

Smoking withdrawal in hospital patients: factors associated with outcome

SUBCOMMITTEE OF THE RESEARCH COMMITTEE OF THE BRITISH THORACIC SOCIETY*

ABSTRACT Factors associated with outcome were investigated in the British Thoracic Society's study of smoking withdrawal in 1550 patients attending hospital with smoking related diseases. A long term abstinence rate of 9.7% was found. Men did better than women, 12.2% of them succeeding in stopping smoking compared with 5.3% of the women. Success rate increased with age, and people with heart disease did better than those with any other diagnosis. The success rate of the best group, men with heart disease, was 21%. Sex, age, and diagnosis appeared to act independently. If the most important other person in the patient's life was a non-smoker success was more likely. Weight increased by an average of 5.9 kg over a year in those who stopped smoking.

In a comparative trial the British Thoracic Society found that hospital physicians' verbal advice to patients to stop smoking gave long term results similar to those achieved when that advice was supplemented with a booklet, or with a booklet plus placebo or nicotine chewing gum.¹ One year after joining the study 9.7% of 1550 patients had stopped smoking and remained abstinent. This paper reports further characteristics of the patients and the relationships of these to outcome.

Patients and methods

This was a multicentre study of newly attending or re-referred hospital outpatients and of inpatients with smoking related diseases and aged 18-65 years. Pregnant women, terminally ill patients, and those with psychiatric disorders were excluded. Patients were allocated randomly to one of four "treatments": 1—verbal advice from the doctor to stop smoking; 2—verbal advice plus a booklet on how to stop smoking; 3—the same as (2) plus placebo chew-

ing gum and instructions on its use; 4—the same as (2) but with nicotine chewing gum (Nicorette, 2 mg pieces) and instructions on its use. The gum treatments were double blind. On entering the study all patients completed a questionnaire asking about their marital status, occupation, smoking habits, and attitudes, including attitudes towards their smoking and their health.[†] Age, sex, weight, and diagnosis were recorded by the doctor. The smoking withdrawal strategy was included as part of the discussion of the treatment of the patient's condition. Patients could chew up to 15 pieces a day for three months. Follow up forms were completed at out patient attendances at one, three, six, and 12 months, when patients were asked about their smoking, as well as about the ease or difficulty of stopping and reasons for success or failure. Weight was recorded at 12 months and venous blood samples were taken at six and 12 months for determination of carboxyhaemoglobin and thiocyanate (SCN) concentrations in those who claimed to have stopped smoking.

As there was no difference in outcome between the four treatments¹ the data have been pooled for an analysis of factors associated with success in stopping smoking. Success was recorded when an individual claimed abstinence at the six and 12 month visits and continuously between those times, where the claims were confirmed by the carboxyhaemoglobin or thiocyanate concentrations at both visits, or at one visit if blood was taken on only one occasion.¹ Patients who failed to attend for follow up at six and 12 months were classed as smokers.

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[†]A copy of the questionnaire has been lodged with the editor and further copies are available from the author.

STATISTICAL METHODS

The significance of differences between means was assessed by *t* tests and between proportions by χ^2 tests or, when the numbers were small, by calculation of the exact probability. The dependence of success rate on age in the two sexes and three diagnostic groups was explored by a covariance analysis, using logistic regression since proportions, which cannot exceed 100% or be less than 0%, are not themselves in general related linearly to another variable.

Where differences between groups of patients with different characteristics are reported the statistical significance is given; but it should be remembered that the patients were not allocated at random with regard to these characteristics, and many of them may be interrelated. Moreover, the numbers answering different questions varied, and this could be a source of bias.

Results

CHARACTERISTICS OF THE SAMPLE

Table 1 shows the mean age, cigarette consumption, sex, and social class distribution of the patients taking part in this study together with information from three other studies: ordinary (smoking) patients of general practitioners,³ smokers attending a specialised smoking withdrawal clinic,⁴ and smokers who responded to a television programme offering help in stopping smoking.⁵

Disease of the respiratory system (mostly chronic bronchitis and emphysema) formed the primary diagnosis in 81% of the patients, while 9% had ischaemic heart disease. The remaining 10% had peptic ulcer, hypertension, or peripheral vascular disease as their primary diagnosis. Only 85% acknowledged that they had health problems related to their smoking, though 96% thought that they would be healthier if they stopped smoking and 93% said they wanted to stop smoking. Although 92% thought that they were addicted to smoking 71% were confident that they would be able to stop smoking for at least one year. None of these beliefs showed any significant sex difference. The three

reasons most commonly given for wanting to stop smoking, apart from health, were the expense (mentioned by 30% of the sample), dislike of being addicted (20%), and smoking being a dirty habit (18%). These items were from a list that also included "not fair on other people," "example to younger people," "some other reason," and "no other reason." Concern about putting on weight as a result of stopping smoking was expressed by 41% of the men and 59% of the women.

