

# Causes of Mortality in Preterm Neonates Admitted in a Tertiary Care Hospital in Sahiwal, Punjab - A Retrospective Study.

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## Abstract

**Objective:** To find out the factors causing mortality in preterm neonates admitted at a tertiary care hospital in Sahiwal, Punjab.

**Method:** This retrospective study was conducted in the Pediatric unit of Sahiwal Teaching Hospital, Sahiwal, Punjab, from January to September, 2021. Out of 1256 neonates, including 586 preterm, only those 105 preterm neonates were included in the study who had expired within one month of their stay, were less than 33 weeks of age and had less than 2500 grams birth weight. Their data was recorded for age and weight on admission, gender, length of stay and reason for admission. The record of their clinical and radiological investigations was retrieved to investigate the causes of mortality.

**Results:** More than half of the deaths amongst 105 preterm neonates were unavoidable and occurred within first 48 hours of hospitalization due to their critical condition at the time of admission. Out of the total deaths, 46 (43.80%) were due to sepsis, 24 (22.85%) were due to birth asphyxia, 24 (22.85%) were due to respiratory distress, 8 (7.61%) were due to neonatal jaundice and 3 (2.85%) deaths had no definite cause.

**Conclusion:** Neonatal infections are the leading cause of death, followed by birth asphyxia and respiratory distress in the government hospitals of Pakistan.

**Keywords:** neonatal mortality, preterm neonates, sepsis, respiratory distress, primary health care.

## Introduction

It has been estimated that every year, around 15 million of neonates across the world are born before time, which amounts to one 1 in every 10 births, and approximately, about 1 million of them die annually due to consequences of preterm birth (Liu et al. 2016).<sup>1</sup> Globally, prematurity has been documented as the leading cause of death in children under 5 years of age and alarmingly throughout the world, preterm births are on the rise.<sup>2</sup>

In countries with low-income population, including Pakistan, most of the babies born at or below 32 weeks (2 months early) die due to a lack of reasonable, economical care, such as keeping

the neonate warm, giving it adequate breast milk or an alternative substitute while in the incubator, preventing spread of basic infections and addressing breathing difficulties. Such neonates born in high income countries are fortunate enough as almost all of them survive, in contrast to births taking place in low -income countries, in which majority succumb to death. Use of low standard technology in middle-income countries is adding to the economic burden as neonates somehow survive the initial month of life but end up suffering from life-long disabilities.

Massive discrepancies in the level of neonatal mortality persist across regions and countries, and it has been witnessed that most of these deaths occur in low- and middle-income countries.<sup>3</sup> When the data for causes of neonatal mortality were globally estimated, it was seen that the main factors responsible were complications arising from prematurity, sepsis and maternal co-morbidities during gestational period.<sup>4</sup>

There are higher chances of mortality and morbidity in neonates weighing less than 2500 grams, as the estimated relative risk of low birth weight for neonatal mortality is almost 200 times higher in comparison to neonates having normal birth weight (above 2500 grams).<sup>5</sup>

The causes of neonatal death are different in high income countries as compared to low-income countries, depending upon the health care facilities available, socio-economic conditions of the population and the level of education and awareness among the masses.

Although there has been a remarkable improvement in antenatal care in medical institutions across Pakistan over the years,<sup>6</sup> but striking dissimilarities in antenatal and neonatal care has been observed between urban and rural areas. Moreover, social differences also result in different outcomes of premature neonatal births. The trend of antenatal checkups is prevalent in urban population, compared to rural areas, as the educated females are familiar with its significance, in contrast to the ignorant females residing in rural areas, who are not only deprived of education, but also access to these facilities.

The teaching hospital in Sahiwal has free facilities for the patients as it is a government institution having a high inflow of patients 24 hours round

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the clock. This study is an attempt to evaluate the number and causes of mortality among neonates born in middle to low socio-economic class.

Methods

This retrospective observational study was conducted at Paediatric unit of Sahiwal Teaching Hospital, Sahiwal, from January to September, 2021, after having obtained ethical consent from the ethical review committee. The data of all the admitted neonates entered manually in registers was analyzed for age and weight at the time of admission, sex, duration of stay and cause of admission. Only those preterm neonates were included in the study who had expired within one month of their stay, were less than 33 weeks of age and had less than 2500 grams birth weight. The record of their clinical and radiological investigations was retrieved and studied carefully for causes of mortality.

Results

A total of 1256 neonates were admitted and among these, 586 were preterm, out of which 105 preterm neonates had expired, which included 72 males and 33 females. More than half of these deaths were unavoidable and occurred within first 48 hours of hospitalization due to their critical condition at the time of admission. Out of the total deaths, 46 (43.80%) were due to sepsis, 24 (22.85%) were due to birth asphyxia, 24 (22.85%) were due to respiratory distress, 08 (7.61%) were due to neonatal jaundice and 03 (2.85%) deaths had no definite cause (Figure – 1).

