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Original Investigation

A tailored intervention to support pharmacy-based counseling for smoking cessation

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Abstract

Introduction: Pharmacists are uniquely positioned within the community to provide smoking cessation counseling to their patients. However, pharmacists experience significant barriers to providing counseling, including limited time, reimbursement, and training in counseling techniques. We tested a computer-driven software system, "Exper_Quit" (EQ), that provided individually tailored interventions to patients who smoke and matching tailored reports for pharmacists to help guide cessation counseling.

Methods: A two-phase design was used to recruit an observation-only group (OBS; $n = 100$), followed by participants ($n = 200$) randomly assigned to receive either EQ-assisted pharmacist counseling or EQ plus 8 weeks of nicotine transdermal patch (EQ+). Both treatment groups were scheduled to receive two follow-up counseling calls from pharmacists.

Results: Most participants in the EQ and EQ+ groups reported receiving counseling from a pharmacist, including follow-up calls, while none of the OBS participants reported speaking with the pharmacist about cessation. At 6 months, fewer OBS participants reported a quit attempt (42%) compared with EQ (76%) or EQ+ (65%) participants ($p < .02$). At 6 months, 7-day point-prevalence abstinence was 28% and 15% among the EQ+ and EQ groups, respectively, compared with 8% among OBS participants ($p < .01$), and EQ+ participants were twice as likely to be quit than were EQ participants ($p < .01$).

Discussion: A tailored software system can facilitate the delivery of smoking cessation counseling to pharmacy patients. Results suggest that EQ was successful in increasing (a) the delivery of cessation counseling, (b) quit attempts, and (c) quit rates. Pharmacists can play an important role in the effective delivery of smoking cessation counseling.

Introduction

Despite intensive efforts to reduce tobacco use, 19.8% of Americans continue to smoke cigarettes (Centers for Disease Control and Prevention, 2008). An important part of a comprehensive approach to tobacco control is the development of interventions to help individual smokers quit. Although tobacco treatment specialists make important contributions, the reach of these services is limited. This has prompted efforts encouraging all clinicians to incorporate tobacco interventions into routine clinical practice. The *Clinical Practice Guideline for Treating Tobacco Use and Dependence* (Fiore, Jaen, & Baker, 2008) recommends that a systematic effort be made by all health care providers to identify tobacco users, strongly urge them to quit, and provide aid to do so.

The guideline recommends a "5 A's" approach—ask about tobacco use at every visit, advise patients to quit, assess willingness to quit, assist with quitting, and arrange follow-up counseling. For those patients unwilling to make a quit attempt, the use of motivational interviewing techniques is recommended to encourage a future attempt. The efficacy of the elements of the 5 A's framework has been proven in controlled clinical trials (Fiore et al., 2008; McBride, Emmons, & Lipkus, 2003), and a meta-analysis of brief provider-delivered cessation advice reported a pooled odds of patient cessation of 1.74 (95% *CI* = 1.48–2.05), comparing intervention to control (Lancaster & Stead, 2004). However, this approach has been difficult for clinicians to adopt in practice, and the delivery of the last three A's (assess, assist, and arrange), in particular, remains very low (Manfredi & Lehew, 2008). In a recent survey, fewer than 10% of Medicaid smokers reported receiving all 5 A's from their health care providers (Chase, McMenamin, & Halpin, 2007). Barriers that clinicians face in the delivery of smoking cessation interventions include lack of time, training, and low self-efficacy (Boldemann, Gilljam, Lund, & Helgason, 2006; Jaen, Crabtree,

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Zyzanski, Goodwin, & Stange, 1998; Jaen, Stange, Tumiel, & Nutting, 1997). Thus, there is a clear need to explore innovative approaches to increase the delivery of smoking interventions across diverse clinical settings and to enhance their feasibility of incorporation into routine clinical practice.

