A randomised controlled trial to evaluate the efficacy of a nurse-provided intervention for hospitalised smokers

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Abstract

Objective: Does the provision of a nurse-based intervention lead to smoking cessation in hospital patients?
Methods: At tertiary teaching hospital in Newcastle, Australia, 4,779 eligible (aged 18-80, admitted for at least 24 hours, and able to provide informed consent) and consenting (73.4%) in-patients were recruited into a larger cross-sectional survey. 1,422 (29.7%) smokers (in the last 12 months) were randomly assigned to control (n=711) or intervention group (n=711). The brief nurse-delivered intervention incorporated: tailored information, assessment of withdrawal, offer of nicotine replacement therapy, booklets, and a discharge letter. Self-reported cessation at 12 months was validated with CO and salivary cotinine.
Results: There were no significant differences between groups in self-reported abstinence at three or 12 months post intervention, based on an intention to treat analysis. At three months, self-reported abstinence was 27.3% (I) and 27.5% (C); at 12 months was 18.5% (I) and 20.6% (C). There were no differences in validation of self-report between intervention and control groups at 12 months.
Conclusion: This brief nurse-provided in-patient intervention did not significantly increase the smoking cessation rates compared with the control group at either three or 12-month follow-up.
Implications: A systematic total quality improvement model of accountable outcome-focused treatment, incorporating assertive physician-led pharmacotherapy, routine assessment and recording of nicotine dependence (ICD 10 coding), in- and outpatient services and engagement from multidisciplinary teams of health professionals may be required to improve treatment modalities for this chronic addictive disorder.

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Glasgow and colleagues described the hospital stay as a unique "window of opportunity" for providing smoking cessation.[1] Hospitals provide a resident target group of patients, focused on their health, who must reduce or quit smoking for the duration of their stay and are being seen frequently by multiple health care professionals.[2-4] According to a recent Cochrane review of smoking cessation interventions for in-patients, while there is evidence for efficacy of intensive in-patient interventions with relapse prevention follow-up (OR=1.82, 95% CI 1.49-2.22), there is as yet inadequate evidence for the efficacy of brief in-patient interventions without designated follow-up for hospitalised patients.[3] Nurses have the highest level of patient contact, represent the largest group of health professionals and have an established role in patient education.[5] The aim of this study was to determine, through a randomised controlled trial, the efficacy of a brief nurse intervention for in-patients with minimal follow-up post discharge in achieving long-term smoking cessation among general hospital patients.

Methods

Design

The study design consisted of an initial cross-sectional prevalence survey of all hospital patients (both smokers and non-smokers). Potential participants were consecutive patients admitted to hospital over 12 months in 1997, who provided demographic and smoking history. Eligible patients who reported being smokers in the preceding 12 months were then randomly assigned to either a control group or the intervention group. Outcome measures were collected at three and 12 months post discharge. The study had approval from the Human Research Ethics Committees of the University of Newcastle and the Hunter Area Health Service, as well as the senior management of the hospital.

Sample

The study was conducted in a 500-bed, metropolitan, tertiary teaching hospital in the Hunter region of New South Wales, Australia. The names of potential participants were obtained from the Area Health Service's patient database of all

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hospital admissions. Eligible in-patients for the cross-sectional survey were aged 18-80 and admitted to the hospital for at least 24 hours during a one-year period from 31 January to 19 December 1997. Excluded were patients in accident and emergency, day surgery and dialysis, transplant and intensive care units.

Procedure

During every weekday morning of the data collection period, patient data from the hospital admissions database were downloaded on to a temporary database (LAPSMOKE), including name, medical record number (MRN) and ward location. The research nurse with the LAPSMOKE database visited each ward and met with the nursing unit manager (NUM) or nominee, who was responsible for determining the eligibility of each patient in their ward to be approached for recruitment into the study by the research staff. The criteria for NUM exclusion were: physical inability to provide informed consent (e.g. deaf, brain injury, unconscious); mentally unable to provide informed consent (e.g. Alzheimer's Disease, anxiety, depression, under medication influence likely to impair informed consent); inability to speak English; unexpected early discharge; and unspecified reason (for confidentiality the NUM declined to provide a specific reason). Patients were classified as either eligible, permanently ineligible or potentially eligible (e.g. still recovering from anaesthetic and may be eligible on a later day) to participate in the cross-sectional survey.

