Study of Morbidity and Mortality Pattern of Neonates Admitted in Rajshahi Medical College Hospital

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Cite this as: BMCJ 2021; 7(1): 24-29

Received: 10 October 2020
Accepted: 30 November 2020

Abstract

Background: Rajshahi Medical College Hospital (RMCH) is a tertiary care, teaching and referral centre in the North-West part of Bangladesh. The morbidity and mortality indices in neonates admitted in a tertiary care hospital, like RMCH is needed to measure for developing effective health care planning, appropriate resource allocation and integration of existing health care service facilities of this region. **Objective:** To identify the common causes of morbidity and mortality of neonates admitted in the department of Pediatrics, Rajshahi Medical College Hospital (RMCH), Rajshahi. **Methods:** This was a retrospective study. The collected case records of all neonates admitted in the department of Pediatrics from January 2017 to December 2019 (a period of 3 years) were analyzed. **Results:** A total of 28978 neonates were admitted during the mentioned study period. The ratio of male (16342) and female (12636) neonates was 1.3:1. Major causes of morbidity were perinatal asphyxia (PNA) (29.7%), preterm low birth weight (PT LBW) (21.6%), sepsis (11%), respiratory distress syndrome (RDS) (6.2%), jaundice(5.9%), meconium aspiration syndrome (MAS)(4.2%), transient tachypnoea of newborn (TTN)(3.2%), hypoglycaemia(3.1%) and congenital anomalies (2.6%). The leading causes of neonatal mortality were PNA(30%) followed by PT-LBW (23%), sepsis (16.3%), MAS(6.9%) and RDS (5.6%). Overall mortality in this study was 19.1%. **Conclusion:** Perinatal asphyxia (PNA) was the commonest cause of morbidity and mortality and meconium aspiration syndrome (MAS) was the commonest cause of case fatality of neonates admitted in Pediatric unit of Rajshahi Medical College Hospital. Admission related comprehensive evaluation of this study will help to understand the diseases and death patterns of a hospital leading to develop more effective planning and case management strategies.

Key words: neonatal morbidity, neonatal mortality, Bangladesh.

Introduction

Neonatal period is the first 28 days of life since birth. It is considered as the most susceptible period for mortality and morbidity.[1] Every year about 130 million babies are born and 4 million die in the first 4 weeks of life—the neonatal period.[2] About two-thirds of neonatal deaths occur in Africa and South- East Asian region.[2] A country's

health status is measured in terms of infant mortality.[3] Neonatal mortality accounts for 2/3rd of the infant mortality.[3] In Bangladesh, neonatal mortality is 30/1000 live births.[4] It still remains high compared to the developed countries.[2] In general, neonatal morbidity and mortality are the consequences of poor status of maternal health and nutrition and lack of care during delivery or immediately after birth. Prematurity, LBW, infection, jaundice and asphyxia are the major problems affecting neonates in the developing countries which are easily preventable.[5] It is estimated that 30% of neonatal deaths is contributed by prematurity/ LBW in Bangladesh, the direct causes of mortality being sepsis (32%), asphyxia (26%), tetanus (15%), respiratory distress (6%) while 14% remains unknown.[6]

The Millennium Development Goals for child survival cannot be met without substantial reduction in neonatal mortality. Very few studies have reported information on the neonatal situation in our country. This retrospective study was done in Rajshahi Medical College Hospital, Rajshahi to identify the major causes of neonatal morbidity and mortality. Rajshahi Medical College Hospital is one of the largest tertiary health care centre of the Northern part of Bangladesh. It covers directly five districts and extended three districts. Analysis of neonatal morbidity and mortality in this hospital should therefore give better evaluation of patients covering services of these regions. Obtaining data from hospital neonatal admissions and review of morbidity and mortality in medical institutions reflects the health situation of covering areas' people.[7] Such understanding of epidemiological data were very/obligatory for health care planning and appropriate resource allocation.[8]

Methods

This descriptive study was carried out in the department of Pediatrics of Rajshahi Medical College Hospital, Rajshahi over a 3 years period. It was a descriptive review of all the neonatal admissions from January 2017 to December 2019. A total of 28978 neonates, who were admitted during the mentioned period, constituted the sample size. The details of the each case were collected retrospectively by a data collection sheet from patient' sprevious records, e.g. Register, patient's file records, death certificates etc. The data collection sheet was designed to record the detailed information of each case including age, gender, month wise admission, residence, clinical and laboratory findings, diagnosis, causes of morbidity and mortality, and treatment outcome. Data obtained were analyzed using the statistical package for social science version 24. Descriptive statistics were used to analyze the data.

