Original Investigation

Results of a Feasibility Study of Helpers Stay Quit Training for Smoking Relapse Prevention

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Abstract

Introduction: Most smoking quit attempts end in relapse, and interventions focused on relapse prevention are lacking. Helpers Stay Quit (HSQ) is a novel behavioral relapse prevention intervention that teaches newly abstinent smokers to offer a “helping conversation” (HC) to help others quit tobacco.

Methods: Pre-post intervention feasibility study with state quitline participants ≥ 14 days abstinent. Measures at baseline, 3 months, and 6 months included smoking status, offering HCs, and cessation self-efficacy. Primary outcomes: self-reported 7-day point prevalence abstinence; offering HCs. Cox models explored association of HCs with relapse. Preliminary effects analysis using propensity score matching compared 30-day abstinence of quitline clients with study sample at 7 months.

Results: Participants ($N = 104$) were as follows: mean age of 53 years (SD 13.9 years), 48.1% male, mean of cigarettes smoked/day of 16.2 (SD 9.7). Compared with participants who remained abstinent ($n = 82$), relapsers ($n = 22$) had fewer HCs over 6 months (2.6 vs 7.2; 95% confidence interval [CI]: 1.4, 7.8, $p = .006$). Using adjusted Cox regression, the hazard ratio of relapse for each HC was 0.85 (95% CI: 0.74, 0.99, $p = .03$). Compared with a matched sample of quitline clients not exposed to HSQ, study participants were 49% more likely to report 30-day abstinence at 7-month quitline follow-up (95% CI: 40%, 59%, $p < .0001$).

Conclusions: HSQ, delivered to newly abstinent smokers who received standard quitline treatment, was associated with less self-reported relapse. These promising preliminary study results warrant further research to evaluate HSQ as a novel behavioral intervention to prevent smoking relapse.

Implications: To date, behavioral interventions for smoking relapse prevention that teach abstinence cessation skills to apply to themselves have not shown effectiveness. This feasibility study examines the preliminary efficacy of a conceptually novel, “help others” behavioral intervention approach for relapse prevention in newly abstinent smokers recruited from a state quitline. HSQ teaches the newly abstinent smoker communication and listening skills to encourage other smokers in their personal social network to quit. Exploratory analysis using propensity score matching suggests that participants exposed to HSQ were significantly more likely to self-report 30-day abstinence at quitline 7-month follow-up than other quitline clients.

Introduction

Although effective tobacco dependence treatments are more numerous and accessible than ever before,^{1,2} available treatments do not consistently produce long-term abstinence rates.^{3,4} Novel approaches are needed to reduce relapse.

Within the first 12 months of smoking abstinence, *risk of relapse is more than 50%.*⁶ The most recent Cochrane review of interventions for smoking relapse prevention noted behavioral interventions have focused on two types of intervention approaches targeting the abstainer: skills training addressing high-risk situations, or minimal interventions using single sessions or self-help materials.⁵ Of 45 behavioral intervention studies reviewed, only 11 focused on “assisted abstainers” (smokers abstinent after cessation treatment)⁵ and meta-analysis of these interventions found no long-term benefit, albeit with only “moderate certainty.”⁵ Noted limitations in the relapse prevention literature include lack of clear separation between cessation treatment and relapse prevention interventions, limited conceptual approaches to behavioral intervention, and insufficient detail to permit survival analyses.⁵

The Helpers Stay Quit (HSQ) study addresses pertinent gaps in the smoking relapse prevention literature by using a novel behavioral intervention that trains newly quit smokers, who received quitline services (“abstainers”), how to *help others* with smoking cessation. This feasibility study aimed to examine HSQ’s effect on smoking relapse among abstainers, HSQ’s effect on actions taken to encourage others to quit smoking, feasibility outcomes, and exploratory analyses using propensity score matching.

