

Treatment of tobacco dependence in UK hospitals: an observational study

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ABSTRACT

Over a million smokers are admitted to hospitals in the UK each year. The extent to which tobacco dependence is identified and addressed in this population is unclear. Data on 14,750 patients from 146 hospitals collected for the British Thoracic Society smoking cessation audit were analysed to determine smoking prevalence, attempts to ask smokers about quitting, and referrals to smoking cessation services. Associations with hospital organisational factors were assessed by logistic regression. Overall hospital smoking prevalence was 25%. Only 28% of smokers were asked whether they would like to quit, and only one in 13 smokers was referred for treatment of tobacco dependence. There was a higher chance of smokers being asked about quitting in organisations with smoke-free sites, dedicated smoking cessation practitioners, regular staff training, and availability of advanced pharmacotherapy. Treatment of tobacco dependence in smokers attending UK hospitals is poor and could be associated with organisational factors.

KEYWORDS: Smoking cessation, tobacco dependence, hospital, smoke-free

Introduction

Despite significant progress in reducing smoking prevalence over the past 30 years, almost 16% of the population of the UK still smoke, and around 100,000 deaths each year are attributable to smoking.¹ The contribution of smoking to respiratory disease is not in doubt;^{2,3} however, non-respiratory conditions that are caused or exacerbated by tobacco use are also common, including ischaemic heart disease, cerebrovascular disease, cancers and infections,⁴ and many of these patients might be admitted to hospital for treatment.

Over a million smokers are treated in hospital each year in England alone,⁵ and there is evidence that hospital admission

offers a prime opportunity to treat tobacco dependence.⁶ Increased contact with health professionals, perceived vulnerability because of illness or impending surgery,^{7,8} and time in a smoke-free environment away from usual triggers are among the reasons why smoking cessation might be more effective in hospitals. There is evidence from the UK that hospital-based smoking cessation interventions work.⁹ Furthermore, simply referring a smoker to community services might be less effective.¹⁰ Smoking cessation is important not only for the prevention of ill health, but also as a core treatment for many pre-existing conditions. Targeting cessation in hospital could reduce the length of stay, for example by avoiding poor wound healing after surgery. However, it is unclear whether clinicians are effectively targeting hospitalised smokers and actively seeking to address their tobacco dependence by using evidence-based interventions, including behavioural support and pharmacotherapy delivered by trained professionals.¹¹ Therefore, in the current study, we sought to investigate the prevalence of smokers in UK hospitals, the extent to which these smokers were identified and offered treatment for their tobacco dependence, and the organisational determinants of treatment.

Methods

Clinicians from hospitals across the UK were invited to take part in the study through the 2016 British Thoracic Society (BTS) National Smoking Cessation Audit. Participating sites were instructed to review 100 randomly selected case notes of patients admitted in April and May 2016, to include at least 50 surgical and 50 medical admissions and covering at least two different specialties in each group. Patients from maternity, paediatric and mental health specialties were excluded. Participants were asked to screen each admission for smoking status, and to request additional records if fewer than 20 smokers were identified from the original selection.

For each record, information was collated on basic demographics (age and sex) as well as route of admission and hospital specialty. Documentation of smoking status, evidence that smokers were asked whether they would like to stop, and documentation as to onward referral and the use of licensed nicotine-containing products to help with abstinence were extracted from each record by local case-note reviewers. Further information on the organisation of local hospital-based stop-smoking services was also recorded; this included factors such as whether the hospital had a hospital smoking cessation practitioner, whether the

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service was supported by a dedicated senior member of staff, and whether pharmacotherapy was available in the hospital. Additional questions covered areas such as whether designated smoking areas were provided and whether frontline staff (including junior doctors, nurses and pharmacists) were offered regular smoking cessation training.

In total, 146 hospitals contributed to the study, providing data on 14,750 patients. Data were collated locally and inputted into the national database via a web-based collection tool, with further analysis completed centrally. Guidance notes were provided to all organisations taking part, and the survey questions were piloted on a smaller cohort of hospitals before the main study. Data collection forms are available in the supplementary data file. The BTS Quality Improvement Committee determined that ethical approval was not required for the conduct of the audit.