Results

A total number of 28978 neonates were admitted during the study period. There was a gradual rising of number of patients from starting 2017 to 2019 end but the number of deaths remained highest in 2018. The ratio of male (16342) and female (12636) neonates was 1.3:1. More than three-fourths (78.5%) of the neonates were admitted in the early neonatal period (<7days). More than half (52%) of the neonates admitted in the pediatric unit weighed more than ≥2500gm and the rest 48% were low birth weight. 78.4% of the neonates were term and 21.6% were preterm (Table I).

Table-I: Socio-Demographic Profile of the study subjects

Characteristics	2017 N (%)	2018 N (%)	2019 N (%)	Total N (%)
a) Total Admission	8106 (28.0)	10102 (34.9)	10770 (37.1)	28978 (100.0)
b) Gender				
Male	4499 (55.5)	5758 (57.0)	6085 (56.5)	16342(56.4)
Female	3607 (44.5)	4344 (43.0)	4685 (43.5)	12636(43.6)
c) Maturity				
< 37 Weeks	1880 (23.2)	2253 (22.3)	2132 (19.8)	6265(21.6)
> 37 Weeks	6226 (76.8)	7849 (77.7)	8638 (80.2)	22713(78.4)
d) Weight on admission				
> 2500gm	3810 (47.0)	5253 (52.0)	6139 (57.0)	15202 (52.5)
2499-1500gm	3323 (41.0)	3839 (38.0)	3770 (35.0)	10932 (37.7)
1499-1000gm	786 (9.7)	808 (8.0)	689 (6.4)	2283 (7.9)
< 1000gm	187 (2.3)	202 (2.0)	172 (1.6)	561 (1.9)
e) Neonatal Peiod.				
Early (< 7days)	6160 (76.0)	7880 (78.0)	8724 (81.0)	22764 (78.5)
Late (> 7days)	1946 (24.0)	2222 (22.0)	2046 (19.0)	6214 (21.5)

Table-II: Morbidity profile of the neonates

Sl. No	Primary Diagnosis	2017 N (%)	2018 N (%)	2019 N (%)	Total N (%)
1	PNA (Perinatal Asphyxia)	2345 (28.9)	2960 (29.3)	3328 (30.9)	8633 (29.8)
2	PT LBW (Preterm Low Birth Weight)	1886 (23.3)	2250 (22.2)	2132 (19.8)	6268 (21.7)
3	Sepsis	878 (10.8)	1120(11.1)	1217 (11.3)	3215 (11.1)
4	RDS(Respiratory Distress Syndrome)	519 (6.4)	525 (5.2)	765 (7.1)	1809 (6.2)
5	Neonatal Jaundices	635 (7.8)	514 (5.1)	571 (5.3)	1720 (5.9)
6	MAS (Meconium Aspiration Syndrome)	310 (3.8)	465 (4.6)	452 (4.2)	1227 (4.3)
7	TTN (Transient Tachypnoea of newborn)	259 (3.2)	290 (2.9)	388 (3.6)	937 (3.2%)
8	Hypoglycemia	253 (3.1)	354 (3.5)	312 (2.9)	919 (3.2)
9	Congenital Anomaly	211 (2.6)	210 (2.1)	345 (3.2)	766 (2.6)
10	Others	810 (10.0)	1414 (14.0)	1260 (11.7)	3484 (12.0)

Major causes of morbidity were PNA (29.7%), Preterm LBW (21.6%), Sepsis (11%), RDS (6.2%), Jaundice (5.9%), MAS (4.2%), TTN (3.2%), Hypoglycemia (3.1%) and Congenital Anomaly (2.6%) (Table - II).

