

The 4th “Quit to Win” Contest – Effectiveness of Small Cash Incentive on Smoking Cessation

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1. Introduction

According to Census & Statistics Department, the prevalence of daily smoking in Hong Kong Special Administrative Region (HKSAR) was 10.7% in 2012¹. Smoking kills over 7,000 people per year². Smoking led to an annual medical cost, long-term care and productivity loss of HK\$5.37 billion (US\$688 million) in 1998³, which was equivalent to 0.6% of GDP in the HKSAR⁴. Tobacco is addictive and it is difficult for some smokers to quit smoking without assistance. Over half of the daily smokers in Hong Kong have not attempted or do not want to quit smoking, and they are unlikely to access the smoking cessation services¹.

The “Quit to Win” programme provided an opportunity to reach and encourage a large number of smokers to make quit attempt in order to increase the number of quitters. The Quit and Win model assumed that smokers could develop a higher motivation to quit and gain a wider social support in quitting through participating in a contest⁵. Such quitting contests or incentive-based programmes not only reached many smokers, but also demonstrated a significantly higher quit rate in the quit and win group than the control group⁵. Cognitive theory suggests that immediate incentive exerts more influence than delayed reward to change their health-related behaviors⁶. Some echoed this by rewarding the participants who were abstinent or achieved other cessation outcomes in the early stage of the quitting process, instead of a later cessation outcome⁷. Among the 3 overseas studies attempted to combine short-term monetary reward and competition as the incentive for abstinence⁸, Koffman’s study in the workplace showed that participants with short-term incentives had a higher quit rate at 6 months than others without the incentives.

The “Quit to Win” Contests organized by Hong Kong Council on Smoking and Health in 2009, 2010 and 2012 recruited over 3,000 smokers in the community in Hong Kong. At baseline, more than 60% of them had quit attempt in their lifetime but only about one-fourth attempted to quit in the past year⁹⁻¹¹. On the other hand, the engagement in the competition boosted up smokers’ confidence and motivation to quit, but additional counseling and short messaging services did not increase the quit rate¹¹. A lucky draw was conducted in all the 3 contests to offer several grand prizes for the quitters whose abstinence was validated by biochemical tests. In accordance with the research direction suggested by the aforementioned studies, the 4th “Quit to Win” Contest examined the effectiveness of a short-term small monetary incentive (HK\$500 in cash) for the quitters who passed the biochemical validation on top of the lucky draw grand prizes.

2. Methods

2.1 Recruitment

To recruit participants in the Contest, 60 recruitment sessions were held in shopping malls, workplaces and public areas in 18 districts in Hong Kong from 29 June to 30 September 2013 (about 3 months). Trained smoking cessation counselors screened participants with the following eligibility criteria for the Contest:

1. Hong Kong residents aged 18 years or above;
2. Daily smokers who smoked at least 1 cigarette per day in the past 3 months;
3. Able to communicate in Cantonese and read Chinese; and
4. Exhaled carbon monoxide (CO) of 4 parts per million (ppm) or above.

After obtaining written consent from the participants, the trained smoking cessation counselors administered the baseline questionnaire, measured the exhaled CO level and provided a health education card and a 12-page self-help smoking cessation booklet to the participants. Eligible participants who were unwilling to join the randomized controlled trial (RCT) could still join the “Quit to Win” Contest, and were allocated to the non-trial group. Smokers who were unable to communicate or currently participating in other smoking cessation programmes were excluded from the RCT.

Block randomization was used to randomize participants into 3 RCT groups:

Group A: Informed early incentive

Group B: Uninformed early incentive

Group C: Control; uninformed late incentive

All participants were individually randomized on each recruitment day. Different individual blocks were generated with a block size equal to 3, 6 and 9 containing random permutations of the three RCT arms within each block, using the website <http://www.random.org> (a website for generating random integers). Then, the investigator allocated the random permutations of group allocation to the list of the participants and passed the group allocation of each participant to the research staff to conduct the 1-week telephone follow-up.

2.2 Intervention and Follow-up

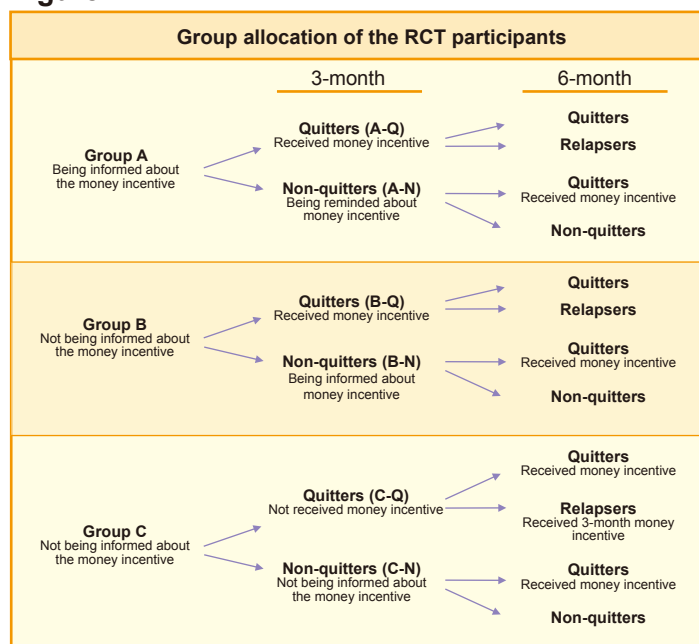
Group A (Informed early incentive): Participants were informed about the incentive of abstinence (HK\$500 in cash) through the 1-week and 1-month telephone follow-up. Incentive of abstinence was given immediately to those who reported abstinence for the past 7 days at 3-month follow-up and passed the 3-month biochemical validation (exhaled CO < 4 ppm and saliva cotinine level < 10 ng/ml^{12,13}) (Group A-Q). Those who did not quit (Group A-N) or those self-reported quitters who refused to participate in the biochemical validation at 3-month follow-up were informed again that they would be given the same incentive if they quit at 6-month follow-up and the quitting was validated (Figure 1).

Group B (Uninformed early incentive): The incentive of abstinence was given immediately to those who reported abstinence for the past 7 days at 3-month follow-up and passed the biochemical validation (Group B-Q), but they were not informed about the incentive at 1-week and 1-month follow-up. Those who did not quit (Group B-N) or those self-reported quitters who refused to participate in the biochemical validation at 3-month follow-up were informed that they would be given the same incentive if they quit at 6-month follow-up and the quitting was validated (Figure 1).

Group C (Uninformed late incentive, control group): The incentive for the self-reported and biochemically-validated abstinence at 3-month or 6-month follow-up was given at the 6-month follow-up. They were not informed about the incentive at 1-week, 1-month and 3-month follow-up (Figure 1).

Non-trial group: This group included participants who were not willing to participate in the RCT, but they could still join the Contest. Participants who joined the TV programme and were recruited from workplaces were included in this group.

