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ABSTRACT

Background. Time and resource constraints limit the ability of oral health care professionals to help patients quit smoking. Opportunities exist for dental providers to help patients who smoke by enrolling them in tobacco use quitlines. The authors conducted a pilot study to investigate whether such referrals were feasible and effective.

Methods. The authors randomly assigned eight general dental practices to provide either brief counseling regarding smoking cessation or brief counseling along with referrals to a tobacco use quitline for patients receiving routine dental hygiene care who reported that they were currently smoking cigarettes.

Results. The authors enrolled 82 patients (60 in the tobacco use quitline group, 22 in the brief counseling group). At six months, the self-reported, seven-day point prevalence tobacco use abstinence rates were 25.0 percent (15 of 60 patients) in the tobacco use quitline group and 27.3 percent (six of 22 patients) in the brief-counseling group ($P \approx 1.0$). Twenty-eight (47 percent) of 60 subjects in the tobacco use quitline group completed the initial tobacco use quitline consultation. Abstinence rates among subjects in the quitline group were higher if they completed more telephone consultations.

Conclusions. Referral to a tobacco use quitline by dental practices is a feasible strategy for helping patients quit smoking if efficient links between the dental practice and the tobacco use quitline can be established. Research is needed to evaluate whether it is more effective than standard clinical interventions for tobacco use cessation.

Clinical Implications. Dental practitioners with limited time and other resources can assist patients who smoke by referring them to a tobacco use quitline.

Key Words. Tobacco use cessation; telephone hotline; dental practices.
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In 2004, 63 percent of the U.S. population older than 18 years had visited an oral health care professional within the preceding 12 months.[1] In that same year, approximately 28,260 new cases of cancer of the oral cavity and pharynx were diagnosed for which tobacco use was the greatest risk factor.[2] Because one-half of cigarette smokers visit a dentist each year,[3] and 70 percent of smokers report wanting to quit,[4] effective tobacco use interventions in the dental practice may play a significant role in decreasing tobacco-related morbidity and mortality. However, oral health care professionals continue to face time and other resource constraints that limit their ability to provide support for patients wishing to quit using tobacco.[5] Telephone counseling through a tobacco use quitline may provide dentists with the support they need to provide tobacco use interventions to patients.

TOBACCO USE QUITLINES

Proactive or reactive. Tobacco use quitlines can be proactive or reactive in nature. Zhu and colleagues[6] showed that proactive tobacco use quitlines (that is, those whose telephone counselors initiate contact after the first contact by the tobacco user) increase abstinence rates compared with reactive tobacco use quitlines (that is, those whose tobacco users initiate all con-

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tact). In addition, the U.S. Public Health Service (USPHS) and the U.S. Centers for Disease Control and Prevention[7] recommend proactive telephone counseling as a format for delivering behavioral interventions.[4] All U.S. residents have access to tobacco use quitlines funded through various state mechanisms; 38 (76 percent) of 50 of these have been described as providing proactive tobacco use quitline counseling.[8] Despite the proven efficacy and widespread availability of tobacco use quitlines, significant barriers to their use clearly exist, as most state tobacco use quitlines reach only 1 to 5 percent of their tobacco-using population.[9]

Fax to Quit. Opportunities exist for dental care providers to facilitate enrollment of tobacco users in tobacco use quitlines. A novel approach for engaging tobacco users in a tobacco use quitline involves transferring patient information to a tobacco use quitline via fax. This approach, called "Fax to Quit," was developed and explored by the University of Wisconsin Center for Tobacco Research and Intervention.[10] In this model, the health care provider faxes the Fax to Quit form directly to the tobacco use quitline, and a staff member there telephones the patient within 48 hours. Investigators in Oregon observed that the Fax to Quit model, administered through physicians' offices, is feasible and cost-effective,[11] but this approach has not been evaluated in dental practices.

Given the lack of published research in this area, we identified a need to evaluate the feasibility of engaging cigarette smokers in telephone quitline counseling through private dental practices. To accomplish this goal, we conducted a randomized clinical pilot study involving eight private dental practices.

PATIENTS, MATERIALS AND METHODS

Patients. Patients were eligible to participate if they were current cigarette smokers, smoking any number of cigarettes per day, 18 years or older and coming to the dental practice for a routine dental prophylaxis. The Western Institutional Review Board (IRB), Olympia, Wash., and the Mayo Clinic IRB, Rochester, Minn., approved the study. We obtained written informed consent from subjects. We recruited subjects from June 2005 to August 2006.

