Obesity and Smoking Habits

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Summary

A large-scale survey of steel workers in South Wales has shown a considerable difference between the body weights of smokers and of non-smokers. The difference increases with age so that men over 40 years who have never smoked are on average 13 lb (5·9 kg) heavier than smokers. Even so, smokers are about 15 lb (6·8 kg) heavier than the weight standard considered desirable by the Metropolitan Life Insurance Company, while non-smokers are nearly 30 lb (13·6 kg) heavier.

About 20% of the men are attempting to give up the smoking habit. Ex-smokers who have given up smoking for more than eight years approach the body weight of men of the same age who have never smoked.

Many reports have been published on the health consequences of smoking and of obesity. Because smoking and obesity are inversely related studies of the interrelation of these two health hazards and of their relative importance are needed.

Introduction

With the virtual elimination of infection and malnutrition as causes of disabling disease and premature death in Britain, tobacco smoking and obesity have emerged as major health hazards. In men, for example, the risk of dying from coronary disease for cigarette smokers is more than twice the risk for non-smokers (Doll and Hill, 1964; Kahn, 1966), and to be 25% above average weight also more than doubles the risk (Society of Actuaries, 1959). Yet these two major health hazards are themselves inversely related: non-smokers weigh more than smokers, and smokers who give up smoking put on weight. Members of the general public are aware of this paradox, for in a study of motivation in smoking, some men who had given up smoking reported that they began to smoke again because they were putting on weight (Fox, 1966). Their fear of becoming overweight was apparently so great that they were prepared to escape from the hazards of obesity at the cost of exposing themselves, once again, to the hazards of smoking.

In view of this curious situation it is surprising that there is so little reliable information about the relation between body weight and smoking, indeed the trends of body weight by smoking habits reported in the literature "tend to be anecdotal rather than based on well-controlled studies" (Fox, 1966). More recently the report from the Royal College of Physicians (1971) stated that "comparison of the weights in surveys of working men have shown that non-smokers tend to be slightly heavier and taller than smokers . . . (and) smokers who stop often find they gain weight and the gain may be considerable."

In this paper we present some observations on the relation between smoking and obesity in 10,482 men employed at an integrated steel works in South Wales.

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Sources of Data

The data on height, weight, and smoking history used here are derived from a study of the prevalence of respiratory disability among men employed in steel works at Port Talbot and Ebbw Vale in South Wales. A full description of the methods by which the information was collected is given elsewhere (Lowe *et al.*, 1968). In another report (Khosla and Lowe, 1968) data on the height, weight, and obesity of these men have been presented and compared with the findings of earlier studies in Britain. In the present paper we look at the relation between smoking and obesity in the steel workers. The observed trends at Port Talbot and Ebbw Vale are very similar, so, for reasons of conciseness, only the data on the 10,482 men surveyed at Port Talbot are reported.

Results

Table I gives the percentage distribution of the men according to their smoking habits, within five-yearly age groups. At ages 35 and over about 65% of the men were smoking some type of tobacco, 20% were attempting to get rid of the habit, and 15% had never smoked.

Because there is as yet no reliable method of measuring body fat which can be easily applied in the difficult circumstances of a large-scale epidemiological investigation, recourse must be had to indices of overweightness as measures of obesity. In an earlier paper (Khosla and Lowe, 1967) we discussed the problem of estimating obesity from weight and height and have concluded that (weight) ÷ (height)^2 provides the most satisfactory index on the grounds that it is highly correlated with weight and, unlike other combinations of weight and height, is independent of height.

Within age groups the ex-smokers in our survey tend to be a little taller than the smokers (Fig. 1). The "never smoked" group and the current smokers are about the same height. More important, the younger men (20-24) are about 3 in (7·5 cm) taller than the older men (60-64); this is mainly a cohort effect, the reasons for which we have discussed elsewhere (Khosla and Lowe, 1968). Our obesity index (W/H^2) adjusts for these

TABLE I—*Percentage of Men by Age and Smoking Habits. Port Talbot Steelworkers* 1965

Smoking Category	Age in Years									All Ages
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	
Never smoked	32·4	27·7	27·1	16·8	13·8	12·1	14·8	11·7	9·6	17·5
Ex-smoker	15·5	17·9	17·7	20·7	23·4	21·8	20·0	20·9	22·9	20·5
Smoker	52·1	54·4	55·1	62·5	62·8	66·1	65·2	67·4	67·4	62·0
All types	100 (509)*	100 (799)	100 (1,371)	100 (1,642)	100 (1,800)	100 (1,489)	100 (1,339)	100 (930)	100 (603)	100 (10,482)

*Total numbers are given in parentheses.