At one month 60% of the 1550 patients admitted to smoking, 23% claimed to be abstinent, and 17% failed to keep their follow up appointment. At three months the corresponding figures were 51%, 20%, and 29%; at six months 50%, 17%, and 33%; and at 12 months 54%, 18% and 28%. Of 260 patients claiming to be non-smokers at six months who had blood tests, 70 (27%) had results which suggested that they were smoking. At 12 months the proportion was 25% (58 of 232). By our criteria, one year after joining the study 150 patients (9.7%) had stopped smoking and remained abstinent.

RELATION OF SOME FACTORS TO OUTCOME

There was a large and highly significant difference in success rate between the sexes, 12.2% of men succeeding compared with only 5.3% of women ($p < 0.001$). Because of this all other factors were analysed separately for each sex. Table 2 shows six factors related to success. The success rate increased with age in men and women. Men with ischaemic heart disease did much better than men with any other diagnosis. In women this effect was not as strong.

Single or married men were more likely to succeed than separated or divorced men. In women there was a suggestion of such an association ($p = 0.16$). If the most important other person in the patient's life was a smoker success was less likely, although in women the effect just failed to reach significance. Female smokers who thought that they were addicted were less likely to succeed in stopping than those who did not think so, but in men the trend was not significant. Men who were confident in their ability to stop smoking were more likely to

Table 1 Characteristics of patients in this study compared with those in three other studies

	Hospital patients* (n = 1550)	GPs' patients ³ (n = 1567)	Smokers' clinic patients ⁴ (n = 69)	"Reports Action" responders ⁵ (n = 1752)
Mean age (years)	49	40	41	35
Mean consumption (cigarettes/day)	24	16	32	25
% of men	63	37	43	39
% from social classes I and II†	26		51	22

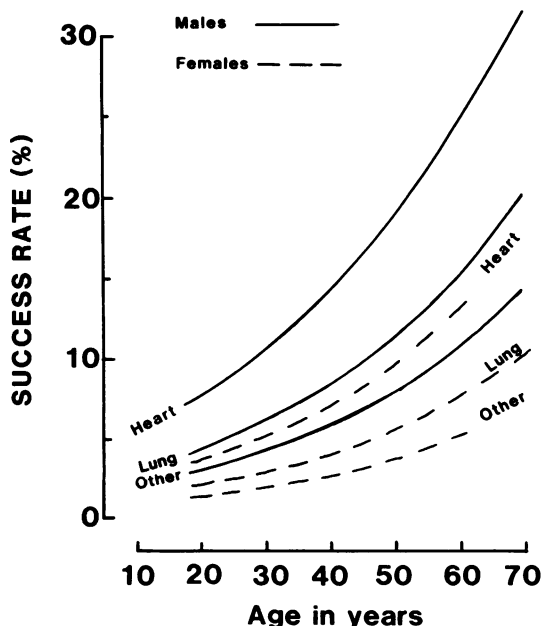
*This study.

†Proportion in general population 18%.⁶

Table 2 Factors associated with success in stopping smoking

	% succeeding*	
	Men	Women
AGE (y)	n = 969	n = 565
Up to 45	6.2	2.8
45-54	13.2	6.6
≥55	15.9	7.1
<i>t</i> = 3.92	p < 0.001	p < 0.001
DIAGNOSIS	n = 976	n = 566
Chest	11.7	5.2
Heart	20.7	8.3
Other vascular	12.8	5.6
Other	5.8	5.1
χ^2 (3 df) and p	11.3, p < 0.01	0.5 p < 0.99
MARITAL STATUS	n = 934	n = 509
Married or single	12.8	6.3
Divorced or separated	4.5	1.5
χ^2 (1 df) and p	3.9, p < 0.05	2.5, p = 0.16
MOST IMPORTANT OTHER PERSON	n = 920	n = 541
Smoker	8.9	3.9
Non-smoker	15.6	7.6
χ^2 (1 df) and p	9.7, p < 0.01	3.5, p = 0.06
PERCEIVED DEGREE OF ADDICTION	n = 935	n = 542
Extremely, fairly, slightly	12.3	5.2
Not at all	20.0	16.7
χ^2 (1 df) and p	2.0, p < 0.2	4.4, p < 0.05
CONFIDENCE IN ABILITY TO STOP FOR A YEAR	n = 967	n = 551
Confident	13.7	5.5
Not confident	7.9	5.4
χ^2 (1 df) and p	5.8, p < 0.02	0.001, p > 0.9

*The different totals are due to the different number of patients with missing data for each variable.