Intervention strategies that deliver smoking cessation interventions via nonphysician health professionals have shown success (Gordon, Andrews, Lichtenstein, & Severson, 2005; Houston et al., 2008; Severson, Andrews, Lichtenstein, Gordon, & Barckley, 1998). Community pharmacies are ideally positioned to promote smoking cessation because pharmacy patients typically interact with pharmacists on a regular basis and have high regard for pharmacists in general (Gallup Poll, 2007). Furthermore, 86.4% of pharmacists believe that their profession should become more active in helping patients to quit smoking (Hudmon, Prokhorov, & Corelli, 2006). The inclusion of pharmacists in smoking cessation activities is consistent with the proposed *Healthy People 2010* initiative to increase to at least 75% of the percentage of health care providers who routinely advise cessation and provide assistance and follow-up for all their tobacco-using patients (U.S. Department of Health and Human Services [USDHHS], 2000). Unlike most other clinicians, advice from a pharmacist does not require an appointment or medical insurance; as such, pharmacists have the opportunity to reach and assist underserved populations, which often suffer from a disproportionately higher incidence of tobacco-related diseases (USDHHS, 1998).

Pharmacists' expertise in drug therapy, their accessibility to the public, and their presence at the point-of-purchase of nicotine replacement therapy products make them particularly suitable advocates for smoking cessation. Moreover, a majority of smokers believe that community pharmacies are a convenient location for receiving cessation services (Couchenour, Carson, & Segal, 2002) and that counseling from a pharmacist would enhance their ability to quit (Hudmon, Hemberger, Corelli, Kroon, & Prokhorov, 2003). Pharmacists are also well suited to educate patients about medication dosing, adverse effects, potential interactions with other medications, the effects of smoking and cessation on medication levels, the selection and correct use of a medication delivery system, and to be involved in the management of medication therapy. However, pharmacists also experience significant barriers to providing consistent high-quality counseling support to smokers, including time limitations, lack of training in effective counseling techniques, and lack of reimbursement for counseling smokers (Bleidt, 2001; Couchenour, Denham, & Simpson, 2000; Hudmon et al., 2006; Kotecki, Elanjian, & Torabi, 2000).

Computer-tailored print and Web-based interventions have been used to reduce provider burden and assist health care professionals to deliver brief effective smoking cessation interventions to their patients. Several reviews and meta-analyses have concluded that print-based computer-tailored interventions for smoking cessation are more effective than standardized (nontailored) interventions (e.g., Lancaster & Stead, 2002; Strecher, 1999; Strecher et al., 2008). Computer-tailored interventions can be used to customize the content of cessation programs to the specific needs of the smoker while also reducing the burden on health professionals by conducting assessments, tailoring intervention content, and providing support to the health care professional to help guide counseling efforts.

In this study, we tested the combination of smoking cessation training for pharmacists and use of a computer-driven software system, "Exper_Quit" (EQ), which provided individually tailored interventions to pharmacy patients who smoke cigarettes and matching reports to the pharmacist to help guide cessation counseling.

Methods

Overview

This study was conducted at two pharmacies that were located within large urban community health centers that serve approximately 18,000 outpatients per year and record more than 67,000 visits annually. Each pharmacy fills more than 300 prescriptions daily. The pharmacies were staffed by six pharmacists (50% were male) who participated in the study. Each pharmacist served patients at both sites during the study.

Two female research associates (RA) with bachelor's degrees were hired and trained by the investigators to assist with obtaining informed consent, participant recruitment, and data collection. This study protocol and all associated measures, consent forms, and recruitment procedures were approved by the institutional review board. Inclusion criteria for Phase 1 and Phase 2 were (a) older than 18 years, (b) pharmacy client (new or repeat), (c) current daily cigarette smoker (at least 5 cigarettes/day for ≥3 months), and (d) no contraindications for nicotine patch use. Exclusion criteria were (a) use of other nicotine or tobacco products and (b) currently using quit smoking aids or medications.

