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Increasing Access to Evidence-Based Smoking Cessation Treatment: Effectiveness of a Free Nicotine Patch Program Among Chinese Immigrants

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Abstract

Pharmacotherapy substantially increases smoking cessation rates. However, programs to reduce barriers to this evidence-based treatment may not improve access among high risk immigrant non English speaking populations. This study estimates the effectiveness of a tailored free nicotine patch (NRT) program among Chinese American smokers living in New York City (NYC). Between July 2004 and May 2005 NRT was distributed to 375 smokers through two community-based organizations that serve the Asian American population in NYC. Participants completed an in person baseline survey and a 4-month follow-up telephone survey. Using an intention to treat analysis the abstinence rate at 4 months was 26.7% (100/375). Predictors of cessation included higher levels of self efficacy at baseline, not smoking while using the patch and concern about personal health risks. Distribution through easy to access, culturally competent local community organizations increased the reach of a free nicotine patch program and assisted smokers in quitting.

Keywords

Chinese Americans; Immigrant health; Smoking cessation; Nicotine; Community-based intervention

Introduction

Smoking cessation medications increase quit rates approximately one and a half to two-fold compared with placebo [1]. Despite calls for universal access to pharmacotherapy these medications remain vastly underutilized [1, 2]. A 2001 national survey of adult smokers found that only 17% of those who had made a quit attempt in the past year reported using a cessation medication in that attempt and among those who try to quit without assistance success rates are below 10% [1, 3]. Several factors contribute to low utilization of nicotine replacement therapy (NRT) but among those who have never used medications to assist in a quit attempt, cost is most frequently cited [3].

Recent efforts to remove the financial barrier to pharmacotherapy include expanded Medicaid and Medicare coverage. Enhanced insurance benefits however require smokers to access the health care system. There is increasing evidence that provision of free NRT outside the clinical setting through population-based programs, such as state sponsored telephone Quitlines, can increase NRT utilization and assist smokers in quitting [4–6]. The addition of free NRT to a state Quitline in Minnesota was followed by increases in calls and abstinence rates resulting in an eight-fold increase in program impact [7].

In 2003 the New York City Department of Health and Mental Hygiene (NYCDOHMH) in collaboration with the New York State (NYS) Department of Health and Roswell Park Cancer Institute provided a free 6-week course of nicotine patches to 34,900 eligible smokers who called the NYS Quitline. Quit rates at 12 months were significantly higher than those who had not received the patch (33.2% vs. 22.3%) [4, 5]. However, this program appears to have reached a greater proportion of US born smokers [4]. Although at 6 months foreign born and Asian American Pacific Islanders (AAPI) were more likely to report abstinence compared to US born and other racial/ethnic groups, proportionally fewer AAPIs and foreign born were reached compared to the estimated prevalence of heavy smokers in these groups.

Chinese Americans constitute the largest segment of Asian Americans in the U.S. and in New York City (NYC) (approximately 400,000), and are at high risk for excess tobacco-related morbidity and mortality [8–10]. Analysis of data from a 2002 population-based survey of Chinese immigrants living in NYC found that only 5% of smokers used pharmacotherapy during a past quit attempt (Fahs M, unpublished data). This is less than half the national average [2]. In an effort to increase access to evidence-based smoking cessation treatment among smokers of Chinese descent residing in NYC the NYCDOHMH free patch program was extended to include dissemination through community-based organizations serving Asian immigrants. Free patches were made available through two community-based organizations serving the Asian immigrant population in NYC. We hypothesized that taking advantage of channels for distribution outside the typical health

care setting would increase access to the free patch program among this non English speaking immigrant population without reducing the effectiveness of treatment.

