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Relationship Between Smokers' Modes of Entry Into Quitlines and Treatment Outcomes

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Abstract

Objectives—To assess the relationship between the mode of entry into a quitline service and subsequent tobacco use treatment outcomes.

Methods—A retrospective study using logistic regression analysis of 11,040 Arizona Smokers' Helpline (ASHLine) clients was conducted to determine whether self- or medical referrals were related to 7- and 30-day point prevalence tobacco treatment outcomes at 7 months postquit.

Results—Smokers referred to the ASHLine by a health care provider were more likely to quit smoking than were those who self-referred.

Conclusions—Mode of entry into a quitline service for smoking cessation is related to treatment outcomes. Reasons for this outcome are uncertain and require additional research.

Keywords

smoking; smoking cessation; quitline; referral for services

Tobacco use is the primary avoidable cause of morbidity and premature mortality in the United States and is attributed to 435,000 deaths annually.[1] According to the 2004 Surgeon General's report, millions of future premature deaths linked to smoking can be prevented through a reduction in tobacco use and abstinence.[2] First implemented in 1990, quitlines are widely cited as an effective method to deliver behavioral support for tobacco cessation in the United States.[3–5] Most often free to callers, quitlines are telephone-based coaching programs that assist smokers in achieving abstinence. These behavioral support programs have several advantages over other cessation models in that they are convenient, can facilitate treatment progress quickly, have the potential to reinforce engagement through proactive counseling, and often follow a structured protocol to ensure quality of service.[6] Despite the demonstrable efficacy, quitlines serve less than 2% of all tobacco users annually.[7,8] Given the low reach of most quitlines and the need to attain sustained abstinence for those smokers who do call, research focusing on which mode of entry into quitlines leads to improved quit rates is crucial.

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Proponents of tobacco control have widely cited health care providers as an effective source of promotion and referrals to quitlines.[9] Many smokers receive care from a health care provider annually,[10,11] which uniquely positions him or her to act as a bridge between hard-toreach tobacco users and cessation treatment services.[9] Moreover, the US Public Health Service (USPHS) guidelines emphasize the positive relationship between provider referrals, treatment enrollment rates, and by extension, quit rates.[3] USPHS guidelines recommend that all providers implement the 5A's during patient visits: (1) ask about tobacco use; (2) advise to quit; (3) assess willingness to quit; (4) assist in quit attempt; and (5) arrange for follow-up.[3]

A fundamental problem with the 5A's, however, is that even though the first 2 steps of this process are frequently implemented,[12,13] few smokers have reported further assistance from their health care providers.[10,13,14] In response to infrequent implementation of the full 5A's by health care providers, the Wisconsin Tobacco Quitline implemented in 2003 the first fax-to-quit program in the United States.[15] In fax-to-quit programs (including Arizona's QuitFax program), with permission from the patient, a smoker's health care provider refers the smoker to the quitline via a fax form so that the quitline can implement the last 2 of the 5A's (ie, assist in quit attempt and follow the progress of the smoker). The fax-to-quit model situates quitline services into existing health care delivery systems and relies upon trained health care staff and the integration of quitline referral systems into various practice settings in order to better facilitate smoking cessation.[15] However, to date there are a dearth of published studies that compare the effectiveness of physician-initiated referrals that result from fax-to-quit programs with other sources of referrals such as quitline-initiated promotions (eg, direct mail, radio, television promotions) or client self-referrals.