Figure 1



All participants were provided the 12-page self-help smoking cessation booklet and health education card and followed up at 1 week, 1 month, 3 months and 6 months after baseline recruitment. Trained smoking cessation counselors conducted the telephone survey using a standardized questionnaire. The interviewers made at least 7 call attempts, at different times of a day, to reach each participant. Those who failed to be contacted in all attempts were classified as loss to follow-up. As stated above, those who reported no smoking in the past 7 days were invited to participate in the biochemical validation. Participants who passed the biochemical validation at 3-month follow-up were included in the lucky draw, of which 5 participants were selected to win a HK\$10,000 gift voucher each. Validated quitters in the non-trial group were selected as winners by interview and then joined the TV programme. The champion received a prize of two round trip flight tickets from Hong Kong to Australia including accommodation (valued at around HK\$25,000), the 1st runner-up and 2nd runner-up received a travel coupon valued at around HK\$15,000 and HK\$10,000, respectively.

The primary outcome was the self-reported 7-day point prevalence (PP) quit rate at 3-month follow-up. The secondary outcomes included (i) self-reported 7-day PP quit rate at 6-month follow-up, (ii) biochemically validated quit rates, (iii) rate of smoking reduction by at least half of the baseline amount, and (iv) rate of quit attempt (no smoking for at least 24 hours) at 1, 3 and 6 months.

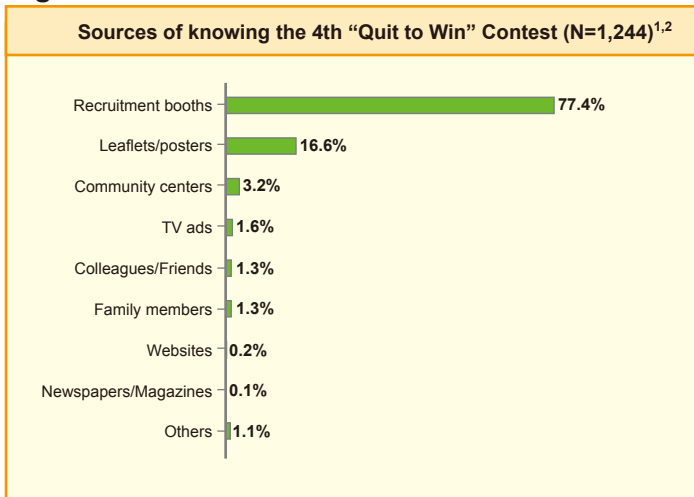
The socio-demographic and smoking characteristics at baseline of all subjects (n=1,254) were described. We compared the primary and secondary outcomes, reasons to quit, methods to quit, withdrawal symptoms, perceived importance, difficulty and confidence to quit, and the use and satisfaction of smoking cessation aids among the three groups. We adopted the intention-to-treat (ITT) analysis (assuming that non-respondents at the follow-up did not change their baseline smoking behavior) to calculate the self-reported and biochemically validated quit rates, and used complete-case (CC) analysis (excluding participants who were lost to follow-up) for other outcomes.

3. Results

In all the 60 recruitment sessions of the 4th "Quit to Win" Contest, 48 trained staff and volunteers from 11 non-government organizations participated in the on-site promotion; 60 trained HKU student helpers participated in the recruitment and provided smoking cessation counseling to the recruited smokers. About 200,200 people walked past the smoking cessation promotion booths and 34,162 people were aware of the activities at the booths. Besides, a total of 11,733 people made enquiries about smoking cessation or participated in the game booth of the Contest. The recruitment staff approached 8,063 smokers and 22,005 non-smokers in all the activities. They also spread the smoke-free messages to another 31,000 smokers and 5,000 non-smokers through distributing smoking cessation leaflets.

Most (77.4%) participants knew the "Quit to Win" Contest from the recruitment booths, and 16.6% received the message through distributed leaflets or posters. More than half (53.3%) had received information about smoking cessation before participating in the Contest. Television (36.8%) and leaflets/posters (15.4%) were the two major sources of the information received (Figure 2 & 3).

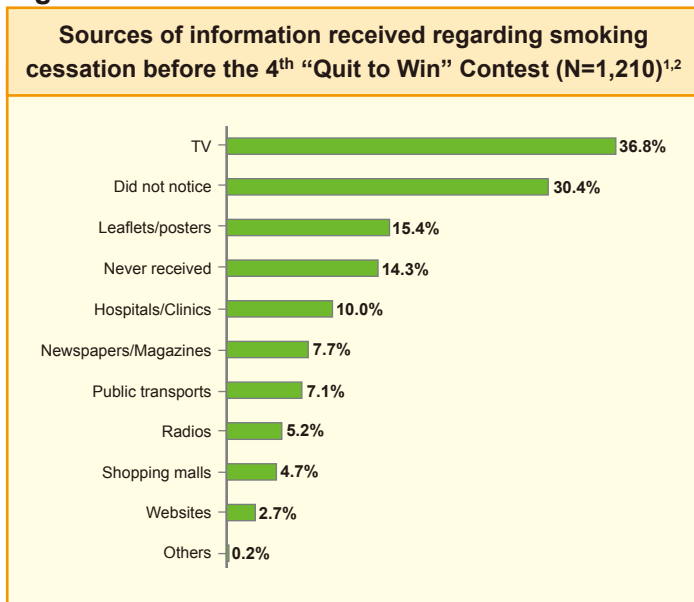
Figure 2



¹ Missing data were excluded

² Participants could choose more than one option

Figure 3



¹ Missing data were excluded

² Participants could choose more than one option

3.1 Demographic characteristics of all participants

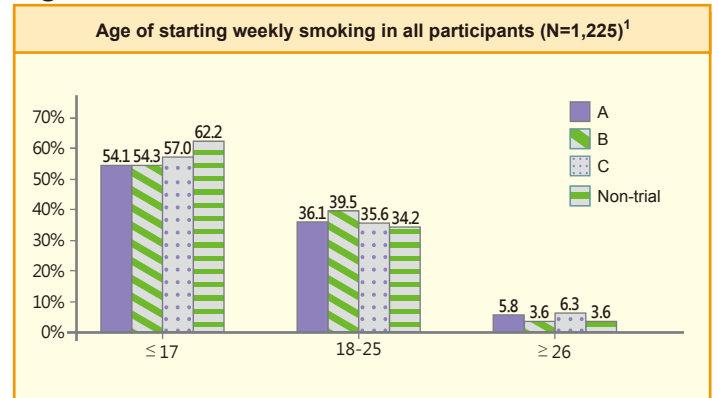
A total of 1,309 smokers were screened for the Contest. 1,254 (95.8%) of them were eligible and consented to participate in the Contest. Of the 1,143 (91.1%) participants who participated in the RCT, 379 (33.2%) were allocated to Group A, 385 (33.7%) to Group B and 379 (33.2%) to Group C. 102 participants who did not join the RCT and 9 who were recruited from a workplace were combined as the non-trial group.

In all participants, 81.6% were male, and the average age was 44.2 years (SD=16.4). 62.2% were married and 60.0% of them had children. More than half (51.8%) had senior secondary education level or above, and the majority (68.2%) were employed. Less than one-third (29.0%) had monthly household income less than HK\$10,000. No significant difference was found among the three groups (Table 1).

