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Effectiveness of a small cash incentive on abstinence and use of cessation aids for adult smokers: A randomized controlled trial

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HIGHLIGHTS

- A small cash incentive can motivate adult smokers to have quit attempt, but cannot increase abstinence.
- The small incentive did not increase quit attempts with medication and cessation services.
- Large incentive and encouragement of using existing cessation resources are needed.

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ABSTRACT

Background: Large amount of financial incentive was effective to increase tobacco abstinence, but the effect of small amount is unknown.
Purpose: We evaluated if a small amount of cash incentive (HK$500/US$64) increased abstinence, quit attempt, and use of cessation aids.
Methods: A three-armed, block randomized controlled trial recruited 1143 adult daily smokers who participated in the Hong Kong "Quit to Win" Contest. Biochemically validated quitters of the early-informed (n = 379, notified about the incentive at 1-week and 1-month follow-up) and the late-informed incentive group (n = 385, notified at 3-month follow-up) received the incentive at 3 months. The validated quitters of the control group (n = 379) received the incentive at 6 months without prior notification. All subjects received brief advice, a self-help education card and a 12-page booklet. The outcomes were self-reported 7-day point prevalence of abstinence, quit attempt (intentional abstinence for at least 24 h) and use of cessation aids at 3-month follow-up.
Results: By intention-to-treat, the early-informed group at 3-month follow-up reported a higher rate of quit attempt (no smoking for at least 24 h) than the other 2 groups (44.1% vs. 37.4%, Odds ratio (OR) = 1.32, 95% CI 1.03–1.69, p = 0.03), but they had similar abstinence (9.2% vs. 9.7%, OR = 0.95, 95% CI 0.62, 1.45). The early- and late-informed group showed similar quitting outcomes. The early-informed group reported more quit attempts by reading self-help materials than the other 2 groups (31.4% vs. 25.3%, OR = 1.56, 95% CI 1.12–2.18, p < 0.01).
Conclusions: The small cash incentive with early notification increased quit attempt by "self-directed help" but not abstinence. Future financial incentive-based programmes with a larger incentive, accessible quitting resources and encouragement of using existing smoking cessation services are needed.
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1. Introduction

Smoking is highly addictive and cessation is difficult. Behavioral economics theories posit that pleasurable smoking experience was perceived more important than future smoking-related physical harms (Loewenstein, Brennan, & Volpp, 2007). As some present-biased smokers pay less attention to the smoking hazards, some smoking cessation programmes offered financial and immediate incentive to those who could quit, aiming to reinforce the desirable and short-term consequences of quitting success. Providing financial incentive such as cash and gift vouchers on proof of abstinence may motivate smokers to quit.

The financial incentive-based smoking cessation was mostly carried out in the form of "Quit and Win" programme (Hawk, Higbee, Hyland,

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et al., 2006; Hahn, Rayens, Chirila, et al., 2004; Thomas, Bengtson, Wang, et al., 2015; van Osch, Lechner, Reubsaet, et al., 2009), or contingent cash or gift vouchers if the participant joined a cessation programme or quit smoking (Volpp, Troxel, Pauly, et al., 2009; Volpp, Gurmankin Levy, Asch, et al., 2006; Heil, Higgins, Bernstein, et al., 2008; Businelle, Kendzor, Kesh, et al., 2014; Higgins, Washio, Lopez, et al., 2014). Systematic reviews of financial incentive-based smoking cessation intervention supported that financial incentive attracts many smokers to quit (Mantzari, Vogt, Shemilt, et al., 2015; Cahill & Rafael, 2008), and is effective to increase short-term abstinence (summary odds ratio = 1.67, 95% CI 1.13–2.45) (Mantzari et al., 2015). Yet, the large incentives of the Quit and Win programmes were only awarded to a few quitters. Most individual trials failed to show the effectiveness of a small amount of cash incentive. The incentive effect often dissipated after stopping the incentive (Mantzari et al., 2015) and most studies could not afford a large amount of cash incentive for a long time. Therefore, offering all quitters a small and guaranteed incentive adjunct to a few grand prizes from a lucky draw of a Quit and Win programme could be a feasible additional intervention to motivate more smokers to quit.

The behavioral theory on *present-biased preferences* suggest that people always give more weight to the potential rewards and costs now than any other future moments (O'Donoghue & Rabin, 1999). Because of delay discounting, people devalue a delayed reward of a decision even though the reward is substantial and desirable (Odum, 2011a; Odum, 2011b). Therefore, the option with immediate rewards should be more preferred than others with delayed rewards (Loewenstein et al., 2007; Hand, Heil, Sigmon, & Higgins, 2014). Based on these theories, we hypothesized that a financial incentive which was noticed and rewarded earlier could be more effective to enhance quitting behavior than the late-informed and delayed incentive.