Table-III: Outcome of the management

Sl. No	Outcome	2017 N(%)	2018 N(%)	2019 N(%)	Total N(%)
1	Discharge with advice	6112 (75.4)	8043 (79.6)	8604 (79.9)	22759 (78.5)
2	Death	1808 (22.3)	1877 (18.6)	1832 (17.0)	5517 (19.1)
3	LAMA*	186 (2.3)	182 (1.8)	334 (3.1)	702(2.4)

***= Leave against medical advice**

Of all the admitted neonates, 78.5% survived. The percentage of the admitted neonates who went on leave against medical advice (LAMA) was 2.4% and 19.1% neonates succumbed (Table-III).

The major causes of death in the study were PNA (30%) followed by Preterm LBW (23%), Sepsis (16.3%), MAS (6.9%), RDS (5.6%), Jaundice with complications (4.8%), TTN (3.1%), Congenital Anomaly(2.5%) and Hypoglycemia (1.7%) Table-IV).

Table-IV: Mortality/death profile

Sl. No	Primary Diagnosis	2017 N(%)	2018 N(%)	2019 N(%)	Total N(%)
1	PNA (Perinatal Asphyxia)	561 (31.0)	525 (28.0)	568 (31.0)	1654 (30.0)
2	PT LBW(Preterm Low Birth Weight)	416 (23.0)	488 (26.0)	364 (20.0)	1268 (23.0)
3	Sepsis	253 (14.0)	300 (16.0)	348 (19.0)	901 (16.3)
4	MAS(MeconiumAspiration Syndrome)	108 (6.0)	131 (7.0)	147 (8.0%)	386 (6.9)
5	RDS (Respiratory Distress Syndrome)	72 (4.0)	109 (5.8)	130 (7.0)	311 (5.6)
6	Neonatal Jaundice with Complication	87 (4.8)	98 (5.2)	84 (4.6)	269 (4.8)
7	TTN(Transient Tachypnoea of newborn)	65 (3.6)	51 (2.7)	60 (3.3)	176 (3.1)
8	Congenital Anomaly	36 (2.0)	43 (2.3)	64 (3.5)	143 (2.5)
9	Hypoglycemia	22 (1.2)	34 (1.8)	38 (2.1)	94 (1.7)
10	Other	188(10.4)	98 (5.2)	29 (1.3)	315 (5.7)

Table-V: Mortality profile according to gestational age, birth weight and time of death

Characteristics	2017 N(%)	2018 N(%)	2019 N(%)	Total N(%)
Gestational Age				
a)<37 week	1139(63.0)	1282(68.3)	1273(69.5)	3694(66.9)
b)>37 week	669(37.0)	595(31.7)	559(30.5)	1823(33.1)
Birth Weight				
a)>2.5 kg	553(30.6)	512(27.3)	540(29.5)	1605(29.1)
b)1.5-2.49 kg	564(31.2)	685(36.5)	692(37.8)	1941(35.1)
c)1-1.49 kg	448(24.8)	492(26.2)	438(23.9)	1378(24.9)
d)<1 kg	243(13.4)	188(10.0)	162(8.8)	593(10.7)
Time of Death				
a)< 24 Hours	820 (45.4)	860 (45.8)	863 (47.1)	2543 (46.1)
b)> 24 Hours	988 (54.6)	1017 (54.2)	969 (52.9)	2974 (53.9)

A total of 5517 dead neonates, 3694 (66.9%) were premature and the rest 33.1% were mature. More than two third (70.9%) of the succumbed neonates were low birth weight (LBW). More Than 53% of the neonates died after 24 hours of admission in the hospital (Table-V).

