Middle Articles

Chronic Bronchitis and Occupation

At the request of the Minister of Pensions and National Insurance, the Medical Research Council agreed to examine the role of occupation in the aetiology of chronic bronchitis, with particular reference to the coal-mining industry. Concern has been expressed that, whilst miners suffering from pneumoconiosis and other dust diseases are eligible for industrial insurance benefit, those with chronic bronchitis are not. The Council were accordingly asked to advise whether or not there was a case for relating the development of chronic bronchitis to occupation.

To undertake this task the Medical Research Council set up, under the chairmanship of their Secretary, Sir Harold Himsworth, K.C.B., F.R.S., a committee consisting of the following experts: Dr. C. M. Fletcher, C.B.E. (Postgraduate Medical School of London); Dr. J. C. Gilson, O.B.E., (Director, M.R.C. Pneumoconiosis Research Unit); Professor Sir Robert Platt, Bt. (Chairman, Clinical Research Board); Professor D. D. Reid (London School of Hygiene and Tropical Medicine); Professor J. G. Scadding (Institute of Diseases of the Chest); and Professor C. H. Stuart-Harris, C.B.E. (Department of Medicine, University of Sheffield). This committee's report was adopted by the Council, who in transmitting it to the Minister expressed their willingness for it to be published. The Minister has concurred with this suggestion and the report is accordingly published below.

Medical Research Council Report

At the request of the Minister of Pensions and National Insurance an examination has been made of the evidence regarding the possible role of occupation in the aetiology of chronic bronchitis and emphysema, with particular reference to the coal-mining industry; and, should occupational factors appear to be involved, of the feasibility of arriving at definite conclusions about their significance.

The problem has been examined in regard to the individual case and in regard to epidemiological data, derived from groups of workers, which might provide statistical evidence of a causative relationship between occupation and the disease.

The Individual Case

Clinical experience provides no evidence of the existence of different types of chronic bronchitis that can be separately related to environmental conditions such as air pollution, cigarette smoking, or occupation. The condition has the same characteristics whether it is found in the coal-miner or agricultural worker, in the male or the female.

It is not, therefore, possible—nor is there any reason to believe that it will at some time be possible—to determine in any particular individual with chronic bronchitis precisely how much of his, or her, illness is attributable to a particular environmental factor. Even if there were incontrovertible evidence that the incidence of chronic bronchitis was higher among workers in certain occupations than in others, it would not be possible on the basis of any known form of clinical examination to measure the extent to which the disease in any individual was due to his occupation.

Epidemiological Data

Epidemiological data are available both on mortality and on morbidity from chronic bronchitis. In general, these move together; a high incidence of morbidity being associated with a high mortality and vice versa. Both show differences between occupations from place to place in the country and between social classes; and the mortality statistics show differences between the sexes.

When assessing these data, consideration has been given to certain distorting factors.

For example, the sickness and death rates used in the Registrar-General's publications are based on the number of cases among men currently doing a specific job compared with the total number of men thus employed at the time of the census. Unfortunately, although a man who was once a miner may correctly describe his present job on the census form as "night watchman," there is evidence that, when registering the same man's death, the respondent may describe him incorrectly as "a miner." Similarly, a miner employed as a surface-worker at the time of his death may be described as a face-worker, a job which he may once have done and which has greater social prestige. The result of these errors is to inflate the reported current death rates of either miners in general or face-workers in particular.

Even when such errors of reporting have been corrected there remains the problem of selective movement both within and from the mines. When an industry contracts it may happen that the fitter men leave to seek employment elsewhere, leaving behind the less fit whose sickness and death rates are relatively high. This factor may lead to an overestimate of the health hazard of mining. Selective drift may also take place within a mine. With increasing disability the older miner may change from face to surface employment. He may be correctly described as the latter at the time of his death whilst still in the mining industry; but the resulting relatively high death rate among current surface-workers may obscure a real hazard of work at the face, where he has spent most of his adult life.

Similar selective factors may affect occupational sickness-absence rates. In addition, however, comparisons between occupations are affected by the payment of full compensation for loss of wages in certain groups, or by the fact that a respiratory disability which would not incapacitate a clerk may well prevent a man from undertaking a heavy task in the mining industry.

It must therefore be emphasized that high death or sickness rates among men divided in the conventional way according to present occupation must be interpreted with caution.

Mortality Statistics

The gradient in death rates from bronchitis with social class is a striking feature of national statistics, with the rate highest for the lowest socio-economic groups. These differences affect both males and females. Wives of men in occupations for which a high death rate from bronchitis is reported also show an increased mortality rate from this condition. Evidence on this point is provided by the occupational mortality figures in the Registrar-General's Decennial Supplement (1951), from which the figures shown overleaf have been extracted.