All quitline promotion types and referral sources are potential modes of entry for tobacco users into existing quitline treatment services. In many respects, as extensions of quitline services, these various modes of entry are best described as direct links to one of the 2 primary categories of proactive or reactive quitline services. Proactive cessation services consist of quitline-initiated first and/or follow-up contacts with clients (ie, outbound services). A reactive service, on the other hand, consists of contacts with quitline coaches solely initiated by clients (ie, inbound services). Most proactive quitlines offer both comprehensive tobacco cessation services through scheduled outbound calls as well as reactive assistance such as that when a tobacco user initiates calls for service.[16] Research shows that the likelihood of success in quitting tobacco through the use of proactive telephone counseling services, such as those provided by quitlines, is greatly increased when compared with the use of minimal interventions such as self-help materials or brief advice.[4] Meta-analysis of 13 randomized, controlled trials have demonstrated the efficacy of proactive interventions with results showing a 56% increase in quit rates when compared with other types of cessation efforts.[4] In an effort to establish and disseminate best practices for tobacco cessation, the USPHS and the US Centers for Disease Control (CDC) both recommend proactive telephone counseling as a method to improve quit rates.[16,17] Given the prevailing consensus within tobacco control communities on the need to expand cessation services through increased quitline reach,[18,19] as well as the varied mechanisms employed to accomplish this task, a greater understanding of the most effective modes of entry into quitlines that are related to abstinence is critical. Hence, in order to inform the development of initiatives aimed at increasing quitline reach, smoking cessation, and abstinence, we analyzed differences in abstinence rates as a function of referral type to the Arizona Smoker's Helpline (ASHLine).

METHODS

Data Collection

Data for this retrospective study were extracted from the ASHLine database that contained client treatment files documenting quitline coach-client interactions during the tobacco cessation service period. Client electronic files consisted of data from 3 primary sources: (1) interactions between program participants and ASHLine intake, callback, and coaching staff; (2) program data entered by ASHLine staff to denote that a client's episode of care ended unsuccessfully (eg, unable to reach, client not quit/not ready to quit, deceased, moved, etc); and (3) clinical manager review of participant files at 30 days postquit, at program completion (90 days), or in the event a participant opted for aftercare, at 180 days postquit.

The first of these data collection points occurred during the referral and enrollment periods. Clients either telephoned the ASHLine directly or were called proactively by a staff member within 3 days of the receipt of a referral by mail or fax. At the time of the initial call, clients and ASHLine staff engaged in dialogue regarding the needs and interests of the client concerning services provided by the ASHLine. Part of this interaction entailed completion of the client information form (CIF). The CIF is a survey used to collect client intake data pertaining to personal information, tobacco use, demographics, health status, and an assessment of readiness to quit. ASHLine enrollment staff were trained to conduct this survey through the use of standard operating procedures (SOPs) in order to collect data in a consistent manner. SOP oversight was conducted by ASHLine management through periodic monitoring of calls and frequent review of telephone logs and clinical data as well as ongoing staff training. Most commonly, by the end of the first call, the client has elected to formally enroll in the program, request additional information, or decline services.

Clients who enrolled in treatment services were assigned to a trained tobacco cessation coach. Upon electing to enroll in treatment services and after establishing a quit date, clients received weekly coaching calls averaging 10–15 minutes until they reached 30 days free of tobacco. Call frequency was reduced to biweekly up to 90 days after quitting and monthly during the additional 3 months of aftercare. Data to include time, date, duration of call, quit status, nicotine replacement therapy (NRT) and/or pharmacotherapy adherence, responses from a self-reported outcomes rating scale (ORS) and a coachclient session rating scale (SRS) were collected at each call. The outcomes rating scale was used to assess clients' perceptions of their personal well-being and social relationships during their quit attempt whereas the session rating scale was used to evaluate the clients' level of satisfaction with quitline services. Additionally, ASHLine coaches collected qualitative data in the form of clinical case notes, to include relapse triggers, social support, withdrawal symptoms, and adverse events related to NRT and/or pharmacotherapy use. Client case data were entered into a secure database, which was stored and backed up daily on a discrete server.

Data entered by the clinical manager at the 30-, 90-, and 180-day collection points were collected in the process of client chart reviews. Baseline data included ORS score, quit date, information on NRT/pharmacotherapy use (eg, purchased or received at no cost to the client from ASHLine, Medicaid, or a provider) as well as the Fagerstrom Test of Nicotine Dependence (FTND),[20] social support and environmental indicators. Subsequent data collected at each of the 3 separate collection points included most recent quit date, the number of in- and outbound calls or e-mails, ORS score, NRT/pharmacotherapy use, relapses and, at 90- or 180-day end-of-care episode, most days quit and reason for closure (eg, completed program, quit-refused further services, moved, deceased, etc).

Finally, client data were collected during the posttreatment follow-up period. Follow-up surveys were administered at 7 months and 13 months post initial program contact.

