

Evaluation of General Practitioners' Use of a Smoking Intervention Programme

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A study was made of a smoking cessation programme in a four-man general practice to determine the efficacy of general practitioner counselling and follow-up. In the treatment group 33% of patients became abstainers at six months compared with 3% in the control group. Self-reports of smoking status were verified by blood tests. Patients were more successful if they attended the first three visits compared with those who did not fully attend (48%: 6%). Continuing smokers had significantly higher blood concentrations of cotinine, thiocyanate and carboxyhaemoglobin per cigarette smoked at six months than at entry, despite a 30% decrease in stated cigarette consumption. This suggests that when smokers reduce the number of cigarettes smoked they compensate by increased inhalation.

If general practitioners in Australia widely used the intervention programme with similar success this could have a major impact on the smoking habits of the three million smokers in Australia between 16 and 65 years of age. The total cost of the visits is a fraction of the medical treatment for a cigarette-related disease.

There has been relatively little change in prevalence rates of cigarette smokers in Australia since 1974.¹ Approximately 40% of males and 31% of females currently smoke cigarettes, although trends indicate that male smoking is declining, whilst female smoking is increasing.²

General practitioners have unique opportunities to counsel patients about smoking during medical consultations. Approximately seven million people in Australia between the ages of 16 and 65 years, representing 80% of this age group, visit their general practitioner at least once annually.³

Studies in other countries involving general practitioner participation in smoking intervention programmes have resulted in long-term abstinence rates of 3-23%⁴⁻⁷ without the use of nicotine chewing gum.

In this paper we present the results of general practitioners' use of an intervention programme for smoking cessation.

SUBJECTS AND METHODS

Assignment to Groups

The study was conducted in a four-man general practice in Sydney. Patients were randomly allocated to either treatment group A (100 smokers), or control

group B (100 smokers), and control group C comprised 200 non-smokers: ex-smokers and those who had never smoked. Patients were visiting their GP with a specific medical complaint. Smokers were randomly allocated to either treatment or control groups on alternate days. There were 15 smokers who refused to participate in the study and were therefore not randomized and have been excluded from the analysis.

In smoking groups A and B there were approximately equal numbers of participants in each age group, except for the 16 to 20 years group which had greater representation in control group B. Sixty six per cent of smokers and 74% of non-smokers were over 30 years of age. There were more males in treatment group A (55%) than in groups B (34%) or C (44%). Less married people were in group B (49%) than in groups A (69%) or C (67%). The majority of participants were of lower middle class according to Daniels' gradings of occupations,⁸ comprising, for example, bus drivers, office clerks, shop assistants and hairdressers.

The discriminant function test was performed to examine for differences in sample characteristics between smokers in groups A and B, as any major differences may have had important implications in the interpretation of the results. The variables entered into the analysis were age, sex, social class, marital status, education, cigarette consumption and duration of smoking. The analysis revealed that group A had

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significantly more males and married people than group B. However, as these variables did not predict response to the intervention programme, these differences in sample characteristics at entry were not regarded as significantly affecting the outcome results of the study.

Participants in treatment group A made six visits and those in control groups B and C made two visits to the doctor over a six-month period.

Patients were excluded if their age was outside 16 to 65 years, they had inadequate understanding of the English language and had an intention to leave Sydney within six months. Non-attenders at each visit after entry were included in the results as continuing smokers for that visit. Non-attenders at the six months' visit were categorized as dropouts irrespective of their attendance at previous visits. Reasons given for dropping out after the first visit included sudden job transfers, domestic problems, illness and loss of interest in continuing the programme.

Blood and Lung Function Tests

Measurements of lung function and blood concentrations of tobacco products were made at the initial visit for all participants. At the completion of six months all participants had lung function tests, and subjects in groups A and B had repeated blood testing. Blood was analysed for plasma cotinine (gas chromatography) using a 12.5 m × 0.2 mm i.d.,⁹ plasma thiocyanate (colorimetric assay following ion exchange chromatography on Amerlyst A21 resin,¹⁰) and carboxyhaemoglobin (automated spectrophotometric method using an I L CO oximeter¹¹). Lung function testing was limited to spirometry performed with a wedge spirometer (Vitalograph) and the best of three measurements of FEV₁ and FVC was used.

