JOURNAL OF THE AMERICAN COLLEGE OF CARDIOLOGY
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PUBLISHED BY ELSEVIER

VOL. 68, NO. 8, 2016
ISSN 0735-1097/$36.00
http://dx.doi.org/10.1016/j.jacc.2016.04.066

SPECIAL FOCUS ISSUE: CARDIOVASCULAR HEALTH PROMOTION

ORIGINAL INVESTIGATIONS

Effects of Large Financial Incentives for Long-Term Smoking Cessation

A Randomized Trial

Jean-François Etter, PhD, Felicia Schmid, MA

ABSTRACT

BACKGROUND It is not known whether large financial incentives enhance long-term smoking cessation rates outside clinical or workplace settings.

OBJECTIVES The goal of this study was to test whether large financial incentives improved long-term smoking cessation rates in low-income smokers, in a general population setting, without face-to-face or telephone counseling.

METHODS This was a 2-arm, parallel group, individually randomized controlled trial, with follow-up after 3, 6, and 18 months. Participants were 805 low-income smokers enrolled between 2011 and 2013 from the general population in Geneva, Switzerland. We randomly assigned participants to receive either booklets plus access to a smoking cessation website (control group, n = 404), or the same intervention plus financial incentives (intervention group, n = 401). Incremental financial rewards, to a maximum of U.S. $1,650, were offered for biochemically verified abstinence at 1, 2, and 3 weeks, and 1, 3, and 6 months. No in-person counseling, telephone counseling, or medications were provided. The primary outcome was continuous abstinence between 6 months (end of incentives) and 18 months (12 months after the incentives ended), verified by expired carbon monoxide and salivary cotinine. We also assessed biochemically verified 7-day abstinence at 3, 6, and 18 months.

RESULTS Rates of continuous abstinence between months 6 and 18 were 9.5% in the incentive group and 3.7% in the control group ($p = 0.001$). Rates of 7-day abstinence were higher in the incentive group than in the control group at 3 (54.9% vs. 11.9%; $p < 0.001$), 6 (44.6% vs. 11.1%; $p < 0.001$), and 18 months (18.2% vs. 11.4%; $p = 0.006$).

CONCLUSIONS In low-income smokers who did not receive face-to-face or telephone smoking cessation counseling, large financial incentives increased long-term rates of smoking cessation. (Financial incentives for smoking cessation in low-income smokers; ISRCTN04019434). (J Am Coll Cardiol 2016;68:777–85) © 2016 by the American College of Cardiology Foundation.

The burden of smoking-related disease is borne disproportionately by the least affluent people because of the high prevalence of smoking in this group (1). To reduce smoking-related health disparities, it is important to design smoking cessation interventions that reach and are effective in low-income smokers. As this population may be harder to reach with traditional information and education interventions (2,3), other approaches need to be explored, particularly those that address the financial stress in this group.

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From the Institute of Global Health, Faculty of Medicine, University of Geneva, Geneva, Switzerland. The study was funded by the Swiss Tobacco Prevention Fund (Swiss Federal Office of Public Health), grant 11.001733. Dr. Etter's salary was paid by the University of Geneva. The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

Manuscript received December 22, 2015; revised manuscript received March 30, 2016, accepted April 10, 2016.

ABBREVIATIONS AND ACRONYMS

CHF = Swiss francs

CI = confidence interval

OR = odds ratio

Financial incentives are effective for smoking cessation while they are in place, but it is not clear whether they have a sustained effect, possibly because most previous studies used small incentives and did not assess long-term outcomes (4). To be effective, the value of financial incentives should be high enough to compensate for tobacco withdrawal symptoms and for the loss of a valued activity. In substance abusers, there is a dose-response association between the value of incentives and their effects on abstinence (5). Two studies of large financial incentives in smokers showed that in educated and relatively affluent employees of large U.S. companies, financial incentives of $750 and $800 increased smoking cessation rates, and that an effect on biochemically verified abstinence was maintained 6 months after the final distribution of incentives (6,7). Thus, large incentives appear to elicit long-term smoking abstinence, but it is not clear whether these findings apply outside workplace or clinical settings, or to other populations, or whether the effect extends beyond 6 months after the final distribution of incentives (4,6,7).

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Therefore, the objective of this study was to test whether large financial incentives improved long-term smoking cessation rates in low-income smokers in a general population setting, without face-to-face or telephone counseling for smoking cessation. As there is a risk that the effects of incentives may disappear after the incentives end (4), our study addressed this important point by assessing outcome 12 months after receipt of the final incentives.

METHODS

STUDY POPULATION. Participants were 805 smokers enrolled in Geneva, Switzerland, between August 2011 and May 2013. The financial incentives study was advertised via the press; on the Internet; in workplaces, hospitals, pharmacies, and medical and dental clinics; and by email. After answering the baseline questionnaire online, participants visited our research unit, where eligibility was assessed. Inclusion criteria included: ≥18 years of age; smokes every day; smokes ≥5 cigarettes per day; has smoked for ≥1 year; expired carbon monoxide ≥10 ppm; saliva cotinine ≥10 ng/ml (NicAlert reading ≥1) (8); sets a quit date within 1 month and commits to quit at that date by signing a quitter contract; commits to take part in all follow-up procedures; and taxable income ≤50,000 Swiss francs (CHF) ($55,000, single) or CHF ≤100,000 ($110,000, married), proven by the most recent tax assessment. These income limits correspond to the least affluent one-third of households in Geneva (9).

TRIAL DESIGN. This study was a single-center, unblinded, 2-arm, parallel group, individually randomized controlled superiority trial with follow-up after 3, 6, and 18 months. We compared an intervention group that received financial incentives plus Internet-based support to a control group that received Internet-based support, but no financial incentives. All participants signed a paper consent form during the enrollment visit. The study was approved by the ethics committee of Geneva University Hospitals, and registered in Current Controlled Trials (ISRCTN04019434). The study protocol was previously published (10) (Online Appendix).

RANDOMIZATION. Randomization was performed using sealed opaque envelopes drawn by participants. Neither the researchers nor the participants could know in advance the content of the envelopes. We did not use blocks for randomization. Participants could not be blinded to their assignment group. Researchers were not blinded, but online data collection at follow-up was computerized. Follow-up data was collected by postal mail from nonrespondents to the online surveys, and for nonrespondents to the postal questionnaires, a minimal set of questions on smoking behavior was asked over the phone.

INTERVENTION. Financial incentives. In the incentive group, financial rewards of up to CHF 1,500 ($1,650 in 2013) were paid to those participants biochemically verified as abstinent. All biochemical tests were performed in person at our research unit. As delayed rewards are usually discounted, and as reinforcement works best when the target behavior is followed without delay by the reinforcer (5,11), self-reported quitters with negative tests of both expired carbon monoxide (0 to 3 ppm) and cotinine (<10 ng/ml; i.e., NicAlert = 0) were declared confirmed quitters, and received their reward immediately. Carbon monoxide tests were performed with a Micro Smokerlyzer (Bedfont, Maidstone, United Kingdom), and salivary cotinine was assessed with NicAlert (Nymox, Hasbrouck Heights, New Jersey) test strips, which can detect cotinine levels >10 ng/ml (8). Escalating rewards appear to produce better results than constant rewards (12). Because we wanted to reward sustained abstinence, rather than initial quit attempts, we used an escalating scheme and gave incentives 6 times during 6 months: CHF 100, 150, 200, 300, 350, and 400 at 1, 2, and 3 weeks, and at