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Providing antismoking socialization to children after quitting smoking: Does it help parents stay quit?

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Abstract

Purpose—Test whether an antismoking parenting program provided to parents who had quit smoking for 24 hours increased parents' likelihood of remaining abstinent two and three years post-baseline.

Design—Two-group randomized controlled trial with three year follow-up.

Setting—Eleven states (CO, ID, MI, MN, MT, NY, OH, PA, SD, UT, VT).

Subjects—Five hundred and seventy-seven adults (286 treatment; 291 control) who had smoked 10 cigarettes daily at baseline, had quit smoking for 24 hours after calling a Quitline, and were parents of an 8- to 10-year old child; 358 (62%) completed the two-year follow-up interview; 304 (53%) completed the three-year follow-up interview.

Intervention—Theory-driven, home-based, self-help parenting program.

Measures—Sociodemographics; smoking history; 30-day point prevalence.

Analysis—Multivariable regression analyses tested for group differences in 30-day abstinence. Attriters were coded as having relapsed.

Results—Between-group differences in abstinence rates were 5.6% and 5.9% at two and three years, respectively. Treatment group parents had greater odds of abstinence, an effect that was significant only at the latter time point (OR = 1.49; $P = .075$ at two years; OR = 1.70; $P = .026$ at three years).

Conclusions—This study obtained preliminary evidence that engaging parents who recently quit smoking as agents of antismoking socialization of children has the potential to reduce the long-term odds of relapse.

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Declaration of conflicting interests

The Authors declare that there is no conflict of interest.

Keywords

Smoking cessation; tobacco control; relapse prevention; interventions

Purpose

Most adult smokers want to quit smoking for good.¹ Although about half of all adult smokers make a quit attempt each year,^{1,2} at least 90% of unaided attempts fail.^{2, 3} Use of pharmacotherapy and cessation counseling increase the likelihood of successfully quitting;^{2, 4-9} however, abstinence rates remain low, even among adults who use such treatments.^{2, 4-10} There is a clear need for additional efficacious relapse prevention strategies. The present study addresses this need by testing a novel cognitive-behavioral approach to relapse prevention. Specifically, this study tests the effects of a home-based, self-help program that uses antismoking socialization of children to enable parents who have called a Quitline and achieved 24-hour cessation to subsequently avoid relapse. By tracking a group of such parents over three years, this study provides a long-term test of the capacity of antismoking socialization of children to prevent relapse among recent quitters who are parents.

Antismoking socialization refers to parent-child interactions that influence the development of children's cognitive and behavioral norms regarding smoking.¹¹⁻¹⁴ Nearly all research on antismoking socialization has examined its effects on children; there is now a strong body of research indicating that antismoking socialization by parents who smoke reduces children's risk of smoking.^{11, 12, 15-24} Our research team has developed the theory-based argument that providing antismoking socialization to children concurrent with making a quit attempt might lower parents' odds of relapse. Specifically, we have argued²⁵ that theories of communication and persuasion,^{26, 27} normative influence,^{28, 29} and cognitive dissonance^{30, 31} each support the hypothesis that engagement in antismoking socialization could prevent relapse among parents who have recently quit smoking.

Research on persuasive communication provides strong evidence that making a choice publicly (e.g., spoken in the presence of children) is considerably more likely to guide behavior than a choice that is made privately.^{26, 27} The parenting program tested in this study engages parents in repeated conversations with children about their reasons for quitting and about their motivations for staying quit. Theories of persuasive communication^{26, 27} posit that these interactions could reduce the likelihood of relapse by increasing accountability to children and other family members to stay quit.

Social norms are standards of thought and behavior that are accepted and valued by one's primary social groups, particularly the family.^{28, 29} The stronger the affiliation among group members, the stronger the influence of shared norms on behavior. Individuals belonging to families that discuss and explicitly value nonsmoking will theoretically have increased motivation to maintain cessation because relapse represents a violation of this declared, valued group norm.