Table-VI: Case fatality rate

Primary Diagnosis	2017 N(%)	2018 N(%)	2019 N(%)	Total N(%)
MAS(MeconiumAspiration Syndrome)	34.8	28.2	32.5	31.5
Sepsis	28.8	26.8	28.6	28.0
PT LBW(Preterm Low Birth Weight)	22.1	21.7	17.1	20.2
PNA(Perinatal Asphyxia)	23.9	17.7	17.1	19.2
TTN(Transient Tachypnoea of newborn)	25.1	17.6	15.5	18.8
Cong. Anomaly	17.1	20.5	18.6	18.7
RDS(Respiratory Distress Syndrome)	13.9	20.8	17.0%	17.2
Neonatal Jaundice with Complications	13.7	19.1	14.7	15.6
Hypoglycemia	8.6	9.6	12.8	10.2

The case fatality rate was more in MAS (31.5%) followed by Sepsis (28.0%), Preterm LBW (20.2%), PNA(19.2%), TTN (18.8%), congenital anomaly (18.7%), RDS(17.2%), Jaundice with complications (15.6%) and Hypoglycemia (10.2%) (Table VI).

Discussion

This study depicted the morbidity and mortality pattern of neonates admitted in the department of Pediatrics of Rajshahi Medical College Hospital, Rajshahi from 1st January 2017 to 31st December 2019 (a period of 3 years). A total number of 28978 neonates were admitted during the study period. There was a gradual increase in admission observed over the three years. Majority of the admissions were males as compared to females (56.4% vs 43.6%), similar findings in other studies.[9,10,11] This may be because of vulnerability of male neonates and gender preference.

In the present study, 52.0% of the neonates weighed ≥2500gm and 48% were low birth weight which was similar to a study conducted by Naharet al.[12]

The vast majority (78.4%) of the admitted neonates in the present study were full-term (≥37 completed weeks of gestational age) and 21.6% were preterm which was nearly similar to another study conducted by Gauchan et al.[13] in which there were 67.5% term babies and 31.3% preterm babies.

In this study, about forth-fifth (78.5%) of the admitted neonates were in the early neonatal group and rest (21.5%) presented in the late neonatal period for admission which was similar to a study conducted by Anjum et al.[14] and Kotwal et al.[15] These findings were logical and expected as neonates in early period are at risk of contracting diseases and at risk neonates are identified by healthcare workers immediately if they are born in hospitals.

The common morbidities in the study subjects were PNA (29.7%), Preterm LBW (21.6%), Sepsis (11%), RDS (6.2%), Jaundice (5.9%), MAS (4.2%), TTN (3.2%), Hypoglycemia (3.1%) and Congenital anomaly (2.6%). So PNA was the most common cause of morbidity of the neonates which was similar to a study conducted by MN Islam et al.[16] Other studies reported higher rates of Prematurity, LBW and Jaundice as the major causes.[12,15] Different hospital based studies have found the incidence of neonatal Sepsis ranging from 17.7% to 70%.[17,18,19]

The mortality rate (19.1%) in the current study is almost similar to a study conducted by MN Islam *et al*[16] but lower than national mortality rate—30/1000 live births[4] depicting minimal and timely interventions can reduce neonatal death rates.

The major causes of mortality in this study were PNA (30%), Preterm LBW (23%), Sepsis (16.3%), MAS (6.9%), RDS (5.6%), Jaundice with complications (4.8%), TTN (3.1%), Congenital Anomaly (2.5%) and Hypoglycemia (1.7%). So PNA was the most common cause of mortality among the admitted neonates which was similar to a study conducted by Suryakant Mundlod et al[20] and Rashid et al.[10] Other studies reported higher rates of Prematurity, LBW, RDS by Nahar et al[12] and Sepsis, PNA, RDS and MAS by Pandya NK et al.[21] as the common cause of mortality.

The mortality rates depend upon many factors like ante natal care, obstetric care, location of referral centre, pattern of referral cases, availability of equipments and skilled manpower.

In the present study, mortality was found higher (66.9%) in preterm neonates than term neonates (33.1%). Mortality was also higher in low birth weight babies (70.9%). Near about half (46.0%) of the neonatal deaths were observed within 24 hours of admission in the hospital. In a study by Malik S, the incidence of early neonatal death was 82.16%.[22]

Conclusion

Institutional trend of neonatal admission and death patterns are essential for regional health sector planning including effective case management strategies specially PNS, preterm LBW, sepsis and MAS.

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