

Audit of Neonatal Morbidity and Mortality at Neonatal Unit of Sir Gangaram Hospital Lahore

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Abstract

Objective: To know the disease pattern and causes of mortality of patients admitted to the neonatal unit of Sir Gangaram Hospital Lahore and to compare it regionally.

Design and Duration of Study: It was a descriptive study conducted from 1st Jan 2007 to 31st Dec 2007.

Patients and Methods: Data of all the patients admitted to the neonatal unit during study period was analyzed for weight, age, sex, gestational age, place and mode of delivery and duration of stay and their outcome.

Results: Total of 1391 patients were admitted during study period. 945 (67.9%) were admitted at the age of less than 24 hours. 595 (42.8%) were preterm babies. 686 (49.3%) were low birth weight. 1124 (80.8%) were delivered in Sir Gangaram Hospital. Main causes of admission were prematurity 327 (23.5%), sepsis 305 (21.9%), and birth asphyxia 250 (18%), JNN 157 (11.3%). Neonatal mortality was 430 (30.9%). The main causes of neonatal mortality were prematurity 159 (11.4%), birth asphyxia 97 (7%) and sepsis 58 (4.2%).

Key Words: Neonates, morbidity, mortality, low birth weight.

Introduction

Neonatal deaths account for a large proportion of child deaths. Neonatal outcome is an important indicator of obstetric and neonatal health care.

Major causes of neonatal mortality are diseases associated with preterm birth and low birth weight (LBW) and lethal congenital anomalies. Neonatal mortality is highest during the first 24 hours of life and accounts for 55% of all infant deaths.

Majority of the causes of neonatal morbidity in our country are preventable.² Clinical audits of neonatal morbidity and mortality can identify specifically the problem areas which can be addressed later.

The neonatal period is described as less than 28 days of life and may be further subdivided into very early (birth to less than 24 hours), early (birth to less than 7 days), and late neonatal periods (7 days to less than 28 days).¹

Of the estimated 130 million infants born each year world wide,³ 4 million die in the first 28 days of life. Three quarters of the neonatal deaths occur in the first week, and more than one – quarter occur in the first 24 hours.^{3,4} Two – thirds of the world's neonatal deaths occur in just 10 countries, mostly in Asia. Pakistan is number three among these countries with an estimated 298000 neonatal deaths annually and a reported neonatal mortality rate of 49 per 1000 live births, Pakistan accounts for 7% of global neonatal deaths.^{3,7}

Infection (36%), preterm birth, (28%) and birth asphyxia account for (87%) of neonatal deaths world-wide.^{3,4,8}

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Material and Methods

This study was carried out in the neonatal unit of Sir Gangaram Hospital Lahore from 1st January 2007 to 31st December 2007. Sir Gangaram Hospital is a teaching Hospital of Fatima Jinnah Medical College Lahore. A single pediatric unit (level III neonatal care) caters for 4 obstetric units and admits all neonates including tetanus, those requiring mechanical ventilation. Patients who need surgical intervention are referred after initial stabilization.

We analyze the admission charts of all the patients admitted in year 2007. Records retrieved from the charts was entered into prepared Performa, which included the information regarding age at admission, weight, sex, gestational age, mode of delivery, place of delivery, indication of admission, final diagnosis, duration of stay and outcome (discharged, left against medical advice, discharge on request, referred for surgical intervention or died in first 28 days of life).

Diagnosis was mainly clinical or based on WHO definition for prematurity (live born neonates delivered before 37 weeks from 1st day of last menstrual period (LMP) and low birth weight (less than 2.5 kg¹¹).

Babies admitted with just prematurity were given the diagnosis of preterm baby, even if developed some other problem during stay like aspiration, JNN, anemia or apnea. Sepsis was diagnosed clinically and on blood culture, meningitis on CSF examination, pneumonia on X-ray chest. Birth asphyxia was diagnosed on clinical basis and according to Sarnat and Sarnat staging, CHD (congenital heart disease) was diagnosed on basis of ECG and echo cardiography, RDS (respiratory distress syndrome on the basis of chest X-ray. Patient's charts with incomplete data were excluded from the study.

Data was entered and interpreted in SPSS version 18. Frequency and cross tables were formulated.

Result

Out of total 1509 admissions in year 2007 (from 1st Jan 2007 to 31st Dec 2007), complete record was available for 1391 patients.

Table 1:

563 (40.5 %) were females and 827 (59.55) were males.

Table 1:

Sex	Frequency	Percent
Female	563	40.5
Male	828	59.5
Total	1391	100

Table 2:

945 (67.9%) were admitted at the age of less than 24 hours. Mean age = 80 hrs.

Table 2:

Age at Admission	Frequency	Percent
< 12 hours	536	38.5
12 – 24 hours	409	29.6
1 – 3 days	193	13.9
> 3 days	251	18.0

Table 3:

686 (49.3%) of the total admissions were LBW. Out of this 595 (42.8%) were preterm.

