REVIEW ARTICLE

PERINATAL MORTALITY

The First Report of the 1958
British Perinatal Mortality Survey

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With the end of the second World War research into major public health problems became more practicable. In Britain the passing of the Midwives Act of 1936 had instituted a free midwifery service and the National Health Service Act of 1947 had instituted a complete medical service for the people of Great Britain. Changes in population structure had much significance and it was considered necessary to investigate perinatal mortality. This survey was conceived in 1953 but not carried out until 1958 and the report was not available until 1963. Today the details are out-of-date, but the principles are still valid and for this reason the report will be studied for a considerable time to come. Although the National Birthday Trust Fund and its executive committee initiated the idea, financial assistance was mainly from the Trustees of the Joseph Roundtree Memorial Trust and generous donations from other organizations. Expert help was obtained from a large number of people and the work itself was planned by a steering committee. Administrative bodies, such as hospital boards, local authorities, and—even more important—doc-

tors, whether in consultant, local authority, or general practice, as well as midwives and many other people all co-operated so that failure to gain information due to the nonreturn of questionnaires was extremely rare. This survey demonstrates that, even with divided administration, if there is a genuine interest from the people in the field almost anything can be achieved.

The survey consisted of two main parts. One was the control week survey in which details were obtained for every birth during the week of March 3–9, 1958, inclusive. The questionnaire was returned on 98 per cent of the notified births for England and registered births for Scotland—an amazing achievement. Because the number of babies dying in any one week was too small, the study on mortality was based on stillbirths and neonatal deaths during three months, March, April, and May, 1958, and approximately 94 per cent of coverage was obtained. For the purpose of this survey perinatal deaths included stillbirths and babies dying within seven days of birth and did not include late neonatal deaths between eight and 28 days. Information on the cause of death is most important and in many instances cannot be obtained without postmortem examination. A pathology committee established centers to which infants, including those who died in outside hospitals, could be removed for examination and then returned for burial. Even more important, the committee agreed on a standardized necropsy technique and a pathology questionnaire designed to be suitable for subsequent analysis. A large amount of information was therefore collected and part of that of more general interest has been analyzed and presented in this volume.

This first report of the British Perinatal Mortality Survey consists of a series of tables, histograms, and other statistical information dealing with variations in mortality according to a number of important factors. Some of the information, such as the variation by geographical region and by parity, is similar to the observations made over many years by the Registrar-General, and is also seen in other countries. A breakdown of figures correlating both geographical region and parity shows certain anomalies, the explanation being probably cultural or sociological rather than medical. For example, although

in nulliparas a lower than average perinatal mortality is achieved in the southeast of England and in the East and West Ridings of Yorkshire, for high-parity women a similar favorable mortality in southeast England compared with the rest of the country is not sustained in the East and West Ridings of Yorkshire. The difference in the proportion of people of higher social class may account to some extent for geographical variations, but the classification of social class in itself is becoming increasingly difficult.

Although illegitimacy, all other things being equal, increases the risk to the baby by approximately 60 per cent, London and southeast England which has the highest illegitimacy rate has one of the lowest perinatal mortality rates, whereas Wales with the lowest illegitimacy rate has one of the highest mortality rates. It would seem that legal illegitimacy may be different from social illegitimacy. When age, parity, and social class were considered together it was thought that the 1958 national average should and could be improved on, and that to stimulate improvements in obstetric care 80 per cent of this level, which would correspond to a perinatal mortality rate of 27, should be aimed for.

The emphasis and possible bias of the writers of the report toward hospital and consultant care are partly due to their own positions and experience and also to their genuine concern over the shortage of the highest grade obstetric facilities in the country where traditionally much midwifery has been done in the home.

The effect of a history of previous obstetric trouble such as antepartum hemorrhage, toxemia, or cesarean section leads to a considerable increase over the average mortality and should invariably be an indication for hospital confinement under consultant care. Some of the preventive work and health education should come earlier, particularly in preventing injury to the mother, but of course this is not considered in this volume. Previous toxemia and cesarean section appear to discourage further pregnancies, whereas significant antepartum hemorrhage does not. Possibly women have tended to regard the latter as inevitable.

