Evaluation of a (pilot) stage-tailored brief smoking cessation intervention among hospital patients presenting to a hospital pre-admission clinic

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Abstract

Despite the significant benefits of advising all smokers to quit, hospital patients who smoke do not systematically receive this advice. This study sought to determine the prevalence of smoking, attitudes of patients towards not smoking while in hospital, and the feasibility and effectiveness of a brief smoking cessation intervention in a pre-admission clinic context. Over 230 smokers received a brief smoking cessation intervention, while a control group (n=114) received only a free Quit Kit. The age-standardised smoking prevalence was 19%; a further 3% of patients were recent quitters. Most smokers do not expect or experience problems with not smoking while in hospital. Brief smoking cessation advice tailored to stage-of-change by a health worker in a hospital pre-admission clinic significantly increased the quit rates for females.

Introduction

It has been proposed that clinicians should give quit advice to every patient who smokes (Royce et al. 1995; Law & Tang 1995). Brief opportunistic interventions with smokers are potentially one of the most effective strategies in reducing smoking prevalence (Reid et al. 1992). Recent evidence-based guidelines developed both in Australia (RACGP 1996; NHMRC 1996) and overseas (USPSTF 1996; Fiore et al. 1996; CTFPHE 1994) are unanimous and unequivocal in recommending that smoking cessation advice be given opportunistically during every consultation with a smoker and should precede referral to more intensive interventions (Lichenstein & Hollis 1992). Unfortunately, brief advice from health professionals to smokers about quitting, though effective and highly cost-effective (Meenan et. 1998), has had limited impact on reducing tobacco consumption at a population level because it is so under-utilised (Reid 1996).

Non-physician health workers, and nurses in particular, are well positioned to provide cessation advice to patients admitted for treatment. It has been argued that nurses have an obligation or duty of care to include tobacco control efforts in their daily clinical practice (Lillington 1997). While nurses are aware that tobacco use is a serious health problem, many lack knowledge about how to identify smokers quickly and easily, which treatments are effective and how such treatments can be delivered (Nagle 1998). Demonstrations of locally effective programs could facilitate the routine introduction of brief intervention programs by health care workers.

Maximum cessation would likely occur if brief interventions were targeted to smokers' stage of change (DiClemete et al. 1991). Lichtenstein and Hollis (1992) demonstrated that smokers who were contemplating quitting (*contemplators*) were more than five times more likely to respond to a referral to a group smoking cessation programme compared to smokers who were not seriously considering giving up smoking (*precontemplators*). Examination of stage-specific brief advice delivered by physicians suggests that this approach has potential benefits for both physicians and patients (Goldberg et al, 1994). Such interventions enhance short-term movement along the stages-of-change continuum and represent a more efficient use of consultation time. The type of intervention offered should also depend on degree of nicotine dependence and the time available for intervention (Mattick & Baillie 1992).

Follow-up contact (either in person or by telephone) is recommended soon after the quit date, preferably during the first week (USPSTF 1996; Zhu et al. 1996). While no optimum time for follow-up contact has been established in the literature, telephone follow-up of smokers who have received a cessation intervention is believed to enhance adherence to the quitting protocol and abstinence rates (Orleans et al 1990; Orleans et al. 1991; Curry et al. 1995; Burke, Dunbar-Jacob and Hill 1997; Westman, Levin and Rose 1993).

Despite the fact that the risks of intra-operative and post-operative complications are increased by smoking (Jones 1985), and that hospitalisation affords an excellent and important opportunity for smoking cessation (Orleans, Kristeller and Gritz, 1993), there have been surprisingly few brief hospital-based smoking cessation programmes for non-cardiac patients or studies to determine the efficacy of brief smoking cessation advice delivered to patients by health professionals other than physicians. Published evaluations of these brief interventions indicate inconsistent results. In an unpublished randomised controlled trial, Nagle (1998) compared specialised nurse-mediated bedside counselling with usual care, and concluded that quit rates of 10% can be achieved simply by assessing smoking history, delivering a brief intervention and telephoning smokers seven days and three months after discharge. Stevens et al. (1993) found a 50% increase in smoking cessation at 12 months compared with a control group.

Other studies have reported initial increases in quit rates and reductions in tobacco consumption following non-physician delivered interventions (Haddock & Burrows 1997; Taylor et al. 1996), but no effect compared with control groups at three months (Colby et al. 1998) or six months follow-up (Wakefield & Jones 1998; Rigotti et al. 1997). No published study has examined quit rates after delivery of a brief intervention in a hospital pre-admission clinic.