All eligible patients were approached at their bedside by the research assistant and provided with a standard information letter explaining the study and a consent form. The study was described to patients as being important for all patients, smokers and non-smokers alike, particularly the bedside interview (admission interview schedule) about personal characteristics and smoking history (not part of this hospital's standard admission procedure), and access to medical records to provide diagnoses. The study was also described as involving possible receipt of information booklets, counselling about withdrawal symptoms, the offer of nicotine replacement therapy (NRT), letter to their GP post discharge and follow-up telephone calls post discharge. In addition, they may be asked for permission for a research assistant to visit their home to take a breath sample using a smokelyser or provide a salivary cotinine sample.

A trained research assistant administered the admission interview schedule to all consenting patients, which comprised demographic and smoking status questions. Never smokers and ex-smokers (who had quit more than 12 months before admission) ended their participation here. Patients who reported smoking within the last 12 months (this included current smokers and those who had quit smoking in the preceding 12 months, who could all potentially benefit from the intervention) were entered by the research assistant at the patient's bedside into the LAPSMOKE program on a laptop computer, which gave an immediate random allocation to either control or intervention group that could not be changed. Randomisation was based on blocks of 20 patients being assigned to either control or intervention. Stratification into recent smoker and recent quitter categories occurred prior to randomisation. Patients assigned to the intervention group had a Smoking Cessation Clinical Pathway document placed on their bedside chart (identifying them to ward nurses), and were also included in the client list for the clinical nurse specialist (CNS). Patients in the control group were not identified to either ward nurses or the CNS and were not approached further as part of the study during their hospital stay.

After discharge, all patients in the RCT were contacted by telephone and surveyed at three and 12 months post discharge. Multiple attempts were made to telephone contact non-responders and after 10 unsuccessful attempts, patients were posted a survey and reply-paid envelope. Patients who were not contactable (but were not deceased or withdrawn) at three months were included at later follow-up. Research assistants were trained to deliver the telephone surveys and were blind to the allocation group. Investigators were blind to the results throughout the study and follow-up period.

Validation by carbon monoxide and salivary cotinine measurement was carried out for all patients who reported abstinence at three and 12 months. A research assistant went to the home of the participants to obtain a saliva sample and perform carbon monoxide testing.

Intervention

The patient intervention components consisted of: assessment and identification of smokers with the Smoking Cessation Clinical Pathway – one copy on the patients' bedcharts (identifying intervention patients for ward nurses and providing a reporting vehicle for care delivery) and one for the CNS; two brief CNS-delivered counselling sessions; delivery of patient booklets, *A guide for hospitalised smokers – Surviving a smokefree hospital stay*, and *A guide for friends and relatives – How to help a hospitalised smoker*, delivered by the research assistant at recruitment; offer of nicotine replacement therapy and discharge letter for patients' general practitioner.