This large data set was then used for the analysis. The main outcome measures were whether smoking was documented in the medical record, whether smokers were asked about quitting, and whether they were referred on to smoking cessation services. Hospital smoking prevalence figures were compared with national prevalence data for the UK obtained from the Office of National Statistics using the chi-squared test,¹ which was also used to compare differences between demographic categories. Any patient classed as a current smoker without a valid record of smoking status from the current admission was not included in the analysis (smoking status likely obtained from elsewhere in the case notes, such as from preceding admissions). Logistic regression was used to assess the association between whether smokers were asked about quitting and both demographic and hospital organisational factors. Data analysis was performed using Stata, version 14.2 (StataCorp, TX, USA).

Results

Of the 14,750 patients screened, 73% had documentation of smoking status in the medical record. Of those with a valid record, 25% were current smokers. Demographics of the total population and the smoking population are shown in Table 1. Smoking prevalence was higher in males (28%) than in females (23%), with the highest prevalence in those less than 45 years of age (over 40%). Smoking was most common in those admitted under respiratory medicine (30%) and was more common in those admitted as emergencies (27%) than as electives (19%). The overall hospital smoking prevalence of 25% was significantly higher than the UK national average of 16% ($p < 0.001$).

Of 2,716 smokers, only 762 (28.1%) had been asked whether they would like to quit, and only 153 (5.6% of all smokers) had been referred to a hospital smoking cessation service. Overall, 57 (2.1%) had been referred to community cessation services, 21 (0.8%) had been referred back to their GP, and 15 (0.6%) had been provided with self-referral information. However, 362 (13.3%) reportedly 'did not want referral'. Of the smokers who had been asked whether they wanted to quit, 137 (18.0%) had no further action documented.

Patients in the 46–55 and 56–65 age categories, and those admitted under respiratory medicine, were more likely to be asked whether they wanted to quit. Patients in Wales were less likely to be asked about quitting than were those in England, and emergency admissions were less likely to be asked than were elective admissions (Table 2).

In terms of organisation factors, there was a higher chance of being asked about quitting in institutions with access to hospital-based smoking cessation services, those with a dedicated hospital smoking cessation practitioner, and those where services were supported by a dedicated senior member of staff (Table 3, Fig 1). Institutions providing regular training to frontline staff and those providing pharmacotherapy in addition to nicotine replacement therapy (varenicline and/or bupropion) also had a higher chance of being asked about quitting. Of the hospitals in the survey, 58% did not have varenicline on formulary. There was a negative association between being asked about quitting and whether an institution provided a designated smoking area, suggesting that staff in hospitals with smoking areas asked less about quitting. These associations persisted after adjusting for sex, age, country, route of admission and specialty.

Discussion

This is the largest study to date of the treatment of tobacco dependence in UK hospitals, reporting a smoking prevalence of 25% among those admitted to hospital, which is more than 50% higher than the overall UK prevalence of 15.8%. Only 28% of smokers had been asked whether they wanted to quit, and only 28% of this number had been referred to hospital or community smoking cessation services, meaning that, overall, only one in 13 smokers had been referred for evidence-based treatment. There was an association between more-comprehensive hospital smoking cessation infrastructure (namely, smoke-free grounds, on-site smoking cessation practitioners, provision of regular staff training, and availability of comprehensive pharmacotherapy) and an increased chance of smokers being asked about quitting.

There is a gap in the literature on the prevalence of smoking in hospitals, but the results of this study suggest that a significantly higher proportion of people in hospital are smokers than among the general population. Smoking was particularly prevalent in younger patients, with prevalence rates remaining above 30% in those aged 65 or under, and among emergency admissions. Targeting smoking cessation treatment to hospitalised patients, a population enriched with patients who smoke, could have a significant impact as well as being an efficient use of resources.¹²

The high concentration of smokers in hospitals did not lead to high rates of treatment for tobacco dependence in our study, with only 28% of smokers being asked whether they would like to quit. This low rate of addressing tobacco smoking contrasts with evidence that hospital admission offers a prime opportunity to encourage quitting,⁶ thereby providing secondary prevention (to reduce disease progression and prevent exacerbations) and tertiary prevention (optimising function in the context of chronic illness).^{13–15} Evidence is also growing that smoking cessation in hospitalised patients is effective.^{9,12} The 'Ottawa Model' for smoking cessation, a systematic approach to tobacco dependence treatment used in Canadian hospitals, was recently shown to yield significantly lower rates of readmissions and emergency department attendances, as well as significant reduction in 1- and 2-year mortality.¹² The reasons for patients not being asked about quitting are likely multifactorial, but include beliefs that addressing smoking is too challenging or not a priority, and that patients might not want to quit, with smoking seen as a lifestyle choice rather than a medical problem that requires treatment.^{16–18} Despite this, most smokers do want to quit.¹⁹ People consume tobacco because of addiction to nicotine and the trigger of