Intervention Technique (Treatment Group A)

Patients attended the doctor six times during the study period: first, second, third and fifth weeks, three and six months. At the first visit all participants had blood taken, spirometry performed, weight measured and a detailed questionnaire administered. The questionnaire provided information relating to medical and smoking histories, levels of dependence on cigarettes, motivation to quit, anxiety and self-control. The patients were given a day diary to record their pattern of smoking over the next week. During this week the patients were asked to reduce their cigarette consumption. At the second visit emphasis was placed on patient education in an attempt to change attitudes to smoking and smoking behaviour. This was achieved by providing the participant with the results of their blood and lung

function tests, and abnormal test results were discussed in terms of their risk of developing cigarette related diseases. A display of 12 photographs illustrating examples of lung and heart disease and their increased incidence in smokers was shown to the patient. The general practitioners had a step-by-step guide presented in a handbook which assisted them to administer the intervention programme.¹² The general practitioner gave the patient a manual, '*Become a Non-Smoker*',¹³ written by the authors which presented information about the smoking habit, personal exercises and strategies for maintaining abstinence. At the second visit the patient was strongly advised to quit smoking rather than to gradually reduce. The doctor discussed withdrawal symptoms, weight management, substitutes and alternatives to smoking, countered arguments of rationalizations for smoking and suggested a social support network.

At the three and five weeks and three and six months visits, the general practitioner continued to support and encourage abstinence. The patients discussed their problems and successes in overcoming smoking urges. At the six months' visit weight was measured, blood and lung function tests repeated and the results were compared to initial values. A follow-up questionnaire to determine psychosocial and health changes, and participants' perceptions of the smoking cessation programme was administered.

The costs of each of the visits at the time of the study according to the Medical Benefits Schedule (Commonwealth Department of Health) were \$13.20 for a standard consultation of 5–25 minutes in the surgery, and \$24.50 for a long consultation of 25 to 45 minutes. The first visit to the general practitioner was either a standard or a long consultation depending on the patient's presenting complaint. The second visit was a long consultation for patient education. The third, fourth, fifth and sixth visits were standard consultations. The total cost was under \$100.00, a fraction of the cost incurred by medical treatment for a cigarette related disease. The cost of the assays of cotinine, carboxyhaemoglobin and thiocyanate was \$6.00 per person for the study. For the wider application of the programme in general practice, salivary cotinine will be measured.

RESULTS

Forty four in treatment group A were abstinent after the first three treatment visits, 36 remained abstinent at five weeks, 30 at three months and 33 at six months (Table 1). Smoking status at six months was validated by blood cotinine (cot), carboxyhaemoglobin (COHb) and thiocyanate (SCN) levels for all but two subjects

TABLE 1 *Number of subjects in the treatment group in each smoking category at follow-up visits.*

Smoking status of treatment group	Follow-up visits		
	5 weeks	3 months	6 months
Abstainers	36	30	33
Reduced smokers (1 to 49% of original consumption)	8	5	6
Continued smoking (50 to 100% of original consumption)	7	7	36
Non-attenders/dropouts	49	58	25
Total	100	100	100

whose self-reports were verified by family and fellow workers. Two smokers reporting abstinence had blood concentrations similar to smokers, and further questioning confirmed their continuing smoking status enabling them to be reclassified as smokers. Six continuing smokers reduced to less than half of their initial cigarette consumption by six months and the remainder were smoking 50 to 100% of their initial consumption or were dropouts (Table 1). The apparent large increase in the numbers of smokers at six months compared with those at five weeks and three months was due to non-attendance by many of them at the earlier visits and their subsequent response to written and telephone requests.

Attendance at the first three treatment visits was important to the outcome as 31 of 64 (48%) subjects who attended each of the first three treatment visits were abstinent at six months contrasting with two of 36 (6%) who did not attend at each of these visits.