The section dealing with the place of delivery and the effect of the type of antenatal and obstetric care is of particular interest to the

medical administrator, but selection of the type of care, whether hospital, home, or general practitioner unit, is determined by an assessment of the degree of risk during the early antenatal stage. The hospital in particular is at the receiving end for the difficult "high-risk" cases and the numbers of those that are booked for home deliveries or for general practitioner units but are subsequently transferred to hospitals give an important measurement of error in the prediction of what might happen. The value of first-class medical and nursing care both in the antenatal and delivery periods is emphasized by the fact that 41 per cent of the population were cared for in this way by being booked and delivered in hospitals. The overall mortality ratio was substantially the same as the national average, although the hospital would deal with a much higher proportion of high-risk patients, both those diagnosed early after the first examination for the confirmation of pregnancy and those with a previous history of high risk. What is of considerable importance, however, is that the mortality rate in the general practitioner unit—where the patient is under the care of the general practitioner-obstetrician for the antenatal period and for the delivery and where the nursing facilities should be so much better than at home—is substantially higher than the domiciliary rate where the patient generally receives antenatal care from the Local Health Authority Medical Officer and is delivered by a Local Authority midwife. Although it might be assumed that the general practitioner unit is dealing with more difficult cases, there is no evidence to support this and the rate is substantially higher than in the hospital-booked where high-risk cases are selected. The validity of these figures in presenting the true state of affairs in Great Britain is strengthened by the fact that only 2.3 per cent of women are delivered in private nursing homes outside the National Health Service.

No trained person was present at 2.1 per cent of the births, but from the point of view of the planning of maternity services and the training of the various types of persons taking part some of the most significant figures in the report show that a consultant performed the delivery in only 2.8 per cent of the births but that he supervised the delivery of a further 0.6 per cent. These figures include deliv-

eries done by consultants in private hospitals. Registrars who have had considerable obstetric experience personally deliver 3.1 per cent of the cases and supervise an additional 0.7 per cent. As both the consultants and the Registrars carry out cesarean sections, which comprise 2.7 per cent of deliveries, the number of normal deliveries done by them is, in fact, very small. Including Obstetric House Officers, hospital medical staffs deliver or supervise a total of 14.4 per cent, although in an obstetric hospital skilled assistance is immediately available even if the doctor is not present at the delivery. General practitioners, even those with obstetric interests, appear to deliver far fewer babies than is popularly supposed, as they deal with only 4.4 per cent of cases and are present at delivery in an additional 7.3 per cent. The midwife, however, is the senior person present in the majority of all deliveries—70.4 per cent.

The place of delivery and the person undertaking it are important. The highest mortality rates occur in those patients who have been transferred from home to hospital or from general practitioner unit to hospital, and are proportionately high in the multiparous patient because there is less time. The problem is complicated by the uneven spread of hospital beds and by the fact that skill in prediction of complications is perhaps rather new in medicine. There are a number of factors operating. Culturally there is a tendency among upper social classes to regard "hospital" (non-home) confinement as essential and among lower social classes to regard home confinement as inevitable and even desirable. The influence of the patient's mother in wishing to play a part may also be greater in social classes 4 and 5. The mother's leaving the family to go into a hospital may also be a problem, although the major role of home help services in Britain is in the maternity field. The tendency has been to emphasize the risk to primiparas and admit them to hospitals and to ignore the increasing risks to multiparas. In many instances bad housing and the difficulty of doing even normal midwifery in the home have resulted in women being booked for hospital care who really have a low risk of complications. The writers of the report feel that social class "high-risk" booking should be regarded as a medical hospital indication and poor home circumstances regarded as an indication

for a general practitioner unit booking. One can't see many general practitioners wanting this as the general practitioner unit would lose its "snob" value. It should be pointed out that although the Local Health Authority maternity service doctors have perhaps overstressed hospital booking on domestic accommodation grounds it is they who have given the lead to discriminative hospital admission rather than the general practitioner.

The proportion of women delivered in hospitals varies considerably from one region to another; it is highest in London and the southeastern counties and is not correlated directly with mortality. The range of variation for hospital and general practitioner unit cases between regions suggests that a more uniform standard of care is available in home confinements and greater variation in hospital and general practitioner unit, although selection of cases may play some part. It makes one wonder, however, whether the rigidity of the rules of the Central Midwives Board does in fact pay dividends compared with the rugged individualism so cherished in medical practice.

Because of its importance both to the mother and to the child and in the prediction of complications, the varying standards in prenatal care are of great interest. Where the mother has had no prenatal care the mortality is over five times the national average, but only 0.6 per cent of mothers are in this category. With 0.5 per cent of the population attended by a midwife only for prenatal care, responsibility for this important service can be put fairly and squarely on the medical profession. An assessment of the level of prenatal care is not easy because the hospital has a higher rate for abnormality and is able to admit cases for investigation, thus reducing the amount of care outside the hospital.