3.2 Smoking profile

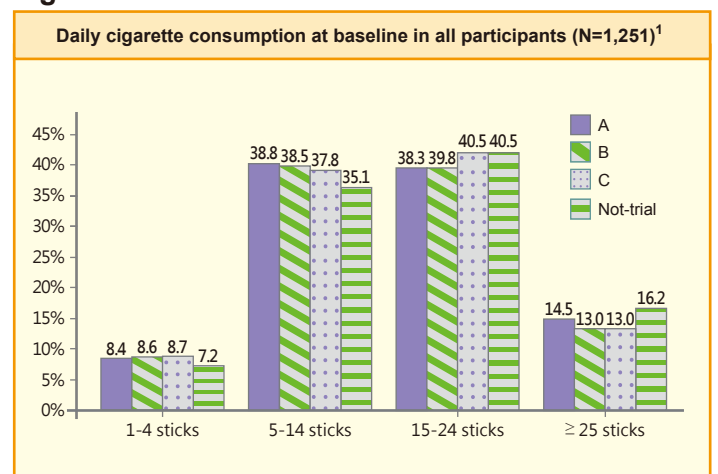
The mean age of first smoking attempt in the participants was 17.5 (SD=5.9) years. More than half (55.7%) started smoking before the age of 18 years (Figure 4). The mean daily cigarette consumption was 16 (SD=10.3 sticks), with 38.0% consumed 5-14 sticks and 39.6% consumed 15-24 sticks per day (Figure 5). The proportion of having previous quit attempt or ready to quit were both about 70% (Figure 6). No significant difference was observed in the three groups.

Figure 4



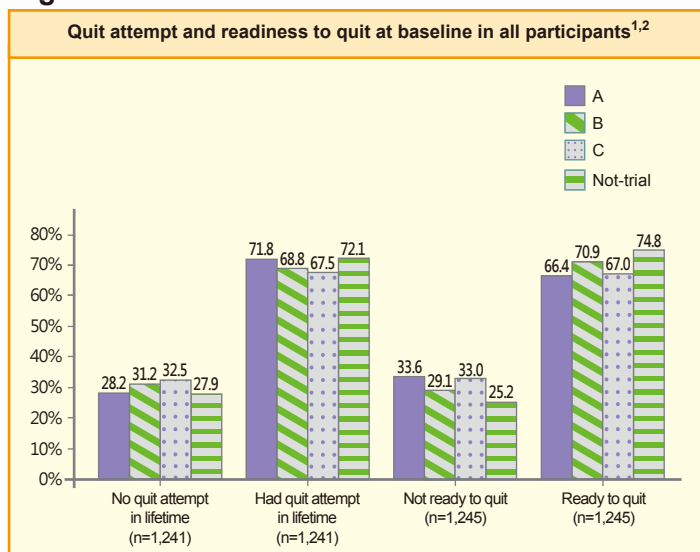
¹ Missing data were excluded

Figure 5



¹ Missing data were excluded

Figure 6



¹ Missing data were excluded

² Participants who were ready to quit included those who wanted to quit within 30 days, while those not ready to quit included those who wanted to quit after 30 days or more, and those who had not decided to quit

3.3 Social support

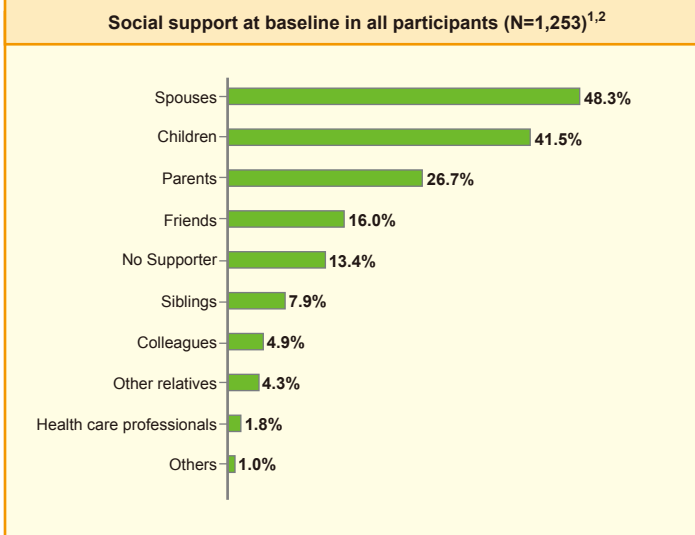
The major sources of perceived support during the quitting process were: (1) spouses (48.3%), (2) children (41.5%), (3) parents (26.7%) and (4) friends (16.0%). However, 13.4% of them did not receive any support from others during the quitting process. There was no significant difference in receiving support from other people among the three RCT groups (Figure 7).

Table 1 Demographic characteristics of all participants (N=1,254)¹

		Total (N=1,254) (n,%)	Non-trial (N=111) (n,%)	A (N=379) (n,%)	B (N=385) (n,%)	C (N=379) (n,%)
Gender	Male	1,023 (81.6)	88 (79.3)	311 (82.1)	309 (80.3)	315 (83.1)
	Female	231 (18.4)	23 (20.7)	68 (17.9)	76 (19.7)	64 (16.9)
Age, mean (SD), years		44.17 (16.4)	41.48 (14.7)	44.56 (16.8)	44.11 (16.0)	44.86 (16.6)
Marital status	Single	403 (32.6)	40 (36.0)	120 (32.1)	123 (32.5)	120 (32.2)
	Married/ Cohabited	769 (62.2)	64 (57.7)	232 (62.0)	236 (62.3)	237 (63.5)
	Other	65 (5.3)	7 (6.3)	22 (5.9)	20 (5.3)	16 (4.3)
Child	None	493 (40.0)	53 (47.7)	140 (37.8)	150 (39.3)	150 (40.4)
	One child	289 (23.4)	25 (22.5)	89 (24.1)	91 (23.8)	84 (22.6)
	Two children	269 (21.8)	19 (17.1)	92 (24.9)	70 (18.3)	88 (23.7)
	Three or more children	183 (14.8)	14 (12.6)	49 (13.2)	71 (18.6)	49 (13.2)
Education level	No formal education	34 (2.7)	4 (3.6)	7 (1.9)	10 (2.6)	13 (3.5)
	Elementary education	200 (16.1)	18 (16.4)	59 (15.7)	59 (15.4)	64 (17.1)
	Junior secondary education	365 (29.4)	32 (29.1)	112 (29.8)	111 (29.1)	110 (29.3)
	Senior secondary education	435 (35.0)	35 (31.8)	133 (35.4)	144 (37.7)	123 (32.8)
	Undergraduate	178 (14.3)	19 (17.3)	57 (15.2)	49 (12.8)	53 (14.1)
	Postgraduate	31 (2.5)	2 (1.8)	8 (2.1)	9 (2.4)	12 (3.2)
Employment status	Student	46 (3.7)	3 (2.7)	17 (4.5)	14 (3.7)	12 (3.2)
	Self-employed	157 (12.6)	9 (8.1)	54 (14.4)	39 (10.2)	55 (14.6)
	Employee	692 (55.6)	70 (63.1)	206 (54.9)	221 (57.9)	195 (51.9)
	Unemployed	105 (8.4)	13 (11.7)	26 (6.9)	32 (8.4)	34 (9.0)
	Housewife	55 (4.4)	6 (5.4)	15 (4.0)	17 (4.5)	17 (4.5)
	Retired	189 (15.2)	10 (9.0)	57 (15.2)	59 (15.4)	63 (16.8)
Monthly household income (HKD)	Less than \$5,000	173 (14.5)	18 (16.4)	57 (15.7)	51 (13.9)	47 (13.2)
	\$5,000-9,999	173 (14.5)	11 (10.0)	37 (10.2)	57 (15.5)	68 (19.2)
	\$10,000-19,999	416 (34.8)	43 (39.1)	128 (35.4)	129 (35.1)	116 (32.7)
	\$20,000-29,999	203 (17.0)	17 (15.5)	73 (20.2)	52 (14.1)	61 (17.2)
	\$30,000-39,999	116 (9.7)	11 (10.0)	35 (9.7)	41 (11.1)	29 (8.2)
	\$40,000 or more	114 (9.5)	10 (9.1)	32 (8.8)	38 (10.3)	34 (9.6)