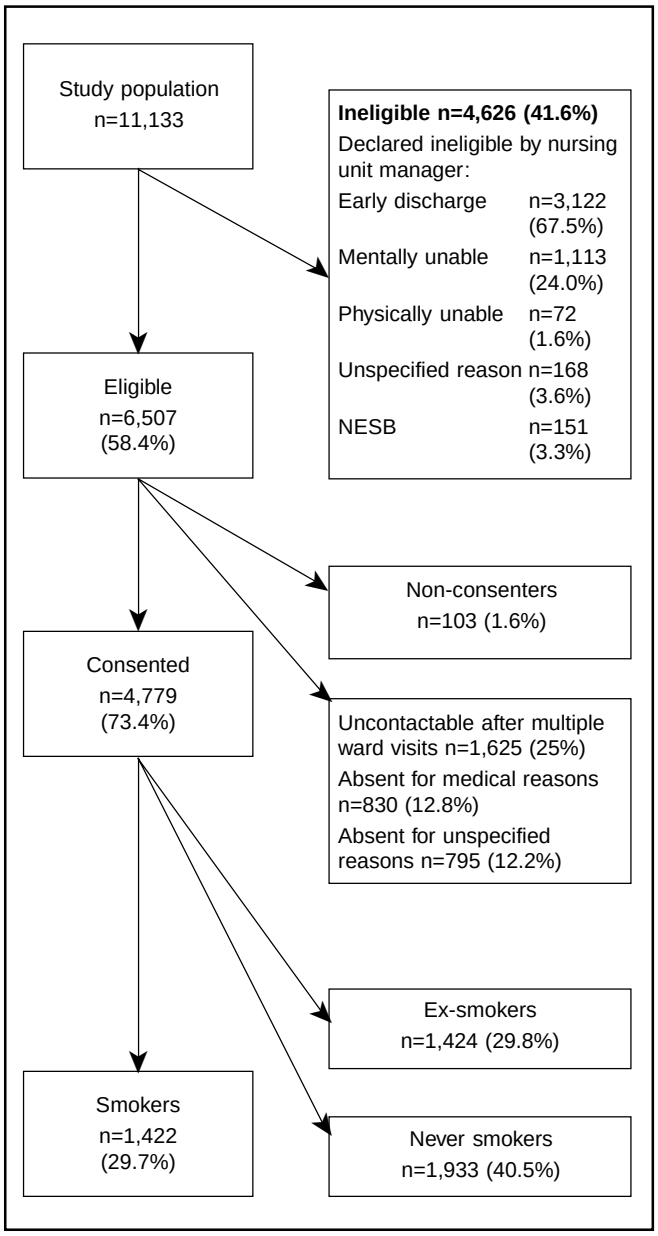
Additionally, the intervention involved training of at least half of all full-time equivalent ward nurses (during their in-service training) in the delivery of brief opportunistic smoking cessation advice; placement of a smoking cessation manual at the nurses' station on each ward, and inclusion of NRT in the hospital pharmacy and training of a nurse educator on each ward to support staff.

Usual care for smokers at the time of the study involved no standardised smoking assessment, minimal contact about smoking or symptoms, no pharmacotherapy available in the hospital pharmacy, no discharge plan, and smoking behaviour was not considered part of the drug and alcohol counsellor's role. The control group received (for ethical informed consent) assessment of their smoking status, information about the smoking research trial and the components of the intervention that participants may receive. In addition, they had two follow-up telephone surveys at three and 12 months post discharge asking about their smoking status (and for some patients a visit to take CO and saliva samples

was also involved). All managers were informed of the trial and that nurses would only be asked to provide care to patients who had consented to receive care (as identified by the Smoking Cessation Clinical Pathway on the bed-chart).

The CNS scheduled two bedside visits to the patients. Patient visits were individualised according to their stage of readiness to quit, including those in maintenance stage. Smokers were given tips for coping with abstinence and assessed for NRT through questions on the clinical pathway: *"How long before admission did you smoke a cigarette? (Within 24 hours or >24 hours but <one week). Do you smoke more than 15 cigarettes per day? Do you smoke your first cigarette within 30 minutes of waking? Are your withdrawal symptoms severe? Do you want to try nicotine patches?"* If the patient met any of the above criteria the CNS asked the patient if they wanted NRT, and if they agreed the medical team were contacted with a recommendation to commence NRT. Patients who were given NRT were assessed regularly for side effects and benefits and provided with five days' supply post discharge. The CNS also arranged for the post discharge letter to be sent to the patient's GP.

Figure 1: Recruitment flowchart.



Measures

The brief bedside admission interview schedule included socio-demographic questions (gender, education, employment, and occupation) and self-reported smoking status questions: *"Have you ever smoked any cigarettes, cigars or pipes? If no (Never Smoker) and if yes, can you tell me when you smoked your last cigarette?", with response options: Since admitted to hospital (Recent Smoker); On the day of admission but not after entering hospital (Recent Smoker); In the week prior to admission (Recent Smoker); In the 3 months prior to admission (but not in the week prior to admission) (Recent Quitter); More than 3 months but less than 12 months before admission (Recent Quitter); More than 12 months before admission (Ex Smoker).*

The Smoking Cessation Clinical Pathway document (both the bedside chart and that retained by the CNS) measured the delivery of intervention care components.

