A Nurse-Managed Smoking Cessation Program for Hospitalized Smokers

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ABSTRACT

Objectives. This study evaluated a nurse-managed smoking cessation program for smokers hospitalized for a variety of conditions.

Methods. Hospitalized patients who smoked prior to hospitalization and who were motivated to quit (n = 660) were randomized to intervention or usual-care groups and followed for the next year. The intervention included a meeting with the nurse–case manager; the use of a videotape, workbook, relaxation audiotape, and nicotine replacement therapy; and nurse-initiated phone contacts after discharge.

Results. The 12-month confirmed cessation rates were 21% and 31% for, respectively, the usual-care and intervention groups (odds ratio = 1.7; 95% confidence interval = 1.1, 2.3).

Conclusions. A nurse-managed smoking cessation intervention can significantly increase cessation rates for hospitalized patients. (*Am J Public Health.* 1996;86:1557–1560)

Introduction

Cigarette smoking is the leading cause of premature and preventable morbidity and mortality in the United States. More than 20 million Americans are hospitalized each year, of whom more than 30% are smokers. Although hospitalization affords an excellent opportunity for smoking cessation,[1] there have been surprisingly few studies of hospital-based smoking cessation programs for noncardiac patients. In the largest study, Stevens et al.[2] found that a brief smoking cessation and relapse-prevention program for a general population of hospitalized smokers increased the 12-month quit rate from 9% to 14%. Given the effectiveness of more intensive interventions, at least with patients hospitalized for cardiovascular disease,[3,4] a more intensive intervention than that provided by Stevens et al.[2] might be necessary to achieve more significant smoking cessation outcomes at 1 year.

The purpose of the present study was to determine if a nurse-managed smoking intervention would improve cessation rates in smokers hospitalized for various medical or surgical conditions.

Methods

All patients who were hospitalized at one of four Kaiser Permanente Medical Centers in the San Francisco Bay Area and who had smoked in the month prior to admission were considered for the study. Excluded were patients who did not speak English, who did not plan to remain in the Bay Area for the next year, whose level of consciousness was impaired, whose hospital stay was less than 36 hours, whose medical charts revealed evidence of alcohol and/or drug abuse, or who refused to quit smoking or stated that they wanted to quit on their own.

Measures

During hospitalization, a baseline structured interview was used to obtain patients' smoking history (years smoked, previous quit attempts, etc.). Strength of addiction was assessed by five questions from the Fagerstrom Tolerance Questionnaire modified by Killen et al.[5] Demographic information collected included age, sex, ethnicity, confidence to quit smoking (measured on a single-item scale with ratings ranging from 0% [no confidence] to 100% [absolutely confident]), and education (no high school, some high school, high school graduate, some college, college graduate, or postgraduate).

Self-reported smoking rates were obtained at 12, 24, and 52 weeks, at which time patients were classified as smokers if they stated that they had used any tobacco products in the previous week. Patients who stated that they were not smoking were asked to provide a blood sample so that their nonsmoking status could be confirmed by determination of plasma cotinine. Cotinine levels were analyzed

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TABLE 1—Baseline Characteristics for Intervention and Usual-Care Patients: Hospitalized Smokers, San Francisco

	Usual Care (n = 313)	Intervention (n = 315)
Males, %	55	55
Education ≤ high school, %	48	48
Race/ethnicity		
Caucasian, %	71	76
African American, %	11	11
Hispanic, %	10	9
Other, %	8	4
Age, mean ± SD	52 ± 13	51 ± 13
Employed, %	61	70
Confidence to quit, %	67 ± 27	69 ± 26
Cigarettes/day, mean ± SD	21.4 ± 13	21.6 ± 13
Alcohol, drinks/week	3.5 ± 8	4.0 ± 9
Level of addiction (5–25)	14.0 ± 4	13.9 ± 4.1

TABLE 2—Smoking Cessation Rates at 3, 6, and 12 Months after Initiation of Hospital-Based Intervention