Participants either successfully completed the 90 days quit, volunteered for aftercare, or declined further service constituting a program dropout. Clients agreeing at the time of their initial enrollment to be contacted for follow-up were called for survey administration by the ASHLine callback staff. Staff members employed SOPs for the administration of follow-up surveys.

Data were entered into the database in real time by ASHLine staff completing the aforementioned data collection processes. ASHLine employs a front-end Web-based interface for entering data into the database. The following security elements are used to protect client data: an SSL certificate, discrete log-in measures for all users, roles assigned to each user based on his or her functions, and limited access to complete data sets. Additionally, data are housed in an independent server at The University of Arizona, Mel and Enid Zuckerman College of Public Health (MEZCOPH). Institutional security is provided at the site 24 hours a day whereas daily maintenance and backup is provided by MEZCOPH's independent informational technology team.

Client mode of entry was obtained from the CIF. Arizona residents can access the ASHLine via 3 different mechanisms: self-referral, personal passive referral, provider passive referral, or provider active referral (fax); thus, 4 distinct modes were defined:

1. Self-referral indicates that the client had initiated first contact via telephone call or e-mail communication with the ASHLine on her or his own. This client may have actively sought out ASHLine contact information or learned about the ASHLine through free publicity or paid advertisements (eg, billboards, radio, television advertisements).
2. Personal passive referral is used to categorize clients who were encouraged to call the ASHLine by nonmedical sources. These sources may include family, friends, employers, and community members.
3. Provider Passive Referral is used to categorize clients who were encouraged to call the ASHLine by a medical professional, but were not formally referred.
4. Provider active referral indicates that the clients within this category were identified as interested in quitting tobacco and willing to accept an outbound call from the ASHLine within 3 days to begin treatment services. Thus, this category represents a group of clients who received a formal referral from a provider and were called by the ASHLine shortly upon receipt of a provider referral. Virtually all of these referrals were through the ASHLine's QuitFax program, though very occasionally a referral may be received via the United States Postal Service.

This study was conducted with approval from the University of Arizona Human Subjects Protection Program.

Data Analysis

Descriptive statistics were used to characterize the subjects under study. Quit rates were measured by 7-day and 30-day point prevalence surveys taken at 7 months post enrollment. Responses were coded as currently using tobacco for nonresponders or individuals who refused to respond. Backward stepwise logistic regression was used to evaluate the effect of predictor variables on quit rates. Wald chi-square test was used to determine the parameter estimates of the individual predictor variables. Bonferroni adjustments were applied to paired comparisons when determining statistical significance. The LOGISTIC procedure in SAS® 9.2 (SAS Institute, 2008) was used to analyze the data.

RESULTS

A total of 11,040 clients who enrolled in the ASHLine between July 1, 2005, and May 27, 2010, were included in the analysis. The average age of the clients under study was 47.23 (SD = 13.27), with 16% reporting Hispanic ethnicity. The majority of clients in this study were white (90.51%) males (52%) who graduated high school (62.89%). Average number of years of tobacco use for those included in the study were 28.32 (SD = 13.77). Table 1 lists the demographic characteristics of the clients.

A backward stepwise logistic regression was used to evaluate the effect of mode of entry on quit rate. Additional control variables were also included in the model. These control variables were race/ethnicity, gender, level of education, presence of health insurance, NRT/pharmacotherapy use, number of cigarettes per day, and how soon client smoked after waking. Quit rates were measured on 7- and 30-day point prevalence at 7 months post program enrollment. Thirtyday point prevalence is standard for quitline metrics[21] whereas 7-day point prevalence is more commonly cited in tobacco research.[22] The initial (full) model revealed that race/ethnicity, gender, level of education, and presence of health insurance were not significantly related to client quit rates. These variables were dropped from the final, restricted model so that these nonsignificant variables would not artificially inflate the standard errors in the final model.