The two interesting groups are, however, those who had Local Health Authority clinic care and those who had general practitioner care only or general practitioner and midwife care. Both Local Health Authority clinic care and general practitioner and midwife (jointly) care tended to have a high proportion of social classes 3, 4, or 5, whereas the general practitioner care only had a high proportion of social classes 1 and 2. Notwithstanding this, those having

general practitioner care alone, had a mortality ratio of 126 compared with the Local Health Authority ratio of 84 and the general practitioner and midwife ratio of 73. One can only conclude from this that the general practitioner on his own is less effective in maintaining antenatal care than the doctor plus the midwife, when a fair proportion of the care will be delegated to the latter. The "general practitioner only" cases may well have a higher proportion of primiparas but one would not have thought that this would have made all the difference. The poor quality of general practitioner care is also reflected in the figures for individual tests. Of those attending Local Health Authority clinics 35 per cent did not have the hemoglobin tested, as against 60 per cent of those who were attended only by the general practitioner. When the women were attended by the general practitioner and midwife, the figure was 68 per cent which suggests that with two supervisors each may assume that the other is doing something. This is also borne out in the figures for the proportion of those who did not have the blood pressure taken at each visit. Rh blood type was tested in almost all hospital patients, but 5 per cent of Local Health Authority clinic patients, 12 per cent of general practitioner only, and 13 per cent when there was a general practitioner and midwife were not tested for Rh type. The general practitioner seems particularly adverse to taking blood. The section dealing with toxemia in pregnancy is of less value owing to the great difficulties in classification and even in agreement on the precise mode of taking the diastolic blood pressure. Comparisons between different places of delivery are complicated by the fact that this is of all the conditions the one where early diagnosis will lead to transfer to hospital.

Vaginal bleeding in pregnancy is an important symptom because, with suitable health education, it is something the patient can take action about. When it occurs before the 28th week the over-all mortality ratio is three times that in women who have no bleeding of any type, and although part of this is related to prematurity there is increased perinatal loss even in those who are delivered at term.

Gestation and birth weight are important, and it is much easier for the obstetrician to minimize by induction of labor the adverse

effect of prolongation of pregnancy than it is to prevent the delivery of an immature infant with a considerable chance of perinatal death. Tables are given to show the effects of the gestation period on mortality and also on birth weight, and there is one table on the interrelationship of both. At each period of gestation, there are some fetuses whose birth weight is below average, average, or above average compared with dates. Correlation of the social class shows that there is an increase in the incidence of curtailed pregnancy as social class falls. The incidence of birth before the 38th week is 50 per cent higher in social class 5 than in social class 1. There is a consistent but less increase in prolonged pregnancy, while mature pregnancy is maximal in social class 1 and minimal in social class 5. On the other hand, the type of obstetric care—hospital, home, or general practitioner—did not seem to affect the mortality whether the pregnancy was curtailed, mature, or prolonged. The survey confirmed well-known studies which conclude that the incidence of prematurity is lowest at social class 1, rises progressively as social class descends, and is highest in unmarried mothers.

The effect of labor and delivery and the form of presentation give figures which are well known to obstetricians. Spontaneous delivery of the vertex presentation, the outcome in 85 per cent of the population, has the low mortality ratio of 68. The spontaneous delivery of vertex face-to-pubes presentation, with an incidence of 2.4 per cent, has an appreciably higher ratio of 93. Cesarean section had an incidence of 2.7 per cent and a mortality ratio of 225, and although the mortality ratio was higher when the section was done prior to the onset of labor rather than in labor, the indications for this in itself carries a higher risk of fetal loss. For the benefit of historians, in five cesarean sections done after the death of the mother all the infants died.

As already mentioned, midwives were the senior persons present at the majority of all deliveries—70.4 per cent. All medical personnel, consultants, hospital junior personnel, and general practitioners only, deliver 13.7 per cent and are present for the birth of 27.1 per cent of the population. What is particularly striking is that in general practitioner units, which are supposed to provide opportunities

for general practitioners interested in obstetrics and which carry a high proportion of upper social classes, the family doctors do 11.3 per cent of the deliveries and supervise a further 16.6 per cent. In 72 per cent of these births no doctor is on the premises when delivery occurs.