Dental practices. We identified eight private dental practices in the Minnesota counties of Olmsted and Mower that represented a variety of practice environments (that is, single versus multiple providers, urban versus rural, independent versus contractual providers) and indicated an interest in participating. We randomly assigned four dental practices to the tobacco use quitline intervention and four to the brief counseling group.

Two of us (J.O.E., A.B.C.) conducted focus groups with the dental practices to determine the optimal training and study implementation procedures. We provided training in human subjects research and study procedures via a series of in-service sessions conducted at each dental practice. After beginning the study, we modified some procedures on the basis of feedback received during weekly on-site visits to optimize practice recruitment. Specifically, we modified the screening questionnaire assessing patients' interest in study participation to include a brief description of the study, an explanation of the age requirement and the following questions: "Do you smoke cigarettes?" and "If you smoke, would you be interested in participating in this study?" We implemented this modification for all tobacco use quitline and brief counseling practices.

Study enrollment. All patients visiting participating dental practices for a routine dental hygiene appointment were asked by the receptionist to complete an anonymous screening questionnaire assessing their interest in participating in the study. The screening questionnaire was printed on small sheets of brightly colored paper. The screening questionnaire was distributed to patients as they checked in for their appointment and contained the two questions shown above. The questionnaire also instructed patients to give the form to the dental hygienist. Dental hygienists reviewed the forms for patient eligibility, briefly discussed the study with patients and obtained written informed consent from those who agreed to participate.

All tobacco users in both groups received brief counseling from the dental hygienist. The counseling was composed of a clear, strong and personalized message to quit; the dentist reinforced this message during the dental visit. We based this message on the brief office intervention proposed in the USPHS clinical practice guideline.[4] The basic components were clear (for example,

ABBREVIATION KEY. IRB: Institutional review board. **USPHS:** U.S. Public Health Service.

"I think it is important for you to quit smoking and I can help you."), strong (for example, "As your clinician, I need you to know that quitting smoking is the most important thing you can do to protect your health right now and in the future.") and personalized (for example, tying tobacco use to the patient's current health/illness and/or its social and economic costs; addressing the patient's motivation level/readiness to quit; and/or the impact of tobacco use on children and others in the household).

This intervention was delivered during the hygiene visit if patients expressed an interest in participating in the study. Two of us (J.O.E., A.B.C.) trained staff members in all participating dental practices in this intervention, which was designed to be delivered within 10 minutes. The dental hygienist and dentist provided feedback, which addressed the association between the patient's oral clinical examination findings and smoking, and gave patients a National Cancer Institute brochure ("Clearing the Air") to read.

Tobacco use quitline intervention. Subjects randomized to the tobacco use quitline intervention received brief counseling, as described above. In addition, the Mayo Clinic Tobacco Quitline[12] provided an intervention. After the dental hygiene visit, the dental office faxed the subject's contact information (obtained at the time of receiving consent) to the tobacco use quitline. A staff member from the quitline contacted the patient within 48 hours of receiving the fax. He or she provided counseling to subjects, set a quit date if the subject was willing and described available pharmacotherapies. After the initial counseling call, a counselor telephoned the subject one week and two weeks after the quit date. Additional calls were made for up to 10 weeks after the dental visit if the subject requested them. The initial telephone counseling session took 45 minutes, while the subsequent two sessions lasted about 20 minutes each.

Counselors worked with each subject to assess his or her personal motivation and confidence in quitting tobacco use and to identify the social, environmental, physical and emotional factors associated with tobacco use. Quitline counselors helped subjects learn and rehearse cognitive and behavioral strategies for managing urges, withdrawal symptoms, negative emotions and high-risk situations. The counselor created an individualized relapse prevention plan and made arrangements for the follow-up telephone calls.

Counselors discussed pharmacological treatment options with each subject and assisted those who were interested in using these treatment options. Specifically, counselors used established algorithms to assess for contraindications to the use of any product. If subjects said they wanted to use a prescription medication (for example, sustained-release bupropion, nicotine nasal spray, nicotine inhaler), the counselor recommended that they contact their physician for a prescription. If subjects expressed an interest in using an over-the-counter medication (for example, nicotine patches, nicotine gum or nicotine lozenges), the counselor advised them to purchase these products. Subjects received a packet containing self-help materials in the mail. The counselors queried subjects regarding their recollection of oral health findings reported to them by their dentist, and they used this information to reinforce patients' intentions of quitting.