Relationship between success rate and age by sex and diagnosis.

succeed, but in women there was no such association (table 2). There was a suggestion that men who thought that they had a health problem related to smoking were less likely to succeed than those who did not think so (11.7% v 17%, $p = 0.053$) but there was no corresponding trend among women (5% v 7%, $p > 0.3$).

Cigarette consumption, social class, concern about weight gain, and perceived benefit of stopping smoking did not relate to success.

RELATIONSHIPS BETWEEN SEX, AGE, DIAGNOSIS, AND OUTCOME

Relationships between sex, age, diagnosis, and outcome of attempts to stop smoking are shown in the figure. Success rate significantly increased with age ($p < 0.001$), to an extent that did not vary significantly between the sexes or between diagnoses ($p > 0.8$). Sex and diagnosis independently displaced the regression line along the age axis. There was no evidence that sex and diagnosis were not acting independently.

PATIENTS' RESPONSES TO TREATMENT

Initial stopping and eventual outcome

Of the total of 976 men, 673 provided complete data on smoking status at one and three months: 202 (30%) said that they were not smoking at one month and 41 (20%) of these had relapsed by three months. Of the 574 women, 371 provided complete data on smoking status at one and three months; 90 (24%) claimed abstinence at one month and 25 (28%) of these had relapsed by three months. A higher initial stopping rate and a lower relapse rate among men both contributed to the higher eventual success rate (12% men, 5% women). If, however, patients for whom the data were missing are included as smokers the difference in the relapse rate is not evident at three months. The claimed abstinence rates at one month are then 25% in men and 19% in women, and at three months 22% and 16% respectively.

Of the 150 successes, 108 (72% of the 150 and 6.9% of all 1550 patients) claimed not to have smoked from the first month. These individuals were drawn evenly from the four treatment groups.

FACTORS ASSOCIATED WITH RELAPSE

The eventual successes and failures (at one year) were compared with regard to their responses at one month and at three months. At one month eventual failures were more likely to mention worry and anxiety as things which made them want to smoke. At three months there was no difference between the successes and failures in strength of craving but

fewer of the successes experienced craving, 56% of them having some craving compared with 74% of the eventual failures ($p < 0.01$) who were not smoking at three months. Those who were successful found it easier to do without cigarettes, 78% of them finding it easy compared with 52% of the failures ($p < 0.001$). They also were more confident that they would remain abstinent, 85% being certain that they would remain abstinent compared with 59% of the failures ($p < 0.005$). The failures were still more likely to mention worry and anxiety as things making them want to smoke.

Although it did not distinguish eventual successes from failures, the commonest cited situation in which these non-smokers at one and three months felt a desire to smoke was after a meal.

Patients' reasons for success or failure At one year the non-smokers were asked what had helped them most to give up smoking—family, close friends, work associates, will power, or something else (they were asked to choose one only). They cited will power most often (50%), illness or fear of future illness (15%), their families (13%), and their doctor (7%). Only 2% mentioned friends and 1% expense; no one mentioned work associates. Sixty five per cent of the successes said that it had been easier to stop smoking than they had expected and 73% said that they felt healthier than when they had smoked.

The failures at one year were offered a checklist of 13 reasons for failure, plus "other," and invited to tick any that applied (table 3). Women were more likely than men to mention "other smokers in the family" and "pressure at home."

Changes in smoking among smokers at one year Among the 763 patients for whom data on cigarette consumption were available at the begin-

ning and end of the study, the reported daily average fell from 23.6 to 14.1. Among women the average reduction was similar in all four treatment groups but men in the combined gum groups reduced their consumption more than those in the non-gum groups (11.6 v 8.7 respectively, $p = 0.01$). There was no difference between the two gum groups. Of 439 men who answered the question about change in smoking habit, 29% had changed to lower tar cigarettes, 8% to cigars, and 7% to a pipe. The corresponding figures for 309 women who responded were 33%, 0.2%, and zero.

Gum use in relation to other factors At one month and again at three months those still using gum were asked about their average daily consumption of gum, and at three months they were asked whether they would like a further supply. Among those who answered the question (58% answered at one month, 42% at three months) the average consumption was eight pieces per day at one month and seven pieces per day at three months. There were no significant differences in gum consumption at either of these times between those having active and those having placebo gum, or between eventual successes and failures. At three months one third of eventual failures asked for further supplies of gum and again there was no difference between those having active and those having placebo gum; but among the 29 eventual successes using nicotine gum who replied 15 (52%) requested further supplies compared with six (19%) of 31 using placebo gum ($p < 0.01$). Among those abstinent at one month there was no correlation between initial daily cigarette consumption and daily gum consumption in users of either active or placebo gum, or between daily gum consumption and change in cigarette consumption in those still smoking and chewing at one month.

