Chapter 2 Perinatal Mortality

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Perinatal Mortality

Perinatal mortality rate, together with maternal mortality rate, serves as a good index of the effectiveness of a maternity service. Perinatal mortality has two components: the stillbirth rate which is calculated per 1,000 births, and the neonatal death rate which is calculated per 1,000 live births. Such a gauge for the health problems of the newborn has the added advantage of a team approach involving the obstetrician, the paediatrician and the pathologist.

Changes in terminology and in definitions have created a certain amount of confusion, and it is best to understand the basis of the two measurements instead of going by definitions alone which keep changing. (See Fig. 2.1).

Death of foetus occurring before 28 weeks of gestation is now defined as early foetal death, and the term “abortion” now refers to termination. Death of foetus after the 28th week of gestation is referred to as late foetal death. The old terminology “still birth” is still in vogue and is synonymous. Any infant born alive but dying within the first month of life is referred to as neonatal death. In some countries death in the first week of life of a live born infant is referred to as neonatal death. However, the international definition preferred by the World Health Organization for neonatal mortality is death in the first month of life. Death of a live born infant after the first month and before the first year is referred to as post-neonatal mortality. For those countries that prefer to use first week of life as neonatal mortality WHO has suggested that first week of life are referred to as early neonatal mortality and death between the first week and before one month to be referred to as late neonatal mortality.

It is reasonable to assume that high perinatal mortality is prevalent in many developing countries, especially in rural areas. Marriages tend to occur early in most peasant societies. Among the Wazaramo of Tanzania, marriage takes place soon after the onset of menarche; in the rural areas of Hyderabad, India, the average age at marriage is 13 years. Thus a large number of women embark on their reproductive career at an early age, often before their own growth is complete. The average age of the mother at the time of first delivery is 16 years in rural Hyderabad and 17 years in rural Punjab. Maternal depletion due to uninterrupted cycles of pregnancy and lactation, chronic ill-health, lack of maternal care and skilled supervision during childbirth added to the unhygienic
environment of most homes where births take place, provide the background against which this high mortality occurs. (See Fig. 2.2)

Figure 2.2 Poor Weight Gain in Disadvantaged Pregnant Women

In urban areas, where maternity services have been established, a consistent improvement in the mortality figures can be seen.

Stillbirths (late foetal deaths) make the main contribution to perinatal mortality. As a matter of fact, the reduction of perinatal mortality in some western countries in recent years is largely due to reduction in stillbirths (See fig. 2.3).
Perinatal mortality is influenced by the personal and social characteristics of the mother as well as the quality of medical and obstetric care she receives. In the British perinatal mortality survey it was possible to identify two broad categories. In one group death could have been avoided by good obstetric care, and so development of obstetric services and improving the standards of care will be one way of reducing perinatal mortality. In the second larger group, perinatal mortality was found related to personal, social and nutritional factors affecting the mothers. The reproductive physiology of the mother is influenced not only by the events in the current pregnancy but also by her life experience of nutrition and infection and by her achievement of full growth potential.

The more specific causes of stillbirth or early neonatal death may exert their influence antepartum or during the process of childbirth. (See Fig. 2.4), which illustrates the influence of maternal age, parity social class on perinatal mortality. Analysis of such causes helps to identify the ‘at-risk’ pregnancy well in advance so that a plan of management or referral can be devised. It is also likely that for every stillborn baby there are several who are born with severe handicaps which could have been prevented.

In developing countries the common denominators of perinatal deaths are early childbearing, poor maternal health and above all lack of appropriate and good quality services. A third of mothers in many countries still do not have access to services during pregnancy, and almost half do not have skilled attendant at childbirth. A health worker with adequate knowledge and skills is the key resource and best investment.