Two counselors conducted the tobacco use quitline intervention for this study. They received didactic training regarding the adverse effects of tobacco on oral health. Two of us (J.O.E., A.B.C.) trained the counselors in how to use the intervention manual developed for this study, which contained the topics for each telephone counseling session and appropriate examples of positive reinforcement and supportive statements. The counselors audiotaped the sessions, and we reviewed a random sample of sessions to monitor the consistency in delivery. We provided feedback to the counselors regarding their delivery of the intervention. We monitored the study flow through the tobacco use quitline via regular meetings and e-mail and telephone contact with tobacco use quitline personnel.

Brief counseling. Subjects in the brief counseling group received brief counseling from the dental hygienist, as described above.

Outcomes. We collected telephone contact information for all subjects at enrollment into the study. One of us (R.A.M.), who did not provide the tobacco use quitline intervention and who was not associated with the dental practices, conducted follow-up telephone assessments three and six months after the dental visit. He collected the self-reported, seven-day point prevalence smoking abstinence data (that is, no smoking—"not even a puff"—in the last seven days) in these telephone calls.

DATA ANALYSIS

Because of low enrollment rates necessitating a streamlining of study procedures (that is, we changed from a three-page questionnaire to a two-question screening form), we were unable to collect baseline demographic information for subjects in the control group (that is, the brief counseling group) and, therefore, were unable to determine if there were significant differences between smokers in the two groups. When comparing those who did and did not enroll in the tobacco use quitline intervention (that is, completion of the first quitline session), we had information only for sex and age.

We calculated smoking prevalence (number of self-reported smokers in the dental practice/number of patients completing the baseline screening questionnaire) and study participation rates (number of smokers enrolled/number of self-reported smokers) and compared them across participating dental practices within each intervention group using the Fisher exact test. Given the small number of patients enrolled in this pilot study, we also used the Fisher exact test to compare self-reported, seven-day point prevalence abstinence rates between the intervention groups (that is, the brief-counseling group versus the tobacco use quitline group) and among patients enrolled in the quitline groups to assess whether abstinence rates differed according to the number of telephone sessions completed. In all cases, we assumed that patients for whom follow-up information was missing were smoking.

RESULTS

Subjects. Across the eight dental practices, we enrolled 60 cigarette smokers in the tobacco use quitline group and 22 in the brief-counseling group. The number of smokers enrolled at the individual practice sites ranged from one to 30 (mean ± standard deviation, 10 ± 9). All dental practices enrolled patients for at least six months (range, six to 10 months).

Participation rates. Although outcome data were available for all enrolled subjects from the eight dental practices, only six dental practices collected information regarding the number of subjects screened. Smoking prevalence and study enrollment rates were available for three tobacco use quitline dental practices and three brief-counseling dental practices. Two practices (one tobacco use quitline, one brief counseling) were unable to provide reliable smoking prevalence data.

The six dental practices for which data were available screened a total of 3,682 adults (1,688 in the brief-counseling practices, 1,994 in the quitline practices). The prevalence of smoking among these patients was 9.2 percent (10.1 percent in the tobacco use quitline practices, 8.1 percent in the brief-counseling practices). For the three tobacco use quitline practices, the overall percentage of smokers who participated in the study was 27.2 percent (55 of 202 patients) (17.5 percent in one practice [seven of 40 patients], 24.3 percent in the second practice [18 of 74 patients] and 34.1 percent in the third practice [30 of 88 patients]; $P = .121$). For the brief-counseling dental practices, the percentage of smokers who participated in the study differed significantly across the three practices (4.8 percent in one practice [one of 21 patients], 7.0 percent in the second practice [six of 86 patients] and 34.5 percent in the third practice [10 of 29 patients]; Fisher exact test, $P = .001$), resulting in an overall participation rate of 12.5 percent (17 of 136 patients).

