

Neonatal Mortality in a District Hospital Setup

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Objective: To evaluate the causes and risk factors of neonatal mortality, in a non-tertiary district hospital nursery. **Study Design:** Descriptive study. **Place and duration of study:** This study was carried out in the Neonatal Unit of Social Security Hospital Muzaffar Garh, Pakistan from 1st May 2004 to 30th April 2005. **Patients and methods:** All newborns admitted in the nursery during study period were counted and the expired ones were evaluated in detail for the cause of death. **Results:** A total of 410 neonates were admitted during study period, 53.65% were male and 46.35 females. 47.22% were admitted within 1st 24 hours of their life, and 61.66% within 72 hours of birth. 56.66% of the expired neonates were low birth weight. Neonatal sepsis being the commonest cause of death (44%), 35% being of EOS and 65% cases of LOS. 2nd commonest cause of neonatal death was birth asphyxia (22%) and the third commonest cause was prematurity (19%) with its complications. Other causes of neonatal mortality were neonatal jaundice (2.77%), meconium aspiration syndrome (1.66%), hyaline membrane disease (6.66%), neural tube defects (1.11%) and congenital heart disease (1.66%). Many babies had more than one of the above said causes. **Conclusion:** Neonatal sepsis, birth asphyxia and prematurity are the major killers in nurseries.

Key words: Neonatal mortality, Distt. hospital

Neonatal period is defined as the period starting from birth to 28th day of life. Most causes of neonatal morbidity in Pakistan are preventable¹. Neonatal mortality accounts for 40-60% of all infant mortality in developing countries, or more than 50% of all childhood mortality. The survival of newborn babies depends on the care they receive². Almost one quarter of the newborns in developing countries start life with impaired growth in womb, a condition determined largely by the mother's nutritional status², and nearly half of infants death in Pakistan occur within neonatal period³.

Every year an estimated 4 million babies die in the first 4 weeks of life (the neonatal period). Three-quarters of neonatal deaths happen in the first week--the highest risk of death is on the first day of life. Almost all (99%) neonatal deaths arise in low-income and middle-income countries. The prognosis of neonates depends on severity of underlying condition, management given and complications. Although infant mortality rates have declined in recent years, nearly 60% of all deaths occur in the neonatal period and have shown comparatively little change over several decades. Since community-based data are difficult and expensive to collect in the face of lacking resources, hospital-based data, therefore, reflect changes in the community as a whole. For this reason neonatal audit regarding diseases is carried out in Pakistan from time to time^{4, 5, 6}.

Inequities in the provision of health care are one of the reasons for difference in neonatal morbidity and mortality⁷. They can be reduced by proper intervention⁸. The neonatal disease pattern changes between different places and time-to-time, even at same place⁹.

Thus, it is necessary for better neonatal status that we continue to report causes of neonatal diseases from time to time.

Patients and methods:

This study was carried out in Social Security Hosp Muzaffar Garh, from 1st May 2004 to 30th April 2005. This hospital is entitled for the poor class of factory workers. The Pediatric unit admits all sick children except those, requiring surgical intervention.

The neonatal mortality (Death in first 28 days of life was classified as neonatal death) data for the said period was analyzed. The followings information was gathered from the record: (1) Age, (2) Weight, (3) Sex, (4) Duration of stay in neonatal unit, (5) Indication of admission, (6) Cause of death (7) Total number of newborns admitted.

Following were the operational definitions used for defining the data:

Diagnosis was based either on main indication for admission or the final diagnosis at the time of death. Preterm was defined according to WHO definition of prematurity (live born neonates delivered before 37 weeks from first day of last menstrual period (LMP), a newborn was taken as low birth weight (LBW) if having birth of <2.5kg¹³.

If a newborn was received and admitted in nursery primarily due to LBW, the main diagnosis would be LBW though he might develop jaundice later on, while on the other hand if a LBW baby was admitted on 3rd day of life with jaundice, the main diagnosis would be neonatal jaundice. But if the cause of death was different from the indication of admission e.g. a hospital acquired sepsis in a previously normal premature, for evaluation purposes the final cause of death was taken into account. Birth asphyxia was mainly diagnosed on the basis of history of birth events, physical examination, and after fulfillment of clinical parameters of Sarnat-Sarnat staging. Congenital heart disease was diagnosed on echocardiography.

