student approached me and said, 'Hey, why not try quitting smoking?' and that's how I got involved. (ID9, F-25)

Theme 2: Strategies for supporting smoking cessation

Financial incentives as a motivation for quitting. While some participants acknowledged the importance of intrinsic motivation, the financial rewards offered through the Quit & Win contest were significant extrinsic motivator. Younger participants, who often have limited financial resources, cited the monetary rewards (approximately US\$14) as the primary reason for joining the contest and attempting to quit smoking.

One participant shared how the potential for financial incentives was a driving factor in their decision to participate.

I've always had the idea of quitting smoking, but never managed to do it. I joined the contest mainly for the prize. If the reward were even higher, it would definitely motivate me to take part more actively. (ID1, M-18)

For university students, the financial incentives provided a powerful and immediate reason to engage in the quitting process.

Offering money is definitely the biggest incentive, especially for university students. (ID4, M-24)

The attraction of cash rewards was a strong motivator that resonated with many participants.

I think cash rewards are very tempting. Money is a strong motivator. (ID2, M-24)

Sustaining cessation efforts with online group support. Online group support, where participants were invited to join a WeChat group to share their experiences, challenges, and successes. The online group provided a valuable platform for mutual support, enhancing the overall effectiveness of the program.

The sense of community, even in an online setting, helped participants feel supported in their quit journey.

Even though it's an online group and doesn't have the same physical presence, it still provides a sense of community. Knowing that others are in this with you helps. (ID14, M-18)

The nonjudgmental environment of the group made participants more open to quitting and motivated them to make active efforts.

When others talked to me about the harms of smoking before, I would avoid it because I knew the facts but couldn't give up cigarettes. But in this group, everyone is trying to quit, so no one judges you. I wasn't as resistant to quitting and even tried to quit actively. (ID11, F-23)

An additional "smoke-free check-in" activity within the group provided ongoing motivation and supervision. Participants reported their smoke-free status, received encouragement from a chatbot, and tracked their progress relative to others. The check-ins were particularly effective

in fostering a sense of achievement and competition, which motivated participants to continue their quit attempts.

One participant reflected on how the check-in activity influenced their commitment to quitting.

At first, I didn't take the activity seriously, but after consistently checking in, I felt a sense of achievement and kept going. (ID5, M-20)

The competitive check-ins encouraged participants to remain smoke-free.

This online group is a bit like a support group. We have a common goal of quitting, and we feel a sense of identity and competition. I noticed that many people kept checking in, so I wanted to keep going too. (ID15, M-25)

The visibility of check-in activities in the group added extra motivation for participants to stay committed to their quit attempts.

I really like the check-in activity. After checking in for 30 days straight, I felt a sense of achievement, so I kept doing it. Especially in the group, where others could see it, I was even more motivated to stick with it. (ID19, M-23)

Therapeutic alliance with cessation counselors. Personalized chat support from experienced cessation counselors, delivered via WeChat, was another key component of the intervention. The establishment of a strong therapeutic alliance with counselors was pivotal in helping participants sustain their quit attempts. The sense of being supported by someone who genuinely cared about their progress made them more accountable and serious about their quit attempts.

When the cessation counselor sent me a message, I knew she was reaching out specifically to me, so I had to respond. It made me take quitting more seriously. (ID17, F-23)

I wanted to quit smoking, but I couldn't control myself. The counselor often reminded me and encouraged me, like a health assistant, giving me tips on quitting and affirming my efforts. I felt like I was being noticed. (ID16, F-21)

Some participants, especially those dealing with underlying psychological issues, found the counselor's support to be crucial in addressing not just their smoking habits but also the emotional and mental barriers to quitting. The counselors provided timely psychological support that helped participants overcome these challenges.

I used e-cigarettes mainly because of psychological issues. The counselor provided me with timely psychological support, and once those emotional problems were resolved, quitting became much easier. (ID18, F-21)

The cessation counselor slowly got through to me. Her advice gradually lowered my psychological defenses, and I became willing to try quitting. (ID20, F-24)

The key themes identified provide valuable insights into both engagement and support strategies within the program. These findings contribute to a more comprehensive understanding of the mechanisms underlying successful smoking cessation efforts.

Discussion

This study explored the experiences and perspectives of young adults participating in a mobile phone-based smoking cessation program that incorporated a Quit & Win contest within a university campus setting. The findings highlight effective strategies for engaging young smokers, particularly through campus-wide smoke-free environment, the Quit & Win contest, and the use of peer counselors. The results suggest that a multifaceted approach, including financial incentives and mobile-based individual and group support, is crucial for facilitating smoking cessation among young adults. This provides valuable insights into the factors that contributing to the success of a multicomponent smoking cessation program.