Abstinence outcomes. At three months, the overall self-reported, seven-day point prevalence tobacco use abstinence rate in the tobacco use quitline group was 18.3 percent (11 of 60 subjects) compared with 22.7 percent in the briefcounseling group (five of 22 subjects) ($P = .755$). At six months, the self-reported, seven-day point prevalence tobacco use abstinence rate was 25.0 percent (15 of 60 subjects) in the tobacco use quitline group and 27.3 percent (six of 22 subjects) in the brief-counseling group ($P \approx 1.0$). Twenty-eight (47 percent) of 60 subjects in the tobacco use quitline group completed the initial tobacco use quitline consultation (Table 1). Age and sex did not differ significantly between those who completed and those who did not complete the initial consultation.

Table 2 presents the abstinence outcomes for subjects in the quitline group according to the number of quitline sessions completed. Among these subjects, we found that abstinence outcomes differed significantly ($P = .017$ at three months, $P = .010$ at six months) depending on the number of quitline sessions completed. We observed the lowest abstinence rates among subjects who completed only the initial assessment, while we observed higher abstinence rates among subjects who completed the initial assessment

and two or more follow-up sessions.

DISCUSSION

In this pilot study, we demonstrated the feasibility of reaching cigarette smokers for a cessation intervention through private dental practices. The strength of this study is that it provides preliminary information about a novel mechanism (that is, Fax to Quit) for dentists to use to help patients who smoke by enrolling them in a treatment program with proven efficacy (that is, a tobacco use quitline). This approach is consistent with previous guidelines that urge clinicians to identify all tobacco users and offer treatment[4] to such patients, while addressing clinicians' perceived barriers.[5] The efficacy of the Fax to Quit model in the dental setting has not been evaluated formally, but it is being investigated.[13] More research needs to be conducted to establish links between dental practices and state tobacco use quitlines, which would facilitate the initiation of a dental Fax to Quit intervention if it is found to be effective.

TABLE 1

Characteristics of subjects enrolled in tobacco use quitline through dental practices.

CHARACTERISTIC	COMPLETED INITIAL QUITLINE CONSULTATION*		*P* VALUE†
	No (n = 32)	Yes (n = 28)	
Mean ± SD‡ Age (Years)§	41.1 ± 11.3	43.8 ± 14.4	.456
Sex			.176
Female	15 (47)	18 (64)	
Male	17 (53)	10 (36)	
Smoking Rate (Cigarettes per Day)	—		—
One to nine		4 (14)	
10 to 19		8 (29)	
20 to 29		14 (50)	
30 to 39		2 (7)	
Duration of Tobacco Use (Years)¶	—		—
One to five		1 (4)	
Six to 10		4 (15)	
11 to 20		4 (15)	
≥ 21		18 (67)	

* Smoking history information was available only for subjects who completed the initial consultation.
† Comparison of subjects who completed versus those who did not complete the initial tobacco use quitline consultation using the two-sample *t* test for age and the χ^2 test for sex.
‡ SD: Standard deviation.
§ The mean ± standard deviation age of all subjects was 42.5 ± 13.0 years. Age was missing for five patients who did not complete the initial consultation.
¶ Duration of tobacco use was missing for one patient who completed the initial consultation.

Six-month abstinence rate. Our observation of a 25 percent six-month smoking abstinence

TABLE 2

Tobacco use abstinence outcomes among subjects enrolled in quitline through dental practices.*

QUITLINE SESSIONS	NO. OF SUBJECTS (N = 60)	THREE MONTHS		SIX MONTHS	
		No. (%) of Subjects Abstaining From Tobacco Use†	*P* Value‡	No. (%) of Subjects Abstaining From Tobacco Use§	*P* Value‡
No. of Quitline Sessions Completed			.017		.010
None	32	4 (12.5)		6 (18.8)	
Initial assessment only	11	0 (0)		1 (9.1)	
Initial assessment and one follow-up	7	2 (28.6)		1 (14.3)	
Initial assessment and two follow-ups	3	2 (66.7)		2 (66.7)	
Initial assessment and three follow-ups	7	3 (42.9)		5 (71.4)	

* Self-reported, seven-day point prevalence abstinence.
† The overall abstinence rate was 18.3 percent at three months.
‡ The *P* value corresponds to an exact test comparing the abstinence rate across all groups. If patients are grouped according to no quitline sessions (n = 32) versus one or more quitline sessions (n = 28), the seven-day point prevalence abstinence rates are 12.5 percent (four of 32 subjects) versus 25.0 percent (seven of 28 subjects) at three months (Fisher exact test; *P* = .318) and 18.8 percent (six of 32 subjects) versus 32.1 percent (nine of 28 subjects) at six months (*P* = .251).
§ The overall abstinence rate was 25.0 percent at six months.