Cognitive dissonance theory^{30, 31} similarly supports the premise that engagement in antismoking socialization after an initially successful quit attempt could lower the odds of

relapse. Cognitive dissonance is the state of holding contradictory values or goals at the same time, or internalizing new information that conflicts with existing behaviors.^{30, 31} A tenet of dissonance theory is that people are motivated to seek consistency between their values and behaviors because doing so lessens anxiety and distress. The program evaluated by the present study provided parents with scripted materials they could use to espouse antismoking values and to engage in antismoking parenting practices with their children. Such prolonged engagement in providing antismoking socialization to children could increase parents' feelings of dissonance between resumption of smoking and their declared antismoking stance. This could, in turn, strengthen parents' commitment to maintain cessation and therefore lower their likelihood of relapse.

Applying this theory-based argument, we completed an earlier study of the effect of engagement in antismoking socialization on relapse to smoking up to 12-months post-baseline in a sample of adults who had called a state Quitline, self-identified as the parent of an 8- to 10-year old child, and quit smoking for at least 24 hours after their call.²⁵ This antismoking program, described briefly in the next section, has been described in detail elsewhere.^{25, 32, 33} The most conservative analysis conducted in this earlier study—one that excluded very light smokers and counted any parent lost to follow-up as having relapsed to smoking—found a significant effect of the program on 30-day abstinence at 12 months (adj. OR = 1.50; $p = .046$).²⁵

The present study expands the research of Jackson et al.²⁵ by testing for any evidence of a relapse prevention effect two to three years post-baseline. Specifically, we conducted analyses to test whether parents who, at baseline, had quit smoking for 24 hours and received a program promoting antismoking socialization of children would be more likely than untreated controls to be abstinent when assessed two and three years post-baseline. We replicated only the most conservative approach used in the earlier study; specifically, using an intent-to-treat approach to analysis, we assumed that all parents whom we were unable to interview at two or three years had relapsed to smoking. As detailed below, given relatively high levels of absenteeism at two years (38%) and at three years (47%), this approach set up a stringent test of program effects on relapse. In addition, we excluded very light smokers (i.e., parents who had smoked < 10 cigarettes per day prior to the focal quit attempt) from the analysis. This approach, also used by other investigators,¹⁰ tests for intervention effects among smokers who are likely to have actual nicotine dependence and are therefore likely to experience withdrawal symptoms that can trigger relapse.⁵ Indeed, meta-analysis of multiple prospective studies examining predictors of success following quit attempts indicate that daily cigarette consumption prior to quitting is the strongest predictor of relapse to smoking.³⁴

Methods

Design

A two-group randomized controlled design was used in which adults recruited via state Quitlines completed baseline interviews, were randomly assigned to treatment (antismoking socialization program) or no-treatment control, and completed follow-up interviews two and three years post-baseline (see Figure 1).

Sample

A total of 1604 adults were recruited through 11 state Quitlines (CO, ID, MI, MN, MT, NY, OH, PA, SD, UT, and VT). Details of the recruitment protocols are reported elsewhere;²⁵ briefly, over a 13-month rolling recruitment period, cessation service providers for the 11 participating states asked two screener questions as part of their intake protocol to ascertain whether callers were a parent of an 8- to 10-year old child and, if so, if they would like to be contacted by RTI International (RTI) to learn about “a research project about what parents who smoke can do to keep their children from smoking.” Quitline staff transmitted consenting callers’ contact information to RTI. Subsequent screening, recruitment and data collection activities were conducted by RTI research staff. The Institutional Review Board at RTI approved all recruitment, intervention, and data collection protocols.

The present analysis used data collected via telephone interviews at baseline and two and three years post-baseline. Those eligible for the present analysis were 577 parents (n=286 treatment; n=291 control) who had (a) quit smoking for 24 hours between their Quitline call date and the date of their baseline interview approximately 3 weeks later and (b) had not resumed daily smoking by the date of their baseline interview (Figure 1). The latter criterion allowed inclusion of parents who slipped (i.e., puffed or smoked a cigarette) between call date and baseline interview; this was done because slips are relatively common and do not preclude achieving long-term abstinence.^{35, 36} Of the 577 eligible parents, 358 (62%) completed the two-year follow-up interview and 304 (53%) completed the three-year follow-up interview. As shown in Figure 1, parents excluded from the present analysis had smoked fewer than 10 cigarettes daily prior to quitting (n=112), did not quit smoking for 24 hours at baseline (n=741), did quit prior to baseline but had resumed smoking daily before the baseline interview (n=163), or were missing smoking status data at baseline (n=11).