Only 3% of the control smokers stopped smoking by six months compared with 33% in the treated group. Twelve of the subjects in the non-smoking group took

up regular smoking or had the occasional cigarette during the same period. The dropout rate from the programme at six months was 25% in treatment group A, 23% in control group B (smokers) and 9% in control group C (non-smokers).

Sixty five per cent of all the participants considered that it was part of the doctor's role to help people quit smoking, and this attitude was particularly expressed by ex-smokers in group C (Table 2). Most participants (70%) were satisfied that the chances of a successful outcome were increased if the programme was administered by a doctor. Abstainers and continuing smokers in group A had similar expectations of the doctor's involvement. Health was the main reason given by the majority of participants in treatment group A (81%) for wishing to stop smoking.

The majority of abstainers in group A considered that discussion of their spirometry (88%) and blood test results (85%) had been an important motivating factor in their decision to stop smoking. The continuing smokers were less convinced (50% and 43% respectively).

Before joining this programme the main factors perceived by the participants to have caused their relapse at the last quit smoking attempt were habit (33%), domestic stress (31%) and work stress (17%). These three factors remained the major ones cited at the end of six months by relapsing smokers.

Continuing smokers in group A consumed significantly fewer cigarettes (17 ± 13 S.D. per day) at six months than at entry (26 ± 16 S.D. per day), $p < 0.0001$ (Table 3). After five weeks in the programme, the cigarette consumption of the continuing smokers had reduced by 67% but by six months this reduction was only 30%. The relationship between the number of cigarettes smoked per day and the ratios of SCN, cot and COHb per cigarette smoked at entry and at six

TABLE 2 *Number of participants in the three study groups who considered the doctor as important in the stop smoking process.*

Is it the doctor's job?	Treatment group		Control group (smokers)		Control group (non smokers)			
	N	(%)	N	(%)	Never	Ex-smoker	N	(%)
Yes	56	57 *(47-67)	57	61 (51-71)	100	70 (62.5-77.5)	45	80 (69.5-90.5)
No	42	43 (33-53)	37	39 (29-49)	43	30 (22.5-37.5)	11	20 (9.5-30.5)
Total	98	100	94	100	143	100	56	100

Note: Not all participants answered this question.

* 95% confidence limits.

TABLE 3 Mean, SCN, cotinine and COHb levels per cigarette smoked at initial and six months' follow-up for attending treatment group subjects.

Smoking status of treatment group	Mean cigarette intake	SCN/cig.*	Cotinine cig.**	COHb/cig.***
<i>1st visit</i>				
Abstainers at six months	24	4.55 (3.7–5.4)†	68.78 (50.4–87.2)	0.17 (0.14–0.21)
Continued smokers at six months	26	5.67 (4.6–6.7)	95.37 (77.8–112.9)	0.23 (0.20–0.27)
<i>Six months' visit</i>				
Continuing smokers	17	11.04 (8.06–14.02)	120.85 (86.57–155.13)	0.36 (0.24–0.48)

* SCN/cigarette = $\frac{\text{mean thiocyanate}}{\text{mean cigs/day}}$

** Cotinine/cigarette = $\frac{\text{mean cotinine}}{\text{mean cigs/day}}$

*** COHb/cigarette = $\frac{\text{mean carboxyhaemoglobin}}{\text{mean cigs/day}}$

† 95% confidence limits.

months for continuing smokers in treatment group A is shown in Table 3. Although the mean reported number of cigarettes smoked per day had declined at six months, the SCN, cot and COHb concentrations were similar to those at entry, so that the concentrations per cigarette consumed were significantly increased. Blood concentrations per cigarette in smoking control group B did not change appreciably over the study period.

DISCUSSION

The results show that the general practitioner is in a strategic position to successfully counsel patients about smoking cessation. The intervention programme was comparatively effective with 33% abstinence in the treatment group compared with 3% in the control group. Self-reports were verified by blood tests. This result compares favourably with other GP based programmes.^{4–7} The largest of these studies by Russell *et al* in the UK,^{4,5} provides an estimate of what general practitioners can achieve by simple advice to stop smoking. In Russell's programme patients were counselled for two minutes during a routine consultation and were given a four-page prescription pamphlet on how to quit. A sample of participants had self-reported outcome verified by nicotine concentration in saliva. Although there were modest abstinence rates of 5% and 4% from this relatively low intensity programme, the outcome was encouraging as it showed that some smokers respond to brief advice from their doctor and maintain abstinence from four weeks to 12 months.

