

Perinatal Mortality - Identification of Risk Factors

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OBJECTIVE - To determine the perinatal mortality rate and various factors affecting it. **METHODS** - The study was conducted in a tertiary care hospital among 9301 deliveries during August 1996 to December 1997. All still births and babies who died during the first seven days were included as cases. The babies who were born immediately after these cases and lived for more than seven days were taken as controls. Various maternal factors like age, parity, socioeconomic status, antenatal care, evidence of fetal distress, time of rupture of membranes and mode of delivery were recorded. Babies' details like sex, maturity, weight, Apgar score were noted. The data were analysed using software Epi info 6. **RESULTS** - Maternal factors like age < 20 years, inadequate antenatal care, low socioeconomic status, illiteracy, nonvertex presentation, operative deliveries, presence of fetal distress and premature rupture of membranes (PROM) were associated with increased perinatal mortality. Among neonatal factors, birth asphyxia was the most important risk factor followed by low birth weight, prematurity and male sex. **CONCLUSION** - Identification of high risk mothers, prevention of asphyxia by adequate intranatal care and availability of proper neonatal care for preterm and low birth weight babies would significantly help reduce the perinatal mortality rate.

Key words - perinatal mortality, antenatal care, risk factors

Introduction

Perinatal mortality continues to be high in India, despite various measures taken to reduce it^{1,2}. Perinatal mortality rate (PMR) has been recognised as the most sensitive index of the quality of health care provided to pregnant women and their newborns³. The issue has been discussed in numerous national and international conferences and various targets for morbidity reduction have been set. Despite these efforts, progress has been slow. In India, approximately 1.5 million perinatal deaths occur every year despite various measures taken to reduce its incidence^{2,4,5}. Perinatal mortality rate is affected by various maternal and neonatal factors^{4,6}. Identification of potentially preventable causes of mortality and undertaking appropriate steps will help reducing PMR. The present study was undertaken to identify risk factors and suggest steps for reducing perinatal mortality in our region.

Material and Methods

This prospective study relates to PMR among 9301 consecutive births from August 1996 to December 1997. All the stillbirths and babies who died during first seven days of life were included as cases in the study. The baby who was born immediately after the case (from the confinement register) and survived for more than seven days of life was taken as control. If a baby in the control

group died during seven days it was taken as a case and two additional controls were taken from the labour register. The maternal factors included were age, parity, socioeconomic status, obstetrical illnesses like pregnancy induced hypertension, antepartum hemorrhage, eclampsia, hydramnios, anemia, heart disease and chorioamnionitis. Antenatal care during pregnancy, type of presentation, time interval between rupture of membranes and delivery, presence of fetal distress and mode of delivery were also noted. The neonatal factors included were birth weight, sex, gestation, birth asphyxia and congenital malformations. All perinatal deaths were discussed during the monthly perinatal meetings. The findings among cases were compared with those in controls using the software Epi info 6 version 6,04 b, 1996.

Results

Among the 9301 deliveries during the study period, there were 342 stillbirths and 170 early neonatal deaths. Among the cases, 307 were male, 201 were female and four with ambiguous genitalia while the control group had 240 males and 272 females. The perinatal mortality and early neonatal mortality rates were 55.1 and 19.0 per thousand respectively. The perinatal mortality in relation to various maternal factors is shown in Table I. PMR was significantly high in women from low socioeconomic status and in those with inadequate antenatal care, presence of rupture of membranes for > 24 hours and fetal distress ($p < 0.001$). Perinatal mortality was also higher when maternal age was less than 20 years, woman was illiterate, presentation was nonvertex and delivery was abnormal. Among neonatal factors, presence of asphyxia, prematurity, low birth weight and

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male sex were associated with high perinatal mortality (Table II).

On comparing the various factors for perinatal mortality in terms of relative risk, it was observed that highest risk was associated with fetal distress followed by inadequate antenatal care, presence of rupture of membranes for more than 24 hours and low

socioeconomic status. The neonatal factors with high risk for perinatal mortality were birth asphyxia and low birth weight. When the causes of early neonatal mortality in the study group were analysed, it was observed that birth asphyxia was the most common cause followed by prematurity, congenital malformations and infection. Sepsis was more common among preterm and low birth weight babies (Table III).

