



MORBIDITY AND THE MORTALITY PATTERN IN THE NEONATAL INTENSIVE CARE UNIT AT A TERTIARY CARE TEACHING HOSPITAL IN BHARATPUR

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ABSTRACT

Background: Neonates are powerless and delicate creatures. A significant number of them would fall debilitated notwithstanding insurances and care, particularly in asset helpless home settings. The early identification of genuine sickness and looking for care are key zones in deflecting neonatal morbidity and mortality. So, if we aware of morbidity and mortality pattern design it is useful to redirect assets appropriate way. Aim of study the morbidity and mortality patterns in a NICU of a Zanana Hospital, Govt. Medical College, Bharatpur.

Subject And Method: This current study was carried out in the NICU, at Zanana Hospital, Govt. Medical College, Bharatpur (Rajasthan), for a period of 1 year. After tacking ethical permission from Institutional Ethical Committee and administrative permission from medical superintendent, medical files of the neonates were retrospectively reviewed.

Results: The admission of outborn neonates (33.9%) was more than inborn neonates (66.1%). On applying one sample Chi-square test for seeing the observed frequency distribution in males and females overall admitted neonates at the NICU, it was found to be significant (P is 0.01). Z test has been used to see the observed difference in the proportion of male neonates in the inborn and outborn neonates admitted at the NICU, and it was found to be significant.

Conclusion: Mortality is essentially higher than created and indeed, even a lot higher than other non-industrial nations also, rest of India essentially because of the helpless forecast of alluded (outborn) youngsters.

KEYWORDS : Morbidity, Mortality & Neonatal Intensive Care Unit.

INTRODUCTION:

A baby is an inestimable blessing and bother. The peri-natal and neonatal period, in spite of its shortness, is considered as most critical phases of life[1]. It reflects the general health and the various socio-biological features of mothers and infants [2-3]. Neonatal period is the most vulnerable period of human life as it accounts for very high morbidities and mortalities and most of these are preventable. Of the 130 million babies born every year, about 4 million die in the first 28 days of their life, and 75% of neonatal deaths occur in the 1st week.[4] The global burden of neonatal death is primarily concentrated in the developing countries where care of neonate is practically nonexistent.[5] India contributes to one-fifth of global live births and more than a quarter of neonatal death. In India, nearly 0.75 million neonates died in 2013, the highest for any country in the world and the current neonatal mortality rate is 25 per 1000 live births with interstate, rural-urban variation and in most backward and disadvantaged population especially scheduled caste and scheduled tribe population.[6-8]

Globally, prematurity (29%), infections (29%), asphyxia (23%), congenital malformations (8%), and other (11%) are important causes of neonatal death in low-income country while prematurity and malformation contribute in developed countries.[9] Accurate assessment of morbidity and mortality pattern of neonates are reported in generally inborn babies treated in the neonatal intensive care unit. However, accurate data of outborn neonates is scanty. Outborn neonates have been previously admitted to a different institution or might be home delivered, and sometimes older at the time of admission. Due to above-mentioned differences, morbidity and mortality pattern may be different from those found in the inborn unit and such data are lacking in India and globally.

This present study was conducted to provide caregivers and health planners with basic data necessary for interventions to reduce neonatal morbidity and mortality. It was also done to assess the level of neonatal care in a tertiary referral centre of Bharatpur and analyze its shortcomings.

SUBJECT AND METHODS:

This hospital based retrospective study was carried out in the neonatal intensive care unit (NICU), Department of Pediatrics, at Govt. Medical College and Hospital, Bharatpur, India, for a period of 1 year from 1st, January 2019 to 31st, December 2019. Our hospital caters mainly to rural and semi-urban/urban patients, with a significant number of them being below the poverty line (BPL) income group patients. This government hospital provides maternal and child health care services in the city, in addition to high percentage of referral of high-risk pregnancies and sick newborns from other peripheral hospitals. With ethical permission from Institutional Ethical Committee of Govt. Medical College and Hospital, Bharatpur, medical files of the neonates were retrospectively reviewed.

Inclusion Criteria:

All new-borns < 28 days of life admitted in NICU from 1st, January 2019 to 31st, December 2019.

Exclusion Criteria:

(i) Babies who left the hospital against medical advice. (ii) Neonates whose medical records were incomplete.

New-borns admitted in the hospital but referred to other hospital due to any reason. The calculation of the survival was done after subtracting them from the total admission, as their outcome was not known.

These new-borns were categorized as inborn if delivered by any route in the Teaching Hospital and outborn if born outside. The data were recorded from record files of neonates in Proforma and definitions used for the purpose are:

Preterm - Live born neonate delivered before 37 weeks from 1st day of last menstrual period (LMP) and confirmed clinically after delivery

LBW (low birth weight) —was defined as birth weight of 1500 grams to 2499 grams.