The likelihood ratio, which tests the difference in predictive improvement between the null model and the specified model, indicated that the final model significantly predicted both 7-day (χ^2 [8] = 187.72, P<.0001) and 30-day (χ^2 [8] = 186.77, P<.0001) point prevalence quit rates at the 7-month follow-up. Table 2 displays the quit rates by mode of entry, and Table 3 shows the odds ratios and associated p values based on the Wald chi-square test for these effects. Quit rate was negatively related to number of cigarettes per day and was positively related to NRT/pharmacotherapy use and elapsed time after waking until client smokes.

Paired comparisons in both 7- and 30-day point prevalence quit rates between different levels of mode of entry that were not coded as the reference group (personal vs provider active, personal vs provider passive, and provider passive vs provider active) yielded no significant differences.

Table 4 shows the percentage of ASHLine clients lost to follow-up by mode of entry. There was a significant difference in lost to follow-up by mode of entry (χ^2 = 139.42, P<.0001). The values are fairly similar (mid 60s) for all modes except self-referral, for which 81% were lost to follow-up.

In an attempt to discern whether the observed differences in quit rates by mode of entry were, in fact, due to the effects of mode of entry or to the effect of increased loss to follow-up for the self-referral group, an adjusted, random sample of individuals from the self-referral group was analyzed. This sample was created to produce a lost to follow-up rate (67%) similar to that observed for the other groups. Results revealed no differences in the full and final models reported in which the full self-referral sample was used.

DISCUSSION

Findings from this study support other research that asserts that quitlines are an effective, accessible, and institutionalized model for behavioral support to decrease the use of tobacco.[23] The analysis of predictors of cessation by mode of entry through the Arizona Smokers' Helpline represents a real-world look at the treatment process that holds significant relevance to the tobacco treatment community. The large sample of ASHLine clients used for this study provides some confidence that the results represent a potential

phenomenon occurring within several US quitlines; however, some results presented were inconsistent with previous findings in research. For example, our analysis showed no association between race/ethnicity, gender, level of education, presence of health insurance, and subsequent quit rates. Other studies have found that that race/ethnicity, gender, or educational attainment, for example, may significantly impact the probability of quitting.[24–35] In the present study, given the large population of white non-Hispanic clients in the sample, it is likely that any effects associated with race/ ethnicity were rendered insignificant due to an unbalanced sample. The same may hold true for effects associated with education levels as the majority of ASHLine clients serviced during the study period had attained a high school diploma or above. Given the potential significance of the discrepancies between our findings and other published literature, we intend to extend the scope of this study in order further explore our current findings in the future.

Consistent with other research, our study found that the number of cigarettes per day, amount of time after waking, and the use of NRT/pharmacotherapy were all related to quit outcomes.[36–39] Subjects who consumed higher numbers of cigarettes and who were more likely to smoke soon after waking were less likely to report being abstinent, thus supporting the premise that those smokers who are most addicted are least likely to quit. However, subjects who reported the use of NRT or pharmacotherapy were most likely to quit. This finding supports many other studies that have shown that use of NRT/ pharmacotherapy can assist smokers in achieving abstinence.[39]

Of particular interest to this study is that the age distribution for those clients enrolled in quitline services during the period under study was approximately 47 years. In light of these results, it is important to note that regardless of mode of entry, there is ample opportunity for quitlines to increase their reach to younger adults via physician referrals or other types of promotional activities that strategically focus recruitment efforts to reach these smokers. It is unclear whether younger smokers are advised to quit by providers at the same rate or in the same manner as older smokers. It is plausible that providers place less emphasis on abstinence in younger adults who have not borne the same negative health effects associated with smoking for over a longer period of time. However, these findings suggest the importance of encouraging renewed efforts to support abstinence for all smokers, particularly, those of fewer years and who have much to gain with regard to the long-term health benefits from earlier cessation.