¹ Missing data was excluded in some variables

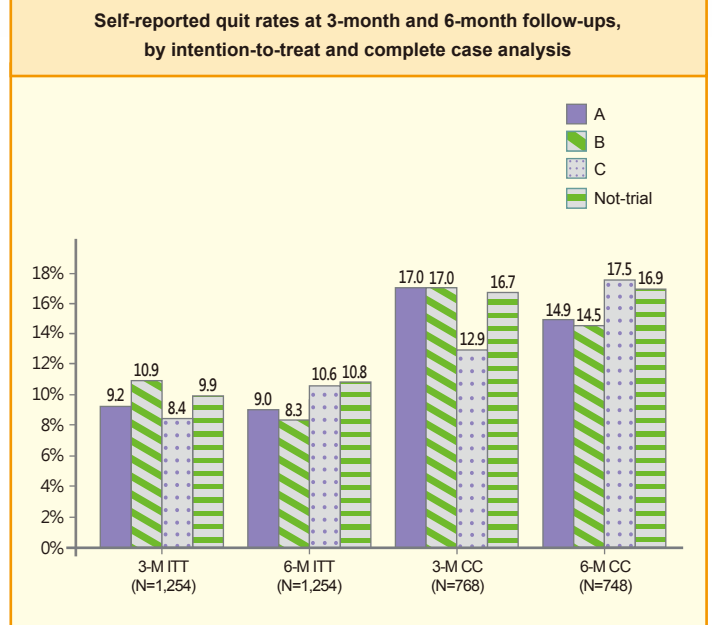
Figure 7



¹ Missing data were excluded

² Participants could choose more than one option

Figure 8



ITT: Intention-to-treat analysis; CC: Complete-case analysis

3.4 Retention rate

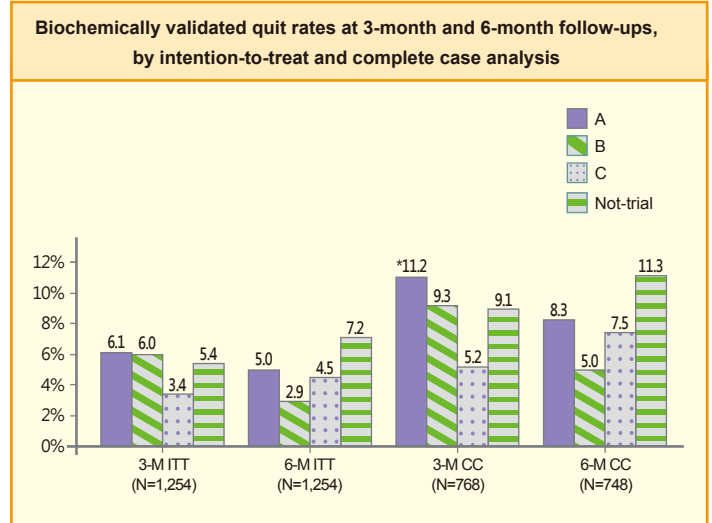
At 1-month follow-up, the overall retention rate was 64.1%, with 56.7% in Group A, 67.3% in Group B and 72.0% in Group C. At 3-month follow-up, the overall retention rates were 61.2%, with 54.4% in Group A, 64.2% in Group B and 65.7% in Group C. There was a significant difference in the retention rate between Group A and C (A: 54.4%, C: 65.7%, $p < 0.01$). At 6-month follow-up, the overall retention rate was 59.6%, with 60.2% in Group A, 57.6% in Group B and 60.2% in Group C, but the difference was not significant.

3.5 Self-reported and biochemically validated quit rate at the 3-month follow-ups

By ITT analysis, the overall self-reported 7-day point prevalence quit rate at 3-month follow-up was 9.6%. There was a slightly higher quit rate in Group B (10.9%) than Group A (9.2%) and C (8.4%), but the differences were not significant (Figure 8).

In the 120 self-reported quitters, 69 of them participated in the biochemical validation and 94.2% passed. The validated quit rate for all the participants at 3-month follow-up was 5.2%. By CC analysis, the self-reported quit rates of Group A, B and C were 17.0%, 17.0% and 12.9%, respectively, and the corresponding validated quit rate was 11.2%, 9.3% and 5.2%, respectively. By CC analysis, Group A had a greater validated quit rate than Group C at 3-month follow-up ($p = 0.02$) (Figure 8 & 9).

Figure 9



ITT: Intention-to-treat analysis; CC: Complete-case analysis

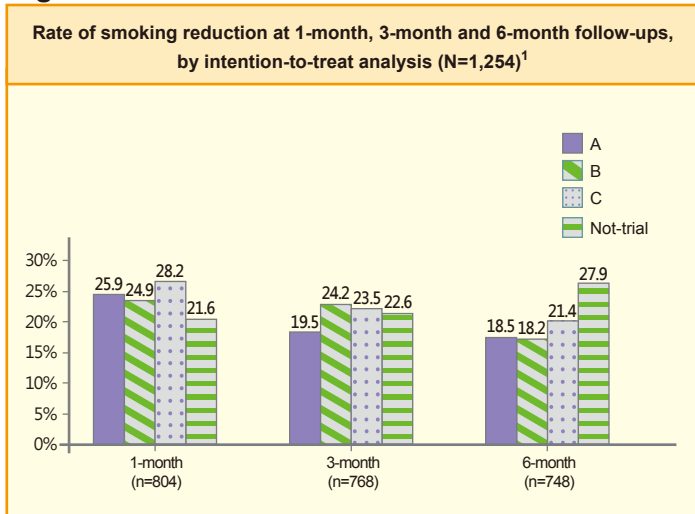
*p-value for comparing Group A and Group C = 0.02

3.6 Smoking reduction by half at the 1-, 3- and 6-month follow-ups

By ITT analysis, excluding the self-reported quitters, 283 (22.6%) and 252 (20.1%) participants reduced daily cigarette consumption by at least 50% at 3-month and 6-month follow-up, respectively, compared with baseline. No significant difference in the three groups was found at any follow-ups (Figure 10). When quitters were included in the numerator and denominator, the quit and reduction rate for the two follow-ups were 32.1% and 29.5%, respectively. The difference in the three groups at all follow-ups was not significant (Figure 11).