This report concludes, "Mortality from bronchitis in men and single women was almost six times as high among the unskilled manual workers as among farmers and professional people. It is evident, though, from the similar tendencies dis-

Standardized Mortality Ratios for Bronchitis at Ages 20–64

(*a*) By social class:

Social Class	*Men*	*Married Women*
I	34	35
II	53	49
III	98	101
IV	101	123
V	171	154

(*b*) By occupation:

Occupation	*Men*	*Wives*
Coal-miners	135	175
Face-workers	200	190
Iron and steel foundry workers	158	213
Agricultural workers	53	82
Farmers	31	52

played by married women (classified by husband's occupation) that these large differences in mortality owe little to direct occupational effects, and must be attributed to more general socio-economic or environmental factors."

Of such factors, there is good evidence of the importance of cigarette-smoking. A study in this country revealed a steady increase in bronchitis death rates with increasingly heavy smoking, those smoking more than 25 cigarettes a day having a death-rate from bronchitis six times greater than that of non-smokers. Studies in the United States of America have shown similar results.

The role of air pollution is not so clear-cut, but in Britain bronchitis death rates are considerably higher in areas where air-pollution levels are high.

Morbidity Statistics

The Report on the Enquiry into the Incidence of Incapacity for Work, carried out by the Ministry of Pensions and National Insurance, shows that bronchitis occurs in all occupations, and that there is a gradient in incidence from the lowest rate in agricultural workers to the highest in miners.

A similar gradation is present in the figures for arthritis, rheumatism, psychoneurosis, and migraine ; in fact it is evident that the extremely high figures for incapacity in miners apply to every category of disease recorded except heart disease, hernia, pneumonia, appendicitis, and varicose veins.

Furthermore, the Report on Incapacity for Work shows that the rates of incapacity from bronchitis in all heavy, non-agricultural occupations are higher than in occupations involving lighter work. There is thus a high rate of bronchitis morbidity not only in coal-miners but also in furnace, forge, foundry, and rolling-mill workers and in gas, coke, and chemical workers.

The assessment of the relationsihp between coal-mining and bronchitis is also affected by geographical considerations. The Enquiry conducted by the Ministry of Pensions examined the incidence of incapacity in different areas and found that among coal-miners there was a marked difference between the mean average number of days of incapacity from bronchitis in different regions. Of the nine regions concerned, Midland Region was about average, North Midland and Northern Regions just below, and Scotland, South-Western Region, and London and South-Eastern Region well below the average, while North-Western, East and West Riding of Yorkshire Regions, and Wales were well above the average. At the present time this regional variation cannot be explained satisfactorily.

It is generally believed that atmospheric pollution may be a contributory cause of bronchitis, and in confirmation of earlier studies the Enquiry of Incapacity for Work provides evidence of a significant correlation between bronchitis incapacity in middle-aged men and the average levels of pollution in high-density residential districts. The only exception to this is South Wales, which appears to have a higher incapacity rate for bronchitis than can be accounted for by the air pollution found there. This finding is unexplained but does not apply in other mining districts.

Field Surveys

The findings in the Ministry's Report are endorsed by those obtained in a number of detailed surveys carried out by Medical Research Council workers, the National Coal Board, and others in Britain and in similar studies in America. The British surveys were concerned with the prevalence of bronchitis and respiratory disability in miners and random samples of men and women in Wales and also in miners, foundry workers, and random samples of the population in other parts of the country. Convincing evidence emerged, for example, of the close association between cigarette-smoking and the incidence of bronchitis, and of considerable regional differences in the amount of bronchitis among miners.

These studies also demonstrated a higher bronchitis incidence in miners' wives than in the wives of non-miners, thus confirming the inference from mortality studies that the high rate of bronchitis in miners is likely to be related to general social causes rather than to occupation.

These and other special surveys have confirmed that miners have more respiratory symptoms than non-miners living in the same area, but the difference is only pronounced in South Wales. They have also shown some relationship between the length of mining exposure and the presence of these symptoms. Whereas the inhalation of dust in miners is known to be the cause of pneumoconiosis, the evidence so far does not point to the inhalation of dust as being a major factor in causing bronchitis.

Conclusions

Chronic bronchitis displays the same clinical characteristics irrespective of the occupation of the individual affected. In consequence—even if epidemiological data were to establish an association between the incidence of chronic bronchitis and occupation in a particular industry—it would not be possible in the individual case to determine the extent to which engagement in a particular occupation had contributed to the development of the illness.

Epidemiological evidence indicates that cigarette-smoking, atmospheric pollution, geographical location, and uncharacterized socio-economic factors are associated with the differences in the incidence rates for chronic bronchitis. Coal-miners in whom these same associations are observed are exposed to relatively high dust concentrations. However, on present evidence intensity of dust exposure does not appear to be a very significant factor in determining the prevalence of bronchitis in this group of workers.

During the past ten years chronic bronchitis has excited increasing interest and has been the subject of many studies ; it is important that research designed to increase our understanding of the many factors involved in its causation should continue.

The results of research in this field are being kept constantly under close review. Accordingly it is not considered that a further review at the present time would be likely to uncover evidence at variance with that upon which we have based our conclusions.

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