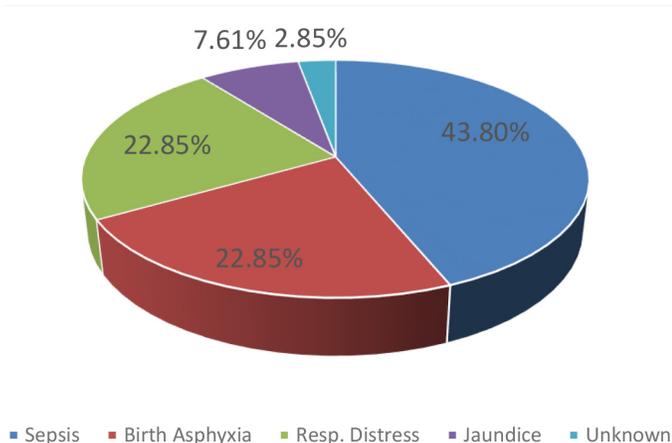


Figure 1: Diagrammatic representation of causes of neonatal mortality

Factors causing neonatal mortality at Sahiwal Teaching Hospital between January to September, 2021.

Table 1: Days of admission and place of birth of expired neonates

Parameter	Number of neonates
Neonates admitted within first 3 days of life	72 (68.57%)
Neonates admitted after 3rd day till 24th day of life	33 (31.42%)
Number of cases born in health care facility	78 (74.28%)
Number of cases born outside a health care facility	27 (25.71%)

The average birth weight of the 105 cases was between 1800 to 2200 grams and were mostly between 28 to 32 weeks of age. Most the deaths were due to sepsis and birth asphyxia and 25% of these cases were born outside a health care facility (Table – 1).

Discussion

Birth weight, besides the gestational age, has a close relationship with infant mortality rate. The lower the birth weight and the gestational age, the greater the chance of death in the first year of life. Low birth weight is in itself a major cause of mortality in preterm neonates. To study the causes of neonatal mortality, it is important to know the important determining factors for ensuring neonatal health and wellbeing.

Factors associated with the health of the mother and child in Pakistan reflect a very poor state. To determine the health status of the newborn, it is important that the health of the mother should be taken care of as it has a direct impact on the outcome of the child health and its chances of survival. It has been documented that more than 80% of pregnant females in Pakistan have no formal education about the importance of well-being of mothers.<sup>7</sup> According to WHO, a minimum of four antenatal check-ups are recommended.<sup>8</sup> However, a survey conducted in 2014 in Sindh revealed that about 80% women had antenatal checkup only once by a skilled birth attendant.<sup>9</sup> Similarly, in the present study, we assume that the mothers were unaware of the importance of antenatal visits or such facility was not within their physical or economic reach. It has been documented that masses with low socio economic conditions are mostly unaware of the importance of antenatal care.<sup>10</sup>

One major short coming we encountered while recording the data was lack of information regarding mother’s clinical investigations, but it has been observed in many studies in the past that mothers visiting ante natal clinics in Pakistan are mostly suffering from anemia,<sup>11</sup> which is a major cause of premature births. Similarly, in a study conducted by Ali et al. in 2020, it was documented that anemia is highly prevalent among pregnant females in developing countries, affecting around two-thirds of the population and contributing to both maternal and neonatal morbidity and mortality as well as to low birthweight.<sup>12</sup>

More than three quarters of premature babies can be saved with feasible, cost-effective care, such as essential care during child birth and in the postnatal period for every mother and baby, provision of antenatal steroid injections (given to pregnant women at risk of preterm labor to strengthen the babies’ lungs), skin-to-skin contact between the baby and mother, frequent breastfeeding and antibiotics to treat newborn infections. With regards to delivery care in Pakistan, there are many challenges encountered in the government sector. The recently released report of UNICEF on the causes of neonatal mortality highlights all the problems faced in the developing countries which lead to early death of neonates. Unfortunately, Pakistan is tagged as one of those countries which rank amongst the top few in this list, where newborns face one in 22 percent chance of dying in the first month of life.<sup>13</sup>

Sepsis was the major cause of mortality reported by the data we obtained and the cause of sepsis is most probably lack of adequate sanitary equipments during home deliveries, as 25% of deliveries were reported outside of a health care facility (Table-1). In a study conducted by Parveen et al (2017), it was stated that the incidence of home delivery is roughly the same as institu-

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tional delivery in Pakistan.<sup>14</sup> A study conducted by Iftikhar ul Hussain et al. in 2018 revealed that it is a very common and prevalent practice to deliver at home rather than in a hospital or a clinic in Pakistan, with Baluchistan having the highest cases (74%); Khyber-Pakhtunkhwa following (53%), Gilgit Baltistan third in the list (46%), Punjab scoring 45% and Sindh having the least reported cases of home deliveries (34%). The reason could be difficulty obtaining permission to visit a health facility, financial barriers or the distance to health facilities and transportation.<sup>15</sup> Similarly in our study, 25% of the admissions were not from a health care source (Table -1) and it is assumed that those neonates dying from infections were either delivered in septic environment or the mothers had a history of prolonged rupture of membranes leading to infection of the fetus, or, perhaps, they were suffering from infections transferrable to the fetus.

### Conclusion

Infections are the chief cause of death, followed by birth asphyxia and respiratory distress. Although the government has made tremendous efforts in the recent years to upgrade the prenatal health services, there is need to further educate the masses and enhance the reach and quality of primary health care services in the district and rural areas of Pakistan.

### Limitations of study

We could not include the mothers and their detailed health and gestational history in this study. That would have helped us further explore the reasons leading to complications and mortality in neonates.

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