

## Middle Articles

### Social Pathology of Foetal and Infant Loss\*

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*Brit. med. J.*, 1965, 1, 1057-1060

It is well known that stillbirth and infant mortality rates vary strikingly not only in different parts of the country but also in different sections of the community. When women are grouped into social classes according to the occupations of their husbands it is found that infant mortality rates are lowest in social class I, professional, and rise fairly steeply as the level of occupational skill falls, the highest rate being in social class V, unskilled labourers. In Scotland, for example, the still-birth rate in the unskilled manual group is about two and a half times that experienced by the wives of professional men, the neonatal death rate is twice as high in the unskilled as in the professional group, and the post-neonatal rate is nearly six times as high.

These differences in perinatal and infant mortality rates within the various social classes constitute one of the factors underlying regional differences in rates. Roughly speaking, the further one moves from London and the South-East of England to the North or North-West the higher are the infant mortality rates—the extremes being Scotland and Wales. One of the reasons is that the further from the south-east corner of England the lower is the proportion of the population engaged in professional occupations and the higher the proportion of semi-skilled and unskilled workers.

It was Professor Richard Titmuss (1943) who first showed that, despite a fall in overall infant mortality rates between 1911 and 1931, when the rates for social classes were compared over that period the range of social class inequality was found in 1931 to be as great as, if not greater than, in 1911. This finding was later confirmed by Morris and Heady (1955), who analysed trends in infant mortality by social class between 1931 and 1951 and found no narrowing of relative social-class differences.

The analyses by Titmuss and Morris and Heady related to deaths in the first year of life, but Logan (1954) has noted that in England and Wales the same trends hold for stillbirth rates as well.

Information on trends in infant mortality differences between classes appears to be at present available for only two other countries. For France, Croze (1964) has shown that, despite a decline in absolute mortality, the infant mortality differentials between socio-economic groups remained relatively constant between 1950-1 and 1959-60. Only the extreme groups of liberal professions and miners showed respectively less and more than the average rate of relative decrease. For Hungary, however, Szabady (1963) has reported a sharp decrease in the infant mortality differential between the manual and non-manual groups between 1948 and 1959.

#### Changes Since 1951

Has there been any reduction in Britain since 1951 in infant mortality differences between social classes? Information on this point for the whole of Britain will not be available before

the publication of the Occupational Mortality volume of the 1961 Census, since the Registrar-General does not publish infant mortality rates by social class in his Annual Reports. In the meantime, we can look for clues in two bodies of partial data.

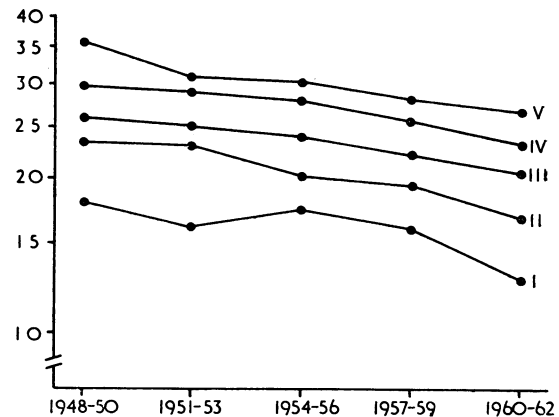


FIG. 1.—Stillbirth rates by social class in Scotland since 1948-50. Source: Annual Reports of Registrar-General for Scotland. Vertical scale indicates stillbirth rates per 1,000 live births and stillbirths.

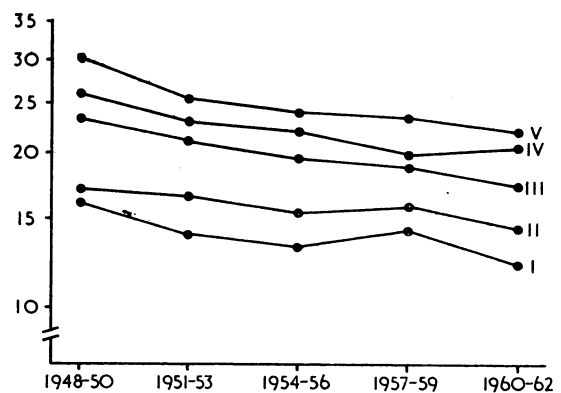


FIG. 2.—First-month death rates by social class in Scotland since 1948-50. Source: Annual Reports of Registrar-General for Scotland. Vertical scale indicates neonatal death rates per 1,000 live births.

