

Cigarette smoking and associated disease

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SUMMARY. I report an undergraduate medical student project in which a questionnaire was used to try to assess the present level of public knowledge about the harmful effects of cigarette smoking on health. Patients attending a health centre were selected for the study, and a total of 410 questionnaires were completed and analysed. Non-smokers appeared to be better informed about hazards than smokers. The general level of awareness was not as high as might be predicted in view of continual propaganda.

Introduction

IN 1952 Doll and Bradford Hill published their now famous report on the association between cigarette smoking and cancer of the lung. Since that time a vast amount of evidence has accumulated which has placed the relationship between cigarette smoking and lung cancer beyond any reasonable doubt. Two extensive epidemiological reports have been published by the Royal College of Physicians, the first in 1962 entitled *Smoking and Health*, and the second in 1971.

Lung cancer

The modern epidemic of lung cancer, which began in men in the 1930s, has progressed to the point where, in 1968 in the UK, 27,000 men and 5,500 women died from lung cancer. In men 47 per cent of these deaths occurred before the age of 65, and in women 45.6 per cent. Cigarette smoking has always been more prevalent amongst men than amongst women, but during the past 25 years the gap has been steadily closing, with the inevitable result that the death rate from lung cancer in women is rising. Thus the numbers of deaths in women due to lung cancer in England and Wales for the years 1950, 1960, and 1970 were 1,978, 3,118, and 5,436, respectively. In 1974, deaths in England and Wales from cancer of the lung amounted to 26,500 for men and over

6,600 for women. The mortality from this disease alone is at present five times as great as that from road traffic accidents (OPCS, 1976).

The prediction contained in the 1971 report from the Royal College of Physicians is worthy of repetition: "If in England and Wales there is no change in the number or kind of cigarettes smoked, it has been forecast from present trends that male deaths from lung cancer will level off in the 1980s at some 35,000 to 40,000 per year. At that time the female deaths will probably have reached about 10,000 to 15,000 per year, so that the total loss of life from lung cancer will be between 45,000 and 55,000 every year."

It is reasonable to conclude that, in view of recent extensive government-supported publicity, most people should know that smoking is harmful to health, at least in relation to lung cancer. There is a tendency for the association between cancer of the lung and cigarette smoking to receive greater emphasis than its other health hazards, though it is estimated that each year in the UK over 25,000 men and women die from bronchitis and emphysema after many years of disability. Chronic bronchitis and coronary artery disease are more important factors than cancer of the lung in the loss of time from work. The number of working days lost during 1968 to 1969 through sickness due to all respiratory disease is reported to be of the order of 25 million and a substantial part of this figure is accounted for by chronic bronchitis.

Coronary heart disease

Coronary heart disease is now a major cause of death in the developed countries, and in Britain the number of deaths attributed to this disease has been rising steadily during the past 40 years. Of the 99,082 men between the ages of 35 and 64 years whose deaths were recorded in the UK in 1968, 31,013 (31 per cent) died from this form of heart disease, which was also responsible in the same year for the deaths of 7,582 (13 per cent) of 57,483 women who died. In England and Wales in 1974 approximately 150,000 deaths were attributed to ischaemic heart disease of various forms (OPCS, 1976). It is generally agreed that cigarette smoking is one factor in the aetiology of coronary heart disease (Dawber *et al.*,

1962), and stopping cigarette smoking diminishes significantly the number of deaths from this condition (Fletcher and Horn, 1970).

Other diseases

Other diseases of the circulation, including peripheral arterial disease and strokes, are also related to cigarette smoking (Begg, 1965). Some American studies have shown an increased liability to strokes in both female and male cigarette smokers, death rates from strokes rising with the increasing numbers of cigarettes smoked at all ages up to 75 years.