Methods

Design

The study was a single-group, pre-post intervention design to examine the effects of HSQ training on individuals with 14-day continuous abstinence after having received standard quitline cessation treatment and to assess feasibility outcomes related to completion and application of HSQ training. Primary outcomes were self-reported 7-day point prevalence abstinence at 3 and 6 months. Feasibility outcomes included accrual, training completion, and study retention. The study was approved by the University of Arizona’s institutional review board.

Study Protocol

Following consent, participants received a link to an online baseline survey. Participants then received access to the HSQ pretest and online training, which takes approximately 2.5 hours to complete, followed by a post-test assessment. Participants received 3- and 6-month follow-up online surveys assessing participant reported outcomes, and monthly text messages assessing 7-day tobacco abstinence and actions taken to help others quit tobacco. See [Supplementary Appendix](#) for details.

HSQ Intervention

HSQ is a web-based tobacco cessation brief intervention training designed to teach lay community members tobacco cessation brief intervention skills,⁶⁻⁹ including relapse prevention. The HSQ trainees (“Helpers”) learn to offer a brief four-step “helping conversation” (HC) that is explicitly tobacco-user centered, nonconfrontational or proscriptive, and aligned with the

tobacco user’s readiness to quit. Helpers learn to assess readiness and motivations for quitting and, when appropriate, to encourage quitting, use of evidence-based cessation aids (eg, medications, quitlines), and referrals to quitlines and reliable information sources (eg, pharmacists, health care providers). Helpers are able to download simple handouts to use in HCs, for example, “Quit Tips,” “Medications for Quitting.” See [Supplementary Appendix](#) for details.

Study Participants

Participants were recruited from clients receiving smoking cessation treatment via Arizona’s state quitline and who reported abstinence at the standard quitline follow-ups at 30 days post-quit or at 7-month follow-up approximately 3 months after the end of the treatment. Clients reporting at least 14-day continuous abstinence from smoking were informed of potential eligibility for a smoking relapse prevention study. Clients reporting Internet access via a computer or tablet, ability to receive/send text messages, and having a personal active e-mail account were referred to the study staff to complete eligibility screening and obtain consent for study participation.

Inclusion criteria were as follows: over age 18 years of age; self-reported proficiency in spoken and written English; used only cigarettes and no other forms of tobacco or nicotine; willing to forego any other training to help people quit smoking during study participation (eg, training to become a quit coach or “quit buddy”). Exclusion criteria was prior exposure to any tobacco cessation training within 2 years. Participants could continue their personal tobacco cessation aids (eg, quitline, support groups, medications, etc.).

Measures

Participant demographics, tobacco use history, and Fagerström test of nicotine dependence score¹⁰ were obtained from quitline intake data. Study baseline survey assessed education, occupation, and reasons interested in HSQ training. Training pre- and post-tests assessed knowledge and confidence for offering an HC. Willingness to recommend HSQ was assessed at post-test and 3 months.

Smoking status (7-day point prevalent abstinence) was queried at 3- and 6-month follow-up using surveys and monthly text surveys. For exploratory propensity score matching (PSM), we used 30-day abstinence collected by quitline at its standard 7-month postenrollment follow-up.

Outcomes at 3 and 6 months included self-efficacy with HCs; motivations for HCs (eg, “Tobacco user was someone I knew,” “I want to have fewer smokers around me”); content of the HC (eg, readiness to quit, discussed medications); target of HC (eg, family member, friend, coworker); satisfaction with experience of HC, that is, “When having helping conversations, how often were you satisfied with the interaction?” (“none of the interactions,” “less than half of interactions,” “half of interactions,” “more than half of interactions,” “all of the interactions”). Monthly text surveys assessed the number of HCs in past month. Other PROs assessed at baseline, 3 months, and 6 months included self-efficacy with smoking cessation skills, smoker identity, relapse vulnerability, and self-regulation of smoking behavior. See [Supplementary Appendix A](#) for details of PRO methods.