The purpose of this study was to determine the prevalence of smoking; smokers' anticipated problems with not being able to smoke while in hospital; the source and type of any quit advice received prior to their admission; and the feasibility, acceptability and effectiveness of a brief smoking cessation intervention tailored to patients' stage of change by a trained research assistant in a pre-admission clinic context.

Methods

Sample

Subjects were recruited over a 26-week period from October 1998 to May 1999 from the pre-admission clinic of the Royal Prince Alfred Hospital, Sydney. Date of birth, sex, and smoking status (current smoker/non-smoker/ recent quitter) were collected for each patient, after verbal agreement from the patient to report smoking status. Recent quitters were defined as those subjects who had quit smoking in the 3 months prior to admission. Subjects who identified as smokers were asked to participate in a research study and their written consent was obtained prior to completing a brief research assistant administered questionnaire. Ethics approval for this study was obtained from the CSAHS (RPAH zone) Ethics Review Committee.

Subjects were considered eligible if they were a current smoker; were aged 18 years or over; had an adequate understanding of English (ie. no interpreter required to complete the questionnaire); their level of consciousness was not impaired; and they were not incapacitated or distressed. The historical control group comprised all smokers admitted in the first 8 weeks of the recruitment period; all other smokers received the intervention package.

Initial assessment

Once a smoker was identified, a baseline research assistant-administered interview was used to obtain patients' smoking habits (current consumption, number of previous quit attempts); level of nicotine dependence (using a modified Fagerstrom Tolerance Questionnaire) (Fagerstrom 1978), and stage of change (DiClemente et al. 1991). Smokers were also asked about problems they perceived they would encounter not smoking while in hospital, (*"none," "a few/some" or "a lot"*). Smokers who anticipated any problems were then asked what steps (if any) they had taken in advance of their hospital admission to deal with possible nicotine withdrawal; and the source and nature of advice (if any) they had obtained regarding quitting smoking prior to admission to hospital. For comparison with results from a survey of Area Health Service staff, smokers were also asked about their attitudes to two statements: *"Health care workers who smoke give the impression that smoking is not harmful" and "Smoking in hospitals and health care centres should be limited to areas not visible to the public."*

Smoking patients in the Control Group received free self-help literature (Quit Kit) about quitting smoking, but no specific instructions by the research assistant on how to quit.

All smokers in the Intervention Group received a standardised unequivocal message to quit smoking in preference to reducing cigarette consumption; a free self-help Quit Kit containing literature about quitting smoking; a five-minute brief smoking cessation intervention tailored to patients' stage of change from a trained research assistant, and a booster call at one month.

Four weeks post-intervention, all intervention group smokers received a 5-minute standardised post-discharge telephone contact (booster call) to monitor their progress, to reinforce and augment the messages delivered during the original consultation and, for smokers who had quit, to provide information about preventing relapse.

In the final 8 weeks of recruitment, highly nicotine dependent smokers who were contemplating quitting were offered a seven day free supply of nicotine replacement therapy (NRT) in the form of gum (2mg or 4mg) to examine the feasibility of administration of NRT.

Follow-up data were collected at three months (Week 12) post-intervention by a single trained telephone interviewer blind to treatment condition. Self-reported smoking status, changes to smoking behaviour since pre-admission (for example, lowered consumption, switched to low tar cigarettes), number of quit attempts, and change in smokers' readiness to quit were assessed. Smokers were also asked what proportion of the Quit Kit they had read.

Data Analysis

The age-standardised smoking prevalence was calculated using 1996 Census data for the NSW population (Taylor 1998). Results for smoking status were analysed according to 'intention to treat' principles and for those patients for whom there was follow-up information. Descriptive statistics were used to describe self-reported smoking status, stage of change, number of quit attempts and abstinence rates. Bivariate analyses compared follow-up smoking status, quit attempts and stage of change by intervention. Chi-square tests were employed to ascertain the differences in smoking cessation between the treatment groups, and logistic regression analyses were performed to examine predictors of cessation at 3 months (adjusting for age and gender).