Survey Protocol

Data were collected by telephone interviewers who were trained and supervised at RTI. Interviewers read aloud an IRB-approved consent protocol that informed participants about data confidentiality and their ability to skip questions or stop the interview. The baseline interview required about 25 minutes to complete and each follow-up interview required about 10 minutes to complete.

Measures

Quit status at baseline—Smoking cessation at baseline was assessed by asking participants whether they had quit smoking for 24 hours at any point since their Quitline call date (“Did you completely stop smoking for 24 hours or longer because you were trying to quit?”). Respondents were also asked about their current smoking status (“Are you currently smoking cigarettes every day, some days, or not at all?”). Those who had quit for 24 hours at any point since calling the Quitline and who answered “not at all” to the question about their current smoking status were defined as having quit smoking at baseline and were therefore available for analysis.

Covariates—The baseline interview assessed participants’ age at onset of daily smoking, daily consumption of cigarettes (10 – 19 or 20 cigarettes) prior to having quit for 24

hours, quit experience prior to their recent Quitline call (ever vs. never previously quit for 24 hours), use of nicotine replacement or other pharmacotherapies subsequent to their Quitline call date (yes or no), and number of current smokers in their household (2, 1, or no current smokers). The socio-demographic covariates assessed were age, years of education (GED, some college, Associate's degree), race (white, African-American, other or undeclared), and sex.

Outcome variable—Abstinence at follow-up was indicated by 30-day point prevalence: date of last cigarette and date of the follow-up interview were used to identify those who had not smoked for 30 days or longer; those who had smoked any amount within the past 30 days or who were missing data for the two items used to assess 30-day point prevalence were coded as relapsed. All cases absent from the two- or three-year follow-up survey were coded as having relapsed to smoking.

Intervention

Participants randomized to treatment were sent *Smoke-free Kids*, a home-based, self-administered, 6-month parenting program designed to engage parents of school-aged children in antismoking socialization.²⁵ The program gives parents who smoke the tools they need to explain nicotine addiction in simple terms, to convey why it is hard for people to quit smoking and why multiple quit attempts are often required to quit successfully. In addition, the program gives parents tools to explain their reasons for wanting to quit smoking and their experiences and thoughts about nicotine addiction, withdrawal, and relapse. Parents receive 6 monthly kits, each including printed material with front content designed to increase parental motivation and readiness to enact that month's recommended antismoking socialization activities, back content in the form of actual activities to do with children (e.g., scripted interviews; board games), and any supplemental materials (e.g., game cards) needed to conduct the antismoking socialization activities with children. Smoke-free Kids is a "print-interactive" intervention—the materials involve participants in carefully structured activities that, when completed, accomplish the specified program objective. When, for example, the program recommends that parents communicate their experience with smoking, it enables this activity by engaging children as "cub reporters" (the materials include a notebook, press badge, and pencil for children) and giving them scripted questions to ask parents (e.g., "When you first started smoking, what made you try it?"; "Now that you are older, how have your feelings about smoking changed?"). By using such materials, parents gain skills and, with their children, participate in guided activities that foster antismoking communication, rule setting, and monitoring across multiple domains of pro-smoking influence, including family, peer and media influences. A detailed description of the program's underlying theory and intervention method is available elsewhere.³² In summary, the program is designed to be relevant to parents who are making a quit attempt and to leverage their quit attempts as a teachable moment for children.