Table 1. Number of smokers by demographic status across UK hospitals

Demographic status	Total sample (n [%])	Proportion with valid smoking status (%)	Current smokers (n)	Proportion of smokers per group (%)	p-value
Sex					
Female	7,476 (50.7)	71.4	1225	22.9	<0.001
Male	7,274 (49.3)	73.8	1491	27.8	
Age group (years)					
16–25	842 (5.7)	72.0	251	41.4	<0.001
26–35	1,047 (7.1)	71.0	308	41.5	
36–45	1,206 (8.2)	72.8	373	42.5	
46–55	1,754 (11.9)	74.3	487	37.4	
56–65	2,174 (14.7)	74.9	496	30.5	
66–75	3,047 (20.7)	76.3	494	21.3	
76–85	2,947 (20.0)	71.8	246	11.6	
86–95	1,618 (11.0)	64.6	59	5.7	
96–105	115 (0.8)	54.8	2	3.2	
Country					
England	13,532 (91.7)	72.4	2,482	25.3	0.773
Scotland	100 (0.7)	95.0	24	25.3	
Wales	794 (5.4)	74.9	150	25.2	
Northern Ireland	221 (1.5)	62.0	41	29.9	
Channel Islands	103 (0.7)	80.6	19	22.9	
Route of admission					
Elective	3,419 (23.2)	68.7	446	19.0	<0.001
Emergency	11,331 (76.8)	73.8	2,270	27.2	
Specialty					
Surgical specialty	6,230 (42.2)	69.0	1,073	25.0	<0.001
Other medical specialty	6,063 (41.1)	74.7	1,097	24.2	
Respiratory medicine	1,766 (12.0)	80.9	429	30.0	
Other/not known	691 (4.7)	65.1	117	26.0	
Total – All patients	14,750	72.6	2,716	25.4	

dopaminergic pathways in the central nervous system. The rapid delivery of nicotine to the brain after inhalation of cigarette smoke contributes to its effectiveness, and this reinforces smoking behaviour as a means of satisfying nicotine cravings.^{20,21} This supports the concept of ‘tobacco dependence’ as a condition requiring treatment rather than simply a personal choice, and patients with high levels of nicotine addiction (eg those with mental health problems) benefit from treatment if it is offered.²²

The associations we identified between organisational factors and asking about quitting are complex, but do suggest that institutions with more-proactive stop smoking services seize more opportunities to address cessation, and it is entirely plausible that a culture where stopping smoking is seen as a priority, with drivers including smoke-free hospital sites, will encourage staff to address this more readily.¹² An example is the national smoke-free public places legislation in the UK, which came into force in 2007 and has contributed to a change in culture in several areas, including restaurants, transport and public buildings, with a significant

decline in UK smoking prevalence and a reduction in passive smoke exposure in adults and children.²³ Smoke-free hospital sites could encourage hospitals to treat tobacco dependence among inpatients more actively, reducing the impulse of patients to smoke inside hospital grounds. Although some institutions, such as mental health hospitals, face particular challenges with regards to smoke-free environments, there is evidence that policies can be implemented successfully,^{24–26} thereby reducing exposure of patients and staff to environmental tobacco smoke,²⁷ with significant health benefits.²⁸

Guidance from the UK National Institute for Health and Care Excellence (NICE) strongly supports the provision of hospital-based stop-smoking services, with intensive behavioural support and early provision of pharmacotherapy to both inpatients and outpatients.¹¹ There is evidence from both the UK and abroad that inpatient treatment of tobacco dependence increases quit rates and reduces readmissions.^{9,12} The National Institute for Health and Care Excellence recommends that all hospitals offer