Phase 1

Adult pharmacy patients (n = 300) were enrolled in this study in two consecutive waves: Phase 1 in which we recruited an observation-only group (OBS) (n = 100) and Phase 2 in which we randomized participants to either of two different treatments (EQ or EQ+, n = 200). The first 100 participants were approached by the study research associate (RA) as they exited the pharmacy. The RA described the study to these pharmacy patients, screened for eligibility, and provided a brief description of the study. The RA escorted interested persons to a small conference room adjacent to the pharmacy and administered informed consent. These participants were assigned to the OBS. The objective of recruiting an OBS was to document the base rate of smoking cessation among patients at the pharmacy sites with minimal influence from the presence of research staff and protocols. After signing consent, participants in the OBS group completed baseline assessments (identical to those used in Phase 2) using the study laptop computer CASI system and then provided the RA with their contact information. The CASI system developed for this program was modified from the system used in our previous research and included features that maximized usability, clarity of question presentation, and minimization of data entry errors (Bock, Niaura, Fontes, & Bock, 1999). Completion of consent and baseline assessments took approximately 20–30 min for OBS participants. We conducted a single follow-up assessment 6 months after recruitment to assess smoking status. All participants were compensated $20 for time and effort for completing the baseline survey and for returning the follow-up survey. Recruitment for Phase 1 was concluded in 2 months.

Pharmacist training

One week after all OBS participants had been enrolled, we conducted a single 3-hr training session with the clinic pharmacists. Pharmacists were trained using the *Rx for Change* tobacco cessation program (http://rxforchange.ucsf.edu; Corelli et al., 2005), which focuses on fostering self-efficacy for counseling and includes role-playing and a hands-on workshop with the various Food and Drug Administration–approved medications for smoking cessation. All counseling approaches were aligned with the 5 A's framework (ask, assess, advise, assist, arrange follow-up) as described in the *Clinical Practice Guideline* (Fiore et al., 2008). The pharmacists were trained to assess readiness to quit, to focus their counseling on motivational issues for those not ready to quit, and, for those ready to quit, to offer practical advice regarding quitting, discuss the importance of obtaining social support, and evaluate the appropriateness of quit smoking medications and make recommendations (the primary difference between EQ and EQ+ conditions being the availability of free nicotine replacement therapy [NRT]). Additionally, the training addressed (a) study aims and the research protocol, (b) a demonstration of the EQ program and examination of tailored intervention reports for the patient and pharmacist, and (c) role-playing with case scenarios that integrated output from the EQ system.

Phase 2

Recruitment for Phase 2 began 2 weeks after Phase 1 enrollment was completed. As part of the study protocol, pharmacists asked patients' smoking status as they presented either new or refill prescriptions. Pharmacists told identified smokers about the study and directed interested patients to speak with the study RA. The RA screened all persons interested in the study and administered informed consent to 200 eligible adult smokers. At the conclusion of the baseline survey, the computer program randomly assigned participants to the tailored intervention (EQ) or to the tailored intervention plus nicotine replacement therapy (EQ+) provided at no cost. Completion of consent and baseline assessments took approximately 30–45 min for EQ and EQ+ participants. Participants were directed back to the pharmacist following randomization where they received the appropriate intervention. For EQ+ participants, transdermal nicotine patches were provided at no cost using an 8-week tapered dosing protocol (4 weeks at 21 mg, 2 weeks each at 14 mg, and 7 mg). Pharmacists were aware of the participant's randomization outcome only if the participant chose to use nicotine replacement and presented the pharmacist with a coupon for free NRT. Individuals who smoked fewer than 15 cigarettes/day began with the 14 mg patch and tapered to the 7 mg patch after 4 weeks.

Tailored feedback and pharmacist intervention

The EQ software system was located in a small room adjacent to the pharmacy area designated for patients waiting for prescriptions. It automated the patient assessment and, for those in the EQ and EQ+ conditions, streamlined the process of delivering feedback, thereby reducing the assessment burden on pharmacists and enabling them to focus their efforts on high-quality counseling and medication advice. The software provided a printed, tailored, four-page feedback report to the patient that was designed to help identify potential barriers to quitting smoking and to reinforce strengths. The tailored feedback was initially developed by the investigators for our study of smokers in primary care clinics (Bock et al., 1999). The feedback content was updated and modified for the present study by Drs. Bock and Hudmon. Contents of the tailored feedback addressed the domains of motivation, decisional making (pros and cons of quitting smoking) and perceived barriers to quitting, smoking triggers/cues, nicotine dependence and effective smoking cessation medications, and the relationship between quitting smoking and the experience of negative affect and/or depressive symptoms.