Neonatal sepsis was based on the presence of appropriate. Clinical features and lab support in the form of either of the following, a raised TLC > 30000, increased band neutrophil ratio and positive blood culture. Early onset sepsis (EOS) was labeled with sepsis presenting within first 7 days of life. Late onset sepsis (LOS) was labeled for sepsis presenting from 8th to 28th day of life.

Results:

During the study period total admissions in Neonatal Unit were 410 out of which 220 (53.65%) were males and 190 (46.35%) females. There were 180 (43.9%) expiries (Chart-1); out of which 102 (56.6%) were males and 78 (33.4%) females. 102 (24.8%) out of the total admissions were LBW (<2.5 kg).

The commonest cause of mortality was neonatal sepsis, of which there were 80(44%) patients, among them (35%) newborns had early onset septicemia (EOS) and 52(65%) had late onset of septicemia (LOS). Prematurity with complications was the second commonest cause with 47(26.1%) patients, followed by birth asphyxia, which was the third highest cause of death accounting for 40(22%) expiries (Table I). Majority (41.6%) of the newborns expired were admitted within the first 24 hours of life, we also had a bulk of community acquired (late onset) sepsis (28.8%) as the cause of neonatal mortality that presented to our NNU after 7 days of 'life (Table). The weight breakdown of the expiries reflects that majority was low birth weight, very low birth weight, or extremely low birth weight (Table). Similarly duration of stay in the hospital shows that majority expired within 24-72 hours of stay (Table).

Table 1: Causes of Neonatal Mortality

Disease	No. of expiries	%age
Late onset sepsis	52	28.8
Early onset sepsis	28	15.5
Prematurity with Complications	47	26.1
Birth Asphyxia	40	22.2
Jaundice	5	2.7
Meconium Aspiration Syndrome	3	1.7
Congenital Heart Disease	3	1.7
Neural Tube defect	2	1.1
Late onset sepsis	52	28.8

Table II: Age at admission

Age at admission	=n	%age
1 st 24 hours	85	47.2
24-72 hours	26	14.4
4-7 days	17	9.4
8-14 days	32	17.7
15-28 days	20	11.1

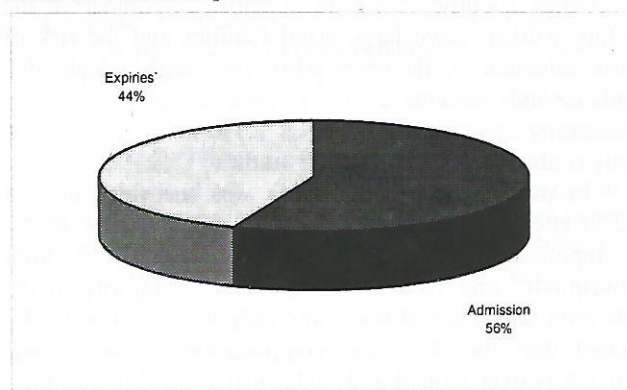
Table III: eight Break down of Expiries

Weight (Kg)	=n	%age
> 2.5 kg	78	43.3
LBW < 2.5 kg	57	31.7
VLBW < 1.5 kg	32	17.8
ELBW < 1.0 kg	13	7.2

Table IV: Duration of Stay in Hospital

Duration	=n	%age
<24 hours	57	31.7
2-3 days	62	34.4
4-7 days	31	17.2
8-14 days	22	12.2
15-28 days	08	4.4

Chart 1: Load of expiries



Discussion:

Social Security Hospital Muzuffar Garh drains newborns belonging to the poor factory workers. Risk factors and causes neonatal mortality in our data is not very much different from those already reported in literature. Our study showed that 47.2% patients who expired were admitted within the first 24 hours of life; they included patients from within the hospital labor ward as well as from outside. Similar figures have been reported from other cities of Pakistan including, Larkana (44.5%), Karachi (33.6%) and Lahore (75%)^{5,6,13,14}. These figures reflect that majority of neonatal problems occur on the first day of life, and most of the time the very birth process is responsible for the morbidity. Our study also showed that male patients were more than female patients and this male predominance at admission is consistent with other studies from different cities of Pakistan^{5,6,13,14}.