In Scotland there is a widespread popular belief that social class is an invention of the English, a phenomenon confined to the undemocratic South. Nevertheless, the stillbirth and infant death rates by social class are reported annually by the Registrar-General for Scotland. Figs. 1, 2, and 3 illustrate the changes in, respectively, stillbirth, neonatal, and post-neonatal rates experienced by the five social classes in Scotland

\* Based on a paper read at the Annual Meeting of the British Medical Association, Manchester, 1964.

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between 1950 and 1962. It is clear from Fig. 1 that though stillbirth rates within each social class have tended to fall over this period there has been no tendency for the rates to converge. The pattern of trends in neonatal and post-neonatal rates is virtually identical.

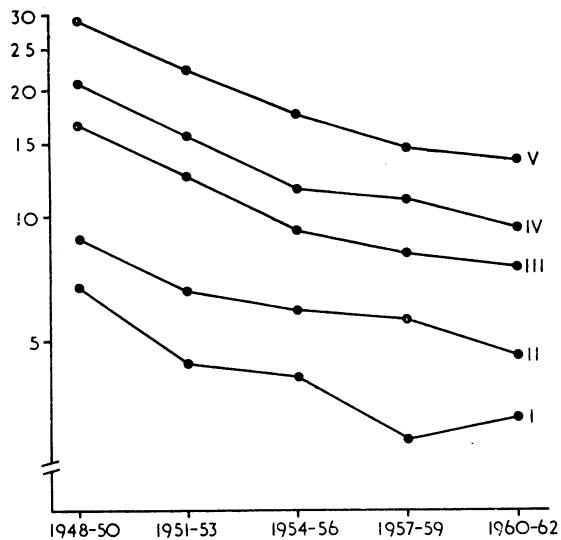


FIG. 3.—Rates of death between 28 days and 1 year of age, by social class in Scotland since 1948-50. Source: Annual Reports of Registrar-General for Scotland. Vertical scale indicates post-neonatal death rates per 1,000 live births.

For England, Wales, and Scotland together, a comparison has been made between the perinatal death rates prevailing in the five social classes in 1949-50, and the rates established by the Perinatal Mortality Survey for the spring of 1958. Again there is no evidence of a decrease in class differences (Fig. 4).

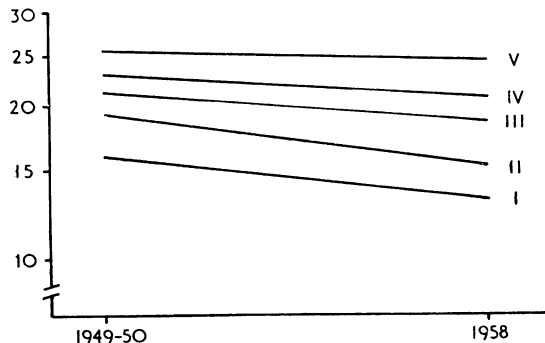


FIG. 4.—Stillbirth rates by social class in Great Britain (Ireland excluded). Sources: for 1949-50, J. A. Heady and M. A. Heasman, *Social and Biological Factors in Infant Mortality*, H.M.S.O., 1959; for 1958, the National Perinatal Mortality Survey. The data relate only to single legitimate births.

To those who planned the creation of a Welfare State in Britain such results would seem disappointing, for one explicit objective of the whole programme of legislation and re-organization was to reduce disparities between large sections of the community in the kind of medical and social factors reflected in the rates of foetal and infant loss.

#### Factors in Class Differences

What explanations can we find for these continuing class differences in stillbirth and infant mortality rates?

To help answer this question there is now available the mass of information—sociological as well as medical—collected in the National Perinatal Mortality Survey, directed by Dr. Neville Butler and Professor Dennis Bonham. Some of the more detailed aspects of the social data are being studied in

Aberdeen by sociologists working under Professor Sir Dugald Baird and in close co-operation with the directors of the Survey.

The Survey suggests that medical resources are not being distributed between the social classes as effectively as seems necessary. Women allocated to the manual working-class on the basis of their husband's occupation tended to pay their first visit to the antenatal clinic at a later stage of pregnancy than middle-class women, and to have visited the clinic less often in the pre-natal period. Butler and Bonham (1963) have shown that women from the manual groups differ from middle-class women in the kind of antenatal care they obtained for themselves. The latter more frequently attended a hospital or general practitioner for antenatal care, whereas the working-class sample more often received antenatal care at a local authority clinic or from a midwife. The same authors note that a larger proportion of middle-class than working-class women were booked for delivery in hospital or in a general-practitioner unit, though it was working-class women who were more at risk of having a difficult labour or of losing their babies, as the outcomes indicate.