	Cessation Rates, %					
	Usual Care (n = 313)	Intervention (n = 315)	χ^2 Test	*P*	OR	95% CI
3 mo[a]	30	48	22.1	<.001	2.2	1.5, 2.9
6 mo[a]	26	40	12.6	<.001	1.9	1.3, 2.5
12 mo[a]	28	36	5.2	.022	1.5	1.0, 2.0
12 mo[b]	21	31	7.4	.006	1.7	1.1, 2.3

Note. OR = odds ratio; CI = confidence interval.
[a]Self-report.
[b]Cotinine or family confimed.

with the method of Jacob et al.[6] If patients were unable or unwilling to be tested, a previously identified family member who could corroborate their smoking status was contacted by phone. Participants were considered to be nonsmokers only if they stated that they were not smoking and their plasma cotinine value was less than 15 ng/mL or, in the absence of plasma cotinine measurements, their nonsmoking status was corroborated by a family member. All patients dropping out of the study or lost to follow-up were categorized as smokers.

Intervention

The intervention incorporated principles of social learning theory combined with nicotine addiction and relapse prevention models.[7] After receiving a standardized message from their physicians, patients met with a nurse for about 1 hour during their hospitalization. They were shown a 16-minute videotape, given a workbook with an accompanying audiotape, and counseled on how to cope with any high-risk-to-relapse situations.

Patients who reported significant withdrawal symptoms or high rates of tobacco dependence were offered nicotine replacement therapy before discharge. Patients received 10-minute nurse-initiated standardized phone contacts at 48 hours, 7 days, 21 days, and 90 days after hospital discharge. Patients who relapsed and who were unable to stop smoking after hospital discharge were asked to meet with the nurse for a 1-hour outpatient visit. No further intervention occurred after 90 days. Further details of the intervention are provided elsewhere.[4,7]

Usual Care

Patients receiving usual care received a standardized message from their physicians to quit smoking but were not given any specific instructions by the nurse on how to quit. Instead, they were given a printed self-help pamphlet from the American Heart Association entitled "Calling it Quits."

Analyses

Differences between the intervention and usual-care groups on baseline characteristics were tested with the Kruskal-Wallis nonparametric test for the continuous variables (age, education, addiction, confidence) and the chi-squared test for the categorical variables (sex, ethnicity). For the primary outcome analyses, patients lost to follow-up or with missing data were treated as smokers. The chi-squared test and odds ratios (ORs) were used to determine differences in smoking cessation between the treatment groups, and independent logistic regression analyses were performed by treatment group to determine the predictors of confirmed cessation at 12 months.

Results

From February 1991 to April 1992, 2357 hospitalized smokers were identified. Of these, 804 patients were ineligible for the trial because they were too sick (16%), were in the hospital for less than 36 hours (25%), revealed alcohol or drug abuse on chart review (22%), were unable to speak English (4%), or were unavailable for follow-up or ineligible for other reasons (33%). Of the remaining eligible patients, 660 agreed to be randomized. Patients in the usual-care and intervention groups did not differ in terms of sex, education, ethnicity, age, strength of addiction, or confidence to quit (Table 1).

By 12 months, 17 (5%) patients in the usual-care group and 15 (5%) patients in the intervention group had died; these patients were excluded from the analyses. Twenty-seven (8%) patients in the usual-care group and 28 (8%) patients in the intervention group were lost to follow-up; they were considered smokers for all analyses.

Of the 201 patients who said they had stopped smoking at 1 year, nonsmoking status was confirmed by cotinine for 49% and by a family member for 26%, and was disconfirmed by cotinine for 5% and by a family member for 19%.

The self-reported and confirmed smoking cessation rates can be seen in

Table 2. Of note, cessation rates at 12 months, confirmed by plasma cotinine or a family member, were 21% and 31% for the usual-care and intervention groups, respectively ($P = .006$).