Based on our prior studies with smoking cessation brief intervention training for community members,^{6,8,11-13} we conservatively set feasibility outcome threshold values for accrual, HSQ training completion, retention; reporting at least one HC; and “would recommend HSQ to others”.

Statistical Methods

Self-reported 7-day abstinence, at 3 and 6 months (using surveys and text messages), were combined into a single variable such that if either the text survey or the 3- and 6-month survey reported relapse, we considered relapse to have occurred. Relapse was defined as (1) any smoking on seven consecutive days or (2) smoking at least once each week over two consecutive weeks.¹⁴ Multiple relapse was defined as relapsing, reporting being quit, and then subsequently reporting smoking. For HCs, we used the average number of HCs at 3 and 6 months from the two sources.

We estimated these statistics for the quitline clients, in order to assess comparability to the quitline population, and the PSM set. T-tests and chi-square tests were used to test differences between these latter two data sets and study participants. Feasibility outcomes were summarized with means or proportions along with 95% confidence intervals (CIs). Aspects of HC delivery as reported in the 3- and 6-month surveys were summarized using descriptive statistics.

Cox models were used to explore the association of HCs with relapse. The cumulative number of HCs was used as a time-dependent covariate, lagged by 1 month to assure that HC(s) occurred before relapse. Our prespecified Cox models included age, sex, and number of other smokers in the house; the small sample size; the small sample size and fairly low event rate (relapse) precluded larger or more complex models (eg, multiple relapses).

PSM was used in exploratory analysis to compare quit rates of quitline clients with our study sample, to assess the effect of HCs on

relapse; and to assess feasibility of using PSM to construct a group of cases comparable to the study sample. Matches were drawn from the complete de-identified quitline data for the 2-year period ($N = 7070$) corresponding to the study, in a 4:1 ratio. Matching variables included age > 50 years (dichotomized), gender, race/ethnicity (white, Hispanic, non-Hispanic white), Fagerström nicotine dependence score, nicotine replacement therapy use, and the presence of a chronic physical or mental health condition. Matching was undertaken using SAS proc PSMATCH (Cary, North Carolina). Balance was assessed using standardized mean differences. A chi-square test for difference in quit rates was computed on the matched set.

Results

Participants had a mean age of 53 years (SD 13.9 years), were 48.1% male, predominately non-Hispanic White (83%), mean cigarettes smoked per day of 16.2 (SD 9.7), and mean Fagerström test of nicotine dependence score of 4.7 (SD 2.1). Compared with quitline client population, study participants had more formal education; were less likely to have a chronic health condition; were less likely to have other smokers in the home; and were less likely to allow smoking in the home. They were also more likely to use nicotine replacement therapy during their quit and to have completed more coaching sessions. See Table 1. For feasibility outcomes of participant recruitment, HSQ training completion, participant retention, report of HC, and willingness to recommend HSQ to others, all observed

Table 1. Sample Characteristics

Characteristics	Helpers ^a ($N = 104$)	Quitline callers ($N = 7070^b$)	Propensity score-matched quitline callers ($N = 416^c$)
Baseline characteristics			
Age (y), mean (SD)	53.0 (13.9)	53.6 (13.7)	54.0 (13.7)
Nicotine dependence (Fagerström), mean (SD)	4.7 (2.1)	4.7 (2.3)	5.1 (2.0)
Cigarettes per day, mean (SD)	16.2 (9.7)	15.8 (9.7)	16.9 (9.1)
Male gender	50 (48.1)	3205 (45.3)	175 (47.8)
Non-Hispanic white	84 (83.2)	5306 (76.5)*	319 (87.2)
Hispanic ethnicity	4 (4.0)	829 (12.0)*	11 (3.0)
Non-white, non-Hispanic	13 (12.9)	802 (12.6)*	36 (9.8)
>High school education	103 (98.0)	6080 (86.5)***	362 (98.9)
Employed	65 (46.4)	2012 (37.9)	89 (36.5)
No or low insurance	62 (60.2)	4174 (59.5)	196 (53.6)
Chronic health condition	55 (52.9)	4521 (64.0)*	192 (52.2)
Mental health condition	44 (42.3)	3531 (50.1)	176 (48.2)
Allows smoking in home	18 (18.6)	1722 (30.2)*	66 (18.0)
Other smokers in home	21 (21.0)	1627 (33.8)*	77 (32.6)
Has had helping conversations		—	—
No	63 (61.0)		
Yes	30 (28.9)		
Unsure	11 (10.6)		
Postbaseline characteristics			
Nicotine replacement therapy	79 (76.0)	4330 (64.1)*	275 (75.1)
Number of coaching sessions, mean (SD)	6.4 (2.1)	4.5 (3.2)***	4.8 (3.7) [#]