At Hlabisa Maternity Hospital in KwaZulu/Natal (South Africa) improvements in maternity services were introduced throughout the district in the form of protocols for care and relevant in-service training. Evaluation five years later showed that perinatal deaths declined from 17 per cent to 6.3 per cent. In spite of increased workload during the period quality of care provided improved. All avoidable deaths were reduced by 61 per cent despite increase in workload of 16 per cent.
Mobilising women’s groups for promoting modern concepts of care during pregnancy and childbirth has been shown to be effective in traditional societies. In Nepal a district level intervention comprising mobilisation of women’s groups through motivated and well trained health workers led to improved health care delivery and behaviour resulting in improved health outcomes. Pregnant women were influenced to go for antenatal care, opt for institutional delivery and receive trained attendance at birth as well as hygienic care. There was a 30 per cent reduction in neonatal mortality and even better reduction in maternal mortality.

**Stillbirths**

In a study of 152 consecutive stillbirths over a period of six months, the commonest associated factors in the antenatal period were:

1. Lack of antenatal care in 17 (11.2 per cent).
2. Antepartum haemorrhage in 16 (10.6 per cent).
3. Maternal anaemia of less than 7.5 g per cent in 17 (11.2 per cent).

Perinatal studies in several countries have demonstrated the importance of antenatal care. This stands out as the single most important factor in promoting perinatal health. The British study showed that of all the factors contributing to perinatal mortality, lack of antenatal care was the most powerful — it is responsible for five times the overall mortality rate in the survey. This is also the experience in the developing countries and it is now the usual practice to treat the 'unbooked' case as an emergency. For example, in Tirupati, India, perinatal mortality in 'unbooked' mothers was 15 per cent and the stillbirth rate was three times that due to abnormal delivery. Other risk factors for perinatal mortality that may be identified from the obstetric history of the mother are shown in Fig 2.5, as derived from the British Perinatal Mortality survey.
Low birth weight is a major contributing factor. The intrauterine growth of the foetus and the subsequent weight of the baby at birth are closely related to the outcome of pregnancy. In Western Europe, perinatal mortality is in general 30 to 35 times higher in infants weighing 2,500 g or less at birth. In Matlab, Bangladesh a population of 196 000 was being regularly observed. The perinatal mortality rate was 75 per 1 000 births, with stillbirths at 37 per 1 000 births and early neonatal mortality of 38 per 1 000 births. The perinatal mortality declined regularly over time in part of the area covered by intensive health services but not so in an adjacent control area. Low birth weight contributed 25% of foetal deaths, prolonged labour 19%, maternal medical problems 13%, malpresentation 12%, twins 2%. In 28% of cases the cause of foetal death could not be determined. With regard to early neonatal mortality low birth weight was responsible for 63% of the deaths followed by prolonged labour 31% and neonatal tetanus 25%.

Another important factor is congenital abnormality. In some studies between 7 to 8 per cent foetal deaths are due to congenital abnormality. Fig. 2.6 provides a global distribution of this important risk factor.
In the earlier quoted study of 152 stillbirths the common obstetric factors associated with stillbirths were:

1. Cord complications (prolapsed or presentation) in 15 (9.9 per cent).
2. Obstructed labour in 9 (5.6 per cent).
3. Prolonged second stage in 4 (2.64 per cent).
4. Placenta previa in 2 (1.32 per cent).

Variations in the relative importance of these factors are seen from one place to another depending upon anthropometric and socio-economic characteristics of the communities concerned. For example, ruptured uterus was the main maternal contributory factor seen in the Baganda, and toxaemia of pregnancy is less common cause.

One useful way of monitoring labour is by means of the partogram which charts the dilatation rate of the cervix once labour has set in. The cervix dilates at the average rate of 1 cm per hour. Any delay in cervical dilatation is an early sign of labour not progressing well, referred to as dystocia. The principles of the partogram are illustrated in Fig. 2.7, and a partogram record of a woman in labour is illustrated in Fig. 2.8.
(The broken line depicts normal rate of dilatation of cervix in women on admission in labour. An alert line is drawn parallel to it and action line 4 hours on a time scale behind it. Abnormal progress of labour is present when the alert line is crossed indicating the need to seek expert opinion.)