VLBW (Very Low Birth Weight) -- birth weight of 1000 grams to

1499 grams.

ELBW (Extremely Low Birth Weight) -- birth weight < 1000 grams.

Neonatal infections (sepsis, pneumonia, and meningitis)- These were diagnosed on clinical grounds along with appropriate tests, which include sepsis screen, blood culture, chest radiograph, and cerebrospinal fluid analysis. Invasive infections have been grouped together due to similar and overlapping presentation and management.

Meconium aspiration syndrome (MAS)—this was diagnosed both radio graphically and clinically based on history of being born through meconium-stained amniotic fluid, chest radiograph, and respiratory distress persisting beyond 24 hours.

Congenital malformations- these were diagnosed on clinical features and diagnostic facilities like ultrasound, echocardiography, X rays, and Electrocardiography (ECG).

Neonatal jaundice- this was diagnosed after assessment of serum bilirubin and found to be in Biochemical zone in age, weight, and gestation-specific range.

Statistical Analysis

The data were collected from the record files of admitted neonates, compiled and entered in MS Excel, and analysed using appropriate statistical tools in SPSS-22.

RESULTS AND DISCUSSION:

Total of 2361 neonates were admitted in 1 year out of which 65.2% were males and 34.8% were females [Table 1]. The admission of outborn neonates (33.9%) was more than inborn neonates (66.1%). On applying one sample Chi-square test for seeing the observed frequency distribution in males and females overall admitted neonates at the NICU, it was found to be significant (P is 0.01). Z test has been used to see the observed difference in the proportion of male neonates in the inborn and outborn neonates admitted at the NICU, and it was found to be significant.

Table-1: Sex distribution

Variable	Inborn (%)	Outborn (%)	Total (%)
Male	1030 (66.02)	509 (63.54)	1539 (65.2)
Female	530 (33.97)	292 (36.45)	822 (34.8)
Total	1560(66.1))	801 (33.9)	2361 (100)

Age And Gestation Of Neonates In NICU:

The neonates were divided arbitrarily into different age and gestational groups (>2500 gm, 2000 to1500 gm, 1000-1500 gm, <1000 gm and >37 weeks, 34-37 weeks, and < 34 weeks) as the management, complications and prognosis of each group is distinct. As seen in Table-2, most of the neonates admitted in the NICU weighed < 2500 gm (44.3%). The percentage of low and very low birth weight babies was in outborn (58.6%) and inborn neonates (50.0%). The total number of preterm babies admitted was 98.2%. Greater percentage of outborn neonates (98.5%) were preterm than inborn neonates (98.1%).

Table-2: Weight & Gestation period of inborn and outborn neonates admitted at NICU

Weight of neonates	Inborn (%)	Outborn (%)	Total (%)
≥ 2500 gm	744 (47.7)	302 (37.7)	1046 (44.3)
1500 - 2499 mg	610 (39.1)	362 (45.2)	972 (41.2)
1000 – 1499 gm	171 (10.9)	107 (13.4)	278 (11.8)
≤ 1000 Kg	36 (2.3)	30 (3.7)	66 (2.8)
Total	1561 (66.1)	801 (33.9)	2362 (100)

Gestation period

≥ 37 Weeks	29 (1.9)	12 (1.5)	41(1.7)
34 - 37 Weeks	1175 (75.3)	503 (62.8)	1678(71.0)
< 37 Weeks	357 (22.8)	286 (35.7)	643(27.2)
Total	1561(66.1)	801(33.9)	2362(100)

Morbidity Profile Of Admitted Neonates:

The chief causes of admission in NICU were RDS (33.6%) followed by HIE/moderate-severe Birth asphyxia (22.3%) and Sepsis/pneumonia/meningitis (9.6%). A lesser percentage of babies were having congenital anomalies (1.76%) followed by hypoglycemia (0.04%), hypothermia (0.7%), respiratory distress due to other causes (1.46%), MAS (3.7%), and jaundice (5.8%) [Table 3]. Respiratory distress syndrome as well as HIE/moderate-severe Birth asphyxia were present in 59.3% and 49.3% outborn babies, whereas RDS was present in 35.04% of inborn babies and HIE/moderate-severe Birth asphyxia was present in 24.3% inborn neonates. Respiratory distress syndrome was the major morbidity found in both inborn and outborn admitted neonates. The morbidity profile of both inborn and outborn neonates was similar [Table 3].