Weight gain The average weight gain among the successes was 5.9 kg compared with 0.5 kg among the failures ($p < 0.01$). There was no difference in weight gain between the sexes or between treatment groups. The average weight gain in the successes was not due to extreme increase in weight in a few individuals.

Discussion

Although the criteria of success in stopping smoking cannot be regarded as absolute proof of long term abstinence, they add to our confidence in patients' claims of abstinence and we considered the data to be sufficiently sound to support the study of the factors associated with success.

Our patients were older and a greater proportion were men than in the populations in the other studies shown in table 1. There was a strong associa-

Table 3 Reasons given at one year for failing to stop smoking by 837 patients who attended for follow up

Reason	% mentioning reason†
Lack of willpower	28
It relieves tension	24
Addiction	16
Enjoy it too much	13
Other smokers among friends	12
Other smokers in family	11*
Couldn't stand the craving	10
Pressure at home	9*
Felt awful	8
Pressure at work	7
It helps my confidence	7
Other smokers at work	7
Not convinced I should give up	3

*There were no sex differences on any except the asterisked items: 10% of men and 14% of women mentioned other smokers in the family ($p < 0.01$) and 6% of men and 15% of women mentioned pressure at home ($p < 0.001$).

†Percentages are of the total number of failures—that is, 860 men, 540 women.

tion in our study between being male and success and between older age and success. Russell's study of the effect of advice in patients attending their general practitioner, in which a lower success rate was found, had a younger sample with fewer men.³ Ours were hospital patients with smoking related diseases, quite different from the highly motivated clients of smokers' clinics.⁴ Our patients had smoking related symptoms and may already have been advised to stop smoking, yet still persisted: clearly they formed an unpromising group.

Sex, age, and diagnosis appeared to affect outcome independently (fig) so the greater success in men cannot be explained by age or diagnosis. Some smokers' clinic studies show no differences in outcome between men and women^{7,8} but in many other studies men have done better.^{9,10} Women may well need more or a different kind of support in stopping smoking than men.

The finding that older people were more likely to succeed is consistent with the results of other studies^{8,10} and may be because the effects of smoking become more apparent and more serious with increasing age.

The higher success rate in people with heart disease is in line with the encouraging results of Burt *et al* in the survivors of myocardial infarction.¹¹ They reported that 63% claimed to have stopped smoking at long term follow up, although these claims were not checked by carboxyhaemoglobin or thiocyanate measurement. The 42% success rate in similar patients reported by Wilcox *et al* was validated.¹² The greater success may relate to differences in speed of onset and progression of disease, and the way these affect motivation to stop smoking. A heart attack is a dramatic and frightening event, whereas chronic chest diseases affect people slowly and stopping smoking can always be delayed another day. Clearly better ways must be found of persuading patients with chest disease to stop smoking.

The finding that patients were less likely to succeed in stopping smoking if the most important other person in their life was a smoker suggests that the clinician should try to persuade this other person to stop smoking with the patient, or at least advise the patient to take account of this factor.

The sex difference in eventual outcome may have been due to a higher initial abstinence rate in the men and a higher relapse rate in the women (since the difference in the eventual success rates was so much greater than the difference in the initial abstinence rates). Pressure at home and the existence of other smokers in the family were often cited by women as reasons for failing. Traditional social roles may be partly responsible for the lower success of

women.¹³

Of patients abstinent at one month, those who mentioned worry and anxiety as things which made them want to smoke again were more likely to relapse. Interestingly, at one year the second most common reason given for failing to stop was that smoking relieved tension.

The reduction in daily cigarette consumption, or switching to lower tar cigarettes or to pipe or cigars, in those who failed to stop smoking may at first sight seem encouraging. But, since such smokers tend to compensate by increased inhaling¹⁴ or, in the case of those switching to a pipe or cigars, tend to continue inhaling,⁷ we think that these changes in consumption are probably clinically unimportant and patients should be told so. Since 28% of our eventual successes had smoked at some time between one and six months after the start of the study it is worth encouraging patients to continue trying even if they do not succeed at first.

Weight gain after stopping smoking is common but our average of 5.9 kg is more than in other studies, in which gains of from 2.7 kg to 5.1 kg have been reported.¹⁵⁻²⁰ Concern about weight bore no relation to success. Patients can be told that from a health point of view stopping smoking is more important than remaining slim.²¹

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