Table 3:

Weight	Frequency	Percent
LBW (< 2.5 kg)	686	49.3
Normal 2.5 kg and above	659	47.4
LGA	40	2.9

Table 4:

Place of Delivery	Frequency	Percent
SGRH	1124	80.8
Private clinic	133	9.6
Gov Hosp outside LHR	67	5.4
Home	54	3.9
Gov Hosp LHR	5	0.4

Table 4:

1124 (80.8%) were in born (at SGRH). Only 54 (3.9%) were delivered at home and 133 (9.6%) at

private clinics, 67 (4.8%) in govt hospitals of Lahore and 5 (0.4%) in govt hospitals out of Lahore. 519 (37.3%) were delivered by emergency caesarian section (EmLscs) and 175 (12.6%) by elective caesarian section. No statistically significant difference in mortality was found in inborn versus out born patients.

Table 5: Mortality according to birth weight group.

Weight	Number	% of Admission	Died	Mortality %
< 1 kg	37	2.65	37	100
1 – 1.5 kg	138	9.92	115	83.33
1.6 – 2 kg	223	16.03	85	38.11
2.1 – 2.5 kg	288	20.70	52	18.05
2.6 – 4 kg	664	47.0	135	20.3
> 4 kg	41	2.94	6	14.6

Table 5: Main causes of admission were prematurity. 327

(23.5%), sepsis 305 (21.9%), birth asphyxia 250 (18%), JNN 157 (11.3%) respectively.

The main factors contributing to neonatal mortality of 430 (30.9%) were prematurity 159 (11.4 %), birth asphyxia 97 (7%), sepsis 58(4.2%), RDS 37 (2.7%) and MAS 33 (2.4%). Mortality in LBW was significantly high as compared to normal birth weight group, calculated by chi-square test and P. value. P.value was 0.000 (P < 0.5 was taken as significant).

Discussion

Our study showed that 945(67.9%) of the patients were admitted within first 24 hours of life. This figure is 75% from Lahore,⁹ 44.47% from Larkaan,¹⁰ 33.6% from Karachi¹¹ and 35% from Peshawar¹². This could be explained because more than 80% of the deliveries took place within the hospital.

Low birth weight (LBW) occurs in high incidence in many developing countries and has important consequences for subsequent morbidity and mortality in infancy and childhood. Our study showed that out of total admissions, 686 (49.3%) were LBW, which constitutes about 289 (67.2%) of the neonatal mortality.

Table 6: Outcome of major neonatal Diseases.

Diagnosis	Total Number	Discharge	DOR	LAMA	REF	Expired
Prematurity	327	135 (41.3%)	9 (2.8%)	23 (7%)	1 (0.3%)	159 (48.6%)
Sepsis	309	189 (62.05%)	17 (5.5%)	39 (12.62%)	2 (0.6%)	58 (18.77%)
ANN	250	112 (44.8%)	9 (3.6%)	31 (12.4%)	1 (0.4%)	97 (38.8%)
JNN	157	124 (79.0%)	12 (7.6%)	15 (9.6%)	0 (0%)	6 (3.8%)
MAS	87	50 (57.5%)	0 (0%)	4 (4.6%)	0 (0%)	33 (37.9%)
RDS	52	12 (23.1%)	2 (3.8%)	1 (1.9%)	0 (0%)	37 (71.2%)
Pneumonia	45	23 (51.1%)	3 (6.7%)	6 (13.3%)	0 (0%)	13 (28.9%)
Congenital disorders	32	9 (28.1%)	0 (0%)	1 (3.1%)	5 (15.6%)	17 (53.1%)
TTN	49	45 (91.8%)	3 (6.1%)	1 (2.0%)	0 (0%)	0 (0%)
Meningitis	15	9 (60.0%)	4 (26.7%)	0 (0%)	1 (6.7%)	1 (6.7%)
IDM	14	10 (71.4%)	0 (0%)	3 (21.4%)	0 (0%)	1 (7.1%)

Abbreviations:

DOR: Discharge on request
 EXP: Expiry
 LAMA: Left against medical advice
 REF: Referred
 JNN: Jaundice neonatorum

MAS: Meconium aspiration
 RDS: Respiratory distress syndrome
 TTN: Transient tachypnea of newborn
 IDM: Infant of diabetic mother

This result is consistent with a study from Karachi¹¹ and from Peshawar¹² which have almost the same pattern of LBW that is 55.4% and 41.2% respectively. While LBW was less in other studies like 39% from Lahore⁹ and 38% from Larkana,¹⁰ studies from neighboring countries like India¹³ and Bangladesh¹⁴ described LBW of 20% and 13.25%. This increase in low birth weight rate may be due to malnutrition in the mothers, large family size, poverty as well as lack of knowledge about antenatal care.