Intervention delivery was initiated immediately after the baseline interview. Each month, for 6 months, those randomized to treatment were sent an intervention kit by mail. As described previously,²⁵ these kits contained printed magazines with parent-only content to strengthen parental readiness to provide antismoking socialization and parent-child content in the form

of structured socialization activities that parents do with their children, plus supplies needed to complete these activities. In addition, booster materials were mailed 15 and 27 months post-baseline (i.e., 9 months before each follow-up survey). The study protocol including checking that intervention materials were received and mailing duplicate materials to any parent who reported having not received or having misplaced any materials.

Analysis

Chi-square tests and *t*-tests were used to test for differential attrition by comparing cases present with those lost to follow-up. Chi-square tests were also used to conduct bivariate comparisons of percent abstinent at follow-up. Logistic regression models were used to test for group differences in 30-day abstinence at follow-up after adjusting for all covariates. Two models were run; in each, 30-day point prevalence was regressed on study group and all covariates. The first model tested for a treatment effect at two years; the second for a treatment effect at three years. The count of parents who were not interviewed at follow-up and were therefore coded as having relapsed to smoking were 219 (38%) and 273 (47%) at two and three years, respectively. All analyses were conducted using SPSS (Version 21).

Baseline equivalence of the treatment and control groups has been reported in the earlier paper and is not repeated here. Briefly, the study groups were found to be similar on all smoking-specific covariates (prior daily consumption, ever before quit, use of pharmacotherapy, and number of smokers in the household at baseline). Study groups also were similar by age, race, and sex. There was, however, a significant between group difference by education, such that more control than treatment group parents had completed some college (37.1% vs. 28.6%) and more treatment than control group parents had a college degree (29.2% vs. 21.3%).

Results

Attrition Analyses

Attrition status was not associated significantly with study group at either follow-up point. Likewise, attrition status was not associated with use of nicotine replacement or any other pharmacotherapy at baseline, number of smokers in the household at baseline, years of education, or sex. Attrition status was, however, associated with parent age; younger parents were more likely to be absent at follow-up ($F(1,574) = 4.74$; $P = .03$ at 2 years; $F(1,574) = 4.67$; $P = .03$ at 3 years). In addition, at two years but not at three years, attrition status was associated with age at onset of daily smoking (parents who had started smoking at a younger age were more likely to be absent ($F(1, 574) = 8.84$; $P = .00$ at two years; $F(1,574) = 1.58$; $P = .21$ at three years) and with daily consumption of cigarettes prior to baseline (those who had smoked 20 cigarettes daily were more likely to be absent than those who smoked 10 to 19 cigarettes daily ($X^2 = 10.69$; $P = .00$ at two years; $X^2 = 2.99$; $P = .08$ at three years).

Intervention Effect

Table 1 shows the percentage of parents reporting 30-day abstinence two and three years post baseline. As expected, the percentage of participants who were abstinent decreased over time in both the treatment and control groups. However, at each time point, the percent

abstinent was higher among parents in the treatment group and the absolute difference between groups remained relatively constant over time. Specifically, 23.1% and 17.5% of treatment and control participants, respectively, were abstinent at two years (absolute difference = 5.6%); 20.3% and 14.4% of treatment and control participants, respectively, were abstinent at three years (absolute difference = 5.9%). Chi-square tests indicate a nonsignificant association between intervention exposure and abstinence at two years ($X^2 = 2.75$; $P = .09$) and a significant association at three years ($X^2 = 3.89$; $P = .04$).

Multivariable analyses indicate that treatment group parents had 49% greater odds of abstinence at two years ($OR = 1.49$; $P = .075$) and 70% greater odds of abstinence at three years ($OR = 1.70$; $P = .026$) (Table 2). These models also indicated that having no other smokers in the home at baseline predicted significantly higher odds of abstinence at two years and that having previously smoked 10 to 19 cigarettes daily significantly increased the odds of abstinence at two and three years, relative to having previously smoked 20 cigarettes daily (see Table 2).