The use of analgesic drugs in labor is an interesting index of sociological demand and cultural attitude. Twenty-four per cent of women had no drugs other than some inhalation agents in the last 12 hours of labor. Inhalation analgesia was used in 78 per cent, gas and air being more popular in the south and trilene in Scotland. In general those parts of the country with the lowest perinatal mortality have the greatest utilization of volatile analgesics. No analgesics were available to 1.8 per cent of mothers in London and the south-east, and to 7.7 per cent in Scotland!

The use of forceps in relation to infant loss is important because it is a fairly common procedure in obstetrics. In hospital-booked-and-delivered cases the mortality ratio is the lowest, in spite of the selection; it is slightly higher at home and highest in the general practitioner units. In cases transferred from home to hospital the incidence of forceps delivery was 22 per cent and the mortality was 150, but in cases transferred from general practitioner units to hospitals with a forceps incidence of 17 per cent there was a perinatal mortality of 214, suggesting that the general practitioner may delay transfer to the hospital, thus prejudicing the survival of the infant.

In the case of breech presentations congenital abnormalities are extremely frequent, particularly when the infant weighs 2,500 Gm. or less. The hospital tended to have selected cases but the general practitioner unit, which should on the whole be handling relatively low-risk cases, has the highest mortality for babies over 2,500 Gm. of any group. The anesthetic factor in obstetric procedures is also important, and in the case of forceps deliveries, in spite of the ready availability of general anesthesia in hospitals, it is used in only 50 per cent and local infiltration or pudendal block is used for 43 per cent. In family doctor maternity homes general anesthesia is used in 85 per cent and local infiltration in only 10 per cent of cases, thus increasing the fetal risk.

The cause of death in perinatal mortality is often not clear and the comprehensive necropsy survey is of great value. There was much co-operation by pathologists, good organization and centralized examination of much of the histology, and the final review of the anatomical cause of death incorporating the histology was made independently by three separate members of the survey team. Finally, the necropsy finding was then agreed on for each case, producing a degree of uniformity rare in investigations of this kind. Even more remarkable is the fact that 96.5 per cent of the hospital cases, 91 per cent of the general practitioner cases, and 85 per cent of the home deliveries had necropsies done during the three months of the survey. The figures for the latter part of the survey are slightly different from those obtained during March, due partly to the increasing enthusiasm of the pathologists concerned, but the general figures are substantially the same. In the case of stillbirths, congenital malformation is the cause of 15 per cent of antepartum deaths, with no major postmortem lesion in 18.4 per cent. Antepartum anoxia, intrapartum anoxia, and intrapartum anoxia with cerebral birth trauma are responsible for 16.1, 31.4, and 10.6 per cent, respectively. In the case of early perinatal deaths, congenital malformations account for 19.3 per cent, pulmonary infection for 14.9 per cent, hyaline membrane for 18.2 per cent, and no histological lesion for 10 per cent. In causes of late perinatal deaths, congenital malformations comprised 42.5 per cent, pulmonary infections 27.7 per cent, and other factors a smaller number. A number of tables are presented analyzing in detail the cause at day of death, birth weight, etc.

Geographical distribution is of interest, particularly in relation to congenital malformations which are a reflection of the genetic and environmental background rather than of the standard of care. East Anglia has a very low rate for congenital malformations, and the southwestern region has one considerably higher than the national average, although the southwestern region is one with a low over-all mortality. Social class differences in congenital malformation are also interesting. In social class 1 the rate is very low, whereas in social class 5 the congenital malformation death rate is six times as high as in social class 1. In unmarried mothers the congenital mal-

formation rate is significantly higher, but three-quarters of these mothers are primiparas and one-third are under 20 years of age, which helps to contribute to this excess. There is an appreciable increase in mortality from antepartum causes, especially pulmonary infection. The authors of the report stress the need for the care of unmarried mothers and their infants in specialist units and at all stages of pregnancy on medical grounds.

The final section, dealing with the social correlations of perinatal mortality, is written by Raymond Illsley and J. C. Kincaid. Social class is based on the classification of the Registrar-General on the 1951 census, and geographical areas have been grouped into three zones: north, including north and northwestern regions, Wales, and Scotland; central, including East and West Ridings, Midland, North Midland, and southwestern regions; and south, London and southeast, eastern, and southern regions. This has been based broadly on their socio-economic character, relative prosperity, nutritional habits, and industrial composition and fertility. The variation of mortality with social class, with the lowest in social class 1 rising to class 5, has been recognized since 1911 and still persists; if anything, the gap between class 1 and class 5 has widened relative to the national average. There is, however, variation of each socio-economic group within the three zones, even standardization shows that social class and geographical zone are independent of one another. However, the physical health of social class 1 in the north may be different from that in the south, and this at least can be seen in the much smaller proportion of taller people in the northern communities. It is suggested in the report that physically social class 1 in the north is more equivalent to social class 3 in the south. It has of course been recognized for a long time that the physique of the mother has marked effects on prematurity and perinatal deaths. This of course supports indirect general public health and social measures related to nutrition.