Cigarette smoking delays the healing of gastric and duodenal ulcers so that they are more persistent and more often fatal in smokers than non-smokers. The fact that smoking is increasing among women has other important implications. It has recently been recognized that maternal smoking in pregnancy is associated with both a reduction in birth weight of the baby and an increase in perinatal mortality (Butler *et al.*, 1972). There is also good evidence that smoking in pregnancy is associated with an impairment of mental and physical growth in later childhood (Butler and Goldstein, 1973).

In the light of this evidence it is perhaps time, as Godber (1967) has said, that more was made of the other effects of cigarette smoking. In terms of morbidity and mortality, and thus socially and economically, these diseases are at least as important as lung cancer.

Method

To estimate the level of public awareness of the hazards of smoking, a structured self-administered questionnaire relating to the patient's age, sex, social class (occupation), smoking habits, and knowledge of the effects of cigarette smoking was used. The patients who were asked to participate in the survey were those aged 16 years and over attending a health centre. Both morning and evening surgeries were involved. On reporting to the surgery reception desk the patients, and those accompanying them, were asked to complete and return a questionnaire before leaving the centre. In the majority of cases the request was made by me, but some patients were approached by the surgery receptionist. Having completed the questions relating to age, sex, marital status, occupation, and smoking habits, the patients were asked to reply 'Yes', 'No', or 'Do not know' to a possible association between cigarette smoking and the following diseases: stomach ulcers, diseases of the circulation, cough/phlegm (chronic bronchitis), lung cancer, heart attacks, and strokes.

Most patients (92 per cent) completed the questionnaire before seeing their general practitioner, but a small number did so after their consultation. This depended almost entirely upon how long they were required to wait. The close co-operation of the doctors involved ensured that those who elected to complete the questionnaire following their consultation did not

receive any special guidance.

A pilot study of 30 questionnaires was completed successfully, and the main study begun. During a period of five days, a total of 410 questionnaires were completed and submitted for analysis. The number of patients refusing to complete the questionnaire was only eight (two per cent) during the whole survey.

Data processing and computation were carried out with the help of the relevant departments of the University of Manchester Medical School. The data were prepared in the form of 12 line, 80 column IBM punch cards for computer analysis. The first computer output provided a general analysis, and after examination of the initial findings, more detailed comparisons were made. Correlation and analysis of all the computer data available were then carried out.

Results

General analysis

A comparison of the sex, marital status, age distribution, number of smokers, and pattern of smoking of the group studied with those of the general population (Registrar General, 1973; Tobacco Research Council, 1976) suggested that this sample was representative of the national population.

The relationship between smoking and knowledge about health hazards

All the patients included in the study were asked if they would say (in terms of 'Yes', 'No', or 'Do not know') that any of the following were more common among

Table 1. Social class and smoking status.

Social class	Smokers (Percentage of social class tested)	Non-smokers (Percentage of social class tested)	Total (Percentage of total number tested)
1	3 (21.4)	11 (78.6)	14 (3.5)
2	16 (25.8)	46 (74.2)	62 (15.5)
1 + 2	19 (25.0)	57 (75.0)	76 (19.0)
3	95 (45.0)	116 (55.0)	211 (52.9)
4	17 (32.7)	35 (67.3)	52 (13.0)
5	30 (71.4)	12 (28.6)	42 (10.5)
Retired	5 (27.8)	13 (72.8)	18 (4.5)
Total	166 (41.6)	233 (58.4)	399 (99.9)

$\chi^2 = 30.4$; $p < 0.001$; d.f. = 4.

Social classes (1 + 2) and 5 are most obviously different.

Table 2. Association between smoking and lung cancer according to age. (Responses 'Yes', 'No', and 'Do not know' to the question, 'Do you think smoking causes lung cancer?').