Discussion

Borland and colleagues have observed that interventions designed to help smokers manage withdrawal symptoms lose relevance as those symptoms subside.^{2, 37} They suggest that follow-up interventions are needed that reach smokers a few weeks after their initial quit date, as symptoms of withdrawal subside and the effort to internalize a non-smoker identity begins. In a similar vein, Segan et al.³⁷ suggest that continued abstinence would be more likely if, after the initial period of coping with withdrawal, quitters were engaged in activities that could enable them to internalize the benefits of being a nonsmoker and to internalize the self-image of a nonsmoker. The antismoking socialization program tested in the present study was delivered to parents 3 to 4 weeks after initial cessation and its content involved parents in advocating for a smoke-free lifestyle. In this regard, the present study provided a direct test of extant recommendations^{2, 35} to boost abstinence rates by attending to the psychological challenges smokers face as withdrawal symptoms begin to subside.

The results of the present study indicate that providing parents who have recently quit smoking with a program that promotes antismoking socialization of their children shows potential to help adult smokers avoid relapse to smoking. We are cautious in our interpretation because we found a nonsignificant group difference at two years ($OR = 1.49$; $P = .075$) and a significant group difference only at three years ($OR = 1.70$; $P = .026$). We do note, however, that with 38% and 47% of the analysis sample lost to follow-up and therefore coded as having relapsed at 2 and 3 years, respectively, these analyses provide a relatively conservative indication of the intervention's potential to prevent relapse over the long term.

The observed odds ratios and the absolute between group differences in abstinence rates observed in this study are comparable to those reported by extant reviews of behavioral approaches to relapse prevention.^{4, 5, 7, 9} The most similar available study, a review of behavioral counseling approaches to relapse prevention,⁷ reported a pooled difference in 6 to 12 month sustained abstinence rates of 3.1% and a corresponding pooled odds ratio of 1.41 for participants who received call-back counseling relative to controls. We observed absolute

differences in abstinence between treatment and control groups above 5% while using follow-up points that were farther from baseline (two and three years vs. 6 to 12 months) than those tested by these prior studies.

In general, behavioral relapse prevention interventions show a positive dose-response relationship between the amount of contact a smoker has with the treatment provider and the likelihood of abstinence.⁵ However, increasing the intensity of behavioral interventions requires additional resources, and such interventions may not be covered by health insurance. By targeting psychosocial and lifestyle factors that are not targeted by standard relapse prevention protocols, antismoking socialization has the potential to serve as a value-added component to standard relapse prevention protocols. A low-intensity intervention that delivers benefits above and beyond those of existing protocols could fill a critical need in a practitioner's arsenal of relapse prevention aids.

This study has several limitations that should be improved upon in future research. First, self-reported abstinence was not validated using a bio-chemical method (e.g., cotinine) and therefore comparisons with studies using verified abstinence should be made cautiously. Second, prolonged abstinence (i.e., abstinence with no slips) was not measured; it is therefore possible that some who quit at baseline and were abstinent at follow up could have smoked during the interim. Third, generalizability is limited by the study sample, which included only smokers who are parents. Fourth, although no differential attrition by study group was observed, generalizability could also be limited by the loss to follow-up, as 37% to 47% of parents included in the analyses were absent from one or both follow-ups. Fifth, several constructs that could have strengthened the study were not assessed, such as additional details about participants' smoking and quit histories, tobacco dependence, and focal quit attempt (e.g., details regarding utilization of cessation services and pharmacotherapy), and data on family attributes with the potential to moderate program effects on adult relapse (e.g., family composition; parenting style; family cohesion). These and other potential moderators of the observed intervention effect merit investigation in future research. Finally, adherence to the intervention was not assessed, a limitation that precludes verification of exposure or assessing links between exposure and outcomes.

Strengths of the current study also warrant mention. First, the study used a novel, theory-driven cognitive-behavioral approach to relapse prevention—one that aimed to engage recent quitters who were parents in antismoking socialization of their children. Second, confidence in the previously reported²⁵ finding that antismoking socialization could be an efficacious relapse prevention strategy is strengthened by the duration of follow-up in the present study: whereas most relapse prevention trials assess results at 6 or 12 month follow-up, and a few at two years, the present study found effects three years post cessation.