The main outcome measures were obtained through the three- and 12-month post-discharge telephone interviews, and included both self-reported point prevalence (24 hours) of abstinence and continuous abstinence since discharge. Validation was carried out at 12 months using carbon monoxide testing with a Smokerlyser (model ACE 055) on all self-reported abstinent patients. Two readings were taken for each patient. If a discrepancy arose between both readings, i.e. one registered above the cut-off level and one below, a third reading was sought for clarification. The cut-off level was set at convention at 10 ppm (parts per million) above that point indicating exposure to carbon monoxide in cigarettes.[6] Saliva samples for cotinine measures were also collected and analysed by the Royal Prince Alfred laboratories in Sydney, using a cut-point of 50nmol/L with levels above indicating continued smoking.[7]

Analysis

A sample size of 700 was required to detect an absolute difference in smoking of 5% between control and intervention groups with a power of 80% and alpha of 95%, assuming that the control group had a quit rate of 10%. All responses were analysed on an intention-to-treat basis. No interim data analysis was performed throughout the study. Basic frequencies and odds ratios with 95% confidence intervals were calculated using STATA Version 5 software.[8]

Results

Characteristics of sample

Figure 1 shows a flowchart of patient recruitment to the study. Of the 11,133 patients admitted to the hospital during the study period, 6,507 (58.4%) were eligible and of these 4,779 (73.4%) consented. Of these, 1,091 (22.8%) were recent smokers (4.2% in the week prior to admission; 9.2% on the day of admission; and 9.3% since admission), 331 (6.9%) were recent quitters (2.7% in the three months; 1.2% in the 3-6 months and 3.1% in the 6-12

months prior to admission), 29.8% were ex-smokers and 40.5% were never smokers. Among the recent smokers, 25.2% were from obstetric and gynaecological wards, 24.7% were from surgical wards and 17.3% were from medical wards. The sample for the randomised trial comprised the 1,422 smokers (i.e. recent smokers and recent quitters). There were no differences between eligible and ineligible patients for gender, age and length of stay. Consenting patients were more likely than non-consenters to have a length of stay less than five days (OR=4.97, 95% CI 4.33-5.69).

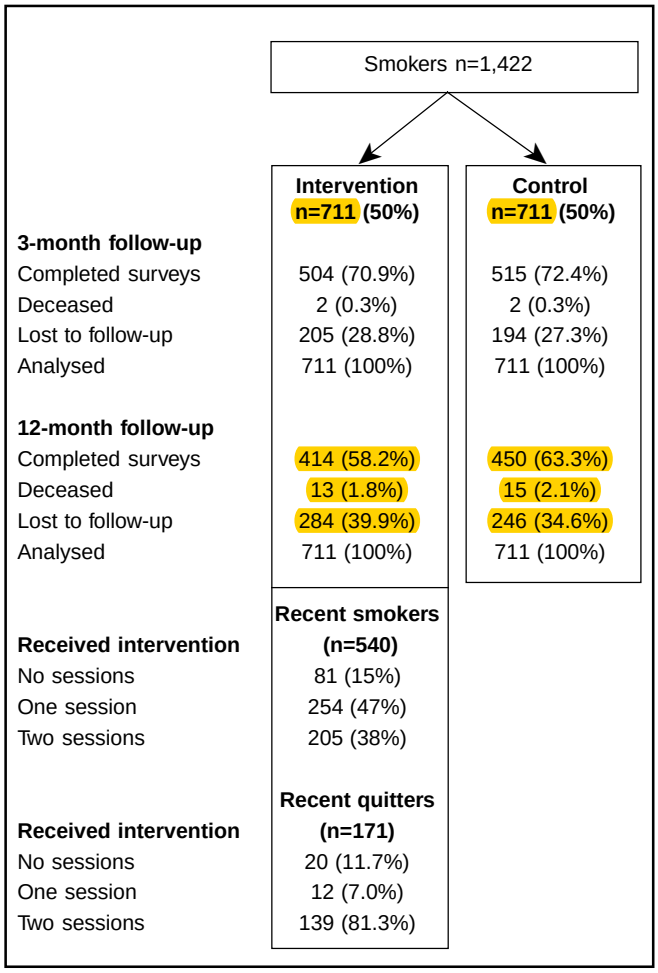
Figure 2 shows the phases of progress of study participants after randomisation. Table 1 shows that those in the intervention group were significantly more likely to be male, aged over 70 years, separated/divorced/widowed or employed. The randomisation process produced equivalent numbers of patients in the control and intervention groups, 711 in each group.