Table I : Maternal factors affecting perinatal mortality.

| Factors | Cases | | Controls | | P value | RR | 95% C.I. |
|-----------------------------------|-------|------|----------|-------|---------|-------|------------|
| | n | % | n | % | | | |
| Age | | | | | | | |
| < 20 | 73 | 14.3 | 48 | 9.4 | 0.0096 | 1.67 | 1.11-1.49 |
| 20-30 | 388 | 75.7 | 425 | 83 | | | |
| > 30 | 51 | 10 | 39 | 7.6 | 0.107 | 1.43 | 0.9-2.27 |
| Parity | | | | | | | |
| 1 | 200 | 39.1 | 214 | 41.8 | 0.23 | 0.91 | 0.78-1.06 |
| 2 | 131 | 25.5 | 116 | 22.65 | | | |
| 3 or more | 181 | 35.3 | 182 | 35.6 | 0.929 | 0.99 | 0.76-1.2 |
| Antenatal care | | | | | | | |
| Booked | 136 | 26.6 | 429 | 83.9 | | | |
| Unbooked | 376 | 73.4 | 83 | 16.1 | <0.001 | 14.29 | 10.4-19.65 |
| Socioeconomic | | | | | | | |
| Upper | 9 | 1.8 | 48 | 9.4 | | | |
| Middle | 163 | 31.8 | 157 | 30.7 | <0.001 | 5.54 | 2.52-12.56 |
| Lower | 340 | 66.4 | 307 | 60 | <0.001 | 5.91 | 2.74-13.14 |
| Literacy | | | | | | | |
| Literate | 119 | 23.2 | 182 | 35.6 | | | |
| Illiterate | 393 | 76.8 | 330 | 64.4 | <0.001 | 1.82 | 1.37-2.42 |
| Presentation | | | | | | | |
| Vertex | 379 | 74 | 466 | 91 | | | |
| Breech | 88 | 17.2 | 31 | 6 | <0.001 | 3.49 | 2.22-5.5 |
| Others | 45 | 8.8 | 15 | 3 | <0.001 | 3.69 | 1.96-7.03 |
| Mode of Delivery | | | | | | | |
| SVD | 322 | 63 | 409 | 79.9 | | | |
| ABD | 84 | 16.4 | 30 | 5.9 | <0.001 | 3.56 | 2.53-5.07 |
| Forceps and Vacuum | 45 | 8.7 | 25 | 4.8 | 0.0011 | 2.29 | 1.34-3.93 |
| CS | 61 | 11.9 | 48 | 9.4 | 0.198 | 1.61 | 1.06-2.47 |
| Fetal distress^a | | | | | | | |
| Present | 74 | 43.5 | 23 | 4.5 | <0.001 | 16.39 | 9.51-28.44 |
| Absent | 96 | 56.4 | 489 | 95.5 | | | |
| Rupture of membranes | | | | | | | |
| > 24 hrs | 134 | 79 | 499 | 97.5 | | | |
| ≤ 24 hrs | 36 | 21 | 13 | 2.6 | <0.001 | 10.31 | 5.11-21.13 |

^a 342 cases had intrauterine death

Table II : Neonatal factors affecting perinatal mortality

| Factors | Cases | | Controls | | RR | P value | 95% C.I. |
|--------------------------------|-------|------|----------|------|-------|----------|--------------|
| | n | % | n | % | | | |
| Apgar Score^a | | | | | | | |
| <3 | 86 | 50.6 | 17 | 3.3 | 70.67 | <0.001 | 36.17-139.91 |
| 4-6 | 51 | 30 | 34 | 6.7 | 20.95 | <0.001 | 11.56-38.2 |
| >7 | 33 | 19.4 | 461 | 90 | | | |
| Sex^b | | | | | | | |
| Male | 307 | 60 | 240 | 46.9 | 1.73 | <0.001 | 1.34-2.24 |
| Female | 201 | 39.3 | 272 | 53.1 | | | |
| Gestational Age | | | | | | | |
| Preterm | 303 | 59.2 | 49 | 9.6 | 1.44 | 0.138499 | 0.86-2.4 |
| Term | 193 | 37.7 | 454 | 88.6 | | | |
| Post term | 16 | 3.1 | 9 | 1.8 | 4.18 | <0.001 | 1.71-10.44 |
| Birth weight | | | | | | | |
| <2.5 kg | 425 | 83.1 | 125 | 24.4 | 8.4 | <0.001 | 6.27-11.27 |
| >2.5 kg | 87 | 16.9 | 387 | 75.6 | | | |

^a 342 stillbirths

^b 4 with ambiguous genitalia

Table III : Causes of Early Neonatal Mortality

| Causes | No. | Percentage |
|--------------------------|-----|------------|
| Birth Asphyxia | 92 | 54.1 |
| Prematurity | 28 | 16.5 |
| Congenital Malformations | 24 | 14.1 |
| Infections | 16 | 9.4 |
| Others | 10 | 5.9 |
| Total | 170 | 100.0 |

Discussion

Perinatal mortality comprises of stillbirths and early neonatal deaths. It reflects efficiency of health services provided to pregnant mothers and their newborns^{3,7}. In spite of advances made in the field of perinatology, including better antenatal and intranatal fetal monitoring and better obstetric and neonatal intensive care services, the PMR is still alarmingly high in developing countries like India compared to the developed nations⁸. Early neonatal deaths account for 40-43% of perinatal mortality in India^{5,6}. PMR in India varies from 77.4 in Vellore⁶ to 37.5 in Punjab². The perinatal mortality in our hospital declined from 62.2 in 1993 to 55.1 per 1000 deliveries in the present study⁵. The lower PMR in our study is because of the overall improvement in maternal and child health care during the last few years.

PMR in mothers with inadequate antenatal care was three times higher than that in those receiving adequate antenatal care. This is similar to the observations made by other workers⁹. More than 75% of perinatal deaths occurred among unbooked cases. Therefore, adequate antenatal care and identification of high-risk mothers may help in decreasing perinatal mortality.

A high PMR was noted in mothers from low socioeconomic status, which may be due to higher prevalence of maternal malnutrition and non-availability of adequate medical facilities. This was in conformity with earlier experiences^{10,11}.

Perinatal mortality was higher when the maternal age was less than 20 years. Other workers also reported similar observations. Parity of the mother did not

significantly influence the perinatal outcome. Premature rupture of membranes, presence of fetal distress and abnormal mode of delivery were associated with increased PMR as observed by Choudhri et al¹². It is obvious from this study that factors like low socioeconomic status, inadequate antenatal care, presence of fetal distress and premature rupture of membranes carry a significant high risk for perinatal mortality.

Birth asphyxia was the most important neonatal risk factor for perinatal mortality followed by low birth weight, prematurity and male sex. Severe birth asphyxia accounted for about 50.6% of perinatal deaths. Similar observations were made in earlier studies^{13,14}. Low birth weight and prematurity were other major factors contributing to perinatal mortality in this study. This is because of increased risk of apnoea, hyaline membrane disease, hypothermia, hypoglycemia and septicemia among preterm babies. Perinatal mortality was significantly higher in male babies in comparison to female ones as observed by Kapoor et al¹¹. Male and female babies accounted for 60% and 30% respectively of perinatal deaths.

Though multiple factors are often involved in the causation of PMR, a few can be singled out like lack of antenatal care, poverty, presence of fetal distress, PROM, low birth weight and birth asphyxia. Improvement of maternal and child health care especially with regard to registration of all pregnant mothers, early identification of high risk cases and timely intervention is the need of the hour. This can be achieved by adequate antenatal visits, promotion of small family norms, nutritional supplementation, appropriate intrauterine monitoring and conduction of delivery by trained personnel along with advanced life support for the sick newborn.

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