Prematurity was a leading cause of admission 327 (23.5%) in our study. Next in our order of frequency was sepsis 311 (21.9%). Findings are almost the same in a study from Peshawar¹² and from Sudan¹⁸. But a study from Karachi¹¹ showed that sepsis was the cause of admission in 608 (30.64%) cases and prematurity in 135 (6.8%) cases. This difference could be due to the fact that majority of the patients in a study from Karachi were out born as compared to ours. Neonatal infection is the main cause of neonatal morbidity and mortality in developing countries.¹⁵ Most of the infections were due to increased workload of obstetric units, unhygienic living conditions and practices of the women as well as lack of sense of utilization of antenatal care services.

Birth asphyxia 250 (18%) is the third common cause of admission in our study. Same result has been reported from Karachi.¹¹ As most of the admissions 1224 (80.8%) were inborn in our study and 519 (37.3%) of the babies were born through emergency caesarian section (EmLSCS). These cases were unbooked and presented in labor in emergency resulting in a high frequency of birth asphyxia. A study from a teaching hospital Nigeria¹⁶ showed main causes of admission as birth asphyxia 27%, sepsis 25.3% and prematurity 16%. A study from PIMS, Islamabad¹⁷ published in 2002 reported the common causes of admission as hyperbilirubinemia 31%, followed by neonatal sepsis 30% and respiratory distress syndrome 14%. While hyperbilirubinemia in our study was 157 (11.3%), those from Karachi¹¹ 261 (13.5%) and Peshawar¹² were 338 (19.95%). This could be due to change in pattern of disease with time and geographical location.

745 (53.6%) of the admissions were discharged and 430 (30.9%) died. Neonatal mortality reported in a study from Lahore⁹ was 34% and 38% from Larkana,¹⁰ while it was 25.85% from Karachi.¹¹ A study from Sudan¹⁸ reported 11% neonatal mortality which may be due to better conditions of obstetric and neonatal units.

38.8% of neonatal deaths occurred in first 48 hours in our study which could be due to critical condition of these admissions at the time of presentation. This observation is supported by a study from Rawalpindi.⁸ Neonatal mortality reported in a study from a teaching hospital Nigeria¹⁶ was 16.9%. Early neonatal deaths (deaths which occurred in first 7 days) in our study were 365 (84.8%), consistent with a study from Rawalpindi.⁸ But this figure is high when compared to a study from Agha Khan University Karachi⁹ which showed early neonatal mortality of 73%. This could be explained on the basis of the fact that our study was hospital based where most of the admissions were critically sick.

Out of 430 (30.9%) neonatal deaths, 352 (81.9%) were inborn cases and 23 (5.3%) cases were from other tertiary care hospitals of the city. The same result has been shown in a study from Agha Khan University Hospital Karachi⁹. Main causes contributing to 30.95% neonatal mortality were prematurity 11.4%, birth asphyxia 7%, sepsis 4.2%, respiratory distress syndrome 2.7%, meconium aspiration syndrome 2.4% and congenital abnormalities 1.2%, consistent with a study done in collaboration with the WHO.¹⁹

359 (25.8%) of the admissions stayed for less than 48 hours. Out of this 125 (16.8%) were discharged, 168 (38.8%) died and the rest either left against medical advice or referred for surgical intervention. We could infer that getting delivered at tertiary care hospital, even by caesarian section, and being admitted to the neonatal unit within 24 hours of birth still ends in high neonatal mortality. Because most of these women were either not utilizing these antenatal services or they were non-existent. Neither the basic health units nor small clinics have trained birth attendants who can timely detect high risk pregnancies. Referral system is also non-existent. After unsuccessful trials by untrained birth attendants they land directly into the emergency and undergo either emergency caesarian section/instrumental or normal vaginal delivery depending upon their condition at presentation. On one hand they over burden the obstetric units and also consume major resources of the neonatal units and add to the neonatal morbidity and mortality.

Out of total neonatal deaths, 289 (67.2%) were LBW and 270 (62.8%) were preterm babies, consistent with a study from Rawalpindi²⁰ that described 68% of the mortality was contributed by LBW, 74% of them being premature, suggesting high mortality among LBW – premature babies.

Conclusion

Prematurity, sepsis and birth asphyxia were the main causes of admission in our study as were the main causes of mortality. Our study concluded that up to 86% of the admissions were delivered at tertiary care hospitals and all the neonates who died were those who received treatment at tertiary care neonatal unit. Most of the causes of neonatal morbidity and mortality were preventable like prematurity, birth asphyxia and sepsis. However a lot more effort needs to be put in order to increase the community / public awareness of importance and regularity of antenatal checkups, increase in birth spacing, improving nutritional and educational status of the mothers and girls, as well as improving neonatal services.

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