Methods

Study Design and Intervention

This study used an open-label prospective cohort design. Between July 2004 and May 2005 a 6 week course of the nicotine patch was provided to 375 individuals enrolled in the study. Kits contained a 2-week supply each of generic 21, 14, and 7 mg patches, instruction sheets and a self help smoking cessation guide. All written materials were provided in Chinese and English. In order to obtain the free patches smokers were required to go to one of two community-based organizations, Asian Americans for Equality (AAFE) or American Cancer Society Chinese Unit (ACS). Both organizations are located in Flushing, Queens, a borough of NYC. These organizations were members of a community advisory board that was formed under the auspices of a larger National Cancer Institute funded study to examine the effectiveness of a multilevel community-based cessation intervention among Chinese Americans.

ACS and AAFE are well known to the Chinese immigrant community as locations to receive free confidential health-related information and social services in their language. Two staff members were chosen at each site by ACS and AAFE to attend a half day training to learn how to provide brief counseling (15–20 min) which included instructions on the use of the patch, and a review of smoking triggers and coping strategies. Staff was bilingual in English and Chinese (Mandarin and Cantonese).

The research team incorporated key principles of community-based participatory research (CBPR) in the final design of the intervention protocol [11, 12]. For example, AAFE and ACS played key roles in guiding program development, determining methods of recruitment, scheduling times that took into consideration work schedules of this immigrant population, and developing and translating the content of instruction sheets and self help brochures.

AAFE and ACS provided expertise in how to disseminate information about the program to the media and community at large. Neighborhood specific promotion efforts used to recruit Chinese American smokers included distribution of flyers at two health fairs, and for one day each week for 5 weeks in front of the main library in the intervention community, Flushing. In addition, AAFE and ACS organized a press conference prior to launching the program. The press conference generated articles the next day in two Chinese newspapers.

Study Participants

Eligibility was limited to adults (aged > 18 years) who were current daily smokers of 10 or more cigarettes per day, willing to make a quit attempt in the next 7 days and receive follow-up phone calls to determine their smoking status, and who reported no contraindications for using the nicotine patch (e.g., pregnancy, recent myocardial infarction).

Data Collection

Eligible smokers completed a baseline survey at the time of registration and receipt of NRT. To evaluate if the availability of the free patches influenced smoking behavior, two telephone surveys were conducted at 4 and 12 months. Results from the 4 month survey are reported. Five attempts were made to reach each study participant before they were considered lost to follow-up. Of the 375 individuals who completed the baseline survey 237 were reached. In addition, postcards with return postage were mailed to participants if the telephone number was no longer in service. This produced only two responses. Staff from the two community-based organizations administered the baseline surveys which were collected on a weekly basis and reviewed for errors and missing values. Graduate students recruited from the MPH program at Columbia University conducted the follow-up surveys in Mandarin and Cantonese. All interviewers attended a 2-hour training session prior to administering surveys.

Measures

A core set of predictor variables was examined which were based on the theory of planned behavior and included other variables associated with cessation [13–16]. Measures included self efficacy, beliefs about the risks of tobacco use and attitudes about smoking, motivation (reasons for quitting), past quitting history (self report of a quit attempt in last 12 months, longest length of quit attempt in the past 12 months) and number of cigarettes smoked per day. The survey design took into account recommendations from the advisory board, AAFE and ACS to limit the interview to less than 10 min.

Attitude and beliefs were measured using a 4 point Likert scale. For example, participants were asked if they strongly agree, somewhat agree, somewhat disagree or strongly disagree that smoking is an important problem in the community. To measure self efficacy related to quitting smokers we adapted the single question used in the International Tobacco Control Four Country Survey [14]. Participants were asked “How sure are you that could stop smoking?” Categories of the answer included: unsure, somewhat sure, very sure.

Number of patches used was recorded as a continuous variable. Participants were asked the following question: “Of the 56 patches you received how many did you use?”

The main outcome measure was 7 day point prevalence. On the 4 month follow-up surveys participants were asked: “Have you smoked a cigarette even a puff in the last 7 days?” A successful quit was defined as a “no” response to this question.