The results of this study indicate that engaging parents who are striving to quit smoking in antismoking socialization of children has the potential—pending additional research and development—to become a viable addition to the field of relapse prevention. Additional research is needed to replicate the finding observed in the present study and to identify the mediators and moderators of the observed effect. Additional research designed to measure purported psychological mechanisms of effect (e.g., cognitive dissonance; strength of

nonsmoker identity) will be particularly informative. If found to be effective in future research, antismoking socialization programs like *Smoke-free Kids* could serve as value-added relapse prevention tools that could be disseminated to smokers via state Quitlines, pediatricians, and other channels.

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SO WHAT? Implications for Health Promotion Practitioners and Researchers

What is already known on this topic?

Although the majority of smokers want to quit, few succeed. Use of evidence-based cessation treatments increases the likelihood of successfully quitting; however, abstinence rates remain low, even among adults who use such treatments. There is a need for new relapse prevention strategies.

What does this article add?

This article provides a first report of the long-term effects of a novel relapse relapse among parents who have recently quit smoking. The findings indicate that this approach, which engages parents in proclaiming a strong anti-smoking stance and in explaining the challenges of overcoming addiction to nicotine to their children, shows promise as a relapse prevention tool.

What are the implications for health promotion practice or research?

If found to be effective in further trials, antismoking parenting programs such as the one used in this study could serve as value-added relapse prevention services that could be disseminated via state Quitlines, pediatricians, health educators, and other channels. In addition, if future research can identify the psychological mechanisms (e.g., cognitive dissonance; strength of nonsmoker identity) that underlie the observed relapse prevention effect, such knowledge could be useful to practitioners who are developing services to prevent relapse.

Figure 1.
Participant flow diagram.

Table 1

Percent reporting 30-day abstinence by study group and duration of follow-up.

Study Group ^a	2-year follow-up	3-year follow-up
Treatment (n=286):	23.1%	20.3%
Control (n=291):	17.5%	14.4% *

^aN = 577 at both time points because parents lost to follow-up was coded as having relapsed.

* $P < .05$

Table 2

Abstinence two and three years post-baseline regressed on study group and covariates ($N=577$).

Predictor variables	2-year follow-up			3-year follow-up		
	OR ^a	CI ^b	P	OR	CI	P
Age at onset of smoking	1.05	0.99; 1.11	.083	1.03	0.97; 1.09	.408
Age at baseline	.99	0.96; 1.03	.673	1.00	0.97; 1.03	.938
Group						
Control ^c						
Treatment	1.49	0.96; 2.30	.075	1.70	1.07; 2.71	.026 *
Prior daily consumption						
20 cigarettes						
10 – 19 cigarettes	1.81	1.16; 2.82	.009 **	1.94	1.21; 3.10	.006 **
Ever before quit 24 hours						
No						
Yes	.62	0.32; 1.23	.173	.64	0.31; 1.33	.235
Used pharmacotherapy						
No						
Yes	.64	0.34; 1.22	.175	1.27	0.59; 2.76	.541
Smokers in HH at baseline						
2 current smokers						
1 current smoker	1.64	1.01; 2.70	.047 *	1.42	0.79; 2.54	.251
No current smokers	2.22	1.24; 3.98	.007 **	1.60	0.95; 2.73	.084
Education level						
GED						
Some college	1.07	0.63; 1.82	.814	1.20	0.68; 2.09	.530
Assoc. degree	1.34	0.78; 2.78	.287	1.24	0.70; 2.19	.455
Race						
White						
African-American	.75	0.36; 1.54	.434	.84	0.39; 1.80	.655
Other; undeclared	.50	0.22; 1.10	.085	.52	0.23; 1.23	.138

Predictor variables	2-year follow-up			3-year follow-up		
	OR ^a	CI ^b	P	OR	CI	P
Sex						
Female						
Male	.95	0.59; 1.53	.821	1.14	0.69; 1.87	.614

^a OR: adjusted odds ratio.

^b CI: 95% confidence interval.

^c First category listed is the referent for each categorical variable.

* $P < .05$;

** $P < .01$;

*** $P < .001$