TABLE II—*Mean and Standard Deviations of the Obesity Index W/H² by Smoking Habits and Age.*

Smoking Category		Age in Years								
		20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64
Never smoked	W/H²*	35·2	37·0	38·1	39·3	39·8	40·3	39·9	40·2	39·7
	S.D.	4·2	4·8	4·7	4·4	5·4	5·0	4·9	4·7	5·1
	No.	165	221	371	276	248	181	198	109	58
Ex-smokers	W/H²	35·0	36·7	38·2	38·7	38·9	39·2	39·4	38·6	39·8
	S.D.	4·3	4·6	5·1	4·4	4·3	4·2	5·0	4·8	4·5
	No.	79	143	243	340	422	324	268	194	138
Smokers	W/H²	34·4	35·8	36·8	36·6	37·3	36·9	37·5	36·7	36·5
	S.D.	4·7	5·0	5·0	4·7	5·0	4·9	5·2	5·0	5·0
	No.	265	435	757	1,026	1,130	984	873	627	407

*The value of the index W/H² (lb/in²) is multiplied by 1,000 in this and subsequent tables.

TABLE III—*Estimated Weights* (lb) at 68 in (173 cm) by Smoking Habits and Age*

Smoking Category	Age in Years								
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64
Never smoked	163	171	176	182	184	186	184	186	184
Ex-smoker	162	170	177	179	180	181	182	178	184
Smoker	159	166	170	169	172	171	173	170	169
Difference between never smoked and smokers	4	5	6	13	12	15	11	16	15

Range of desirable weights for men aged 25 and over for medium frame 142-156 lb (64·4-70·7 kg) (height with shoes at 69 in (175 cm) and weight in indoor clothes with shoes).
*In this and subsequent Tables (and the corresponding Figures) the estimated weights at 68 in (173 cm) have been derived from the observed obesity indices and are rounded to the nearest lp.

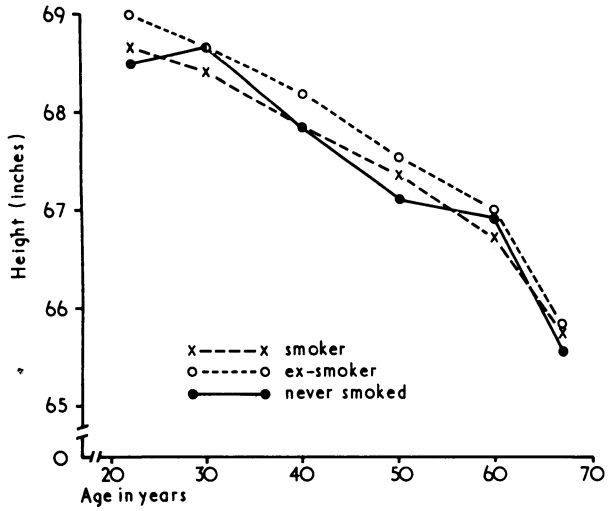

FIG. 1—Trends in standing height by age and smoking habits.

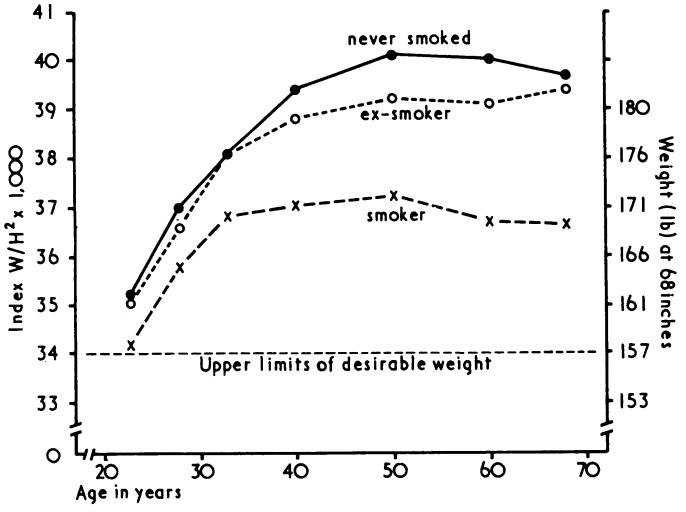

FIG. 2—Trends in obesity by age and smoking habits.