Results

A total of 2702 subjects were approached by trained research assistants in the waiting room of the pre-admission clinic. Ninety-seven percent (n=2619) were eligible for the study, including 394 eligible smokers and 84 respondents (3%) who had quit smoking in the previous three months. The total crude prevalence rate for smoking in this population was 15% (13% women; 17% men). The age-standardised smoking prevalence rate was 19% (16% women; 23% men). More than half of the 394 smokers (53%) were aged 50 years and over. More smokers were males (54%) than females (46%).

Analysis of nicotine dependency scores indicated that 18 per cent of smokers were highly nicotine dependent, one-third (36%) were moderately dependent and almost half (46%) of the sample of smokers had low nicotine dependence. There were no significant differences between age or sex and nicotine dependence.

More than one in five smokers (23%) expected to encounter problems with not smoking while in hospital, and 21 per cent had taken steps to deal with possible nicotine withdrawal. Among smokers expecting problems, those who expected "lots" of problems were more likely (47%) to have taken steps than those expecting "some" or "a few" problems (30%) although this difference was not statistically significant (p=0.23). Low nicotine dependent smokers were more likely to take steps to deal with anticipated problems (41%) than medium (26%) or highly (35%) nicotine dependent smokers, but again these differences were not statistically significant (p=0.45). The most common steps taken were trying NRT (nicotine replacement therapy) and reducing cigarette intake.

One quarter of smokers (25%) admitted smoking while in hospital. Smoking while in hospital significantly increased with length of stay, with 15 per cent of smokers smoking if in hospital for one day only, compared with 33 per cent of smokers if the hospital stay was more than one day (p=0.02). Among smokers, 41 per cent of hospital stays were for one day, and 43 per cent for four days or more including 17 per cent of stays that were for longer than a week. Most smokers reported having no problems with not smoking while in hospital (69%), with only 20 per cent of smokers staying four days or longer reporting some or a great many problems not being permitted to smoke.

In the four weeks prior to pre-admission, 17 per cent of all smokers had received some form of smoking cessation advice; half of these smokers (54%) citing their GP and 27 per cent their specialist as the source of this advice. Other sources cited were family members or friends or other health professionals. The majority (80%) of the advice was provided verbally.

Sixty-nine per cent of smokers disagreed or strongly disagreed with the statement: "Health care workers who smoke give the impression that smoking is not harmful". There was no statistically significant difference between the responses to this statement by sex or age group. When asked to respond to the statement: "Smoking in hospitals and health care centres should be limited to areas not visible to the public", three-quarters (75%) of smokers agreed or strongly agreed. There was no statistically significant difference between the response to this statement and sex. However, older smokers ($\geq$ 50 years) were significantly more likely to agree with this statement than younger smokers (aged 18 - 49 years) (χ = 19.78, p < 0.01).

After initial assessment, some smokers (n=46) did not consent to further involvement in the study, leaving 348 smokers who were randomly allocated into treatment conditions (114 in the control group and 234 in the intervention group) (see Figure 1). Baseline characteristics were similar between control and treatment groups (Table 1). The majority of smokers in both the treatment and control groups (84%) were contacted for a booster telephone call one month after initial contact.

Table 1: Characteristics of the control and intervention group at baseline

	Control group (%)	Intervention group (%)
AGE		
18-29 years	11.4	9.8
30-49 years	39.5	37.5
50-69 years	36.9	40.9
70+ years	12.3	11.9
SEX		
Male	51.8	51.3
Female	48.2	48.7
Have made quit attempts in last 3 months (ie. prior to pre-admission)	35.1	33.5
Level of nicotine dependency*		
Low	49.1	48.7
Medium	36.0	33.3
High	14.9	18.0

* Using a modified Fagerstrom Tolerance Questionnaire

Patients who refused to participate in the study were not statistically different from smokers who consented by age, sex, number of quit attempts in the last three months, number of cigarettes smoked per day, or level of nicotine dependence. Non-consenting smokers were significantly more likely to be in a pre-contemplation stage than participants (χ^2 = 7.98, p=0.02).

