Testing Financial Incentive Interventions in Dyadic-Smoker Couples
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METHODS

Participants and Recruitment

As participation in the study was conducted virtually (e.g., over video teleconference and electronic survey), we utilized a Nationwide recruiting strategy to reach smokers across the contiguous United States. We recruited from three primary sources: Facebook/Instagram advertisements, Craigslist advertisements, and the ResearchMatch database of individuals interested in participating in health research studies. Both Facebook and ResearchMatch recruitment allowed for nationwide placement of recruiting messages. On Craiglist, we placed 134 advertisements in distinct geographic regions, targeting all 48 contiguous states at some point during the study. Each advertisement ran for 28 days.

We enrolled 95 dual-smoker couples (total N=190) from February 2021 to May 2022, consistent with recommendations to recruit ~30 participants per treatment arm for quantitative-focused feasibility studies27. Prior to data collection, we had identified that an intent-to-treat sample of ~95 targets would allow us power of ~82% to compare the control and PIF conditions; estimates were power were based on prior research and past research on financial incentive treatments for smoking.21,28 Eligibility requirements were a) smoking ≥ 5 cigarettes daily, b) 18+ years of age, c) romantically partnered and cohabiting with another eligible participant. Individuals with psychosis risk, recent hospitalization, or current pregnancy were not eligible. Motivation or readiness to quit smoking was not a study prerequisite. Figure 1 shows the CONSORT diagram of enrollment; Table 1 shows the characteristics of enrolled participants. The first member of the couple to make contact with the research team was labeled the target; the other member was labeled the partner.

Overview of Procedures

The study consisted of a) a baseline video conference with surveys and biochemical verification of smoking, b) ten weeks of brief surveys, c) four weeks of optional online psychoeducation, and d) a 3-month follow-up video conference with surveys.

Baseline

Prior to the baseline video conference, both members of the couple completed surveys assessing smoking history, relationship quality, and smoking variables. Between the completion of these surveys and the video conference, randomization via a random number generator occurred. During the video conference, each person confirmed consent and used an IcoQuit Smokerlyzer to collect expired CO. Next, research staff explained procedures to participants, including the administration of experimental conditions. Dyads were randomly assigned via a random number generator to either a) No-FIT control, b) PIF-ST, or c) PIF-DT. In PIF conditions, either the target (PIF-ST) or both members (PIF-DT) were offered compensation of $100 for completing the psychoeducation training and $100 for being quit at follow-up. Participants could receive either or both incentives; partners could earn different amounts of incentives. Randomization was supplemented with stratification, resulting in slightly different sample sizes across condition. We stratified couples based on a) target gender, b) target smoking heaviness (<20 cigarettes per day, 20+ cigarettes per day), and 3) same- of different- sex couple status.

Treatment as usual

All participants received weekly links to a four-module (~ 1 hour weekly) online psychoeducation program combining behavioral change coaching with information about addiction and quitting. The program began one week after baseline; participants could access

links at any time during the study. Participants were also offered home delivery of NRT (patch and/or gum) calibrated to their quantity of smoking (patches) or time to first cigarette (gum).

Weekly surveys

Participants received weekly emails (if necessary, they received a follow-up reminder within three days) in which they engaged in a Timeline Follow-back (TLFB; Harris et al., 2009) to report if they had smoked cigarettes and/or used NRT in the past eight days (today + each day of the prior week). On average, participants completed 8.42 surveys.

Follow up

As with baseline, participants completed surveys at follow-up. Participants received bonus compensation for attending a video session; all participants who indicated abstinence in the survey were required to hold the video session to complete a breath test before receiving abstinence incentives. Participants were instructed not to vape within 24 hours of the breath test.

Measures

The primary outcomes were: 1) Feasibility, defined as percentage of targets retained at follow-up, aiming for >80%; and 2) Tolerability, defined from 8 items assessing the accessibility, benefits, and costs of the study scored on a 1(strongly disagree) to 7(strongly agree) scale. Participants also completed five open-ended questions on their experiences. The four secondary outcomes were: 1) Program completion, defined as completing all four psychoeducation modules; 2) Quit attempts (i.e., self-reported duration of greater than 24 hours without smoking), assessed via weekly surveys; 3) Point prevalence abstinence, defined as a) self-reported abstinence for 7+ days and b) expired CO collected via ICOquit breath sensors (≤5 ppm30); and 4) Joint abstinence, defined as both couple members being abstinent at follow-up.

Data Analysis

The primary outcomes were feasibility and tolerability in targets. The secondary outcomes were preliminary intervention effects among targets, with partners' outcomes as further descriptive dependent variables. Thus, for each analysis, we report outcomes separately by target and partner, with the exception of joint abstinence which was defined at the dyad-level. Results presented in Table 2 and Figure 2 thus show results separately for targets and partners. Student t, one-way ANOVA, ANOVA contrast tests, and Chi Square tests were used for analyses. For each analysis, we provide descriptive information as well as comparisons across conditions. When evaluating intervention outcomes, we focused our tests of significance on the PIF conditions combined compared to the no-FIT control. We provide descriptive follow-up tests comparing PIF-ST and PIF-DT, but note these tests necessarily involve larger confidence intervals and should be interpreted cautiously in a pilot trial. Data analysts were not blind to condition; two researchers verified the data and results. For retention rate and all preliminary efficacy outcomes, we utilized an intent-to-treat sample such that all participants' data were included in analyses. For the tolerability ratings, we report only participants who completed follow-up.