differences in height. Table II gives the trends of that index with age in the three smoking categories. Table III and the right-hand ordinate of Fig. 2 give the estimated weights (lb) at 68 in (173 cm). The fact that maximum height is reached by about 20 years of age (Fig. 1) raises the important question of whether it is biologically inevitable for weight to increase beyond that age. The Metropolitan Life Insurance Company (1959) gave desirable standards for weight (based on the most favourable mortality experience of insured men) for men aged 25 and over for three types of body frames (small, medium, and large).

In Fig. 2 the upper limit of desirable weight for medium frames is shown (a weight of about 156 lb (70·7 kg) for a height of 68 in (173 cm) without shoes). This desirable standard is attained in our population of steel workers at about 20 years of age, and thereafter body weight and obesity rise steeply until about 35 years of age. On average the weight of smokers tends to level off after the age of 35, but the "never smoked" group increase still further in weight until about 50 years of age. The differences in weight of men of different smoking habits increase with age, to the extent that in the middle-age groups men who have never smoked are about 13 lb (5·9 kg) heavier than smokers (Fig. 2 and Table III). In terms of obesity even the smokers are on average 15 lb (6·8 kg) heavier than the desirable standard, while the non-smokers are nearly 30 lb (13·6 kg) "overweight."

Table IV gives the mean values of the obesity index and mean estimated body weights by amount smoked in four 10-yearly age groups. Though smokers are so much lighter than non-smokers (Fig. 2), it is interesting to observe (Fig. 3) that heavy smokers (35 or more cigarette/equivalents per day) are more obese than moderate smokers (15-34 cigarette/equivalents per day). The obesity of heavy smokers may possibly be related to their drinking habits, but we have no information on this point.

About 20% of the men are attempting to give up the smoking habit. Table V gives the mean values of the obesity index and the mean estimated weights of ex-smokers in relation to the number of years they have given up smoking, and Fig. 4 compares their obesity with those of two other groups (smokers and those who have never smoked). Fig. 4 shows that ex-smokers in the age group 45-54 years who have given up smoking for less than two years are about 10 lb (4·5 kg) heavier than the current smokers, and those who have given up for more than eight years tend to reach the weight levels of those who have never smoked.

TABLE IV—*Mean Obesity Index W/H² and Mean Estimated Weights of Smokers by Age and Amount Smoked**

Cigarette Equivalent	Age of Current Smokers (years)											
	25–34			35–44			45–54			55–64		
	No.	W/H²	Weight (lb)	No.	W/H²	Weight (lb)	No.	W/H²	Weight (lb)	No.	W/H²	Weight (lb)
<15	463	36·2	167	789	37·0	171	673	37·4	173	416	36·8	170
15–24	499	36·3	168	896	36·8	170	768	36·8	170	414	36·5	169
25–34	168	37·5	173	350	37·1	172	279	37·3	172	141	36·8	170
35×	59	36·9	171	121	38·2	177	134	37·9	175	63	37·0	171

*Amount smoked was not recorded in six smokers.

TABLE V—*Mean Obesity Index W/H² and Mean Estimated Weights of Ex-smokers by Number of Years given up Smoking*

Years Given up Smoking	Age of Ex-smokers											
	25–34			35–44			45–54			55–64		
	No.	W/H²	Weight	No.	W/H²	Weight	No.	W/H²	Weight	No.	W/H²	Weight
<2	149	38·0	176	184	38·0	176	115	38·8	179	55	38·6	178
2–4	107	37·7	174	189	39·2	181	145	39·0	180	52	39·1	181
5–7	59	36·9	171	85	39·2	181	72	39·0	180	32	39·3	182
8×	71	37·5	173	304	38·9	180	260	39·7	184	193	39·3	182