The software system also printed a one-page bulleted report for the pharmacist for each patient who used the software system; this report contained a summary of the results of the assessment, with counseling suggestions relevant to detected strengths and potential barriers faced by the patient.

Pharmacists used the EQ report to deliver brief (<5 min) counseling and asked participants if they were interested in setting a quit date within the next 2 weeks. For those who chose to set a quit date, follow-up telephone calls to provide support were scheduled for their target quit day and 2 weeks following that day. For those in the EQ+ group, pharmacists also screened for therapeutic appropriateness of the nicotine patch and dispensed patches to those setting a quit date. In both treatment groups, follow-up calls were scheduled for 2 and 4 weeks post-baseline for individuals not setting a quit date. A 1-week window was permitted after which time call attempts were abandoned. Pharmacists recorded whether they were able to complete each follow-up call (yes/no) and the time and date of completed or attempted calls. We conducted a single follow-up assessment 6 months after recruitment to assess smoking status. Participants were compensated $20 for time and effort for completing the baseline survey and for returning the follow-up survey.

Measures

At baseline, all participants completed assessment surveys using the EQ computer system. Participants answered demographic and smoking-related questions and completed assessments of several cognitive and behavioral factors derived from the Transtheoretical Model of Change (Prochaska & DiClemente, 1983) and Social Cognitive Theory (Bandura, 1986). Smoking-related variables included predisposing and precipitating factors, including smoking rate, number and duration of previous quit attempts, overall duration of smoking habit, and nicotine dependence measured via the Fagerström Test for Nicotine Dependence (FTND; Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991).

We assessed motivation to quit smoking using the stages of change algorithm (Prochaska, DiClemente, & Norcross, 1992). Decisional making for cessation was assessed using the Smoking Decisional Balance Scale, a measure of the perceived benefits and costs of smoking (Velicer, DiClemente, Prochaska, & Brandenburg, 1985). The scale is divided into pros and cons subscales, each of which have high internal validity ($\alpha = .88$ and .89, respectively). Participants endorse the perceived relative costs and benefits of quitting, thus allowing the feedback system to identify specific barriers to quitting and include counseling suggestions to overcome these barriers. We also used the Situational Temptation Inventory (STI; Velicer, Diclemente, Rossi, & Prochaska, 1990). This nine-item measure asks participants to rate how much they are tempted to smoke under a variety of

circumstances. The STI has three subscales that correspond to habit, social, and affect triggers for smoking. This measure has demonstrated good validity and internal consistency ($\alpha = .80–.90$). Confidence in quitting was assessed using a single item (scored on a 5-point Likert scale) that asked participants to rate how confident they were in their ability to quit smoking (at baseline and follow-up for continuing smokers) or their ability to remain quit (for those quit at follow-up).

At baseline, participants were asked whether they had ever been asked by their doctor and the pharmacist about their smoking, advised to quit, and offered assistance with quitting. We also asked participants whether they thought it was a good idea for pharmacists to counsel their patients regarding quitting smoking. At the 2-month follow-up, participants were also asked whether they found the pharmacist counseling helpful.

Precautions for medications. Several survey items were developed to screen for precautions for nicotine patch use. Participants answered a series of questions concerning adhesive allergy, severe eczema, or other skin disease; recent myocardial infarction, angina pectoris, or severe arrhythmia; hypertension; and current or planned pregnancy. These items were not intended to replace the judgment and experience of the pharmacist but rather were designed to provide an additional prompt for the pharmacist to screen for potential precautions for the nicotine patch.

Depressive symptoms. Symptoms of depression were assessed using the 10-item version of the Center for Epidemiologic Studies Depression scale (CES-D), which has excellent reliability and validity (Andresen, Malmgren, Carter, & Patrick, 1994). Symptoms of depression, measured via the CES-D, have been significantly associated with current smoking status and inability to quit (Anda et al., 1990; Perez-Stable, Marin, Marin, & Katz, 1990). The CESD-10 has shown good predictive accuracy when compared with the full-length 20-item version of the CES-D ($\kappa = .97$, $p < .001$), cutoff scores for depressive symptoms are ≥10, and retest correlations are generally stable ($r = .71$; Andresen et al.).