Overall, three-quarters of smokers in both the control (76.3%) and the intervention (76.5%) groups were contacted for the three-month follow-up survey. Table 2 shows that for smokers able to be contacted at follow-up, 18.4 % of the control group and 25.7% of the intervention group (odds ratio=1.54, 95% CI 0.81-2.90) were non-smokers (χ^2 = 1.75, p=0.19). There was a significant difference (χ^2 = 4.38, p=0.04) in cessation rates between females in the control (16.7%) and treatment groups (34.5%), but no difference (χ^2 = 0.09, p=0.77) for males by treatment condition (control 20.0%; intervention 17.9%). Overall, when patients unable to be contacted at follow-up were assumed to be smokers, there was no overall statistical difference between groups (control 14.0%; intervention 19.7%) (χ^2 = 1.66, p=0.20), although the difference for females (control 13.2%; intervention 26.9%) remained statistically significant (χ^2 = 3.81, p=0.05). Quit rates for male or female patients offered a seven day free supply of NRT did not differ from patients in the intervention group not offered NRT. Longer length of hospital stay was associated with increased cessation in the intervention group (p=0.02) but not the control group (p=0.29).

Table 2: Outcomes by treatment condition (smoking status, stage of change, quit attempts, number of cigarettes smoked) (%)

	Control		Intervention		
	Baseline (n=114)	3 months (n=87)	Baseline (n=234)	3 months (n=179)	p-value*
Non-smoking status					
Overall	-	18.4	-	25.7	.186
Males	-	20.0	-	17.9	.765
Females	-	16.7	-	34.5	.036**
Have made quit attempts in last 3 months (current smokers only)					
Overall	35.1%	40.0	33.5%	41.9	.799
Males	33.9	44.1	31.2	40.0	.686
Females	36.5	36.1	35.5	44.4	.431
Number of cigarettes smoked daily cigarette consumption?					
0-10 cigarettes (all types)					
Males	30.5	55.6	32.8	36.7	.054
Females	40.4	51.4	32.1	38.9	.369
11-20 cigarettes					
Males	32.2	33.3	23.0	32.9	
Females	30.8	31.4	34.9	46.3	
21 + cigarettes					
Males	37.3	11.1	44.3	30.4	
Females	28.9	17.1	33.0	14.8	
Stage of change					
Pre-contemplation					
Males	36.7	35.6	32.0	31.9	
Females	40.4	34.2	28.7	25.0	
Contemplation					
Males	26.7	37.8	41.0	46.2	
Females	31.5	36.6	34.3	29.8	
Preparation/Action					
Males	35.0	26.7	21.1	22.0	.702
Females	26.4	19.1	36.1	45.2	.242

* Comparison of treatment and control group at three months

** Significantly different at $p<0.05$

The number of quit attempts by male smokers in both groups increased post-intervention, however intervention group females were most likely to have made an attempt. Males in the control group were significantly more likely to have decreased daily cigarette consumption than males in the intervention group or females in either group. There were no significant shifts along the stage-of-change continuum for any group.

After controlling for treatment condition and how much of the smoking cessation materials disseminated were read, women were almost twice as likely than males to have quit smoking at three months (see Table 3). Living with a smoker (adjusted odds ratio=0.36) and having smoked while still in hospital (adjusted odds ratio=0.08) were significantly associated with a decrease in quit rates. A hospital stay of longer than four days significantly increased quit rates (adjusted odds ratio=5.34)

Discussion

The findings suggest that the brief (less than five minute) stage-tailored intervention delivered in this hospital pre-admission clinic increased the smoking cessation rate of females, but not of males. Females in the intervention group made more attempts to quit compared with males in the intervention group who were more likely to cut down on the number of cigarettes smoked. This higher quit rate among women is consistent with other research indicating that smokers are more successful if they make a quit attempt rather than reduce cigarette consumption (Mattick & Baillie 1992).

The 7.3 per cent overall increase in cessation in the intervention group is considerable, despite not achieving statistical significance. With the sample size of this pilot study, the analysis has low statistical power (27%) and therefore the significant finding of increased quitting among females is important. Over 450 subjects per group (1:1 ratio of treatment to control) would be needed for 80% power and 95% confidence interval.

Females were more likely than males to have quit, independent of treatment condition or amount of cessation material read, suggesting that compared to males the experience of going to hospital and being identified as a smoker also prompted a serious quit attempt. Males may require a gender-specific intervention in this hospital pre-admission context. The finding that living with a smoker significantly decreased the likelihood of a successful quit attempt for both males and females is perhaps not surprising, but does illustrate the need for brief interventions to address partner smoking or the social context of smokers at home. In recent years there has been a significant increase in the number of smoke free households, where smoking is not permitted indoors (Pierce et al. 1998; Mullins, Scollo and Borland, 1994).