At three months there was no difference between the intervention (29.1%) and control (27.6%) groups for loss to follow-up (OR=1.07, 95% CI 0.85-1.36). At 12 months no difference for completed surveys or for loss to follow-up existed between the intervention group and the control group.

Three-month outcomes

Table 2 shows there were no differences between intervention and control groups, respectively, on self-reported point prevalence of abstinence (27.3% vs. 27.5%) and for self-reported continuous abstinence (18.5% vs. 20.6%) at three months. Among recent smokers, 15.2% of the intervention group compared with 16.7% (NS) of the control group reported point prevalence of abstinence. Among those who had quit smoking in the 12 months preceding admission, 65.5% (intervention) and 65% (control) reported abstinence for the last 24 hours at three months post discharge.

Figure 2: Study subject progress through RCT.



12-month outcomes

No differences were found between intervention and control groups in point prevalence of abstinence, (19.5% vs. 21.9%) or continuous abstinence (11.7% vs. 13.9%) at 12 months. Among recent smokers at 12 months 12.4% of intervention group and 15.4% of control group patients reported point prevalence of abstinence. Among those who had quit smoking in the 12 months preceding hospitalisation, 42% of the intervention group and 44% of the control group reported being abstinent in the preceding 24 hours.

Validation of outcomes

Results of biochemical validation of self-report in Table 3 show no significant differences between the groups in misreporting of smoking status based on CO or salivary cotinine. As can be seen from Table 3, the proportion of all patients (in both groups) providing self-report data at 12 months who refused (at 12 months) to participate in the validation study was approximately 50%. This could indicate either misreporting or a disinclination to have a home visit and intrusive testing. Conservatively classifying those who refused to consent to biochemical validation as smokers, the validation data shows that 9.4% (67/711) of intervention and 9.7% (69/711) of control patients were likely to have been accurately reporting abstinence for the last 24 hours at 12 months, based on carbon monoxide measurement. Similarly, based on salivary cotinine assay, 6.8% (48/711) of intervention patients and 7.7% (54/711) of controls were likely to have been accurately reporting abstinence for the last seven days at 12 months.

Process evaluation

The research assistant records showed that all patients in the intervention group received the two patient booklets (delivered by the research assistant) and their nominated GP was sent a letter after their discharge. The data from the Clinical Pathway document held by the CNS for each intervention patient indicated that the CNS visited 459 (85%) recent smokers on at least one occasion with 205 (37.9%) receiving two visits. The CNS spent a median time of 10 minutes per session (range 1-35 minutes). In the recent quitters intervention group, 151 (88.3%) received at least one visit from the CNS, with 139 (81.3%) of recent quitters receiving both planned CNS visits. The median time for each session visit in this group was five minutes (range 3-20). Patients seen by the CNS were visited within a median of two days of notification. Some patients were discharged prior to being seen by the CNS and thus missed sessions: 81 (15%) of the recent smoker intervention group and 20 (11.7%) of the recent quitter intervention group.

NRT was accepted by 29 (4.1%) of patients in the intervention group and prescribed and delivered to 22 (3.1%). The usual dose was 21mg patches with six patients being commenced on a smaller

dose of 14mg patch as per the pharmaceutical company guidelines for administration. Side effects such as nightmares were noted in some patients but were not sufficient to cease taking NRT.