Primary smoking outcome. Smoking status was assessed both 2 and 6 months after the initial pharmacy visit. Follow-up assessments were conducted by telephone. Participants who reported abstinence of at least 7 consecutive days (7-day point prevalence) were asked to visit the pharmacy clinic site to provide breath or saliva samples for analysis. Abstinence was verified with carbon monoxide (<10 ppm) at the 2-month follow-up since some participants could be using NRT at that time, and by saliva cotinine analysis at the 6-month follow-up. In accordance with guidelines from the SRNT Subcommittee on Biochemical Verification (2002), cotinine concentrations of <15 ng/ml were used as the cutoff to classify participants as abstinent. When self-reported smoking conflicted with biochemical measures, the results of the salivary cotinine analysis were used to determine quit status. Saliva samples were collected from all participants reporting abstinence at month 6.

Data analysis

Descriptive statistics were used to characterize participants by treatment group. Groups were compared using analysis of variance for means of continuous variables, and chi-square tests were used for percentages. The primary outcome variable for the study, 7-day point prevalence abstinence at 6 months, was analyzed using chi-square analyses, and p values were obtained using binary logistic regression analyses. To examine the relative impact of the interventions on smoking prevalence among continuing smokers, we applied analysis of covariance comparing changes from baseline across the three groups while controlling for baseline smoking. We also conducted a binary logistic regression to examine intervention components (pharmacist follow-up calls, pharmacist gender) and baseline characteristics, including treatment group assignment, nicotine dependence, confidence in quitting, temptations to smoke, and the participant's rating of the importance of quitting as predictors of cessation at months 2 and 6. Data from one individual in the OBS group who withdrew from the study are not included in the analyses.

Results

Participants' baseline characteristics

The participant sample ($n = 299$) was 59% female, 91% White, 6% Native American, 2% Black, and 1% "other/mixed race." Over half of all participants (53%) were Hispanic (91% of Hispanics were White and 5% were Native American). Average age was 44.8 years ($SD = 11.4$), and 74% had at least 12 years of education. Participants in the OBS group were younger than EQ participants (42.3 years, $SD = 11.7$ vs. 46.5, $SD = 11.5$; $p < .05$) and reported higher household incomes compared with EQ and EQ+ groups ($p < .05$). At baseline, 86% of participants reported having ever been asked about their smoking by their physician and 67% reported having ever talked with their doctor about quitting. Only 3% of participants said that they had ever been asked about their smoking by a pharmacist (prior to this study), and only 1.7% reported having ever talked with a pharmacist about quitting. However, 88% of participants indicated that having a pharmacist counsel smokers was a good idea. No significant differences were observed between groups for any of these variables. Baseline data are presented in Table 1.

Smoking at baseline

Participants smoked an average of 16.6 cigarettes/day ($SD = 8.7$; range = 5–62). OBS participants smoked fewer cigarettes per day at baseline (13.8, $SD = 5.7$) compared with EQ (17.9, $SD = 7.4$) and EQ+ (18.2, $SD = 8.0$) groups ($p < .05$). Participants in the OBS group also were less likely to be in the preparation stage of change for quitting compared with the EQ and EQ+ groups (28%, 89%, and 91%, respectively, $p < .01$). EQ+ participants also tended to endorse higher importance for quitting (9.1, $SD = 1.8$) compared with OBS participants (8.2, $SD = 2.4$, $p < .05$). No significant differences between groups were noted for any other baseline measures (the pros or cons on the decisional balance measure, depressive symptoms [CES-D], temptation to smoke, nicotine dependence [FTND], and confidence in quitting).