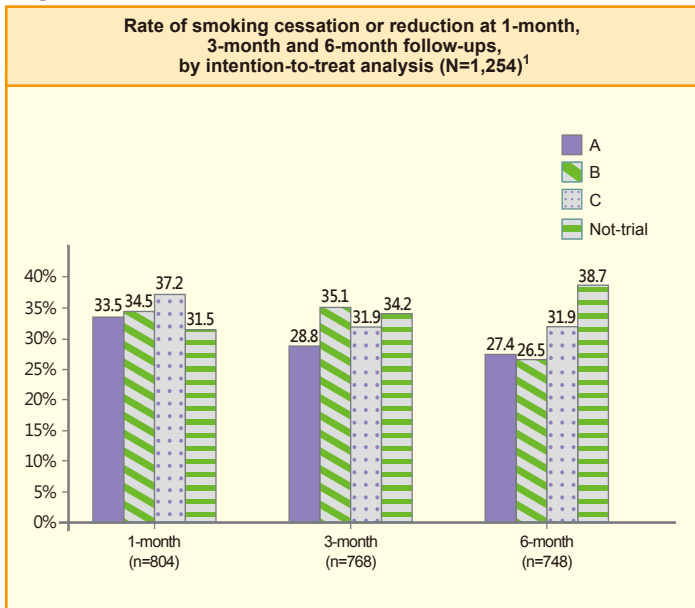
By CC analysis, excluding quitters, the smoking reduction rates were 36.8% and 33.7% at 3-month and 6-month follow-ups, respectively. No significant difference in the three groups was found at all follow-ups. When quitters were included, the quit or reduction rate for the two follow-ups was 52.5% and 49.5%, respectively. The difference in the three groups at all follow-ups was not significant.

Figure 10



¹ Quitters were excluded in the numerator but included in the denominator

Figure 11

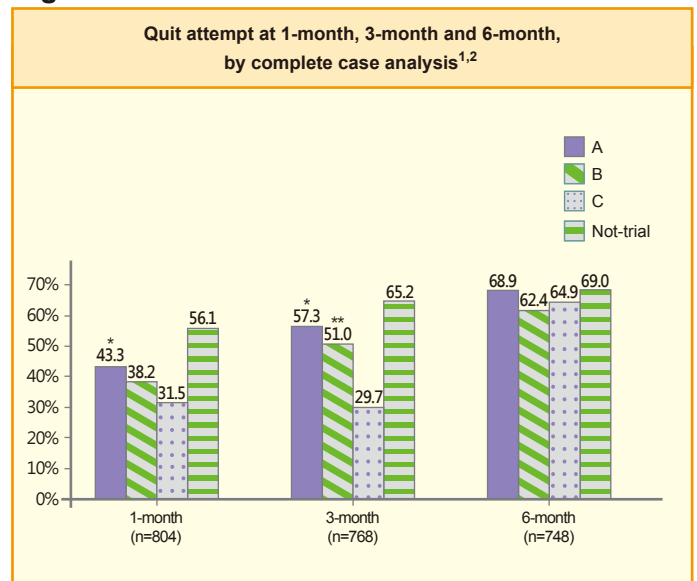


¹ Quitters were included in the numerator and denominator

3.7 Quit attempt at the 1-, 3- and 6-month follow-ups

Including quitters, 38.6% and 46.9% of the participants made one or more quit attempt at 1-month and 3-month follow-ups, respectively. At 1-month follow-up, Group A had significantly greater proportion of having quit attempt than Group C (A: 43.3%, C: 31.5%, $p < 0.01$). When quitters were excluded, Group A still had a higher proportion of having quit attempt than Group C (A: 34.4%, C: 21.8%, $p < 0.01$). At 3-month follow-up, including quitters, more participants in Group A and B made quit attempt than Group C (A: 57.3%, B: 51.0%, C: 29.7%, p for A versus C < 0.01 ; p for B versus C < 0.01). When quitters were excluded, more participants in Group A and B also made quit attempt than Group C (A: 48.5%, B: 41.0%, C: 19.4%, p for A versus C < 0.01 ; p for B versus C < 0.01) (Figure 12). There was no significant difference in the three groups at 6-month follow-up.

Figure 12



¹ Missing data were excluded

² Quitters were included

*p-value for comparing A and C < 0.01

**p-value for comparing B and C < 0.01

3.8 Reasons and methods of quit attempts at the 6-month follow-up

At 6-month follow-up, in the participants who had at least one quit attempt in the study period, the most common reasons of quit attempt were: (1) illness prevention (61.6%), (2) expensive cigarettes (19.9%), (3) concerned about family's health (14.6%), (4) received encouragement or pressure from others (8.8%), and (5) received medical treatment (7.5%). There was no significant difference in the three groups (Figure 13).

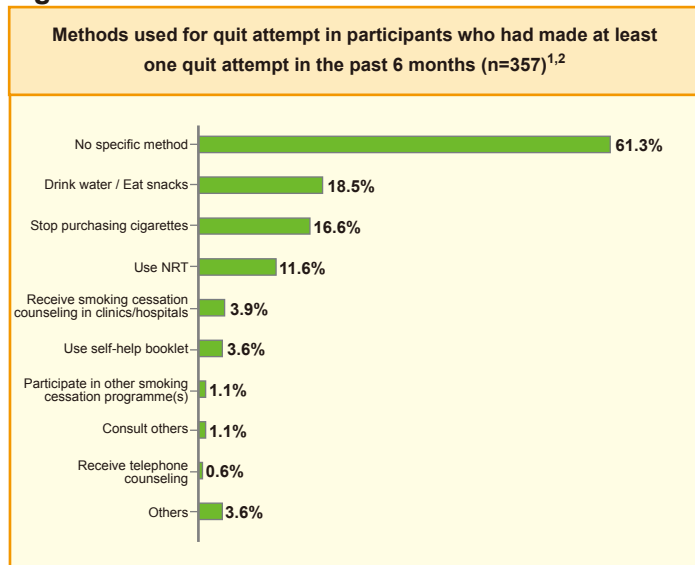
Figure 13



¹ Participants who were lost to follow-up were excluded
² Participants could choose more than one reason

In the participants who had quit attempts, the majority (61.3%) did not use any specific methods to quit. More participants in Group A (5.8%) and B (5.9%) received smoking cessation counseling from clinics or hospitals compared with Group C (0.8%) (p-value for A versus C=0.04; p-value for B versus C=0.04). Moreover, a higher proportion in Group C than Group B stopped purchasing cigarettes (B: 8.9%, C: 22.8%, p<0.01). There was a marginal significance between Group B and C (B: 15.8%, C: 7.3%, p=0.05) in using nicotine replacement therapy (NRT) (Figure 14).