The data from the Smoking Cessation Clinical Pathway on the patient bed charts show that no components of brief opportunistic counselling were recorded as having been delivered by ward nurses.

Discussion

This randomised controlled trial of a brief nurse-based smoking cessation intervention for hospitalised patients found no significant difference in the cessation rates between intervention and control groups at three or 12 months. Subsequent trials have found similar null results from a brief bedside intervention, which included a one-month follow-up telephone call (Rigotti 2000).[9] Additionally, a United Kingdom (UK) trial of 540 patients with myocardial infarction, given either usual care (control) or a brief 20-minute bedside intervention, reported no difference in cessation rates between groups at either six weeks or 12 months.[10]

Prior to discussing the implications and potential explanations for these findings, it is appropriate to review some aspects of the methodology used in this study.

First, the strengths of the study included: outcome data based on an "intention to treat" analysis, the randomisation process provided no opportunity for interference, and the blinding process for outcome measurement removed potential bias among interviewers and investigators. The study used a large sample size recruited from medical record numbers on the HOSPAS database for all admissions. Biochemical validation was used for self-reported smoking status. Recent smokers as well as recent quitters were included in the study and separately analysed, enabling comparison with other datasets.

Some limitations with the methodology also need to be noted. Two key methodological issues for an efficacy trial include the fidelity of intervention delivery and possible contamination between groups. Our process evaluation provided evidence of less than complete delivery of all the intervention components to the treatment group. While all intervention patients received

Table 1: Socio-demographic, hospital stay and recency of smoking characteristics among the sample of hospitalised smokers.

	Intervention n (%)	Control n (%)	*p* value	OR	CI
Sex (n=711)					
Female	430 (60.5)	475 (66.8)	0.242	0.76	0.61-0.94
Male	281 (39.5)	236 (33.2)	0.090	1.31	1.05-1.63
Age (n=711)					
≥18 ≤ 34	278 (39.0)	293 (41.2)	0.596	0.91	0.74-1.13
≥35 ≤ 69	299 (42.0)	315 (44.4)	0.589	0.91	0.73-1.12
≥70	134 (19.0)	103 (14.4)	0.062	1.3	1.03-1.81
Marital status (n=709)					
Married	403 (56.8)	430 (60.7)	0.458	0.85	0.69-1.05
Separate/divorced/widowed	135 (19.0)	106 (14.9)	0.084	1.33	1.01-1.76
Never married	171 (24.1)	172 (24.2)	0.961	0.99	0.77-1.26
Employment status (n=703)					
Employed full time/part time	274 (38.9)	237 (33.9)	0.160	1.25	1.00-1.55
Home duties full time	199 (28.3)	201 (28.8)	0.930	0.99	0.78-1.25
Student/ret/unemployed/unable	230 (32.7)	260 (37.1)	0.242	0.82	0.66-1.03
Occupation (n=708)					
Manager/professional/para prof	77 (10.8)	59 (8.3)	0.140	1.34	0.94-1.91
Trade/admin assistant	339 (47.8)	369 (52.3)	0.357	0.84	0.68-1.03
Sales/operator/manual	213 (30.0)	205 (29.0)	0.731	0.95	0.76-1.20
No job/home/other	79 (11.1)	72 (10.1)	0.588	1.10	0.79-1.55
Education (n=704)					
No/some secondary	165 (23.4)	147 (20.8)	0.356	1.15	0.90-1.49
Intermediate/HSC	424 (60.2)	439 (62.3)	0.687	0.91	0.73-1.13
Trade/apprent/cert/dip/degrees	115 (16.2)	118 (16.6)	0.855	0.96	0.73-1.28
Length of stay (n=683)					
≤5 days	347 (50.8)	358 (52.6)	0.735	0.93	0.76-1.15
≥6 ≤ 10 days	173 (25.3)	158 (23.2)	0.458	1.12	0.88-1.43
≥11 days	163 (23.8)	163 (23.9)	1.000	1	0.78-1.28
Smoking status at hospitalisation					
Recent smokers (smoked in week prior to admission)	540 (76.0)	551 (77.5)	0.809	0.91	0.71-1.17
Recent quitters (smoked in 12 months prior to admission)	171 (24.0)	160 (22.5)	0.625	1.09	0.85-1.39