The campus-wide smoke-free activities, combined with the Quit & Win contest, created a unique and supportive environment that effectively engaged participants. The collective participation and sense of community fostered by these activities were significant motivators, aligning with previous research suggesting that social environment enhances the effectiveness of smoking cessation interventions among young adults.¹² This environment likely contributed to a social contagion effect,²⁸ where smoking norms and peer influences shaped smoking risk and cessation outcomes. These findings are consistent with broader literature emphasizing the importance of smoke-free environments, social norms, and social support as critical factors for smoking cessation.^{29,30}

The Quit & Win contest, offering modest financial incentives, also emerged as key driver of engagement. Although the monetary reward was relatively small, prior research has shown that even modest financial incentives can serve as effective motivators. Our prior trial demonstrated that small monetary rewards, when combined with other cessation support, significantly promoted smoking cessation among community smokers.¹⁹ Similarly, our qualitative findings support this, showing that even \$14 reward was a primary motivator for many young smokers. This aligns with existing evidence that financial incentives can enhance cessation outcomes,³¹ though future studies should explore how to balance intrinsic and extrinsic motivations.

Peer counselors played an essential role in recruiting participants and providing brief cessation advice. This approach is consistent with meta-analyses indicating that peer-support

interventions significantly improve smoking abstinence.³² Peer support fostered trust with participants, helping reduce the stress of quitting by offering emotional and informational support.³³ This aligns with social cognitive theory,³⁴ which emphasizes the importance of social reinforcement and modeling in behavior change. Peer support also made the intervention scalable and cost-effective for larger community settings, consistent with our prior trials using trained lay volunteers as peer counselors.^{19,20}

The mobile phone-based intervention, including online group support and personalized chat support, provided convenient, real-time assistance. Existing research highlights that mobile-based interventions offer accessible and continuous support for smoking cessation.¹⁴ The online group fostered mutual encouragement, and seeing others' progress inspired participants to persist in their quit attempts.³⁵ This social reinforcement, combined with a sense of competition, further motivated participants.³⁶ Our findings corroborate existing literature showing that such tailored, real-time support improves engagement with cessation services and increases smoking cessation rates.^{20,24,25}

The personalized chat support, tailored according to participants' readiness to quit, provided a strong therapeutic alliance. By addressing specific psychological barriers such as stress and anxiety, this timely psychological support reinforced participants' commitment to cessation. These qualitative insights reveal the mechanisms that made the intervention effective, highlighting the need to address both physical and emotional challenges, as supported by our prior trial on psychological and behavioral support in cessation interventions.²⁶

Future interventions aiming to promote smoking cessation among young people should consider using Quit & Win contest as an initial step to drive engagement. Universities and other community settings are ideal for implementing comprehensive smoking cessation programs that foster smoke-free environments. The use of peer counselors is recommended, given their low cost and scalability. Financial incentives can boost motivation, while mobile phone-based interventions ensure that support remains accessible. A multifaceted approach, combining these strategies, is essential to address the unique challenges faced by young adult smokers.

This study has several limitations. First, the participants in the study were university students, which may limit the generalizability of the findings to other young adult populations. Future research could benefit from including participants from diverse background to better understand how different contexts influence engagement with smoking cessation interventions. Second, the reliance on self-reported data introduces potential biases, as participants may underreport or overreport their smoking behavior due to social desirability bias. In the parent trial, quitters were biochemically validated to ensure the accuracy of cessation outcomes. Third, while the financial incentive of \$14 was a significant motivator, especially for younger adults, the

long-term sustainability and effectiveness of such incentives remain uncertain. Larger incentives may not be feasible for widespread use, and their impact may diminish over time as intrinsic motivation becomes more critical for sustained cessation.

Conclusion

This study demonstrates that a multifaceted approach, combining a supportive environment, peer counselors, and the Quit & Win contest, effectively encourages young adults to initiate quit attempts. Mobile-based interventions, when integrated with structured cessation programs, can significantly enhance smoking cessation efforts in this population. Universities and other community settings should implement comprehensive programs that incorporate these elements to address the unique challenges faced by young smokers. The findings have important implications for policy and practice, highlighting the need for accessible and engaging cessation strategies tailored to the specific needs of young adult smokers. Future research should explore the scalability of such interventions and their long-term impact on smoking behaviors across diverse populations. These findings could guide public health policies to create supportive environments and accessible interventions for young smokers on a larger scale.

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