Table 2. Association between being asked about quitting and demographic factors

Demographic factor	Current smokers (n)	Asked about quitting? (n (%))	Unadjusted odds ratio (95% CI)	Adjusted odds ratio (95% CI) ^a	p value
Sex					
Female	1,225	355 (29.0)	1.00	1.00	
Male	1,491	407 (27.3)	0.92 (0.78–1.09)	0.92 (0.77–1.09)	0.314
Age group (years)					
16–25	251	53 (21.1)	1.00	1.00	
26–35	308	69 (22.4)	1.08 (0.72–1.62)	1.01 (0.67–1.53)	0.952
36–45	373	83 (22.3)	1.07 (0.72–1.58)	1.01 (0.68–1.49)	0.973
46–55	487	144 (29.6)	1.57 (1.09–2.25)	1.47 (1.02–2.12)	0.039
56–65	496	178 (35.9)	2.09 (1.47–2.98)	1.80 (1.25–2.59)	0.001
66–75	494	158 (32.0)	1.76 (1.23–2.51)	1.43 (0.99–2.06)	0.059
76–85	246	69 (28.1)	1.46 (0.97–2.20)	1.17 (0.77–1.79)	0.460
>85	61	8 (13.1)	0.56 (0.25–1.26)	0.44 (0.20–1.01)	0.051
Country					
England	2,482	710 (28.6)	1.00	1.00	
Scotland	24	1 (4.2)	0.11 (0.01–0.81)	0.11 (0.01–0.82)	0.031
Wales	150	30 (20.0)	0.62 (0.41–0.94)	0.60 (0.39–0.91)	0.016
Northern Ireland	41	14 (34.2)	1.29 (0.67–2.48)	1.07 (0.55–2.10)	0.842
Channel Islands	19	7 (36.8)	1.46 (0.57–3.71)	1.34 (0.51–3.50)	0.548
Route of admission					
Elective	446	146 (32.7)	1.00	1.00	
Emergency	2,270	616 (27.1)	0.77 (0.62–0.95)	0.68 (0.53–0.87)	0.002
Specialty					
Surgical specialty	1,073	263 (24.5)	1.00	1.00	
Other medical specialty	1,097	281 (25.6)	1.06 (0.87–1.29)	1.17 (0.95–1.46)	0.140
Respiratory medicine	429	183 (42.7)	2.29 (1.81–2.90)	2.51 (1.93–3.27)	<0.001
Other/not known	117	35 (29.9)	1.31 (0.28–0.37)	1.26 (0.82–1.94)	0.284

^aAdjusted for sex, age, country, route of admission and admitting specialty. CI = confidence interval

a range of licensed nicotine replacement therapies, as well as varenicline (a partial nicotinic receptor agonist) and bupropion (an antidepressant), both of which have strong evidence of effectiveness above placebo in smoking cessation, with varenicline in particular among the most effective treatment options.²⁹ The National Institute for Health and Care Excellence also specifically recommends provision of regular training to all frontline staff, as a means of ensuring all smokers are offered treatment for their tobacco dependence.¹¹ The health economic benefits of treating tobacco dependence for individuals, hospitals and the wider society are well studied. In England, smoking is estimated to cost the NHS approximately £2 billion per year,⁴ and there is evidence that smoking cessation interventions in secondary care are cost-effective.³⁰ It is widely accepted that smoking cessation provides better value than many other interventions: as an example, the cost per quality-adjusted life year of stop-smoking support in chronic obstructive pulmonary disease is around a quarter of that of a single long-acting bronchodilator.³¹ Unfortunately, smoking cessation services in the UK are under threat because of

cuts to local authority funding, and there have been calls for new approaches for funding and a re-emphasis that all opportunities should be taken to encourage smoking cessation in the NHS.³²

A key strength of the current study lies in the large sample size, covering a variety of hospitals from across the UK, including both medical and surgical specialties and both elective and emergency admissions. Therefore, the prevalence estimate is likely to be highly applicable to the UK, and an improvement on previous work based on large data sets without clinical validation. However, there are limitations to the observational study design, such as the possibility of response bias because of the variable enthusiasm of local specialists. Those who are frustrated with local services might downplay their provision, whereas others might overestimate services to deflect perceived criticism. The association between organisational factors and asking about quitting also needs interpreting with caution because of the possibility of confounding by additional factors, such as funding.