Outcomes

Participant retention and intervention delivery. Across all three groups (OBS, EQ, and EQ+), follow-up completion rates were high at both month 1 (92%, 96%, and 96%, respectively) and month 6 (79%, 88%, and 83%, respectively). Pharmacists recorded completing 91% of telephone follow-up calls to

Table 1. Baseline variables by treatment group (n = 299)

	OBS	EQ	EQ+	Significance
Age	42.3 (11.7)[a]	46.5 (11.5)[b]	45.5 (10.8)	$p < .05$
Cigarettes/day	13.8 (8.6)[a]	17.7 (8.3)[b]	18.2 (9.1)[b]	$p < .05$
FTND	4.9 (2.3)	5.1 (2.2)	5.3 (2.3)	*ns*
Decisional balance	0.48 (3.1)	0.57 (3.5)	1.2 (2.8)	*ns*
Temptations	3.5 (0.71)	3.8 (0.67)	3.7 (0.77)	*ns*
Confidence	3.1 (1.6)	3.0 (1.1)	2.8 (1.2)	*ns*
Importance of quitting	8.2 (2.4)[a]	8.7 (1.5)	9.1 (1.8)[b]	$p < .05$
CES-D	11.7 (6.3)	11.8 (6.6)	11.6 (6.2)	*ns*

Note. Values are expressed in *M* (*SD*). Superscript notations (a,b) denote significant differences between groups. CES-D = Center for Epidemiologic Studies Depression scale; EQ = ExperQuit; EQ+ = ExperQuit plus Nicotine Replacement Therapy; FTND = Fagerström Test for Nicotine Dependence; *ns* = nonsignificant; OBS = Observation-only group.

participants; however, at the 2-month follow-up, only 63% of participants reported having received the follow-up calls. There were no significant differences between EQ and EQ+ groups in rates of intervention completion. Of these participants, 25% reported that the calls were "helpful" and 58% said calls were or "very helpful." Logistic regression indicated that pharmacist follow-up calls were not significantly associated with abstinence, making a 24-hr quit attempt, or number of quit attempts at either follow-up. Only pharmacist gender (female) was positively associated with abstinence at the 2 months (but not 6 months) of follow-up (p = .03). Only 26% of participants were counseled by a female pharmacist. No difference was observed in the proportion of participants counseled by female vs. male pharmacists between EQ and EQ+ groups. Of participants who were counseled by a female pharmacist, 77% set a target quit day compared with 58% of those counseled by a male pharmacist, $\chi^2(2) = 7.6$, p = .02. None of the OBS participants reported being asked about smoking by the pharmacist or advised to quit (in this study).

Smoking outcomes. Significantly, fewer OBS participants (42%) reported making a quit attempt between baseline and month 6 compared with EQ (76%) and EQ+ (65%) participants, $\chi^2(2) = 7.6$, p = .02. Among OBS participants, 14% reported using the nicotine patch, 3% used nicotine gum, and 3% used bupropion SR. At the 2-month follow-up, 87% of EQ+ participants reported having used the nicotine patch. Two EQ+ individuals reported using nicotine gum in addition to the patch, and two were using bupropion SR (one in addition to the patch). Among EQ participants, 6% reported having used the nicotine patch, 4% reported using the nicotine gum, one used bupropion SR, and one reported using varenicline at the 2-month follow-up. No participants reported continued use of medication at the 6-month follow-up.

At the 2-month follow-up, 9% of those in the OBS group were abstinent compared with 27% in the EQ group and 39% in the EQ+ group, $\chi^2(2) = 22.0$, p = .008. At the 6-month assessment, 8% of OBS, 15% of EQ, and 28% of EQ+ participants were abstinent (self-report was verified by saliva cotinine).

Compared with OBS, those in the EQ (odds ratio [*OR*] = 1.49, 95% *CI* = 1.2–3.6) and EQ+ groups (*OR* = 3.3, 95% *CI* = 1.9–5.2) were more likely to be quit at month 6. Likewise, those in the EQ+ group were twice as likely to quit compared with EQ without the nicotine patch (*OR* = 2.3, 95% *CI* = 1.5–3.9). A binary logistic regression analysis of baseline variables showed that significant predictors of cessation at month 6 included treatment group assignment (p = .004), baseline nicotine dependence (p = .034), temptations to smoke (p = .046), confidence in quitting (p = .050), and the individual's rating of the importance of quitting smoking (p = .013). Nicotine dependence and all three subscales of the temptations measure were negatively associated with abstinence at month 6, while confidence and the importance of quitting smoking were positively associated with abstinence.