Values shown are n (%) unless otherwise noted (values with a * indicate statistically significant difference from the HSQ study sample).

^aMissing data < 5%, except for 9% for Fagerström.

^bWith 7-month quitline follow-up data.

^cMatched to the 92 helpers with quitline 7-month follow-up data.

*Statistically significant differences between HSQ sample and unmatched quitline sample: * $p < .05$, ** $p < .01$, *** $p < .001$.

[#]Statistically significant differences between HSQ sample and matched quitline sample: [#] $p < .05$.

Table 2. Characteristics of Helping Conversations, 3 and 6 mo Surveys

	3 mo (<i>n</i> = 68)	6 mo (<i>n</i> = 63)
Number of participants who had an HC in last month	43	25
Number of HC in last month, median (range)	1 (0, 50)	0 (0,30)
Reason for not having HC ^a		
Did not have an opportunity	19 (27.5)	25 (39.7)
Did not feel confident	2 (2.9)	2 (3.2)
Was not interested	1 (1.5)	3 (4.8)
Did not think it would make a difference	2 (2.9)	2 (3.2)
Other	2 (2.9)	4 (6.4)
Motivations for having HC ^a		
Tobacco user was someone you knew	36 (52.9)	22 (35.0)
Tobacco user indicated a desire to quit tobacco	21 (30.9)	14 (22.2)
Tobacco use was taking place at your home/car/work	9 (13.2)	3 (4.8)
Tobacco user was violating a law/ordinance/posted sign	0	1 (1.6)
Among those who had a HC, how often the ^b HC included:		
Awareness of tobacco user's current interest in quitting	21 (48.8)	14 (56.0)
Understanding tobacco user's reason(s) for quitting	19 (44.2)	15 (60.0)
Offering suggestions for treatment or resources	24 (55.8)	17 (68.0)
Arranging for follow-up conversations	8 (18.6)	13 (52.0)
Discussion of cessation medications	24 (55.8)	18 (72.0)
With whom did you have a HC? ^a		
Family	18 (26.4)	14 (22.2)
Friend	28 (41.2)	17 (27.0)
Acquaintance	12 (17.7)	9 (14.3)
Someone at work	15 (22.1)	9 (14.3)
Client or patient	3 (4.4)	4 (6.4)
Stranger	11 (16.2)	6 (9.5)
More than half the HCs were satisfactory	24 (55.8)	17 (68.0)
Participant recommendations for services or materials ^c		
Referred to quitline	48 (77.9)	46 (73.0)
Encouraged to talk to doctor or pharmacist	15 (22.1)	16 (25.4)
Offered quit tips handout	6 (8.8)	6 (9.5)
Offered medications handout	19 (27.9)	18 (28.6)

Values displayed as *n* (%). HC = helping conversation.

^aRespondents could give more than one response.

^b(Often, always vs never, sometimes).

^cHandouts for "Thinking of quitting," referral to professional services, quit plan instructions, quit plan worksheet, secondhand and thirdhand smoke, e-cigarette, and tobacco facts were endorsed less than five times.

values exceeded the criteria value for feasibility. See [Supplementary Appendix](#) for feasibility result details.