Analysis

Data were analyzed using SPSS 13.0. Standard descriptive statistics were used to summarize demographics and smoking-related characteristics at baseline. Bi-variate correlates of quit status at the 4-month follow-up were explored using chi-square tests for categorical variables and ANOVA for continuous variables. Adjusting for demographic factors, we performed a multiple logistic regression analysis to further explore the association of the dependent variable of quitting status at the 4-month followup (quit vs. continued smoking) with

potential predictors. Independent variables were included if they were significant on the bivariate analysis.

Results

Demographic and Smoking-Related Characteristics of Participants

Table 1 presents demographic and smoking-related characteristics of the sample at baseline. The participants were predominantly male (84.3%). This was a low income population with 77.3% reporting an annual income of less than \$25,000, but the employment rate was over 85% (94.4% men, 62.2% women). Over half of participants did not have health insurance (54.6%).

At baseline, 83.5% of participants reported smoking 20 or fewer cigarettes per day. Fifty-three percent reported at least one quit attempt in the past 12 months and 42.2% lived with another smoker. At baseline 85.8% reported they were very sure or somewhat sure that they could quit smoking. Sex was associated with several smoking-related characteristics. Women were more likely to start smoking cigarettes smoking after age 18, and to smoke fewer cigarettes per day compared with men ($P < 0.01$).

Among those interviewed at 4 months 92.4% reported using at least one patch (data not shown). Twenty-four percent reported a skin rash, 2.3% heart palpitations, 9.3% trouble sleeping. Only one individual reported stopping medication because of a side effect. Approximately 12% reported giving some patches to another person. Over 90% reported that the offer of a free patch program was somewhat or very important in terms of motivating them to quit. Among those registrants who were not abstinent at follow-up (57.8%) 76.6% reported making at least one quit attempt over the past 4 months. Ninety-two percent of those interviewed at 4 months reported no experience with the patch prior to entering this study.

Participants were most likely to hear about the program from a newspaper report (43%) followed by friends or family (29%), posters/flyers (9.7%), a doctor (6.2%) or the radio (3.5%). Women were more likely to hear about the program from friends and family compared with men (37.9% vs. 27.5%).

Program Reach

The reach was restricted by the time limited recruitment period of 10 months. Program reach was defined by the proportion of eligible smokers within Flushing enrolled in the program. The number of eligible smokers was estimated by multiplying the percentage of NYC Chinese Americans who smoke cigarettes (30% males and 2% females based on Chinese Health Survey) by the number of adults living in Flushing (14,435 adult males and 15,638 adult females) based on 2000 census data [8, 17]. Based on this calculation we estimated that 4644 Chinese American adult smokers were living in this community. Therefore, the overall reach was approximately 8% of eligible smokers.

Associations Between Smoking Cessation and Tobacco Use Behavior at Baseline

Using an intention to treat analysis which assumed that those not contacted at follow-up were still smoking, the quit rate was 26.7% (100/375) (Table 2). Among the 237 participants reached at 4 months 219 reported using the patch. The quit rate among these patch users was 44.7%. Demographic characteristics were not associated with quit status (data not shown).

The number of nicotine patches used by those individuals who quit was slightly higher than that among those who did not quit (35.7 vs. 33.8 respectively), however the difference was not statistically significant (Table 3). Smoking cessation at 4 month follow-up was associated with self efficacy, length of the longest quit attempt in the past 12 months, number of cigarettes smoked at baseline, concern for personal health as a reasons to quit, and complete abstinence while wearing the patch.

Self efficacy for quitting was strongly associated with quit status. Among participants who quit, 94% said they were very or somewhat sure they could quit. In contrast, among those who continued to smoke, 77.8% reported at baseline that they were very or somewhat sure they could quit ($P < 0.001$). Smoking while wearing the nicotine patch was strongly associated with continued tobacco use. Among participants who quit, 18.4% reported smoking while wearing the nicotine patches whereas 38.0% of participants who continued smoking reported that they smoked while wearing the nicotine patch ($P < 0.001$).

Regression Analysis

Table 4 presents the result of a multivariate logistic regression model. After adjusting for sociodemographic factors self efficacy, smoking when wearing the nicotine patches, and concern about personal health as a reason to quit were predictive variables for quitting.