rate with the tobacco use quitline is comparable with quit rates observed with standard outpatient therapy administered by tobacco use treatment specialists.[14] Our observed six-month outcome with the tobacco use quitline also is comparable with outcomes of interventions that capitalize on the "5 A's" (Ask, Advise, Assess, Assist, Arrange)[4] approach to treating tobacco users conducted through public health dental clinics.[15] Consistent with reports in the literature, we observed a dose-response relationship between tobacco use quit rates and the number of completed tobacco use quitline counseling calls.[16]

Study limitations. Our pilot study had several limitations. First of all, we had a small sample size and, therefore, were unable to perform a meaningful comparison of abstinence rates between subjects in the tobacco use quitline and brief-counseling groups. Differences in abstinence rates between the two groups were not statistically significantly different, but we also cannot conclude that the two interventions have equivalent efficacy.

Second, the inability to blind practices to the intervention appears to have affected the participation rates between the two groups. The 27.2 percent participation rate among smokers in the tobacco use quitline group versus the 12.5 percent participation rate among smokers in the brief-counseling group suggests that the dental practitioners may not have been as motivated to participate in the study if they were not providing an intervention beyond the brief counseling. Brief tobacco use cessation counseling may not be embraced enthusiastically by procedure-oriented dentists, a challenge that has been noted by other investigators.[15] The finding that the participation rate differed between groups also raises the possibility that a selection bias may have occurred and/or that the motivation level or other tobacco use characteristics of the enrolled smokers may have differed between groups. Therefore, the comparison of quit rates between subjects in the intervention and control groups should be interpreted with caution.

Third, we did not confirm tobacco use abstinence rates with objective measures such as expired carbon monoxide levels; however, biochemical confirmation for low-intensity interventions generally is considered uninformative.[17,18]

Fourth, we did not collect demographic information for the smokers who declined to participate in the study, so we are unable to draw conclusions about the generalizability of the sample to all smokers. Future research should focus on how to increase patients' motivation to participate in the tobacco use quitline by addressing barriers among patients for this type of intervention.

By facilitating engagement in a tobacco use quitline, dental practitioners can close the gap between patients' expectations and the current standard of practice. Although 61.5 percent of dentists believe their patients do not expect tobacco use cessation services, 58.5 percent of patients believe that such services should be provided.[19] Barriers to providing tobacco use cessation services among oral health care professionals include concerns regarding patients' resistance,[20] lack of knowledge, lack of time,[21] lack of financial reimbursement[22] and poor coordination of care between dentistry and tobacco use cessation services.[20]

The oral health care community may improve the care provided to tobacco users by considering alternative strategies for helping them in the dental setting.[23] Tobacco use quitlines provide such an alternative strategy, whereby oral health care professionals can capitalize on the face-to-face interaction in the dental setting and engage patients in tobacco use quitline counseling that serves as "a behavioral extension to the clinician."[16] Furthermore, the American Dental Hygienists' Association has committed to an action plan that uses a three-step ("3 A's") approach to smoking cessation interventions: "Ask, Advise, Refer." Among the available resources is a tobacco use quitline resource list.[24]

The simplest way for dental practitioners to engage patients in the tobacco use quitline is to tell them to call 1-800-QUITNOW (784-8669). Through the National Network of Tobacco Cessation Quitlines, callers will be routed to the tobacco use quitline in their state. States have differing levels of support that they can provide, and patients can receive this information when they call. Dentists also can learn about the state-specific service offerings through the North American Quitline Consortium Web site.[8]

Future research in this area should focus on methods to increase patients' motivation to use quitlines, comparisons between individualized training of dental practices and use of mailed training materials, and comparisons between managed care dental practices and non–managed care dental practices.

CONCLUSIONS

Referring dental patients who smoke to a tobacco use quitline is a feasible strategy for helping people quit smoking if efficient links can be established between the dental practice and the quitlines. A Fax to Quit model also may be beneficial. Research is under way to investigate the utility of a 5 A's approach compared with a 3 A's approach in the dental setting.[13] ■

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