When the recent quitters (3%) were considered, the current smoking prevalence of this population is similar although slightly lower than rates expected in the NSW adult (18+) population (males 27.6%; females 21.4%) (NSW Department of Health 1999). Quitting in the 3 months prior to pre-admission is most likely due to adverse health (resulting in a need for hospitalisation). There is also likely to be some under-reporting of smoking in this clinical setting (Velicer et al. 1992).

The relatively high quit rate in the control group is also probably a function of the health concerns requiring a hospital visit, and may have been elevated further above natural quitting rates by supplying smokers with a Quit Kit. A 12 month period of follow-up is required to assess whether any differences between the treatment and control group are maintained. Biochemical validation of smoking status at follow-up would be desirable in this hospital population (Velicer et al. 1992), but logistically difficult and expensive. Follow-up assessment should be blind to treatment condition.

The feasibility of routine delivery of brief smoking cessation advice to smokers in this hospital setting is highlighted by low initial refusal to be asked smoking status and the low refusal to participate in the study. A free 7-day supply of nicotine replacement therapy (2mg or 4mg nicorette gum) was able to be offered to highly dependent smokers who were actively considering quitting through collaboration with a local pharmacist. The number of smokers in the intervention group meeting these criteria was quite small (n=8), representing 10 per cent of smokers in that period of data collection. Therefore, if 15 out of 100 in-patients are smokers, the total demand for NRT is likely to be only about two per cent of patients. The small cost of offering NRT to highly nicotine dependent smokers in hospital may be offset by potential gains in smoking cessation and decreased irritability of smokers finding it difficult not smoking while in hospital. Few smokers anticipated problems with not smoking while in hospital, although this is possibly related to the majority of patients not expecting to stay in hospital for more than a day or two. After their hospital experience, most smokers reported that they had had no problems not smoking while in hospital. Unsurprisingly, a longer stay in hospital was associated with a higher quit rate than a one day stay.

The number of smokers receiving advice to quit smoking prior to pre-admission was poor. Only one smoker in five recalled being advised to quit. A standardised information kit with steps of how to quit and how patients should prepare for not smoking while in hospital should routinely be provided to all patients who smoke by referring doctors. This is particularly important as smoking bans on health service property are likely to become the norm across NSW when a NSW Department of Health smoke-free workplace policy (NSW Department of Health 1998) is implemented across the state. Several NSW Area Health Services already have or are in the process of introducing such a policy.

Community support for such a policy is likely to be very high. Three-quarters of patients who smoked agreed that smoking in hospitals and health centres should be restricted to areas not visible to the public. This result is similar to that of a recent study of smoking rates and attitudes among CSAHS health services staff which found that two thirds of staff who smoked (67%) would also support such a policy (Hughes & Rissel 1998). Similar proportions of smoking patients in this study (69%) and smoking staff in the previous survey (64%)[37], agreed that 'health care workers who smoke give the impression that smoking is not harmful.'

As one of the first Australian studies in the hospital pre-admission context, we believe that recruitment of smokers via pre-admission clinics represents an ideal setting for brief smoking interventions and one that maybe more appropriate than interventions delivered at bedside. Patients attending pre-admission clinics are conveniently reached, making multiple (and perhaps futile) attempts to locate hospitalised patients in their wards unnecessary. Further, as patients are admitted within 7 to 14 days of their pre-admission visit, they are provided with an opportunity to set an immediate goal to quit smoking. A larger trial of this intervention with a longer follow-up period is recommended.

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Table 3: Factors associated with smoking cessation adjusting for age (n= 252)*

	Follow-up quit rate (%)	AOR~	95% CI
Treatment condition			
Control	18.4	1.00	
Intervention	25.7	1.32	0.62-2.79
Remember reading materials distributed			
None/some	20.2	1.00	
Most/all	26.6	1.85	0.94-3.66
Sex			
Male	18.6	1.00	
Female	28.6	1.93	0.98-3.83
Living with a smoker			
No	31.0	1.00	
Yes	12.5	0.30	0.12-0.64**
Smoked while in hospital			
No	29.0	1.00	
Yes	3.1	0.05	0.01-0.23**
Length of stay in hospital			
One day	15.7	1.00	
2-3 days	18.6	2.88	0.99-8.35
4 days or more	32.7	5.34	2.45-11.62**

* Smokers for whom follow-up data were available

~ Adjusted odds ratio

** Statistically significant at $p<0.05$