Participants who at baseline reported self efficacy for quitting (sure or somewhat sure they could quit) were four times more likely to quit at the 4-month follow-up interviews than participants who were not confident of quitting ($P < 0.05$). Those participants who ever smoked when wearing the nicotine patch were 63% less likely to quit at the 5-month follow-up interviews than participants who reported no smoking at all when wearing the nicotine patches ($P < 0.01$). Participants who said that they wanted to quit because of concerns about their health were 5.5 times more likely to quit than participants who said at baseline that concern about their personal health was not a motivation for quitting ($P < 0.05$).

Demographic characteristics, number of patches used, and number of cigarettes smoked a day at baseline were not significantly associated with quit status.

Discussion

Our findings demonstrate that the offer of free NRT through community-based organizations is a feasible and effective way to encourage an immigrant population of smokers to access this evidence-based treatment. Ninety percent of program participants surveyed said that the offer of free medication was important in their decision to try to quit smoking. Using an intention to treat analysis, the abstinence rate at 4 months was 26.7% (100/375) which is comparable to other population-based smoking cessation interventions. For example, an open-label, prospective study of 223 smokers who received free nicotine patches via

distribution at a shopping mall reported an overall quit rate at 6 months of 22%, almost the same quit rate found 6 weeks following patch distribution (21%) [6, 18].

Several other studies have shown that the offer of free NRT through population and community-based distribution channels (e.g. state quitlines) increases program enrollment while achieving abstinence rates that are equivalent to those observed in health care settings [4–7, 18, 19]. The present study builds on these recent successes by demonstrating a similar impact on a hard to reach high risk immigrant population. Moreover, the results suggest that it is feasible to train non professional staff at community-based organizations to deliver minimal intervention and over-the-counter medications without losing effectiveness.

In this group of smokers who were motivated to enroll in a program there were important correlates of cessation. Confidence to quit and concern about health were associated with abstinence while smoking while wearing the patch which may indicate ambivalence and a lack of confidence was associated with continuing to smoke. These findings point to the importance of raising the level of knowledge about health risks prior to onset of tobacco-related illness and continuing to develop language-specific social marketing and educational campaigns that raise self efficacy among Chinese immigrant smokers. The availability of free medication in the context of language-specific assistance, delivered in an easy to access, familiar location may enhance confidence in quitting and warrants further study.

It is important to note that the free patch program was implemented within the context of a National Cancer Institute (NCI) funded study after other strategies failed to increase utilization of cessation services in this population. As part of the intervention strategy for the NCI study, the aim of which was to examine the effectiveness of a multicomponent community-based cessation intervention among Chinese Americans, three new cessation programs were established. These programs were located in health care settings (one hospital-based and two in community health centers) in Flushing, the NCI study intervention community. All three programs offered free counseling and pharmacotherapy. Despite regular promotional activities, there was very low utilization with less than 50 smokers attending these programs over the first year of the intervention period.

Although we do not have data to explain poor attendance at these programs, several reasons may explain why Chinese immigrants were not utilizing free treatment opportunities based in health care settings. Fifty-five percent of participants in this study were uninsured and therefore may not have regular interactions with the health care system. Language and cultural incompatibility, inflexible office hours, lack of familiarity with the care system and fears related to legal status may have also inhibited access to care [20, 21]. The community-based nicotine patch program was designed to overcome these potential barriers.

The large response to the free patch program indicates an unmet need for a method of disseminating smoking cessation treatments that eliminates cost and addresses structural and cultural barriers. Over a period of 10 months we reached an estimated 8% of Chinese smokers in Flushing, NY. This compared favorably to the 5% reach NYC achieved with their population-based free patch program [4]. NYCDOHMH's decision to extend the free patch program distribution to include CBOs, combined with the cultural competency of the

delivery system, provided a vital channel to smoking cessation treatment for this economically disadvantaged population when other strategies failed.