A report of this nature with a mass of statistics of considerable degrees of accuracy can be used by workers in many fields to find answers to some of their questions. The authors, because of their clinical interests, have tended to write with the assumption that peri-

natal mortality is a bad thing and that every attempt should be made to lessen it. From the strictly public health and sociological points of view one would feel that this view carried to its extremes is a form of medical blindness, striving to preserve the life of something which is a near biological reject and which, when preserved, will give rise to much waste of social effort. Misplaced effort on the part of the parents of this misfit will create emotional problems which do not contribute to the mental health of the population as a whole. Is the high perinatal mortality in the grand multipara a bad thing when, because of her social class, intelligence, and environment, she is probably unable to rear adequately the five or six children she already has? Is the perinatal death of the unmarried mother's child a medical tragedy or a heaven-sent solution to a personal and family problem which may exist for the following 20 years? One day true preventive medicine will probably go much further and terminate many of the pregnancies in unmarried mothers, and we shall really mean what we say about mental health when we are prepared to think of the problems of the future and not only those of the present. In countries with very high birth rates perinatal mortality is one method of controlling excessive population growth.

It is perhaps a pity that perinatal mortality has to be considered entirely on its own in this report. Maternal mortality and maternal health in the widest sense should be considered together. If the aim of public health is to make people as happy and as contented as possible, which I believe it is, one must consider the whole process of pregnancy and child-rearing, the creation of a family unit, as something which should be studied as a whole, and recognize that the desires of mothers in this respect and also the needs of communities will vary.

The differences in quality of medical care provided by the hospital, general practitioner, and midwife show that the general practitioner comes out badly in his present role in obstetric care. This may be due to defective training or to his giving insufficient time to this important subject in his day-to-day practice. Most medical schools put far too much emphasis on the mechanics of the actual

delivery, particularly the abnormal, and not enough on the real physician-accoucheur approach to antenatal care. Antenatal care should be the care and welfare of the mother in a physical and psychological sense throughout the whole of pregnancy, an educational process in future motherhood.

The doctor who has been trained as a student on the exciting abnormalities may find the apparently normal dull, and the placid course of pregnancy in the large majority of his patients lulls him into a false sense of security. The midwife, on the other hand, has been trained to do a particular job. Following the Midwives Act of 1936 her function was clearly defined and her limitations fully understood, not only by the medical profession but by the midwife herself. Taking into account the difficult circumstances under which she often works in the home the results are very good. The consultant obstetrician and others of the hospital staff are particularly expert when emergency care is required, but to be effective this expert care must be at hand.

Traditionally birth is the emotional finale of gestation, and in the minds of many patients and even some doctors the only important part of pregnancy is the delivery. This report reaffirms that the unspectacular antenatal care is important and is still not done sufficiently well. It is a pity that the medical profession does not or will not realize that a well-trained midwife, with an obstetrician available if required, produces the best results. The discipline of both the hospital and the Local Health Authority Clinic with their staffs, doctors, and midwives working as organized teams provides much better care than the fashionable general practitioner working on his own among his private patients of social classes 1 and 2.

The general practitioner could provide first-class medical antenatal care and even better care than the hospital in the sociological and psychological fields because of his opportunity for community and family contact if he is trained for this type of preventive medicine. If he is to remain outside the boundaries of a salaried service he must be paid in such a way that he can give adequate time to this work. Methods of payment both in the United Kingdom and else-

where rarely encourage the necessary expenditure of time. The desire of the woman to have her own general practitioner to look after her and the belief that this is best is not supported by the facts. The general practitioner not only fails in many instances to give adequate antenatal care but is rarely present at the delivery which takes place in surroundings where no doctor is at hand. The public is undoubtedly being fooled and fooling itself not only in Britain but in many other countries where similar types of service exist; but this is only another example of the patient's inability to judge the quality of medical care. In medicine we are selling goods to blind customers who at best judge only the wrapping paper.

Whether they will always remain quite so blind in the face of the sort of evidence in this report remains to be seen. Our emotional fears and prejudices and our superficial cultural values will doubtless overlay truth for a long time to come.

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