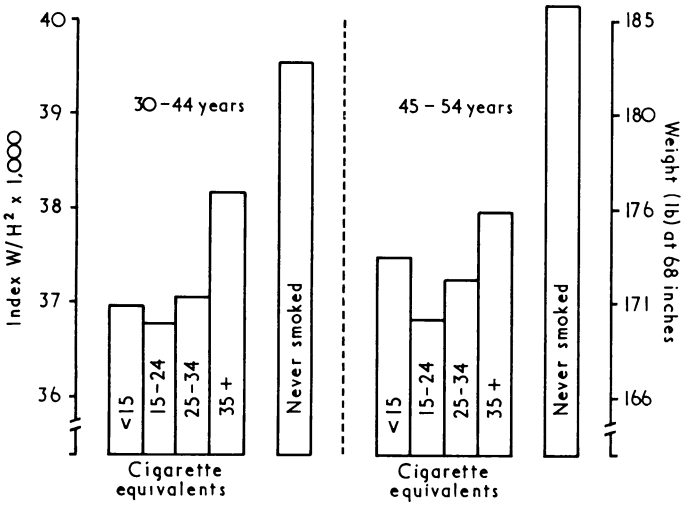

FIG. 3—Obesity index of current smokers by amount smoked.

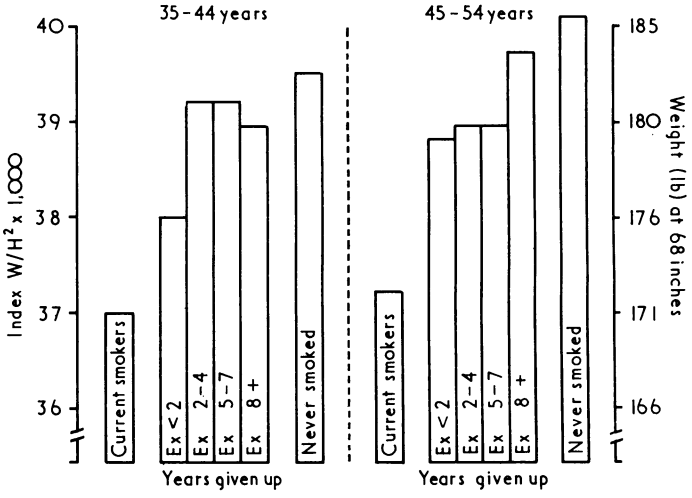

FIG. 4—Obesity index of ex-smokers by number of years given up smoking.

Discussion

Although in adults body weight tends to increase with age (Ashcroft, Ling, Lovell, and Miall, 1966), the trends observed in different cross-sectional studies vary considerably as they reflect the many influences to which men born in different age periods have been exposed during their life times (Khosla and Lowe, 1968). However, recent longitudinal studies show that the greatest increase in adult body weight occurs between the ages of 20 and 37 years (Clark, Allen, and Wilson, 1967). We have shown elsewhere that the young and middle-aged men in our study are about 15 lb (6·8 kg) heavier than men of comparable age, height, and social class 30 years ago (Khosla and Lowe, 1968). The representativeness of our finding may be questioned as it pertains to measurements of men in the steel industry, but it may be mentioned that the trend of the obesity index with age observed in the Port Talbot steel workers is very similar to that observed in a large random sample of men in the United States (Stoudt, Damon, McFarland, and Roberts, 1965). Moreover, men in social classes I and II are no more obese than men in social classes IV and V, though they are considerably taller (Khosla and Lowe, 1967).

Sixty-two per cent. of the men in our survey were currently smoking, and this finding is in good agreement with another study (Emery, Hilgendorf, and Irving, 1968). Most smokers acquire the habit in adolescence (Royal College of Physicians, 1971), and about 50% of youths aged 15-19 in South Wales were found to be currently smoking.