Implemented within the context of well funded state and city wide tobacco control efforts, this study also demonstrated that eliminating disparities will require balancing population approaches with tailored interventions that target high risk segments of the community [22, 23]. Foreign born smokers were less likely to call the NYC Quitline compared with US born during NYC's patch program but were more likely to quit [4]. Determining the most acceptable dissemination strategies for this diverse population, and providing resources to implement those strategies, must remain a priority.

With the continued collaboration between AAFE, ACS and NYCDOHMH the program is proving sustainable. According to ACS staff, from July through September 2007, 224 courses of free NRT were distributed to Chinese immigrant smokers living in Flushing (Arlene Chin, ACS, 11/2007 personal communication). Ensuring that effective health promotion interventions are maintained after research funding ends is a difficult challenge. Factors associated with sustainable public health programs include community-based organization (CBO) participation in developing and evaluating the program, use of non research staff to deliver the intervention, a good fit between the provider's mission and the intervention and program champions [24–27]. At the start of the planning process for this study most of these features were present. AAFE and ACS staff were trained to integrate the intervention as part of their regular duties, in both organizations the intervention goals were approved at the highest levels of leadership, and the organizations' senior staff was intimately involved in developing all components of the intervention and evaluation.

ACS and AAFE maintain recruitment levels by using several channels to disseminate information. These include integrating promotion of the free NRT program into existing activities including health fairs, workshops, and community outreach. Marketing of the program is also facilitated through the high density of Chinese language news outlets interested in publicizing these activities.

Although these results are promising, there are still large gaps in our knowledge about how to effectively reach and treat Asian immigrant smokers. A recent review of the literature identified only five smoking cessation intervention studies of Asian Americans and only one included Chinese immigrants [27]. Research is needed to further explore the potential for CBOs to serve as access points for needed health services among immigrant populations perhaps in collaboration with local community health centers. As newer prescription medications are released we will be faced with the additional challenge of how to maintain access through population-based strategies that currently depend on over-the-counter medications.

Our knowledge of the barriers to access is also limited in this population yet clearly extends beyond cost and coverage. A better understanding of sociocultural factors that influence decisions to seek treatment for tobacco use is needed. In particular, we know very little about the misperceptions immigrant smokers have about the safety and efficacy of cessation medications.

This study had several limitations. Quit rates were based on self report with no biochemical validation and the follow-up period was only 4 months. An analysis of outcomes at 12 months will be presented in a future publication. We did not measure fidelity to the brief counseling protocol so we cannot quantify how much counseling each client received and if that impacted the cessation rates. Additionally, the lack of a control group limits the strength of the conclusions. Randomized controlled trials of cessation interventions among immigrant groups are needed. Despite these limitations the results demonstrate an innovative method for distributing evidence-based smoking cessation treatment in this population.

Conclusion

With minimal resources this study leveraged a partnership between local organizations a local DOH and researchers to enhance diffusion of smoking cessation services. These findings indicate a need to continue to study interventions that remove barriers to efficacious treatment and prompt cessation attempts among Chinese immigrant smokers. State and local tobacco control programs should consider allocating resources to enhance the reach of population-based programs by tailoring distribution and marketing of smoking cessation services to high risk populations.