At some point during the 12 months of the trial, 48% of the intervention patients were prescribed nicotine gum and/or patches; of those patients, 21% quit smoking. Of patients in the usual-care group, 33% were prescribed nicotine gum and/or patches, of whom 9% quit smoking (OR = 2.8, 95% confidence interval [CI] = 1.4, 6.7, treatment compared with control). Only one patient was using a nicotine patch at 1 year. Among the intervention patients, 52% (172/330) reported relapsing during the first 90 days, of whom 36% (62/172) underwent a single face-to-face repeat counseling visit. Of these, 13% (8/62) were confirmed nonsmokers at 12 months.

To determine factors that might predict outcome, a logistic regression was run for the intervention and usual-care groups separately, with 12-month confirmed smoking status as the dependent variable and sex, age, education, ethnicity, addiction, and confidence to quit smoking as the predictor variables. Results of the analyses for the two groups were very similar. Sixteen percent ($P = .01$) and 17% ($P = .01$) of the variance in 12-month cessation was accounted for in the intervention and usual-care groups, respectively. In both groups, age (older; $\beta = .14$ and $\beta = .20$, $P < .05$, respectively) and confidence to quit smoking ($\beta = .21$ and $\beta = .26$, $P < .01$, respectively) were the only significant predictors.

Discussion

This study demonstrated that a nurse-managed smoking cessation intervention initiated in a hospital significantly increased the smoking cessation rates for hospitalized patients. Our results are similar to those of an outpatient study that combined nicotine replacement therapy, a physician intervention, nurse counseling, follow-up, and relapse prevention.[8] In that study, the intervention produced a 28% cessation rate at 1 year, compared with a 14% rate in the placebo group.

A higher proportion of intervention patients than of control patients were prescribed pharmacological therapy, and of those prescribed such therapy, the percentage of those who had quit smoking at 12 months was much higher in the intervention group than in the usual-care group. The nurse–case managers may have enhanced the effectiveness of the intervention by helping to ensure not only that nicotine replacement therapy was prescribed, if indicated, but also that it was used properly.

Independent logistic regression analyses for the intervention and usual-care groups found that age and confidence to quit smoking were positively associated with confirmed smoking cessation at 12 months for both groups. Age and confidence have been found to be important predictors of long-term smoking cessation in previous studies. For example, age was positively associated with smoking cessation in the 6-year follow-up of the Multiple Risk Factor Intervention Trial (MRFIT) for both special intervention and usual-care groups,[9] and in a large population survey (n = 13 031), older smokers (>65 years) were more likely to attempt to quit smoking and remain abstinent than were younger smokers (25 to 64 years).[10] Confidence to quit smoking (i.e., self-efficacy[11]) has also been found to be prospectively predictive of smoking status in a number of studies.[12–14] Self-efficacy is hypothesized to affect behavioral change by providing the motivation to initiate a change in behavior, determine the amount of effort expended in the change, and enhance persistence in behavioral change in the face of external and internal obstacles.[11]

The present intervention can be implemented in most hospital settings at relatively low cost. An analysis of a similar intervention for post–myocardial infarction patients found it to be very cost-effective.[15] The intervention is designed so that one full-time–equivalent nurse can manage approximately 500 patients attempting to quit per year. The intervention should be part of a broader nonsmoking hospital policy that implements such policies for patients and staff alike and provides help to all who wish to stop smoking.

Among the entire pool of smokers identified in this study, more than half were poorly motivated to quit in the hospital, had a hospital stay of less than 36 hours, and/or were abusing drugs or alcohol. To maximize the public health impact, future interventions for hospitalized smokers need to target these subpopulations. For instance, the poorly motivated smokers could be followed on an infrequent basis by phone or mail to determine if they had become interested in quitting. Smokers who are hospitalized too briefly to enable counseling could be mailed intervention materials and receive counseling by phone.[16] Patients who want to quit on their own could be given self-help materials and provided with follow-up. Patients who abuse alcohol or drugs may require special interventions. If adopted by hospitals nationwide, these approaches could have an important public health impact on smoking. □

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