Age	Yes (Percentage of age group tested)	No (Percentage of age group tested)	Do not know (Percentage of age group tested)	Total (Percentage of total number tested)
16 to 24	34 (56.7)	6 (10)	20 (33.3)	60 (14.7)
25 to 34	63 (64.3)	5 (5.1)	30 (30.6)	98 (24.0)
35 to 44	41 (56.9)	10 (13.9)	21 (29.2)	72 (17.6)
45 to 54	44 (53.7)	14 (17.1)	24 (29.3)	82 (20.1)
55 to 64	24 (46.2)	11 (21.2)	17 (32.7)	52 (12.7)
65 +	15 (34.1)	2 (4.5)	27 (61.4)	44 (10.8)
Total	221 (54.2)	48 (11.8)	139 (34.1)	408 (100)

Two failed to reply.

$\chi^2 = 28.9$; significance $0.1 > p > 0.01$; d.f. = 10.

cigarette smokers than non-smokers—lung cancer, stomach ulcer, diseases of the circulation, cough/phlegm (chronic bronchitis), heart attack, and stroke.

An analysis of the responses was made according to the patients' smoking status, sex, age, and social class.

Smoking status

Among the sample of 410 patients, 173 (42 per cent) were smokers and 237 (58 per cent) were non-smokers. There was no significant difference in the age distribution of smokers and non-smokers. In particular, patients in the age group 16 to 24 years smoked as frequently as patients in older age groups. Both these

observations support the view that current antismoking propaganda does not inhibit the onset of the habit of cigarette smoking, and that an additional educational programme is required to achieve this objective.

There were significantly fewer smokers in social classes 1 and 2 and substantially greater numbers in social class 5. There was no substantial difference between social classes 3 and 4. The differences are shown in Table 1.

Sex

There was no significant difference between males and females in smoking status or the number of cigarettes smoked, nor was there a significant difference by sex in the view that cigarette smoking was related to the specified diseases.

Age

Of the total sample (smokers and non-smokers), the only significant deviation was in the association between lung cancer and smoking cigarettes. This difference was most marked in the age group 25 to 34 (Table 2).

From the table it is clear that a substantial proportion of the total population seemed to be unaware ('Do not know') of an association between smoking and related diseases. This observation was further explored by comparing the responses of smokers and non-smokers.

Smoking-related diseases

An analysis of the responses of smokers and non-smokers to questions relating smoking to specific diseases is shown in Table 3. There is a highly significant difference between the responses of smokers and non-smokers to the relationship between smoking and cancer of the lung, one of the most widely publicized associated diseases. Whilst a number of interpretations can be placed on the results, it is possible that smokers are well aware of the association but choose to deny it. There

Table 3. Analysis of the responses of smokers and non-smokers to questions relating smoking to specific diseases. (Percentages are given in brackets).

Disease	Smokers				Non-smokers				Total number of responses	χ^2	p (%)
	Yes	No	Do not know	Total (% of total number tested)	Yes	No	Do not know	Total (% of total number tested)			
Lung cancer	64 (37.0)	37 (21.4)	72 (41.6)	173 (42.2)	157 (66.2)	12 (5.1)	68 (28.7)	237 (57.8)	410	43	10.1
Stomach ulcer	33 (19.6)	50 (29.8)	85 (50.6)	168 (41.8)	55 (23.5)	42 (17.9)	137 (58.5)	234 (58.2)	402	7.7	2
Stroke	19 (11.1)	57 (33.3)	95 (55.6)	171 (42.4)	42 (18.1)	50 (21.6)	140 (60.3)	232 (57.6)	403	8.7	1
Cough etc.	142 (84.0)	10 (5.9)	17 (10.1)	169 (41.8)	205 (87.2)	7 (3.0)	23 (9.8)	235 (58.2)	404	2.1	>5
Heart attack	56 (32.6)	39 (22.7)	77 (44.8)	172 (42.1)	100 (42.2)	36 (15.2)	101 (42.6)	237 (57.9)	409	5.6	>5
Circulation	39 (24.7)	35 (22.2)	84 (53.2)	158 (42.0)	67 (30.7)	31 (14.2)	120 (55.0)	218 (58.0)	376	4.5	<5 >2

Table 4. Comparison of the 'Do not know' responses of smokers and non-smokers in relation to specified associated illnesses. (Percentages are given in brackets).