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Table 1

Characteristics of study population obtained from baseline survey

Variables (N = 375)	Male n = 316(84.3%)	Female n = 59(15.7%)	Total (%)
Demographic characteristics			
<i>Age (years)</i>			
18–34	16.6	22.4	17.5
35–44	32.9	37.9	33.7
45–54	31.9	29.3	31.5
55	18.5	10.3	17.3
<i>Education</i>			
<HS	23.9	23.7	23.9
HS	30.1	39.0	31.5
>HS	46.0	37.3	44.6
<i>Employment</i> ***			
Yes	94.4	62.2	89.1
No	5.6	37.8	10.9
<i>Income (n = 296)</i>			
<15,000	50.0	45.5	49.3
15,000–24,999	28.2	27.3	28.0
25,000–49,999	16.3	18.2	16.6
50,000+	5.6	9.1	6.1
<i>Health insurance</i>			
Yes	46.2	41.4	45.4
No	53.8	58.6	54.6
<i>Years in the US</i>			
<5 years	29.5	39.0	31.0
6–10 years	28.3	23.7	27.5
>10 years	42.2	37.3	41.4
Smoking characteristics			
<i>Live with smokers</i>			
Yes	41.9	44.1	42.2
No	58.1	55.9	57.8
<i>Age at first smoke</i> ***			
<18	27.0	10.2	24.3
18–21	43.2	30.5	41.2
22	29.8	59.3	34.5
<i>Quit attempts past 12 months</i>			
Yes	53.1	54.2	53.3
No	46.9	45.8	46.7
<i>Number of cigarettes smoked/day</i> ***			
10	10.8	33.9	14.4

Variables (N = 375)	Male n = 316(84.3%)	Female n = 59(15.7%)	Total (%)
11–20	70.3	62.7	69.1
20	19.0	3.4	16.5
<i>Self efficacy</i>			
Very/somewhat sure	85.6	86.4	85.8
Unsure	14.4	13.6	14.2

* $P < 0.05$

** $P < 0.01$

*** $P < 0.001$

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Table 2

Quit rate at 4 months

	Quit rate
^a Respondents only (<i>n</i> = 237)	42.2% (100/237)
^b Patch users only (<i>n</i> = 219)	44.7% (98/219)
^c All participants (<i>n</i> = 375)	26.7% (100/375)

^a Respondents are those who were reached at 4 months (*n* = 237)

^b Patch users refers to those reached at 4 months who reported any use of the patch

^c Intention to treat analysis including all participants from baseline. Assumes those not reached continue to smoke

Table 3

Association between smoking-related behaviors and quit status

Variables (N = 237)	Not Quit n = 137	Quit n = 100
Age at first smoke (%)		
<18	27.0	21.0
18–21	43.1	35.0
≥22	29.9	44.0
Quit attempt past 12 months (%)		
Yes	47.8	41.8
No	52.2	58.2
Number of cigarettes smoked at baseline (mean)(SD) *	19.4 (7.3)	17.7 (5.7)
Length of the longest quit attempt (in weeks) in the past 12 months (mean) (SD) * (n = 104)	2.7 (6.6)	6.3 (9.9)
Self efficacy (%) ***		
Very/somewhat sure	77.8	94.0
Unsure	22.2	6.0
Live with smokers (%)		
Yes	46.7	40.6
No	53.3	59.4
Number of patches used (mean)(SD)	33.8 (16.7)	35.7 (15.1)
Ever smoked when wearing patches (%) ***		
Yes	38.0	18.4
No	62.0	81.6
Concern about personal health as the reason to quit (%) ***		
Very much	82.4	97.0
A little	16.9	3.0
Not at all	0.7	0.0

* $P < 0.05$ ** $P < 0.01$ *** $P < 0.001$

Table 4

Correlates of smoking abstinence

Variables (N = 205)	Odds Ratio	95% Confident Interval
Gender		
Female	1.00	
Male	0.72	0.31; 1.65
Education		
<12 years	1.00	
HS	1.30	0.57; 2.92
>12 years	1.19	0.55; 2.55
Age (years) ^a	1.02	0.99; 1.04
Years in the US		
5 years	1.00	
6–10 years	0.77	0.35; 1.69
>10 years	0.78	0.37; 1.64
Number of cigarettes smoked/day at baseline ^a	0.98	0.93; 1.03
Self efficacy [*]		
Unsure	1.00	
Very/somewhat sure	3.55	1.32; 9.55
Number of patch used ^a	1.01	0.98; 1.02
Ever smoked when wearing patches ^{**}		
No	1.00	
Yes	0.39	0.19; 0.77
Concern about personal health as the reason to quit ^{**}		
Not at all/a little	1.00	
Very much	5.52	1.51; 20.1

* $P < 0.05$ ** $P < 0.01$ ^aContinuous variables