Among those still smoking at month 6 (n = 180), smoking rates were significantly lower among EQ (M = 8.2, SD = 5.9) and EQ+ (M = 9.3, SD = 6.5) compared with OBS participants (M = 12.8, SD = 8.1), $F(2,177) = 8.19$, p = .001. These differences remained significant when controlling for baseline smoking rate.

Discussion

The goal of the EQ software system was to facilitate the routine delivery of cessation counseling by pharmacists in the community setting. Results of this study suggest that EQ when combined with pharmacists' training for cessation was successful in increasing (a) the delivery of cessation counseling, (b) quit attempts, and (c) quit rates, with further increases among patients who also received nicotine patches at no cost. As such, a tailored intervention combined with brief proactive counseling from a pharmacist may be an effective means of reaching out to smokers and helping them quit. Cessation rates obtained in this study compare favorably with those obtained in recent work using pharmacist-led face-to-face counseling sessions (Dent, Harris, & Noonan, 2009). Other research also has shown that pharmacist interventions for smoking cessation are both effective (Dent, Harris, & Noonan, 2007; Dent et al.; Sinclair, Bond, & Stead, 2004) and cost-effective (Tran, Holdford, Kennedy, & Small, 2002) in terms of cost per successful quit attempt and cost per life-year saved.

In the current study, the addition of a brief tailored report and pharmacist counseling was associated with significantly increased quit rates compared to usual care. The addition of the nicotine patch doubled quit rates above the brief tailored intervention. A doubling of quit rates typically accompanies the use of nicotine replacement regardless of intervention modality (Fiore et al., 2008). It is notable, however, that follow-up calls

from pharmacists did not have a significant impact on quit rates, although there was a discrepancy between the pharmacist reports of follow-up counseling calls completed (91%) and the participant reports of having received those calls (63%). It is possible that in some cases, pharmacists recorded attempting a call rather than only recording successful completion of the counseling call (i.e., when the participant was reached). Alternatively, some participants might not have remembered the counseling calls, which happened weeks before the 2-month follow-up assessment. The use of a dedicated study phone line could reduce this problem by automatically logging phone numbers called and the duration of the calls. Despite this discrepancy, no differences were observed in reported calls completed between treatment groups (EQ vs. EQ+). However, neither pharmacist nor participant reports of completed follow-up calls were predictive of cessation at either time point. This was surprising because proactive calls have been shown to be effective in previous studies (Stead, Perera, & Lancaster, 2006). Our results may be due to the relatively small number of participants in this study relative to other studies involving proactive counseling calls or may be the result of the somewhat low intensity (two calls, ≤5 min) of the telephone counseling. It may also be that the majority of the impact of pharmacist intervention is obtained at the initial face-to-face counseling and that any additional counseling might be best when conducted in the pharmacy setting.

Differences in cessation rates were also noted based on the gender of the pharmacist who counseled the participant. Although interesting, this difference should be interpreted with caution, given the small number of pharmacists in the study. Thus, the *n* for analysis is 6 rather than 200 (EQ and EQ+ groups), and differences by pharmacist gender may be an artifact of the small number of interventionists. It is possible that time spent counseling individual smokers was greater among female pharmacists since they counseled fewer smokers (18.6, ±4.2) than male pharmacists (49.1, ±4.6). However, this difference in the number of smokers counseled could also be the result of longer hours worked by male pharmacists and not reflective of time spent counseling. Because actual time spent counseling was not recorded, and given the small *n*, we can only speculate about why this difference appeared in the data.

Individuals in the OBS group universally reported that the pharmacist had not asked them about their smoking or advised them to quit. This is not surprising, given that pharmacists historically have not intervened with smokers (Bleidt, 2001; Couchenour et al., 2000; Hudmon et al., 2006; Kotecki et al., 2000; Margolis et al., 2002; Meshack, Moultry, Shaohua, & McAlister, 2009; Williams, Newsom, & Brock, 2000). It is encouraging, however, that the overwhelming majority of participants in this study and previous studies reported positive opinions about pharmacists counseling smokers. Indeed, pharmacists (Hudmon et al.) and pharmacy students (Corelli et al., 2005) believe that the profession should become more active in helping patients quit and have positive attitudes toward provision of smoking cessation services.