**How the partograph provides warning guidelines**

- **a** At 12 noon, the woman, in established labour with 3 centimetres (cm) cervical dilatation, is admitted to the health centre.
- **b** At 4pm, the cervix is 5cm dilated, showing that labour is progressing slower than normal making referral from the health centre to hospital necessary.
- **c** At 8pm, the woman reaches the hospital when the cervix is 7cm dilated. With her graph now having reached the ‘Action line’, a decision must be made on the medical attention required.
In a maternity hospital in Senegal 1022 pregnant women were monitored using the partogram. The alert line was crossed in 100. Amongst their newborns the frequency of neonatal resuscitation was 4 times higher, and the risk of stillbirth five times higher. Women in whom both the lines were crossed, and there were 35 of them, the stillbirth rate was 10 times higher. Crossing of the alert line indicates dystocia and is associated with foetal distress. Without intervention to induce labour like artificial rupture of membranes or administration of oxytocics 44 per cent of the subjects crossed the action line compared with 26 per cent who received such treatment. Thus monitoring labour with the partogram allows early detection of foetal distress by means of the alert line, and of risk of stillbirth with the action line.

In the absence of post-mortem findings, only a clinical diagnosis is possible. The British perinatal mortality survey has shown the importance of anoxia; in more than half the stillbirths surveyed anoxia alone (48.2 per cent) or in association with cerebral birth trauma (7.8 per cent) was an important cause of death.

**Neonatal Deaths**

Seventy-five percent of all early neonatal deaths (in the first week of life) are seen in the low birth weight baby. In Ho Chi Minh city 4 809 births were monitored. There were 48 stillbirths and 66 early neonatal deaths giving a perinatal mortality rate of 25 per 1 000 births. Major causes of perinatal deaths were prematurity (33%), congenital malformation (15%), perinatal asphyxia (12%), perinatal infection 11%, birth injury (4%). The cause could not be determined in 16%. Similar experience has been reported from other countries. For example, in the Medical College Hospital in Kerala (India), main causes of early neonatal deaths were perinatal hypoxia, infection, congenital anomalies and the hyaline membrane disease. Asphyxia because of intrapartum hypoxic injury causes early onset encephalopathy due to derangement of cerebral energy metabolism. When severe, a majority of the affected newborns develop serious neurodevelopmental sequelae. Risk factors like multiparity, poor maternal nutrition and heavy work during pregnancy increase the risk of asphyxia largely by increasing the likelihood of low birth weight. Intrapartum risk factors like cord prolapse and maternal haemorrhage also increase the risk of asphyxia. Birth asphyxia is damaging to not only cerebral energy metabolism but also to other vital organs like the heart, liver and kidney.

In twin pregnancy the second twin is at two to three times greater risk than the first one. Complications associated with the second twin include:

- longer second stage of labour;
- compound presentation leading to trauma during delivery;
- cord prolapse;
- premature separation of the placenta;
- intrapartum anoxia.

Vaginally delivered second twins stand a fourfold higher risk than the first twin of death due to intrapartum anoxia.

Besides multiple pregnancy the other major causes of early neonatal deaths are:

1. Difficulty in establishing and/or maintaining respiration.
2. Cerebral birth trauma.
3. Congenital abnormalities.
4. Infections.
After the first week of life, an important factor in the survival of the baby is the availability of breast milk. A baby born in a rural area of the developing world with no access to breast milk has virtually no chance of survival. In this respect, the establishment of successful lactation is as crucial as antenatal care and supervised labour.

After the first week of life, infection, both pulmonary and extra-pulmonary, is an important cause of death. Force feeding by hand, resulting in inhalation pneumonia, traditional methods of cord care giving rise to a high incidence of neonatal tetanus, and the overcrowding and lack of hygiene in many homes producing respiratory or other sepsis, are the major contributory factors to high mortality in the late neonatal period.

References