Figure 14

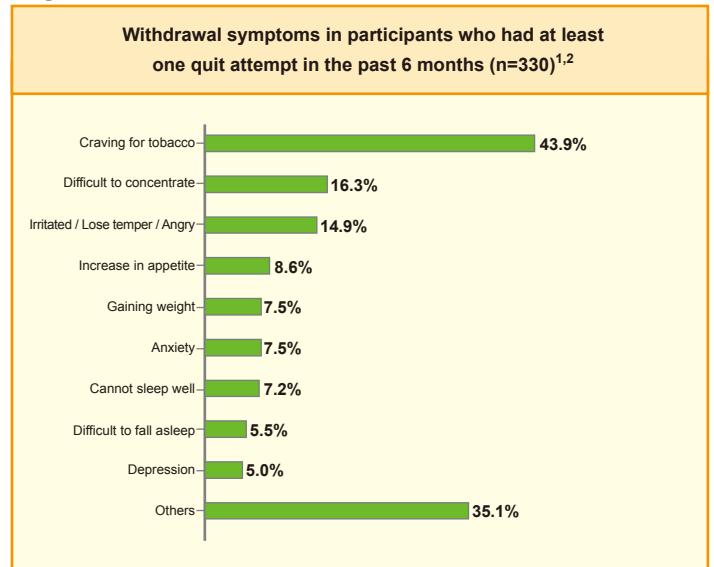


¹ Participants who were lost to follow-up were excluded
² Participants could choose more than one method

3.9 Withdrawal symptoms of the quit attempt at the 6-month follow-up

The three most common withdrawal symptoms at 6-month follow-up were: (1) craving to smoke (43.9%), (2) difficult to concentrate (16.3%), and (3) feeling irritated or losing temper (14.9%). There was no significant difference in the three RCT groups (Figure 15).

Figure 15



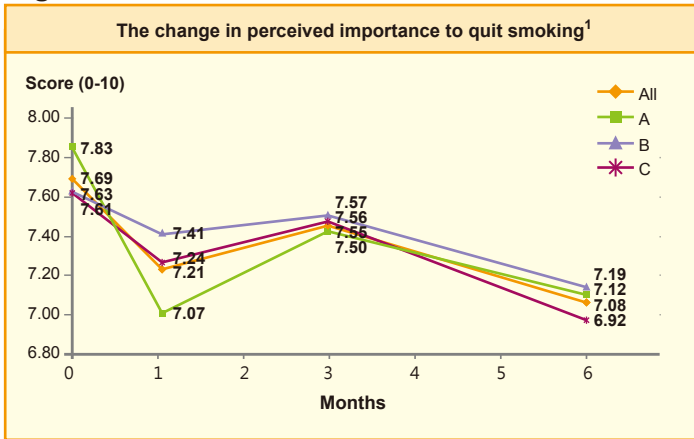
¹ Participants who were lost to follow-up were excluded
² Participants could choose more than one symptom

3.10 Self-perceived importance, difficulty, and confidence to quit smoking

Among all participants, in a scale of 0 (minimum) to 10 (maximum), the mean scores of "perceived level of importance to quit smoking", "perceived level of difficulty to quit smoking", and "perceived level of confidence to quit smoking" at baseline were 7.69 (SD = 2.09), 7.25 (SD = 2.49), 5.52 (SD = 2.46), respectively.

The mean score of perceived importance in Group A and C dropped significantly from baseline to 1-month follow-up (p<0.01), but Group B did not have significant change (p=0.11). All groups had lower mean score at 6-month follow-up than baseline (all p<0.01). There was no significant difference in the three RCT groups at all follow-ups (Figure 16).

Figure 16



¹ Missing data were excluded

Within-group pair-sample t-test:

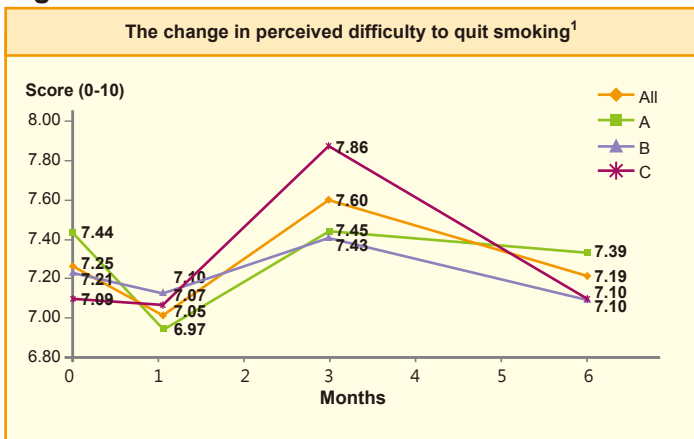
A p-value for Baseline versus 1-month<0.01
p-value for Baseline versus 3-month=0.22
p-value for Baseline versus 6-month<0.01
B p-value for Baseline versus 1-month=0.11
p-value for Baseline versus 3-month=0.10
p-value for Baseline versus 6-month<0.01
C p-value for Baseline versus 1-month<0.01
p-value for Baseline versus 3-month=0.09
p-value for Baseline versus 6-month<0.01

Between group independent t-test

Baseline p-value for A versus C=0.19
p-value for B versus C=0.88
1-month p-value for A versus C=0.42
p-value for B versus C=0.78
3-month p-value for A versus C=0.76
p-value for B versus C=0.92
6-month p-value for A versus C=0.34
p-value for B versus C=0.21

The mean score of perceived difficulty of quitting in Group C increased significantly from 7.09 at baseline to 7.86 at 3 months ($p<0.01$). There were no significant temporal changes in Group A and B. For between-group comparison, the mean score of Group A was higher than Group C at baseline (A: 7.44, C: 7.09, $p=0.05$), but the contrast was opposite at 1-month follow-up (A: 6.97, C: 7.07, $p<0.01$). At 3-month follow-up, the mean score of Group A (7.45) and B (7.43) was lower than Group C (7.86) (p -value for A versus C=0.04; p -value for B versus C=0.02) (Figure 17).

Figure 17



¹ Missing data were excluded

Within-group pair-sample t-test:

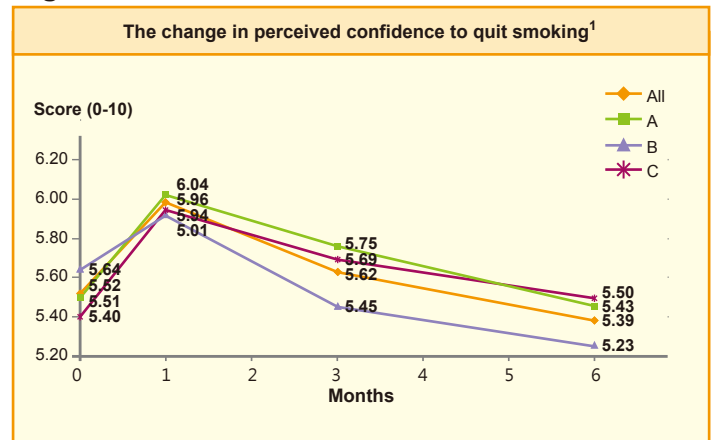
A p-value for Baseline versus 1-month=0.10
p-value for Baseline versus 3-month=0.38
p-value for Baseline versus 6-month=0.29
B p-value for Baseline versus 1-month=0.08
p-value for Baseline versus 3-month=0.45
p-value for Baseline versus 6-month=0.18
C p-value for Baseline versus 1-month=0.94
p-value for Baseline versus 3-month<0.01
p-value for Baseline versus 6-month=0.74

Between group independent t-test

Baseline p-value for A versus C=0.05
p-value for B versus C=0.51
1-month p-value for A versus C<0.01
p-value for B versus C=0.82
3-month p-value for A versus C=0.04
p-value for B versus C=0.02
6-month p-value for A versus C=0.16
p-value for B versus C=0.99

The mean score of perceived confidence of quitting significantly increased from baseline to 1-month follow-up for all the three groups. The scores at 3 and 6 months were similar to the baseline in the three RCT groups (all $p>0.05$). The scores were also similar in the three RCT groups at all the follow-ups (all $p>0.05$) (Figure 18).