assessment and identification, patient booklets and the post discharge letter sent to their GP, a proportion of patients in the intervention condition (15% of recent smokers and 11.6% of recent quitters) did not receive the brief bedside smoking cessation counselling from the CNS (due largely to the mobility of some patients in the hospital environment and patients not being in their bed on multiple contact attempts).

A second potential methodological limitation is the use of ward nurses in the intervention, which raises the potential for contamination of the control group. The general ward nurse elements of the intervention (in-service training of more than half of all nurses, the presence of Smoking Cessation Clinical Pathway tools on intervention patients' bed charts, the presence of training manuals at the nursing stations and the presence of the CNS in the wards every day) may have acted as prompts for ward nurses to intervene with other patients in the ward (some in the control group). However, given the lack of documentation from any ward nurses indicating the delivery of any smoking cessation care to the "identified and consenting" patients in the intervention group, it would seem unlikely that ward nurses were delivering any smoking cessation care. It is probable that in the hectic and overloaded work environment of the ward, and the presence of the smoking cessation CNS on the ward (capable, trained and employed to deliver the care), that a low priority was given to smoking cessation care by ward nurses. The lack of adoption by usual ward nursing staff of the protocols for providing cessation care has also been noted by other researchers, with Hajek et al. suggesting that inconsistent delivery of the intervention raised concerns about the feasibility of incorporating smoking cessation interventions in routine care.[10]

Table 3: Validation of abstinence reported at 24 hours (carbon monoxide) and seven days (salivary cotinine) at 12 months post discharge.

	Intervention	Control	OR	CI
Carbon monoxide validation				
CO obtained[a]	n=69	n=75		
CO reading ≤10 ppm	n=67	n=69	1.02	0.80-1.30
CO reading >10 ppm	n=2 (2.9%)	n=6 (8%)		
Salivary cotinine assay				
Saliva sample obtained[b]	n=62	n=66		
Saliva cotinine ≤50nmol/L	n=48	n=54	0.97	0.73-1.27
Cotinine detected >50 nmol/L	n=14 (22.6%)	n=12 (18.2%)		

Notes:
(a) Carbon monoxide validation: sample reported they had not smoked a cigarette in the last 24 hours.
(b) Salivary cotinine assay: sample reported they had not smoked a cigarette in the last seven days.

It is possible that there may have been some contamination between intervention and control patient (transfer of booklets or exposure to the CNS bedside counselling session). However, the 711 intervention patients were dispersed throughout the hospital's 11,133 admissions in the year of the study.

Another possible explanation of the null effect in this study could be a Hawthorne effect. The control group received considerably more than the usual care received by smokers in a hospital setting. The control group were assessed at the bedside for smoking status and history, informed of a list of potential care

Table 2: Proportion of patients self reporting abstinence (24 hours point prevalence and continuous) at three and 12 months post discharge.

	Intervention n (%)	Control n (%)	*p* value	OR	CI
Three-month outcomes					
Point prevalence of abstinence (24 hours)					
Total sample	194[a] (27.3)	196[b] (27.5)	0.928	0.98	0.79-1.23
Recent quitters	112[c] (65.5)	104[d] (65)	0.965	1.00	0.71-1.41
Recent smokers	82[e] (15.2)	92[f] (16.7)	0.561	0.90	0.66-1.25
Continuous abstinence					
Total sample	132[a] (18.5)	147[b] (20.6)	0.411	0.89	0.69-1.16
Recent quitters	84[c] (48.1)	91[d] (56.9)	0.433	0.86	0.59-1.24
Recent smokers	48[e] (8.9)	56[f] (10.2)	0.514	0.87	0.58-1.30
12-month outcomes					
Point prevalence of abstinence (24 hours)					
Total sample	139[a] (19.5)	156[b] (21.9)	0.367	0.89	0.69-1.14
Recent quitters	72[c] (42.1)	71[d] (44.4)	0.793	0.94	0.64-1.40
Recent smokers	67[e] (12.4)	85[f] (15.4)	0.210	0.80	0.57-1.13
Continuous abstinence					
Total sample	83[a] (11.7)	99[b] (13.9)	0.264	0.83	0.61-1.14
Recent quitters	47[c] (27.5)	53[d] (33.1)	0.413	0.82	0.53-0.41
Recent smokers	36[e] (6.7)	46[f] (8.3)	0.328	0.79	0.50-1.25