The Survey provides evidence of other social-class differences which may be relevant to infant mortality. The wives of manual workers were more likely to have been engaged in manual occupations themselves than middle-class women, and also tended to work later in pregnancy. The working-class women tended to have larger families and to live in more overcrowded conditions. Far more of the working-class babies were conceived pre-nuptially.

All of these factors are, so to speak, specific to the reproductive situation, and presumably affect the outcome of pregnancy in different ways. But they are not to be thought of as isolated items of behaviour and culture. A woman who is working or who already has several children to look after finds it more difficult to attend the antenatal clinic. Women who conceive before marriage tend to postpone attendance at the clinic until they can register under their married names. Women who have large families are more likely to begin with a pre-nuptial conception.

#### Patterns of Behaviour

In effect, what we are dealing with are not isolated factors but whole patterns of behaviour. And, in so far as these factors vary between the various social classes, what are in question are differences between the whole way of life of different sections of the community.

The notion of a whole way of life implies a certain continuity running through people's lives, and suggests that in trying to understand what underlies perinatal death rates we should not look exclusively at what happens in the antenatal period and in the course of labour.

The close association between maternal stature and the outcome of pregnancy is becoming more and more widely recognized, and is amply confirmed by the results of the Perinatal Mortality Survey. Fig. 5 indicates that, within each social class, tall women experience lower stillbirth rates than women of medium height; and these in turn experience lower rates than women defined as short in stature. Illsley and Kincaid (1963), using the same data, showed that the association between maternal stature and perinatal mortality holds even when socio-economic group and parity are simultaneously controlled.

My medical colleagues are willing to commit themselves to no more than a tentative explanation of this association. They suggest that, though potential height may be genetically determined, the actual height achieved by individuals as adults is greatly affected by experience during the period of growth—by, for example, nutrition, exercise, fresh air, and so on. In consequence, short women include a proportion where growth

has been stunted. The bony pelvis will be affected with other bones; the pelvic capacity will be diminished, and in severe cases the shape distorted.

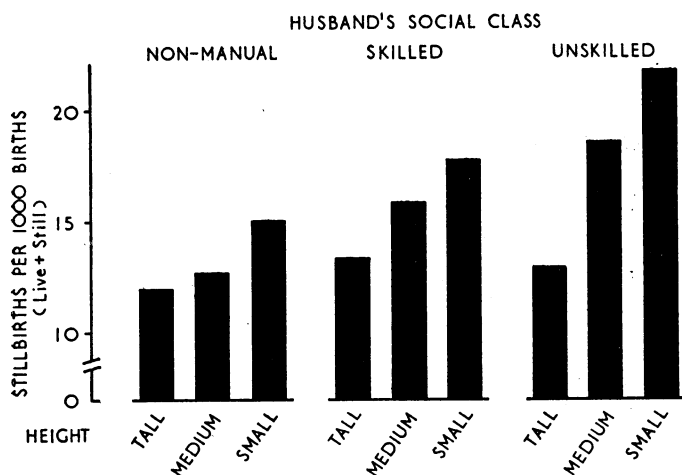


FIG. 5.—Stillbirth rates by maternal height within social classes. Source: National Perinatal Mortality Survey, 1958. Women 65 in. (165 cm.) and over are classified as tall, those under 62 in. (157 cm.) as small. The graph relates to 16,845 single births. The sampling bias arising from inclusion of women of all parities is here unimportant since the relative number of women from different social class or height group is not in question.

#### Influence of Number of Sibs on Mother's Growth

The importance of the period of the mother's growth in determining the outcome of her pregnancy can be illustrated by social as well as by height data. Fig. 6, again based on the Perinatal Mortality Survey, indicates that the more brothers and sisters a woman grew up with the more likely she is to experience a stillbirth. This holds good, even when women are divided into three social classes according to the occupation of their father.