Table 3: Morbidity profile of the inborn and outborn neonates admitted in NICU

Type of Morbidity	Inborn (%)	Outborn (%)	Total (%)
Respiratory distress syndrome	538 (35.04)	244(30.84)	782(33.6)
Meconium aspiration syndrome	62 (4.03)	25 (3.16)	87(3.7)
Other causes respiratory distress	22 (1.43)	12(1.51)	34(1.46)
HIE /Moderate-severe Birth asphyxia	47(3.06)/325(21.17)	12(1.51)/134(16.94)	518(22.3)
Sepsis/pneumonia/meningitis	124(8.07)/4(0.26)/2(0.13)	85(10.74)/4(0.5)/4(0.5)	223(9.6)
Jaundice requiring phototherapy	91(5.92)	44(5.56)	135(5.8)
Major congenital Malformation	28(1.82)	13(1.64)	41(1.76)
Hypothermia	10(0.65)	6(0.75)	16(0.7)
Hypoglycaemia	0(0.0)	1(0.12)	01(0.04)
Other	282(18.37)	207(26.16)	489(21.02)
Total	1535	791	2326

Mortality Profile Of Neonates:

The major causes of death in this study in increasing order are prematurity (10.5%), sepsis/pneumonia/meningitis (14.0%), Birth asphyxia with HIE (25.4%), and RDS (34.2%) [Table 4].

Table 4: Morbidity profile of the inborn and outborn neonates admitted in NICU

Type of Morbidity	Inborn (%)	Outborn (%)	Total (%)
Respiratory distress syndrome	14(25.9)	25(41.7)	39(34.2)
Meconium aspiration syndrome	7(12.96)	4(6.7)	11(9.6)
Birth asphyxia with HIE	16(29.62)	13(21.7)	29(25.4)
Sepsis/pneumonia/meningitis	6(11.1)	10(16.7)	16(14.0)
Major congenital Malformation	1(1.85)	0(0.0)	01(0.9)
Prematurity	8(14.8)	4(6.7)	12(10.5)
Others	2(3.7)	4(6.7)	06(5.3)
Cause not established	0(0.00)	0(0.0)	0(0.0)
Total	54(100)	60(100)	114(100)

Table 5: Survival outcome of the admitted neonates at the NICU

Outcome	Inborn (%)	Outborn (%)	Total (%)
Discharged	1103 (71.8)	536 (67.71)	1639 (70.43)

LAMA	365 (23.76)	183 (23.13)	548 (23.54)
Referred	14 (0.91)	12 (1.51)	26 (1.11)
Death	54 (3.51)	60 (7.58)	114 (4.89)
Total	1536(65.1)	791(33.5)	2327 (34.0)

Outcome of admitted neonates: As seen in Table 5, most of the neonates admitted in NICU survived (98.5%), being 65.1% in outborn and 33.5% in inborn neonates. The percentage of the admitted neonates who went on leave against medical advice (LAMA) was 23.5% while referred neonates were 1.1%. However, 4.9% neonates died. The death percentage is higher in the outborn neonates (7.6%) than in the inborn neonates (3.5%). For comparison of deaths in inborn and outborn neonates as seen in Table 6, the percentages of neonates that went LAMA (N = 548, 23.5%) and referred (N = 26, 1.1%) have been excluded. Out of all neonates (N = 114) who died, the outborn neonates who died is more (N = 60, 52.6%) than the inborn neonates (N = 54, 47.4%), and this difference in the death rates of inborn and outborn neonates is found to be statistically significant (P = 0.001). The demographic distribution of population in this study (male/female and preterm/term) is in concordance to National Neonatal-Perinatal Database (NNPD) and other studies of rural India.[7] The study shows a high male:female ratio. Further studies are needed to determine whether this is due to gender bias prevalent in India where male children are given more care or a greater tendency of male children to face neonatal complications.

Outborn versus inborn neonates (33.9% vs 66.1%) were similar to a study by Orimadegun and Owa JA et al.[8,9] in Nigeria, a developing country (55.3% vs 44.7%).

Table-6: Comparison of deaths in inborn and outborn neonates:

New born	Deaths		Survived		Total
	Number	%	Number	%	
Inborn	54	47.36	1103	67.3	1157
Outborn	60	52.64	536	32.7	596
Total	114	100	1639	100	1753

In the present study, the commonest causes of admission were respiratory distress (RDS contributing 34.2% and HIE /Moderate-severe Birth asphyxia 22.3, other causes 21.02%, sepsis/pneumonia/ meningitis were responsible for 9.6%, MAS 3.7%, and neonatal jaundice 5.8% with no significant difference between inborn and outborn. The findings are similar to NNPD where systemic infections (28.4%), hyperbilirubinemia (27.9%), seizures (11.7%), hypoglycemia (11.5%), hypoxic ischemic encephalopathy (8.3%), anemia (8.9%), and hypocalcemia (8.6%) were common morbidities observed. