AETIOLOGY OF PERINATAL MORTALITY- A STUDY IN A RURAL SETTING

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ABSTRACT

*Background***:** Each year, an estimated six million perinatal deaths occur worldwide and 98% of them occur in low and middle-income countries. Globally there are 3 major causes of neonatal death: infections (36%), prematurity (28%) and asphyxia (23%). Of the remaining, 7% are due to congenital malformations.

*Objectives***:** Analysis of risk factors associated with perinatal mortality and to determine the most common causes of early neonatal deaths.

*Material and method***:** The study was carried out at a tertiary care rural hospital of central India. Data were collected on 5,856 births over a one year period.

Results: The perinatal mortality rate was 17.07 per 1,000 births. Clinically relevant factors independently associated with perinatal death included: low birth weight, breech presentation, birth asphyxia, sepsis, respiratory distress syndrome, congenital malformations and meconium aspiration syndrome. Over one-half of early neonatal deaths occurred during the first two post natal days, and the most common causes were low birth weight/prematurity (28.80%), asphyxia (13.04%), and congenital malformations (9.23%).

*Conclusion***:** Most neonatal deaths occur soon after birth, and nearly three-quarters are caused by low birth weight/prematurity or asphyxia. Neonatal mortality might be reduced by targeting interventions to improve neonatal resuscitation and care of larger preterm infants. Specifically, deaths due to breech presentation, a common risk factor, will be reduced by making available emergency obstetric care. Large number of stillbirths is preventable by regular antenatal check up and institutional delivery.

Keywords: Neonatal mortality; Observational study; Perinatal mortality; Stillbirths

1. Introduction

Each year, an estimated six million perinatal deaths (the combination of stillbirths and early neonatal deaths) occurs worldwide [1-3] and 98% of these deaths occur in low and middle-income countries (LMICs). Perinatal deaths are the leading burden of disease among children aged less than five years worldwide [4]. As perinatal mortality is a major contributor to child mortality, unless effective interventions aimed at reducing perinatal mortality are implemented, achieving the Millennium Development Goal 4 of reducing under-five mortality by two-thirds in 2015 will not be possible[5]. Since rural populations tend to be under represented in survey data, these figures may underestimate the magnitude of the problem[6]. We sought to determine the perinatal mortality rate (PMR) in a population-based study in a rural tertiary center, examined the risk factors for perinatal mortality and determined the most common causes of early neonatal deaths to identify the potential strategies for reducing mortality.

2. Material and Methods

2.1 Study Setting: The study was carried out in a tertiary care centre at Sewagram, Wardha, Maharashtra, India.

2.2 Data collection: The birth history and perinatal mortality data of all the infants in the population under study were obtained from the birth records and perinatal mortality register maintained by the Department of Obstetrics and Gynaecology in Mahatma Gandhi Institute of Medical Sciences, Sewagram, Wardha between October 2010 to September 2011.

2.3 Analysis of data: The data collected was divided into intrauterine deaths, intrapartum deaths (stillbirths) and neonatal deaths. Proportional and cause specific mortality in these categories and the birth history versus cause specific mortality were also studied. The most common causes of death were determined and compared. Predisposing factors such as the gestational age, birth weight, mode of delivery, sex of baby and their contribution to perinatal deaths were also examined.

The rates were calculated by following formulas:

Perinatal mortality rate = (Early neonatal deaths+ Still births/ total births) x 1000

Early neonatal mortality rate = (Early neonatal deaths / live births) x 1000

Still birth rate = (Still births / total births) x 1000.

3. Results

Between October 2010 and September 2011, there were 5,672 live births and 184 perinatal deaths, giving an average perinatal mortality rate of 17.07 per 1000 births. Of 184 perinatal deaths 84 were intrauterine deaths, 14 intrapartum deaths and remaining 86 were early neonatal deaths. The still birth rate was 17.27 per 1000 live births and early neonatal death rate was 15.16. The birth history of the 184 babies showed that 131 babies delivered normally, 38 by lower segment caesarean section, 3 by forceps, 11 by assisted breech delivery and 1 had vaginal birth after caesarean section (VBAC). The majority of perinatal deaths were in preterm babies 139 (75.54%), and 45 (24.45%) were of 37 weeks gestation or more. The birth weight distribution of the babies was comparable and 157 (85.33%) of the babies weighed less than 2.5 kgs. Of 184 perinatal deaths 106 (57.60%) were males, 71 (38.58%) females and remaining 7 (3.8%) were of ambiguous genitalia.

The most common cause of death was low birth weight and prematurity. 53 perinatal deaths were due to low birth weight (28.80%). Other causes included birth asphyxia (13.04%), congenital anomalies (9.23%), respiratory distress syndrome (3.2%), meconium aspiration syndrome and hyaline membrane disease (0.54%), sepsis (0.54%) and majority of intrauterine deaths (44.56%) were due to maternal risk factors like hypertensive disorders, abruption, placenta previa, GDM etc.

4. Discussion

In global perspective, newborn mortality and morbidity are still very high. Between 1980 and 2000, neonatal mortality was reduced by 25% only, and even less progress has been achieved in reducing mortality in 1st week of life. The slow decline in neonatal mortality, and especially early neonatal mortality, is the main reason why the Millennium Development Goal (MDG) 4 to reduce child mortality (< 5 year) by two thirds from 1990–2015 will not be reached[2]. With the present rate in reduction of child mortality, the MDG 4 will be reached 30 years later than the goal of the UN and other global organizations.

Global neonatal mortality is, according to the World Health Report, 28 per 1,000 live births[7]. 99% of all neonatal deaths occur in low or middle-income countries[7]. About 40% of children < 5 years who die are newborns. Of the almost 4 million newborns who die, between 25 and 50% die in the first 24 hours and 75% die in the first week. Maternal and newborn health is one of the major health inequities of the world[2].This huge inequity represents one of the largest gaps between rich and poor, and is perhaps more a human rights issue than a medical problem. Globally there are 3 major causes of neonatal death: infections (36%), prematurity (28%) and asphyxia (23%). Of the remaining, 7% are due to congenital malformations[8].

Intrapartum risk factors are associated with greater risk of neonatal death than prepartum risk factors. Obstructed labor and malpresentation gives the highest risk. Breech presentation and obstructed labor increases risk of neonatal death more than 6-fold. Maternal fever during labor and meconium-stained amniotic fluid increase the odds ratio for neonatal death by about 10 times[2].

Low birth weight is one of the most common causes of perinatal mortality. There are a number of risk factors for low birth weight, such as preterm labor, poor socioeconomic conditions, very young maternal age, poor diet (inadequate caloric intake, nutritional deficiencies of iron, folate and zinc), cigarette smoking and infections. One problem with birth weight as an outcome variable is that only about half of the world's babies are weighed at birth. Estimates indicate that there are 20 million low birth weight newborn babies each year – 15% of all deliveries– with about 95% occurring in low-income countries[2]. For babies with birth weights between 2.25 and 2.5 kg, the infant mortality is almost 5 times greater than for babies weighing more than 2.5 kg. An increase in 100 g in mean birth weight is associated with a 30–50% reduction in neonatal mortality[9,10]. In our study also low birth weight was the most common cause of perinatal mortality (28.80%).

The second most common cause in our study was birth asphyxia or intrapartum-related neonatal deaths (13%). It is globally the 5th most common cause of deaths among children under 5 years. It is estimated that 6–7 million, or even more, would need some form of intervention or resuscitation at birth with

approximately 1% of all births requiring extensive resuscitation, i.e. 1.3 million infants each year[11]. Four million newborn infants go through birth asphyxia each year, accounting for an estimated 904,000 deaths and 42 million disability-adjusted life years[12]. An equal number develop sequelae following birth asphyxia, most commonly cerebral palsy, epilepsy or sensory deficit[13].

Congenital abnormalities as a cause of neonatal deaths, is also increasing. In this study it was found that it is responsible for 9.23% of perinatal deaths. In countries with low neonatal mortality, congenital malformations constitute a bigger part of deaths than in countries with high neonatal mortality.

More than 1 million newborns die of infections each year. Most of these occur in the late neonatal period. Preterm births are associated with asymptomatic genital and urinary tract infections. Bacterial vaginosis, genital infections by chlamydia, gonorrhea and group B streptococcus acquired from a colonized birth canal may infect the newborn during delivery resulting in high morbidity and mortality. Other causes of perinatal mortality were respiratory distress and meconium aspiration syndrome accounting for 3.8% in the study.

In this study it was found that perinatal mortality was more common in males (57.60%) than in females (38.58%). A similar study was carried out in Brazil, to know the effect of sex on perinatal mortality between the years 2000 to 2009 and it was found that perinatal mortality was more common in males than in females. The male/female sex ratio (SR) for all fetal deaths was 1.188.[14]

Conclusion

Based on the findings of the study, we conclude that perinatal mortality is a significant problem in rural setup. Our identification of specific factors that increase risk does not prove a cause-and-effect relationship between the factor and mortality. However, potential strategies for reducing perinatal mortality might include, increasing enrollment in antenatal care, prevention of preterm deliveries, proper care of low birth weight babies and improving the management of birth asphyxia and sepsis. Reducing neonatal mortality associated with breech presentation and intrapartum stillbirth would require identification and timely referral of mothers with fetuses in the breech position and having other high-risk factors.

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Table – I Risk factors for perinatal mortality

GESTATION(WK)	IUD	STILLBIRTH	NEONATAL	TOTAL
<37 WEEKS	66	08	65	139
>-37 WEEKS	18	06	21	45
BIRTH WEIGHT(Kg)				
< 2.5 Kg	76	06	75	157
>- 2.5 Kg	08	08	11	27
MODE OF DELIVERY				
VAGINAL DELIVERY	77	11	43	131
LSCS	04	03	31	38
INSTRUMENTAL	01	00	02	03
ASSISTED BREECH	02	00	09	11
VBAC	00	00	01	01
SEX OF BABY				
MALE	42	06	58	106
FEMALE	40	05	26	71
AMBIGUOUS	02	03	02	07

Table – II Causes of perinatal mortality

CAUSES	IUD	STILL BIRTH	NEONATAL	TOTAL
LOW BIRTH WEIGHT	00	03	50	53 (29%)
BIRTH ASPHYXIA	00	05	19	24 (13%)
CONGENITAL ANOMALIES	02	05	10	17 (9.23%)
RESPIRATORY DISTRESS SYNDROME	00	00	06	06 (03%)
SEPSIS	00	00	01	01 (0.5%)
MECONIUM ASPIRATION SYNDROME	00	01	00	01 (0.5%)
UNEXPLAINED	82	00	00	82 (44%)
TOTAL	84	14	86	184