Our primary objective in this study was to assess whether mode of entry was related to cessation, and our findings suggest an association between how one enters quitline services and subsequent treatment outcomes. Both the QuitFax and passive medical referral callers were significantly more likely to quit than were self-referrals. It is plausible that those who have interacted with a health care provider had either greater levels of motivation to quit – perhaps as a result of the interaction with the provider or because health conditions that required a visit to the health care provider were related to smoking. However, to assert this as evidenced in the present study would be inaccurate given that data on motivation to quit were not collected on the client intake form. Motivation levels and the reasons for quitting from smokers referred to quitlines by providers represent a future line of research. Nonetheless, our results support greater engagement of health care providers to increase medical referrals to quitlines and also suggest that policy makers should increase their efforts to expand quitline reach by encouraging health care providers to actively refer smokers to quitlines. Because the US federal government has released guidelines for tobacco treatment as part of the Patient Protection and Affordable Care Act (H.R. 3590), which requires tobacco treatment of all patients,[39] there is added incentive for health care providers to refer to quitlines as a cost-effective approach to treating large numbers of smokers.

Given that this study was not a randomized clinical trial, there are a number of limitations that might impact interpretation of results. This study used a convenience sample, and cases were not randomly assigned to one condition or another. It is likely that many different factors impacted distribution into the modes of entry investigated in the present study, and additional research is needed to further explore these factors. In addition, these results represent associations, and consequently, it is not possible to attribute specific causation between the modes of entry and subsequent quit rates, though in our discussion we explore some potential causal factors.

A further limitation is that this study relied upon self-reported quit rates without biochemical verification, which may have yielded slightly higher rates of reported abstinence. However, a methodology review sponsored by the Society for Research on Nicotine and Tobacco as well as other studies has found a strong correlation between self-reported tobacco use and cotinine levels thus demonstrating that self-report is a reasonable and accurate representation of quit status.[3,41,42] Yet another limitation is that the duration of subject accrual very likely meant that historical factors impacted reasons for enrolling into ASHLine services and even the specific methods by which callers were treated. However, it is unclear if any patterns that were not observed by the ASHLine management staff could have impacted the results that we found here.

CONCLUSION

Findings from the current study have implications for the understanding of mechanisms that may influence tobacco cessation services within quitlines. This study provides compelling data to suggest that mode of entry to quitline treatment impacts cessation outcomes and, most importantly, that referral by health care providers is associated with increased probability of quitting. Future research is needed to confirm this outcome, however, and ideally via clinical trials. If other studies, particularly controlled trials, confirm our results, tobacco treatment guidelines could be strengthened to encourage greater linkage between health care systems, providers, quitlines, and the clients they serve. This integration would reflect the blurring of lines between clinical and public health approaches to tobacco cessation and foster a systems approach to treatment that will maximize care for those who seek assistance with achieving abstinence.

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Table 1

Demographics of Quitline Clients

	Frequency	Percent
Gender		
Male	5032	52.22%
Female	4604	47.78%
Race		
White	7249	90.51%
African American	540	6.74%
Asian	46	0.57%
American Indian	158	1.97%
Education		
Did not graduate high school	1996	20.65%
High school graduate	6078	62.89%
College graduate	1591	16.46%
Insurance		
Yes	8120	84.72%
No	1464	15.28%

Table 2

Quit Rates by Mode of Entry

Mode of Entry	7-Day Point Prevalence Quit Rate (n=8930)	30-Day Point Prevalence Quit Rate (n=8930)
Self	7.11%	6.02%
Personal	8.36%	7.47%
Provider Passive	9.06%	8.17%
Provider Active (fax)	10.55%	9.86%

Table 3

Parameter Estimates for the Final Model

	30-Day Point Prevalence (n=8930)		7-Day Point Prevalence (n=8930)	
Variable	**Odds Ratio**	**P Value**	**Odds Ratio**	**P Value**
Mode of Entry				
Personal vs self	1.71	.70	1.59	.77
Provider active (fax) vs self	2.15	.0002	1.93	.001
Provider passive vs self	1.96	.07	1.85	.05
# Cigs/day	.99	.004	.98	.0007
Time after waking until client smokes				
Within 5 min vs >60 min	1.87	.03	1.97	.009
6–30 min vs >60 min	2.17	.0002	2.19	.0002
31–60 min vs >60 min	1.38	.15	1.42	.15
Uses NRT/pharmacotherapy	3.61	<.0001	3.02	<.0001

Table 4

Percent of ASHLine Clients Lost to Follow-up by Mode of Entry

	Self	Personal	Provider passive	Provider active
Lost to Follow-up	81.2%	66.9%	65.2%	64.7%