Figure 18



¹ Missing data were excluded

Within-group pair-sample t-test:

A p-value for Baseline versus 1-month=0.01
p-value for Baseline versus 3-month=0.54
p-value for Baseline versus 6-month=0.78
B p-value for Baseline versus 1-month=0.05
p-value for Baseline versus 3-month=0.54
p-value for Baseline versus 6-month=0.32
C p-value for Baseline versus 1-month<0.01
p-value for Baseline versus 3-month=0.14
p-value for Baseline versus 6-month=0.74

Between group independent t-test

Baseline p-value for A versus C=0.55
p-value for B versus C=0.19
1-month p-value for A versus C=0.20
p-value for B versus C=0.62
3-month p-value for A versus C=0.78
p-value for B versus C=0.29
6-month p-value for A versus C=0.80
p-value for B versus C=0.24

3.11 Use and satisfaction of smoking cessation aids

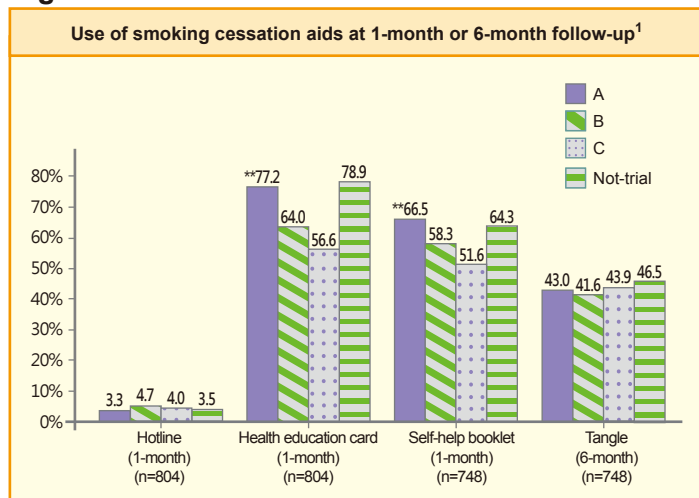
At 1-month follow-up, 4.0% of all participants had called the smoking cessation hotline (1833183) to seek assistance in quitting. There was no significant difference in the usage of the hotline in the three RCT groups. The three most common reasons of not calling the hotline were "Not interested" (35.4%), "Useless" (25.1%) and "Too busy" (21.9%).

Overall, 65.9% had read the health education card at 1-month follow-up. More participants in Group A had read the card than Group C (A: 77.2%, C: 56.6%, $p<0.01$). 58.6% had read the self-help booklet at 1-month follow-up. More participants in Group A had read self-help booklet than Group C (A: 66.5%, C: 51.6%, $p<0.01$). The most common reasons of not reading the education card were "Too busy" (36.0%), "Not interested" (25.4%), "Lost it" (18.0%), and "Useless" (16.9%). These reasons were also common for those who did not use the self-help booklet: "Too busy" (37.5%), "Not interested" (25.7%), "Lost the booklet" (15.5%) and "Useless" (15.2%) (Figure 19).

A cessation aid, "Tangle", which is a tool to help keeping participants' hands active to relieve the stress in quitting, was offered to all participants. At 6-month follow-up, 43.2% participants had used "Tangle" in the Contest. No significant difference in the use of "Tangle" among the three RCT groups was detected. The reasons for not using it included "Not interested" (28.1%), "Useless" (26.4%), "Lost it" (21.2%) and "Too busy" (19.2%) (Figure 19).

In a scale of 1 (minimum) to 5 (maximum), the mean scores of satisfaction for the "smoking cessation hotline", "health education card", "self-help booklet" and "Tangle" were 1.43 (SD = 0.5), 2.86 (SD = 0.9), 2.66 (SD = 1.0) and 2.27 (SD = 1.0), respectively.

Figure 19



¹ Participants who were lost to follow-up were excluded
 **p-value for comparing A and C < 0.01

3.12 Predictors of abstinence at 3-month and quit attempt at 6-month follow-ups

Using the multivariate logistic regression model, with ITT analysis, the predictors of self-reported abstinence at 3 months included (1) starting quitting within the past 60 days (but not within 7 or 30 days) (Adjusted OR=3.58, 95% CI=1.37-9.37), compared to those who did not decide to quit at baseline; (2) higher perceived importance to quit (Adjusted OR per score=1.25, 95% CI=1.09-1.43); (3) higher perceived confidence to quit (Adjusted OR per score=1.24, 95% CI=1.12-1.37); and (4) receiving social support from parents (Adjusted OR=1.60, 95% CI=1.00-2.54). Besides, heavy nicotine dependency was associated with lower likelihood to quit (Adjusted OR=0.53, 95% CI=0.32-0.88) (Table 2).

Table 2 Baseline predictors to quit smoking at 3-month follow-up by multivariate logistic regression model (n=1,039)¹

Predictors to quit smoking	Adj. OR	P	95%CI
Nicotine Dependency			
Light (HSI<4)	1.00		
Heavy (HSI≥4)	0.53	<0.01	0.32-0.88
Time to start quitting			
Had not decided	1.00		
Within 60 days	3.58	<0.01	1.37-9.37
Within 30 days	1.05	0.91	0.46-2.40
Within 7 days	1.65	0.13	0.87-3.13
Perceived importance of quitting	1.25	<0.01	1.09-1.43
Perceived confidence of quitting	1.24	<0.01	1.12-1.37
Received support from parents	1.60	<0.05	1.00-2.54

Notes:
 HSI = Heaviness of Smoking Index; Adj. OR = adjusted odds ratio; CI = confidence interval
¹ Excluding loss to follow-up and missing data
 *Participants who were lost to follow-up were treated as continued smoking at 3 months, by intention-to-treat analysis
 **The following variables were insignificant and excluded in the model: treatment condition, education level, marital status, recent experience of quitting, number of children, number of quit attempts, perceived difficulty, received support from spouse, received support from children, read the health education card at 1 month, read the booklet at 1 month and dialed the smoking cessation hotline at 1 month

At 6 months, the predictors of quit attempt since participation included (1) having 1-3 quit attempts (Adjusted OR=1.68, 95% CI=1.22-2.32) or having 4-6 quit attempts (Adjusted OR=2.17, 95% CI=1.22-3.84) at baseline, compared to those without any attempts; (2) starting quitting in 7 days (Adjusted OR=1.66, 95% CI=1.18-2.33) at baseline, compared to those who did not decide to quit at baseline; and (3) reading the self-help booklet at 1 month (Adjusted OR=1.65, 95% CI=1.25-2.17) (Table 3).