To increase abstinence, a few RCTs offered large and continuous financial incentive contingent on the participation in behavioral group or individual counselling sessions (Hennrikus, Jeffery, Lando, et al., 2002; Koffman, Lee, Hopp, & Emont, 1998; Glasgow, Hollis, Ary, & Boles, 1993). Such incentive increased participation in the intensive programmes, but the overall participation was low (15–40%) and thereby had a small effect on the overall quit rate (Volpp et al., 2009; Volpp et al., 2006). Delivering self-help printed materials might be more feasible to offer cessation advice to smokers in incentive-based cessation programmes. Self-help print-based materials were modestly effective to increase abstinence compared to no such intervention (summary odds ratio = 1.19, 95% CI 1.04–1.37) (Hartmann-Boyce, Lancaster, & Stead, 2014). Indeed, most former smokers quit without assistance of medication or smoking cessation services (Chapman & MacKenzie, 2010; Borland, Li, Driezen, et al., 2012). Several previous incentive-based cessation trials provided self-help materials to the subjects (Heil et al., 2008; Gomel, Oldenburg, Simpson, & Owen, 1993; Rand, Stitzer, Bigelow, & Mead, 1989; Jason, McMahon, Salina, et al., 1995), but most did not evaluate the effect of incentive on usage of these materials.

The prevalence of daily smoking in Hong Kong halved from 23.3% in 1982 to 10.7% in 2012 (Census & Statistics Department (Hong Kong SAR government), 2013). Over half of the smokers had never tried and had no intention to quit (Census & Statistics Department (Hong Kong SAR government), 2013). The Hong Kong Council on Smoking and Health (COSH) (The affiliation of the 2 authors) organized the “Quit to Win” (QTW) Contest each year since 2009 to promote smoking cessation in the territory. The primary objective of the present study was to evaluate if a small contingent cash incentive could increase 7-day point prevalence of abstinence and quit attempts (intentional abstinence for at least 24 h) in adult smokers who participated in the QTW Contest 2013. We also tested if an early-informed and early-delivered incentive could be more effective than the delayed one. Lastly, we tested, a posteriori, the intervention effect on the use of cessation aids.

2. Material and methods

2.1. Trial design and subjects

A parallel three-armed, block randomized controlled trial (RCT) (with allocation ratio of 1:1:1) was conducted on the participants in the Hong Kong 4th QTW Contest in 2013 (ClinicalTrials.gov number NCT01928251). Adult daily smokers who smoked at least 1 cigarette per day in the past 3 months with exhaled carbon monoxide (CO) ≥4 ppm were recruited. The less stringent inclusion criteria were applied to achieve high generalizability of the findings and expedite subject recruitment. Smokers who were physically or mentally unable to communicate or currently following other forms of smoking cessation programmes were excluded.

2.2. Procedures

Smokers at shopping malls and public areas in all 18 districts in Hong Kong were proactively recruited from July to September 2013. Eligible smokers consented and completed a baseline questionnaire. They were individually randomized into 3 groups and received 1-week, 1-, 3-, and 6-month telephone follow-up. Subjects who reported abstinence in the past 7 days at 3- or 6-month follow-up were invited to participate in a biochemical validation, which was conducted near their residence or workplace within 2 weeks after the telephone follow-up. Validated quitters were defined by exhaled CO <4 ppm and saliva cotinine level <10 ng/ml by NicAlert® strips (www.nymox.com) (Cooke, Bullen, Whittaker, et al., 2008; Javors, Hatch, & Lamb, 2005). At 3-month follow-up, validated quitters participated in a lucky draw organized by COSH, in which each of the 5 winners obtained a gift voucher of HK$10,000 (US$1282). All subjects were informed about this grand prize at the enrolment.

2.3. Intervention

In addition to the lucky draw prize, a small cash incentive (HK$500, equivalent to US$64) was awarded to the validated quitters. To test the effect of this small cash incentive, the 3 RCT groups were informed about the incentive and received it at different time (Fig. 1). At 1-week and 1-month telephone follow-up, the early-informed group was informed about the incentive, which would be offered to the validated quitters at 3-month follow-up. At 3-month follow-up, the late-informed group was informed that they would receive the incentive if they quit and passed the biochemical validation at 6-month follow-up. If the subjects in this group reported abstinence and passed the validation at 3 months, they would still receive the incentive as a “surprise” reward, which might prevent relapse. The control group was not informed about the incentive at any telephone follow-up, but the validated quitters at either 3- and 6-month follow-up could receive the incentive at 6-month follow-up. To ensure fairness, all quitters would receive the incentive, and once only.

All subjects received brief smoking cessation advice based on the AWARD protocol (Lin, Zhao, Cheng, & Lam, 2013) (Supplementary material 1) at enrolment, 1-week and 1-month follow-up, a pocket-sized self-help education card (Supplementary material 2) and a 12-page self-help booklet. The education card was designed with reference from the Health Action Process Approach (HAPA) model (Schwarzer, 2008), which contained a “home assignment” on the positive outcomes of quitting and negative outcomes of smoking, planning of quitting, and tips of handling high-risk situations. The booklet was designed by COSH, which contained information of free nicotine replacement therapy (NRT) and the quitline services provided by the Department of Health, and some behaviors that can relieve withdrawal symptoms (Hong Kong Council on Smoking and Health, 2013).

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