In another study, patients were given a longer counselling session at entry, were provided with an educational pamphlet and were evaluated at six

months.⁶ Twenty three per cent of those who completed follow up with appointments at one, three and six months after entry, had stopped smoking, compared with 12% in a second group receiving similar counselling at entry but no follow-up. However, self-reports were not validated and interpretation of the results has to be qualified, as misreporting of smoking status among abstainers has been found to range from 5% to 25%^{14–16} and was 6% in our study.

The Research Committee of the British Thoracic Society found that 10% of smokers who attended hospitals and chest clinics quit in response to verbal advice alone.¹⁶ Evidence of cigarette-related diseases may have been a key motivating factor in that study. Indeed we noted that health was the main reason given for quitting in our study.

Hunt and Bspalec investigated relapse in 84 smoking modification studies and found that only 25 to 20% of abstainers at the end of treatment remained abstinent nine months later, and that relapse occurred mainly within the first 90 days following treatment.¹⁷ An important finding in our study was that the abstinence rate was maintained from five weeks to six months and suggests the value of follow-up and support. The main reasons given for relapse in our study were domestic and work stress and non-specific internal and external cues associated with the habit.

Our study found that self-reports of reduced cigarette consumption were a poor index of reduced exposure to tobacco products. The results indicate that there is a tendency for continuing smokers to regulate their tobacco exposure to relatively constant levels. Whilst continuing smokers in treatment group A

reported a 30% decrease in cigarette consumption at six months, blood concentrations of SCN, cot and COHb have not changed and therefore blood concentrations per cigarette consumed had increased. This finding implies that either these continuing smokers had under-reported their intake at six months or that a reduction in cigarette consumption to tobacco products was accompanied by increased inhalation. Whilst both explanations may have been operating, there is evidence from other studies that smokers titrate their intake of cigarette products despite an apparent reduction in cigarette intake.¹⁸⁻²² Experiments have shown that smokers who switched from a high to a low nicotine cigarette increased the number of cigarettes smoked, smoked more of each cigarette and inhaled more deeply.¹⁹⁻²² A further implication is that reported consumption of cigarettes is not an accurate method for assessing the success of smoking cessation programmes.^{22,23} Most importantly advice should be given to quit completely rather than gradually reduce cigarette consumption.

Educating patients about the dangers of smoking, performing spirometry, drawing blood and regular follow-up, are practices compatible with the general practitioner's accepted role. Information about the blood and lung function test results and their correlation with cardiovascular and respiratory diseases were regarded as important motivating factors by patients in their decision to quit smoking. Most of the participants considered that it was part of the doctor's role to help people quit smoking, and that the chances of a successful outcome were increased if the doctor encouraged, educated and reinforced them to abstain from smoking. Further patients who attended the first three visits were significantly more successful than those who did not fully attend.

It has already been shown that the general practitioner can be successful in controlling hypertensive disease and reducing deaths attributable to stroke.²⁵ This has been achieved by maintenance drug therapy and dietary education with respect to salt and calorie intake, and has been reinforced by regular follow-up visits. In the same way, general practitioners can counsel about the adverse effects of smoking on health, can help maintain abstinence by regular follow-up visits and thus prevent cigarette related diseases. About half of the smokers who attended the first three treatment visits in this study were abstinent at six months indicating that the time and effort expended on each smoker by the GP in the first three weeks was rewarded.

Incorporation of this intervention programme into daily medical practice is an effective approach to achieving community-wide smoking cessation. If

general practitioners in Australia were to widely use this technique on their smoking patients who comprise one third of their patient population, with a 33% abstinence rate they could have a major impact on the three million smokers in Australia between 16 and 65 years of age. We organize workshops to teach general practitioners this programme of smoking intervention.

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