Pharmacists are in an ideal position to address tobacco use with a wide range of smokers and to advise them about use of smoking cessation medications. Yet, pharmacists experience significant barriers to providing support to smokers, such as time limitations, lack of awareness of when NRT products are being purchased (because of their physical location within the pharmacy; Kilfoy, Prokhorov, & Hudmon, 2006), and a need for training in effective counseling techniques (Hudmon, Bardel, Kroon, Fenlon, & Corelli, 2005). Because educating pharmacists about cessation is associated with increased counseling in practice (Meshack et al., 2009), pharmacy schools should require tobacco education as part of required coursework and have made important strides toward this goal through dissemination of a shared tobacco curriculum (Corelli, Fenlon, Kroon, Prokhorov, & Hudmon, 2007). Furthermore, simple interventions such as placing over-the-counter medications in locations within the visual field of the pharmacist likely will lead to increases in the number of patients who receive cessation counseling in community pharmacies (Kilfoy et al.). However, innovative approaches also are needed to facilitate pharmacists in delivering cessation interventions, despite time limitations in the community pharmacy setting. Computer-assisted interventions hold promise for enabling pharmacists to achieve this goal. Computer-tailoring assessment and intervention systems that make assessment and feedback available through a CASI system with user-friendly interface could be placed at computer stations or kiosks in pharmacy consulting areas to facilitate pharmacist counseling of their patients who smoke.

Limitations

This study did not include the OBS group in a fully randomized design. Our goal in recruiting an OBS group was to assess the true frequency of pharmacist counseling for smoking cessation and rates of smoking cessation among pharmacy patients with minimal interference from study protocols. We elected to enroll the OBS group before initiating pharmacist training in the study protocols to minimize potential "research" interference and eliminate possible cross-contamination between study conditions. Thus, it is likely that some portion of the observed efficacy of the EQ and EQ+ conditions compared with the OBS group was due to pharmacist training, which has been demonstrated in previous research to be associated with increased counseling (Hudmon et al., 2006; Meshack et al., 2009), and increased attention to counseling smokers consequent to the introduction of study protocols.

We also did not require pharmacists to record the number of minutes spent counseling smokers during follow-up telephone counseling contacts. This was in part to minimize burden on the pharmacists participating in this study and partly the result of the study training, which included an expectation that follow-up counseling calls would be brief (<5 min was given as an example during the training). In designing future research protocols, consideration should be given to obtaining objective assessments (e.g., dedicated phone line or recording device) to measure time spent counseling.

Lastly, differences in recruitment may have resulted in important differences between OBS compared with EQ and EQ+ participants. OBS participants were recruited by the study RA, rather than a pharmacist, and were not being asked to join a study focused on quitting smoking. In this study, participants in the OBS group were slightly younger than EQ participants, were much less ready to quit smoking (stage), and rated the importance of quitting lower than EQ and EQ+ participants. These between-group differences are likely an artifact of the study design. EQ and EQ+ participants knew that they were enrolling in a "quit smoking study," while OBS participants knew that they were only being asked survey questions without intervention. It

is possible that younger less motivated individuals were less interested in joining a "quit smoking" study. Thus, some portion of the efficacy of the EQ and EQ+ interventions compared with the OBS group may be an artifact of differences in study recruitment, although this is mitigated somewhat by the lack of difference in predictive ability of baseline stage seen in this study.

Summary

Pharmacists can provide brief effective counseling to their patients who smoke. Computer-tailored interventions can help facilitate assessment and counseling of smokers and help guide interventions in pharmacy settings. Efforts are under way in the United States and other countries to expand the role of pharmacists in providing smoking cessation counseling and to train pharmacists for this role (e.g., Ashley, Victor, & Brewster, 2007; Brewster et al., 2005; Corelli et al., 2007; Thananithisak, Nimpitakpong, & Chaivakunapruk, 2008). The findings of this study support the need for pharmacist's increased involvement in smoking cessation. Additional consideration needs to be given regarding how this can be accomplished under the health care system currently in place in the United States or whether systemic changes would be needed.

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Declaration of Interests

None declared.

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