Specified associated illnesses	Smokers		Non-smokers	
	All responses ('Yes', 'No', and 'Do not know')	'Do not know'	All responses ('Yes', 'No', and 'Do not know')	'Do not know'
Lung cancer	173	72 (41.6)	237	68 (28.7)
Stomach ulcer	168	85 (50.6)	234	137 (58.5)
Stroke	171	95 (55.6)	232	140 (60.3)
Cough etc.	169	17 (10.1)	235	23 (9.8)
Heart attack	172	77 (44.8)	237	101 (42.6)
Circulation	158	84 (53.2)	218	120 (55.0)

Total number of smokers = 173.

Total number of non-smokers = 237

was a high degree of association between smoking and cough and bronchitis by both smokers and non-smokers. It could be presumed that this associated condition is one which smokers have the most difficulty in denying because they suffer the symptoms with sufficient regularity.

As part of the education campaign encouraged by the Department of Health, each cigarette packet carries a warning, "Smoking can seriously damage your health". Any cigarette smoker who is literate, and this must include all smokers in the survey who completed a self-administered questionnaire, cannot escape from the propaganda. It is therefore interesting to compare separately the 'Do not know' responses of smokers and non-smokers in relation to specified associated illnesses (Table 4).

For most associated diseases, smokers and non-smokers seem to be equally unaware of a connection with cigarette smoking. The exceptions are for cancer of the lung (non-smokers) and cough/phlegm (chronic bronchitis) (both smokers and non-smokers). This finding suggests the need for a more extended survey

because the implication is that the statement "Smoking can seriously damage your health" is either substantially ineffective or not sufficiently specific.

A comparison was made between the reaction of smokers and non-smokers to the amount of propaganda about smoking and health (Table 5). The results clearly indicate that smokers regard the propaganda to be at about the right level whilst non-smokers regard the propaganda to be quite inadequate.

Discussion

In retrospect, it would have been useful to have included a question about the important consequences of maternal smoking in pregnancy. The level of knowledge in relation to this question, particularly amongst females, is obviously important.

The level of knowledge about the relationship between cigarette smoking and cough/phlegm (chronic bronchitis) was high. Nevertheless, clinical experience suggests that patients do not generally associate cough and bronchitis with serious and debilitating disease, unless of course they suffer badly from its effects themselves. It would therefore have been more useful to establish the extent to which the patients associated cough with progressive bronchitis or long-term illness.

With any questionnaire, the validity of the evidence obtained depends upon the ability and readiness of the people concerned to complete the questions as accurately and as honestly as possible. The results suggest that smokers may deliberately deny to others, and possibly to themselves, a connection between smoking and associated diseases. It could be argued that smokers are at least as well informed as non-smokers about the health dangers of smoking. Indeed, smokers are as likely as anyone else to know of the association between cigarette smoking and the diseases discussed, and any apparent discrepancy between the level of knowledge found in smokers and non-smokers may not simply be a reflection of how well informed either group is. The probability has to be considered that smokers are far more ready to deny the validity of the evidence, or consciously to suppress their awareness of overt propaganda.

Conversely, non-smokers are probably more prepared to attribute harmful effects to cigarette smoking,

Table 5. Comparison of responses by smokers and non-smokers towards the amount of propaganda about smoking and health. (Percentages are given in brackets.)

Smokers				Non-smokers			
Too much	Too little	Just right	Total (% of total tested)	Too much	Too little	Just right	Total (% of total tested)
46 (26.9)	46 (26.9)	79 (46.2)	171 (42.0)	26 (11.0)	124 (52.5)	86 (36.4)	236 (58.0)

Total number of responses = 407.

 $\chi^2 = 32$; $p < 0.001$; d.f. = 2.

and this may also serve to increase the observed difference in knowledge between the two groups.