Notes:
(a) Intervention total sample n=711. (b) Control total sample n=711. (c) Intervention recent quitter n=171. (d) Control recent quitter n=160.
(e) Intervention recent smoker n=540. (f) Control recent smoker n=551.

they might receive if they agreed to participate in the study (including counselling, assessment of withdrawal symptoms, provision of booklets, offer of NRT and post discharge letter to their GP). Additionally, they were monitored over 12 months post discharge with follow-up telephone calls at three and 12 months by an interviewer asking about their smoking status, history since discharge and use of NRT. It is possible that these research components acted as an assessment and monitoring intervention and that the addition of the brief nurse intervention did not increase the cessation rates above this level. However, there is no evidence of the impact of such monitoring and assessment on cessation rates among hospital patients nor on the natural quit rate post hospitalisation. Both intervention and control conditions delivered a conservatively estimated point prevalence of abstinence at 12 months of 10% (based on classifying self-reported non smokers who were lost to follow-up, who refused biochemical validation, or who had CO >10ppm, as smokers).

Clinical practice guidelines for treating tobacco use and dependence recommend first-line pharmacotherapies (such as NRT) should be prescribed in the absence of contraindications.[11] In our trial, the offer of NRT was accepted by only a small proportion of patients in the intervention group and an even lower proportion were eventually prescribed and received NRT (3%). This is similar to studies of NRT use during hospitalisation reported by Emmons et al. in 2000 (7.1%)[15] and Rigotti et al. in 1999 (5.2%).[13] It may require more assertive prescription of pharmacotherapy for this chronic addictive disorder from a physician (similar to pharmacotherapies for hyperlipidemia and hypertension) than the 'offer' of NRT by a nurse to achieve compliance with best practice guidelines.

Of interest is the finding that of those patients who reported having quit smoking in the year prior to admission, only 65% (at three months) and 42% (at 12 months) reported being abstinent. This suggests that the risk of relapse is high among this population and that interventions to prevent relapse among recent quitter in-patients are appropriate.

Implications

The current study found that a brief nurse-provided in-hospital intervention did not increase the quit rate at three or 12 months post discharge, compared with the control group. One important outcome of this study is the finding that 10% (validated) of the control group had quit smoking at 12 months. Unfortunately, we do not have data on the spontaneous quit rate from hospitalisation. However, it is possible that the standardised assessment and monitoring of smoking status could yield abstinence rates of 10% (validated) at 12 months post discharge. Given the evidence for the efficacy of more intensive programs and the lack of evidence in this trial for brief interventions, a more co-ordinated systematic model seems necessary. For instance, the combination of multiple providers, in-patient and out-patient components, routine assessment and recording systems for coding of nicotine dependence (using the ICD-10 code of F17) on medical records together with more active pharmacotherapy could be beneficial.

It is notable that evidence of such an approach could be gathered using strategies other than large RCTs. For instance, a systematic, health system wide, total quality improvement model, which incorporates 12-month post discharge monitoring and feedback to hospital management on outcomes, has the potential over time to increase outcomes. Compared with efforts put into the detection and treatment of hypertension, the relative lack of assessment and treatment of smoking in hospitals is unsatisfactory. In view of the burden on the hospital budget of smoking-related admissions, it is imperative that hospital and health care management adopt systematic, outcome-focused treatment modalities for this chronic addictive disorder.

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