Low Birth Weight (LBW) or birth weight less than 2500 gram is one of the principal contributors to neonatal morbidity and mortality worldwide¹⁵. The premature babies are the most common LBW babies¹⁶. In our study 56.65% deaths were of LBW (Table III). The mortality data from other studies showed the following percentages of low birth weight newborns, 39% from Lahore¹⁴, 55.4% from Karachi and 36% from Larkana. Comparative data from neighboring countries like Bangladesh (13.25%) and

India (20%) is showing much less number of mortalities due to LBW^{18,19}.

Infections remain one of major problems in neonatal care and are the leading cause of neonatal admission, morbidity and mortality in developing countries²⁰. In our study neonatal sepsis, early onset as well as late onset was the major (44%) killer. Close figures are reported from Karachi (45.21%)²⁷. Late onset septicemia was predominating among the sepsis induced expiries, reflecting the poor hygienic status of the labor community draining to the hospital.

Most of the babies were born at home, this is in line with the reports that high frequency of infection may occur due to delivery by Traditional Birth Attendants (TBA)⁶, due to unhygienic delivery procedures and poor neonatal care¹⁵. It is a known fact that more than 60% infants in developing countries are born at home¹⁵. Almost all the factory workers have large sized families and the risk of cross infection is therefore also very high which also explains high percentage of late onset sepsis in our study. The strong co-existence between LBW and sepsis in our study is also reported from other studies^{8, 17, 22}.

In our study birth asphyxia was the third highest (22%) etiology of neonatal mortality, while it was 40.7% as reported in a study from Lahore²⁴, 31% from Rawalpindi²⁵ and 18.8% from Karachi³⁰. Majority of the deliveries take place at home, and only few are attended by trained dais therefore any complication arising during delivery is over looked and under-managed, thus resulting in birth asphyxia. The average Pakistani women is of short stature which is one of the contributing factors for increased chances of cephalopelvic disproportion and prolonged labor leading to birth asphyxia, thus careful monitoring of newborn during labor and employment of appropriate measures need to be undertaken to prevent it²³.

Neonatal jaundice was the reason of mortality in 2.7% patients, in a study' from Bangladesh, neonatal jaundice was reported in 30.7% admissions, while it was 3.5% as reported from Larkana and 8.33% from Lahore^{24,18}. Arif in 1983 reported that jaundice was the leading cause (25%) of neonatal admission in Pakistan²⁶. But in our study and also from other cites such high number of cases was not reported. Therefore it holds true that pattern of neonatal disease changes with geographical variation and from time to time at same place.

Out of the total admitted cases (410), neonatal mortality was found to be 43.90% in our study. The figures reported in a similar study from Lahore were 34%^{13, 22}, 85% from Karachi and 38% from Larkana⁶. This high neonatal mortality may be due to their critical condition at the time of admission²⁵. Infection was the major cause of neonatal death in our study (44%) followed by prematurity with its complications and birth asphyxia. Similar causes of neonatal mortality have been reported in a study from India²⁸.

In our study 19% of total deaths were of preterm deliveries. In such poor worker class maternal malnutrition, anemia, chronic un-recognized infections and illnesses combined with low socioeconomic status explains such high incidence of preterm deliveries, ultimately leading to death due to the complications of prematurity.

The 48.3% of total neonatal mortality in the present study was due to the prematurity and birth asphyxia. This is in consistent with other studies where prematurity and birth asphyxia was the main contributing reasons for higher neonatal mortality^{6,29}. Antenatal care and timely referral are two important factors that may reduce the high mortality rate due to preterm births.

Conclusion:

Infections birth asphyxia and prematurity were the major causes of neonatal mortality in our study; therefore steps must be taken for the reduction of these problems. Preventive strategy must be adopted to decrease these problems ultimately leading to decreased neonatal mortality and morbidity. Community involvement in the form of health education and better obstetric facilities may play a key role in decreasing neonatal mortality.

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