An important minority of both smokers and non-smokers replied 'Do not know' to the questions asked. These findings do not support the view of some writers that the level of knowledge about the harmful effects of cigarette smoking is now generally high (Baric, 1974).

Conclusion

Much more intensive health education is needed to increase public awareness of the dangers of cigarette smoking, both in relation to the risk of lung cancer and also in relation to the other serious diseases. More emphasis should be placed upon the effects of smoking on the cardiovascular system and on the potential long-term disability from chronic bronchitis. It may also be necessary to consider the educational needs of those who have not begun the habit in a different way from those who have an established addiction.

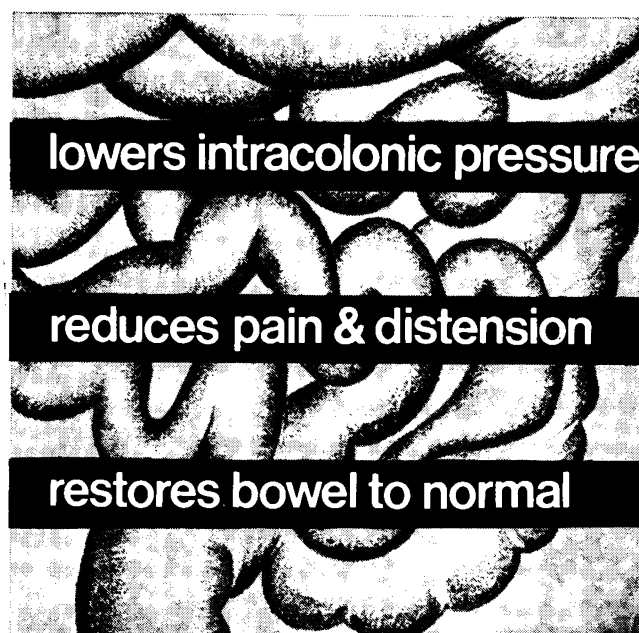
References

- Baric, L. (1974). Acquisition of the smoking habit and the model of 'smokers' careers'. *Journal of the Institute of Health Education*, 12, No. 1, 9-18.
- Begg, T. B. (1965). Characteristics of men with intermittent claudication. *Practitioner*, 194, 202-207.
- Butler, N. R. & Goldstein, H. (1973). Smoking in pregnancy and subsequent child development. *British Medical Journal*, 4, 573-575.
- Butler, N. R., Goldstein, H. & Ross, E. M. (1972). Cigarette smoking in pregnancy: its influence on birth weight and perinatal mortality. *British Medical Journal*, 2, 127-130.
- Dawber, T. R., Kannel, W. B., Revotskie, N. & Kagan, A. (1962). The epidemiology of coronary heart disease. The Framingham enquiry. *Proceedings of the Royal Society of Medicine*, 55, 265-271.
- Doll, R. & Bradford Hill, A. (1952). Study of aetiology of carcinoma of lung. *British Medical Journal*, 2, 1271-1286.
- Fletcher, C. M. & Horn, D. (1970). Smoking and health. *WHO Chronicle*, 24, 345-370.
- Godber, G. (1967). *Summary of the Proceedings of the First World Conference on Smoking and Health*. p. 107. New York: American Cancer Society.
- Office of Population Censuses and Surveys (1976). *Monitor WR 76/16*. London: Government Statistical Service.
- Registrar General (1975). *Statistical Review of England and Wales 1973*. London: HMSO.
- Royal College of Physicians (1962). *Smoking and Health* London: Pitman Medical.
- Royal College of Physicians (1971). *Smoking and Health Now*. London: Pitman Medical.
- Tobacco Research Council (1976). *Statistics of smoking in the United Kingdom*. Research paper 1, 7th ed. London: Tobacco Research Council.

Addendum

Mr Ashton has since qualified and is now a registrar in psychiatry at the University Hospital of South Manchester.

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