The build and blood pressure study of the Society of Actuaries (1959) showed that mortality risks in diabetes, vascular lesions of the central nervous system, and heart and circulatory disease are low in "underweight" insured men and increase progressively through the heavier weight groups. During the decade beginning 1955 the standard mortality ratios in England and Wales have shown consistent increases in certain diseases—arteriosclerotic heart disease, other diseases of heart, diseases of veins and other diseases of circulatory system, bronchopneumonia, and diseases of the brain and other parts of central nervous system—to the extent that the standard mortality ratios in the years around 1965 range from 140 in bronchopneumonia to 220 in diseases of the circulatory system compared with the base year 1950-2 (Registrar General, 1965). These trends point clearly to the fact that mortality from the diseases known to be associated with smoking and obesity are on the increase in England and Wales. The trends of body weight by smoking habits shown in Fig. 2 present, therefore, a disturbing picture. Over 60% of men smoke some type of tobacco. Many of these men are overweight, and many of the non-smokers are grossly overweight.

Our study suggests that about 20% of men at any given time are attempting to get rid of the smoking habit, and that this attempt is likely to succeed at the risk of a considerable increase in body weight (Fig. 4). A suggestion made recently that to be 10 lb (4·5 kg) overweight carries a greater health risk than

smoking 25 cigarettes a day (Office of Health Economics, 1969) is almost certainly untrue, but it may well deter some smokers from making the effort to give up smoking and encourage some ex-smokers to return to the habit.

The aetiology of coronary heart disease, which now accounts for more than a quarter of all deaths among U.K. men aged 35 and over, is complex. As the report of the Royal College of Physicians (1971) points out, the risk of cigarette smoking is clearly established within lower and higher levels of the risk factors of high blood pressure, high blood cholesterol, and low physical activity. Surprisingly, the risk of obesity is not mentioned. The same report points out that lung cancer and chronic bronchitis together account for 17% of all deaths in men aged 35 and over, and the causal relationship of these two diseases with smoking is also well documented. The overall loss of life expectancy shown in the prospective study of British doctors (Doll and Hill, 1964) is strikingly related to amount smoked. Over 80% of the non-smoking doctors aged 35 are expected to survive the retiring age of 65 compared with only 60% of those smoking 25 or more cigarettes (Royal College of Physicians, 1971).

There is no doubt that smoking and obesity are both serious health hazards. Because of the inverse relationship between smoking and obesity there is, therefore, clearly a need for morbidity and mortality studies on the interrelation between the two hazards and their relative importance.

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Intravenous Diazepam for Direct-current Cardioversion

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Summary

The induction of anaesthesia with intravenous diazepam is a valuable contribution to the simpler use of cardioversion and is the method of choice because it is readily available for elective cardioversion. Fifty-six cardioversion procedures were carried out by this method in an African hospital. No special premedication or drug preparation was used. There were no hazards apart from transient apnoea in two patients and persisting amnesia in one patient.

Introduction

The treatment of cardiac arrhythmias by direct-current countershock is now an established procedure since its introduction by Lown *et al.* (1962). Brief general anaesthesia is necessary for electric cardioversion, which can be a painful procedure. For elective cardioversion of atrial fibrillation, especially in rheumatic heart disease, it is desirable to prepare patients by previous anticoagulation for two to three weeks to avoid risks of thromboembolism. In addition, it is customary to stop digitalis preparations for at least four days to safeguard against the risks of digitalis associated arrhythmias. It is usual to start maintenance quinidine therapy one to two days before an elective procedure in order to prevent a recurrence of the arrhythmia. A sedative may be given just before the procedure.

Since earlier reports on the value and simplicity of diazepam administered intravenously as a short-acting hypnotic for cardioversion (Nutter and Massumi, 1965; Kernohan, 1966) and its advantages compared with thiopentone (Muenster *et al.*, 1967), there have been several supplementary reports from various centres (Kernohan, 1967; Winters *et al.*, 1968; Hendrix, 1969; Lebowitz, 1969; Turkel and Lemmert, 1969; Woodbridge, 1969) commenting on the safety and convenience of the method.

The ideal circumstances of previous preparation are not easily achieved in developing countries where pressure on bed space and professional manpower can be excessive. Accordingly, the experience of cardioversion with intravenous diazepam alone reported in this paper is relevant to clinics with humble facilities. In so doing we confirm that electrical cardioversion as an elective procedure can be simplified further with the involvement of minimum personnel and at outpatient or day admission arrangement. The technique we describe has its theoretical hazards. It is, however, based on a reasonable balance of risks in the circumstances prevailing in developing countries.

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