There were 22 (21%, 95% CI: 13%, 29%) participants who relapsed during the 6-month follow-up (22 as reported by text; 13 as reported by the survey, all of whom reported relapse in

the text), four of whom had multiple relapses. The unadjusted hazard ratio of relapse for each HC was 0.86 (95% CI: 0.75, 0.98, *p* = .03). Adjusting for age, gender, and the number of other smokers in the house gave a similar value, HR = 0.85 (95% CI: 0.74, 0.99, *p* = .03). Participants who relapsed had significantly fewer HCs over the 6 months, 2.6 when compared with 7.2 (95% CI: 1.4, 7.8, *p* = .006). Of all the baseline PROs tested for association with relapse, only self-efficacy for smoking cessation skills was statistically significant. See [Supplementary Appendix](#) for PRO result details.

Standardized mean differences showed that the quitline PSM sample was balanced on matching covariates. PSM analyses showed that the likelihood of reporting 30-day smoking abstinence (as reported at the quitline 7-month follow-up) was 36% in the matched set, when compared with 86% in HSQ participants, a 49% difference (95% CI: 40%, 59%, *p* < .0001). These values were similar to the results from unmatched data.

[Table 2](#) describes HCs. The primary reason for not having an HC was lack of opportunity (19 [28%] at 3 months; 25 [40%] at 6 months). The greatest motivator for having an HC was the tobacco user was someone they knew (36 [53%] at 3 months; 22 [35%] at 6 months); friends were the most likely target of the HC.

Discussion

Our data indicate the feasibility of our novel HSQ intervention for participant accrual, training completion, retention, and satisfaction with HSQ. Participant reporting of more HCs was associated with lower risk of relapse, suggesting a potential protective effect when participants applied HSQ training. Preliminary results also suggest that HSQ participants more than doubled self-reported 30-day abstinence at 7-month follow-up when compared with an unmatched quitline sample. Exploratory PSM analyses comparing a matched set were consistent with unmatched results. Albeit, in both comparisons, HSQ participants had completed more coaching sessions.

Although the single group pre-post design significantly limits generalizability, the results are encouraging. Potential mechanisms contributing to suggested efficacy of teaching new abstainers to help others quit include reducing the number of smokers in the abstainer's personal network (PN) and a shift in social norms toward nonsmoking.^{15,16} Abstainers having a HC with others in their PN could increase self-efficacy with cessation skills, reinforce a nonsmoker self-identity,¹⁷ and overtly declare a nonsmoker identity within their PN¹⁸. These actions, in turn, may help the abstainer establish PN social norms that favor long-term abstinence.¹⁹

Although this study addresses gaps in the smoking relapse prevention literature by utilizing a novel behavioral intervention that is distinct from cessation treatment and has high dissemination potential due to partnership with a state quitline, there are limitations to consider. First, smoking status and HCs were self-reported without objective confirmation, which may inflate endorsement of both. Second, the study sample differed from the unmatched quitline client population in characteristics associated with higher likelihood of cessation success (eg, education, chronic health conditions, nicotine replacement therapy use, number of coaching sessions). The intervention group differed from the PSM-matched sample only in numbers of coaching sessions. Third, generalizability is limited because participants were recruited from a single quitline. Building on results from this feasibility study, we will pursue additional research with

a stronger study design (ie, randomized controlled trial, concealed allocation), more rigorous measures (ie, biochemical confirmation of smoking status, track use of cessation aids), a more diverse study sample, and longer follow-up to determine the efficacy of HSQ for prevention of smoking relapse.

Supplementary Material

A Contributorship Form detailing each author's specific involvement with this content, as well as any supplementary data, are available online at <https://academic.oup.com/ntr>.

Funding

This work was supported by the National Cancer Institute at the National Institutes of Health (grant number 1R21CA184361-01A1).

Declaration of Interests

None declared.

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