Table 3 Baseline predictors to quit attempt at 6-month follow-up by multivariate logistic regression model (n=1,039)¹

Predictors to quit smoking	Adj. OR	P	95%CI
Number of quit attempt			
Never	1.00		
1-3	1.68	<0.01	1.22-2.32
4-6	2.17	<0.01	1.22-3.84
7 or above	1.29	0.41	0.71-2.36
Time to start quitting			
Had not decided	1.00		
Within 60 days	1.18	0.47	0.76-1.83
Within 30 days	1.06	0.87	0.53-2.14
Within 7 days	1.66	<0.01	1.18-2.33
Read self-help booklet at 1 month	1.65	<0.01	1.25-2.17

Notes:
 Adj. OR = adjusted odds ratio; CI = confidence interval
¹ Excluding loss to follow-up and missing data
 * Participants who were lost to follow-up were treated as no quit attempt at 6 months, by intention-to-treat analysis
 **The following variables were insignificant and excluded in the model: treatment condition, education level, marital status, HSI, recent experience of quitting, number of children, perceived difficulty, perceived confidence at baseline, received support from spouse, received support from children, read the health education card at 1 month, read the booklet at 1 month and dialed the smoking cessation hotline at 1 month

4. Discussion

The number of participants in the 4th “Quit to Win” was higher than the previous Contests (N=1,119 in 2009, 1,103 in 2010 and 1,193 in 2012). About 1 in 10 participants quit smoking at 3-month (9.6%) or 6-month (9.4%) follow-ups. Meanwhile, about 2 in 10 participants reduced smoking at the two follow-ups. In total, 3 in 10 participants had quit or reduced smoking. No significant difference was found in either the self-reported quit rate or reduction rate in the three RCT groups at 3-month and 6-month follow-ups.

Although more participants had lifetime quit attempts and were ready to quit than the Hong Kong smoking population, the present contest recruited more smokers who had heavy nicotine dependency (Heaviness Smoking Index equal to 4 or above) and were not ready to quit than the previous contests. The proportion of smokers who consumed 25 cigarettes daily or above increased from 10.6% in 2010 and 8.5% in 2012 to 13.7% in 2013. The proportion of heavy nicotine dependency increased from 32.7% in 2009 to 38.7% in 2013. Also, the proportion of smokers who were ready to quit within 7 days decreased from 67% in 2009 to 51% in 2013. These findings suggested that the “Quit to Win” Contest has been recruiting more and more smokers with heavy nicotine dependence and lower quitting intention. This is consistent with another local study which found an increasing prevalence of hardcore smokers¹⁴. This may also contribute to the continuous decrease in the self-reported quit rate over the four “Quit to Win” Contests. Nevertheless, the Contest approached and recruited a large number of smokers who did not seek smoking cessation services to quit. They were willing to have quit attempt due to the incentives, but the brief interventions were not sufficient to achieve a higher cessation rate. Future “Quit to Win” Contests should deliver specific interventions, including larger monetary incentives, to help hardcore smokers to quit. Strengthening the tobacco control measures such as a large tax increase and expanding smoking cessation services are also warranted.

A total of 88 participants underwent the biochemical validation and received the HK\$500 cash incentive at either follow-up. The present study showed that

the HK\$500 cash incentive for validated abstinence was beneficial for motivating more smokers to have quit attempt. Participants who received the early notice about the incentive were more likely to attempt to quit and attend the biochemical validation than those who did not. The incentive also motivated smokers to read the self-help education card and the smoking cessation booklet. However, we do not have sufficient evidence to support that this incentive increased quitting success or increased perceived importance and confidence to quit. The small amount of cash incentive might only motivate smokers to try to quit. In view of this, larger monetary incentive and other cessation aids including counseling and medication should be delivered to increase abstinence.

Over half of the participants read the self-help education card and the booklet delivered in the Contest, but very few reported dialing the smoking cessation hotline (1833183), using smoking cessation services and NRT. It is consistent with the majority of smokers in Hong Kong that they quit on their own will without seeking help from the existing smoking cessation services and medications¹. Therefore, interventions to motivate smokers to use smoking cessation services and medication are needed.

5. Conclusions

In conclusion, the 4th “Quit to Win” Contest pioneered the use of small cash incentive to motivate smokers to quit. The additional small amount of incentive (HK\$500) increased participants’ quit attempt and use of self-help materials, but did not increase abstinence at 6-month. As there was an increase in smokers with high nicotine dependency and no intention to quit, more specific interventions for these smokers and a greater amount of monetary incentive might be needed.

6. Clinical trial Registration

Clinical trial registration number: NCT01928251
(<http://www.controlled-trials.gov>)

7. References

1. Census & Statistics Department, Hong Kong SAR Government. (2013). *Pattern of smoking. Thematic Household Survey Report No. 53*. Hong Kong: Census & Statistics Department.
2. Lam TH, Ho SY, Hedley AJ, Mak KH, & Peto R. (2001). *Mortality and smoking in Hong Kong: Case-control study of all adult deaths in 1998*. *British Medical Journal*, 323, 1–6.
3. McGhee SM, Ho LM, Lapsley HM, Chau J, Cheung WL, Ho SY, Pow M, Lam TH, Hedley A J. (2006). Cost of tobacco-related diseases, including passive smoking, in Hong Kong. *Tobacco Control*, 15, 125–130.
4. Census & Statistics Department, Hong Kong SAR Government. (2001). *Hong Kong Annual Digest of Statistics 2001*. Hong Kong: Census and Statistics Department.
5. Cahill K, Perera R. (2008). Quit and Win contests for smoking cessation. *Cochrane Database of Systematic Reviews*, 2008, Issue 4.
6. Berns, G.S., Laibson, D., Loewenstein, G., (2007). Intertemporal choice – toward an integrative framework. *Trends in Cognitive Sciences* 11:482-88.
7. Aveyard, P., Bauld, L., (2011). Incentives for promoting smoking cessation: what we still do not know. *Cochrane Database of Systematic Reviews* 2011 Apr13:ED000027.
8. Glasgow, R.E., Hollis, J.F., Ary, D.V., Boles, S.M., (1993). Results of a year-long incentives-based worksite smoking-cessation program. *Addictive Behaviors* 18:455-64.
9. Chan SSC, Leung DYP, Wong DCN, Lau L, Lai V, Cheung DYT, Lam TH. (2013). “Quit to Win 2009” and smoking cessation. *COSH Report No. 12*. Hong Kong Council on Smoking and Health.
10. Chan SSC, Wong BY, Wong DCN, Lau L, Lai V, Lam COB, Lam TH. (2013). “Quit to Win 2010” and smoking cessation. *COSH Report No. 13*. Hong Kong Council on Smoking and Health.
11. Chan SSC, Wong DCN, Cheung DYT, Lam COB, Lau LMM, Lai VWY, Lam TH. (2014). “Quit to Win 2012” and smoking cessation. *COSH Report No. 16*. Hong Kong Council on Smoking and Health.
12. Cooke F, Bullen C, Whittaker R, McRobbie H, Chen M-H, Walker N. (2008). Diagnostic Accuracy of Nicalert Cotinine Test Strips in Saliva for Verifying Smoking Status. *Nicotine & Tobacco Research*, 10:607-12.
13. Javors MA, Hatch JP, Lamb RJ, (2005). Cut-off levels for breath carbon monoxide as a marker for cigarette smoking. *Addiction*, 100:159-67.
14. Leung DYP, Chan SS., Chan VC, Lam TH. (2012). *Change in prevalence of hardcore smokers after a comprehensive smoke-free legislation in Hong Kong, Circulation*. Lippincott Williams & Wilkins, Philadelphia, USA, pp. E884-E84.

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