Our assessment of case notes assumed that discussions about quitting smoking were adequately documented in medical records

Table 3. Association between being asked about quitting and organisational factors

Association	Asked about quitting? (n [%])	Unadjusted odds ratio (95% CI)	Adjusted odds ratio ^a (95% CI)	p-value
Does the trust have access to a hospital-based smoking cessation service?				
No	184 (18.1)	1.00	1.00	
Yes	523 (36.3)	2.58 (2.13–3.13)	3.03 (2.47–3.72)	<0.001
Does the trust have a dedicated hospital smoking cessation practitioner?				
No	272 (21.8)	1.00	1.00	
Yes	438 (35.3)	1.96 (1.64–2.35)	2.30 (1.91–2.78)	<0.001
Is the trust's smoking cessation service supported by a dedicated senior member of staff?				
No	273 (23.0)	1.00	1.00	
Yes	437 (33.5)	1.68 (1.41–2.01)	2.00 (1.66–2.42)	<0.001
Does the trust offer additional pharmacotherapy to NRT on formulary?				
Bupropion (Zyban)	No	533 (27.5)	1.00	
	Yes	177 (32.3)	1.26 (1.03–1.55)	0.041
Varenicline (Champix)	No	346 (24.2)	1.00	
	Yes	364 (34.4)	1.65 (1.38–1.97)	<0.001
Does the trust have a dedicated smoking area?				
No	473 (30.8)	1.00	1.00	
Yes	237 (24.9)	0.75 (0.62–0.90)	0.68 (0.56–0.82)	<0.001
Does the trust offer frontline hospital staff regular smoking cessation training?				
No (or not known)	341 (24.2)	1.00	1.00	
Yes	369 (34.1)	1.62 (1.36–1.93)	1.84 (1.52–2.21)	<0.001

^aAdjusted for sex, age, country, route of admission and admitting specialty. CI = confidence interval; NRT = nicotine replacement therapy

and that these data were uniformly extracted, although a multi-site pilot study completed in advance did attempt to anticipate potential problems. Furthermore, documentation of referral to stop-smoking services does not guarantee that patients actually attended these services and subsequently quit smoking, but it was necessary to use onward referral to specialists as a surrogate for being offered evidence-based treatment because this is the treatment that stop-smoking services provide.

Conclusion

Smoking is more common in secondary care than in the general population, but referral for treatment of tobacco dependence is rare. Smoke-free hospital grounds, on-site smoking cessation practitioners, regular staff training and the availability of advanced pharmacotherapy could improve treatment referral rates in hospitals. ■

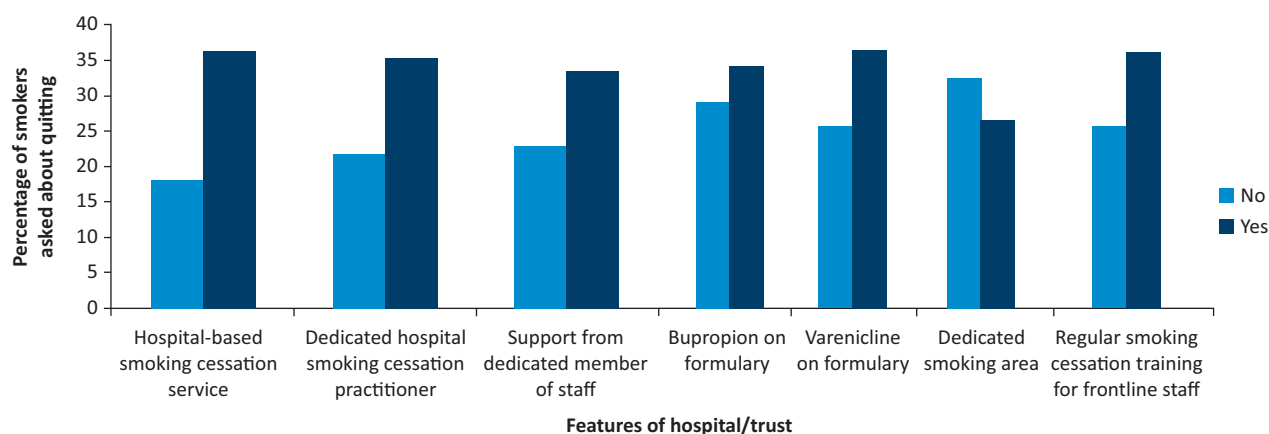


Fig 1. Association between trust organisational factors and likelihood of smokers being asked about quitting.

Conflicts of interest

No conflicts of interest exist for this work.

Author contributions

The study was conceived by the authors and other members of the British Thoracic Society Tobacco Specialist Advisory Group. ZM, LS and SA designed the specific study questions, with input from others. All authors were involved in carrying out the study. JH wrote the first draft of the manuscript, with all authors involved in the revision and approval of the final draft. SA is the guarantor.

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