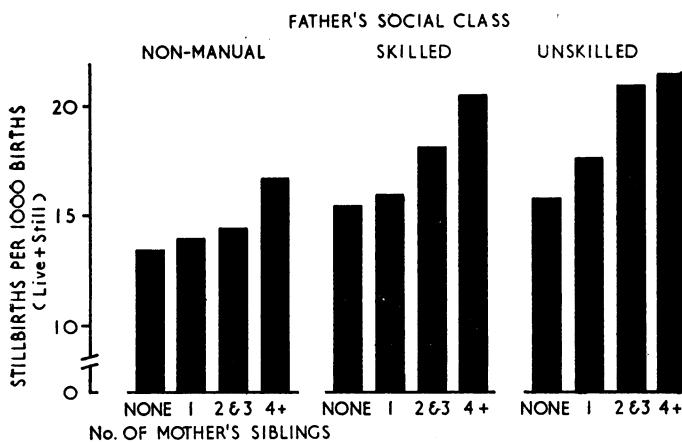


FIG. 6.—Stillbirth rates by number of mother's siblings within mother's social class of origin (that is, "Father's Social Class" is based on occupation of patient's father). Source: National Perinatal Mortality Survey, 1958. The graph relates to only 13,823 single births, since in approximately 3,000 cases no classification by patient's father's occupation was possible. The smallest cell denominator is 239 live births and stillbirths. Besides the interpretation offered in the text, it should be noted that differential social mobility is possibly an additional factor underlying the pattern of results, in that there exists a negative correlation between size of family of origin and probability of upward movement (that is, from a less to a more favourable environment).

Notice that in the group of women of middle-class origins a steep rise in stillbirth rates does not come until the woman has four or more brothers and sisters, whereas in the unskilled manual group there is an appreciable rise between the no-siblings and the one-sibling categories, and between the one and the two or three sibling categories. Medical colleagues suggest an explanation phrased roughly in terms of social-class

differences in the point at which, as family size rises, scarcity of resources begins to have a long-term effect on the growth of the children. The middle-class need at least four children before the decrease in the standard of food intake and of maternal care, etc., results in a long-term lowering of reproductive efficiency. In the working-class this degree of scarcity appears as early as the second child.

The associations between maternal height and stillbirth rates and between numbers of brothers and sisters and stillbirth rates are only two of many associations that can be demonstrated between factors in the mother's background and reproductive outcome. Generally speaking, within each social class, women from small families achieve higher educational standards than those from large families. There is a fairly high correlation between height and performance on tests of intelligence. There is also a correlation between family size in successive generations. Women who have large families are more likely themselves to have come from large families. It can be shown that perinatal mortality rates vary, even within social classes, according to the educational level achieved by the mother, and with her parity number.

#### Long-term Influences on Reproduction

Once again we are concerned with differences in what I have called the whole way of life of different social groups. I have illustrated some ways in which medical and social factors intermesh with each other. The physical and mental capacity, the patterns of thought, attitude, and behaviour that a woman brings to the challenging test of pregnancy are a product of her whole experience, especially during the crucial period of growth.

These long-term influences on reproductive outcome can in two respects help explain continuing social-class differences in stillbirths and infant mortality. First, to the extent that reproductive outcome is a function of circumstances and experiences affecting women in that period of their lives spent in the environment provided by their parents, then social-class differences in living conditions in one generation will tend to be reflected in the infant mortality of the next generation. The data presented above can be seen as an empirical confirmation of the theory discussed by Morris and Heady (1955), who suggest that there is a time-lag in the expression of social improvements in improved health.

A second explanation rests on the operation of processes of social selection, not so far discussed in this paper. Because of the movement of individuals from one social class to another, these classes do not stay constant either in size or in composition. The most common avenue of social mobility for women lies in marriage to a husband of higher or lower social status than the woman's father.

The Perinatal Mortality Survey data indicate that women who are born into working-class homes but who marry men in middle-class occupations have higher educational attainments and fewer siblings than women who stay in the working class after marriage. Similarly, those women who are born into middle-class homes and stay middle-class by marriage have superior educational qualifications and come from smaller families than those who experience a fall in social status at marriage from middle-class fathers to working-class fathers.

There is thus a continual process of social selection whereby those women from working-class environments who have the social characteristics associated with successful pregnancies are being recruited upwards into the middle class. Similarly the women of middle-class origins who move by marriage into the manual social classes are women who, on the whole, are likely to reproduce less successfully than those who stay in the middle class. There has been a great deal of social mobility in recent years, and more upward than downward mobility. This

is because the continuing modernization of our economic structure has led to a great increase in the proportion of white-collar and skilled manual jobs, and a corresponding reduction in the ranks of semi-skilled and unskilled manual labourers.

The same processes of social selection operate geographically. Illsley, Finlayson, and Thompson (1963) have shown, for example, that women who migrate from Aberdeen to the South are taller and have lower infant mortality rates than those who stay in Aberdeen. If these outmigrants are still in the child-bearing ages their loss will tend to raise the perinatal death rates in Aberdeen City as a whole.

### Conclusions

Thus, to sum up, regional and social-class differences are affected not just by persisting differences in social conditions and medical-care factors, but by patterns of social selection which result in a concentration of women with a favourable prognosis for a successful labour in the upper social groups, and in the South and Midlands of England.

This way of looking at perinatal mortality carries a number of implications. First, in so far as pregnancy outcome is affected by the experience of the mother in her own period of growth, then we need not expect great social inequalities to yield overnight to State welfare legislation. It will be some years before we have large numbers of women reaching child-bearing age who have lived all their life in a "Welfare State."

Secondly, it must be emphasized that the argument that reproductive outcome is influenced by long-term factors in no way detracts from the urgency of the case at present being made in a number of influential quarters for improvements in antenatal care and in the management of labour. There are, however, limits to the effectiveness of medical care which is restricted to the antenatal and post-natal periods, and to the labour process. The reproductive capacity of populations reaching child-bearing age is to some extent already determined within a matrix of biological, medical, and social influences. It follows that long-term measures are required which will improve the physical and social environment of generations of future mothers now growing up in Britain. Some of the responsibility for reducing perinatal mortality should be passed back to those who determine the whole shape

and scope of the Welfare State—to the politicians, the administrators, and the public at large.

### Summary

This paper discusses reasons why social-class differences in British stillbirth and infant mortality rates have shown little or no tendency to decrease in recent years, despite the overall decline in these rates of death.

The data provided by the Perinatal Mortality Survey of 1958 supply evidence of fairly large social-class differences in relevant factors which are specific to the antenatal period and the labour process—for example, attendance at antenatal clinics, the pre-nuptial conception rate, work in pregnancy.

The Survey also indicates that certain long-term factors influence the outcome of pregnancy. For example, *within* each social class there exist associations between the patient's height, the number of the patient's own siblings, and the reproductive outcome.

The implications of these findings for the long-term problem of reducing social-class differences in stillbirth and infant mortality rates are briefly discussed.

I am indebted to the National Birthday Trust, which sponsored the Perinatal Mortality Survey, and to the directors of the inquiry, Dr. Neville Butler and Professor Dennis Bonham, for permission and encouragement to carry out sociological analyses of the Survey data. This paper owes a great deal to my colleague Professor Raymond Illsley, of whose work it is essentially a development. I should like to express thanks to Professor Sir Dugald Baird and to Mr. Gordon Horobin for their advice and criticism.

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## B.M.A. Annual Clinical Meeting, Dundee, 1—3 April

The Association's eighth Annual Clinical Meeting was held at Dundee from 1 to 3 April in the presence of the President of the Association, Dr. E. A. GERRARD. The report of the Meeting which began in last week's issue (p. 982) is completed below.

### Plenary Session on Exercise and Sport

*Saturday, 3 April*

The final plenary session was entitled "The Benefits of Exercise and the Dangers of Sport." The chairman, Sir ARTHUR PORRITT (London), regretted that doctors had shown little interest in sport until recently. Britain now possessed excellent medicine and sporting facilities, and these were the best media for international amity. Dr. ROGER BANNISTER (London) thought the mind-body relationship was at the centre of the concept of the benefit of exercise. There were a few individuals who had never had the urge to take exercise, but perhaps they had devoted their energies to cerebral activity. Most people, however, took exercise because they enjoyed it. The benefits of exercise were incidental and not

ends in themselves. No athlete could explain the satisfaction that he obtained from his sport; perhaps if he could he would not be able to compete so well. During education, Dr. Bannister continued, it was a great advantage for a boy to find some form of demanding activity for his physical energy. Successes and failures in sport led to self-discovery of mental and physical limitations, and eventually to the realization that no individual was self-sufficient. With automation leading to increasing leisure there was need for major replanning of sporting and recreational facilities so that the healthy urge present in almost everyone was not thwarted by their absence.

Dr. P. M. O. MASSEY (Birmingham) emphasized the fringe benefits of exercise. It was well known that a person was more efficient when "in training"—a phrase mentioned only by those who had known what it was to be fit. The family doctor commonly prescribed exercise but rarely mentioned dose or frequency. Exercise was of undoubted benefit in conditions such as acne, asthma, constipation, obesity, and dysmenorrhoea. Exercise would also develop the body—but only within the limits of the body type, so that it might be said that the sport selected the athlete. Moreover, there were other benefits. Both extroverted and introverted personalities could achieve a better balance by membership of a sporting club, and sporting achievements were of undoubted help in obtaining a good job. Finally there was a popular misconception that participants in strenuous exercise died young. This was not true, but the essence of longevity was that the activity should be maintained throughout life.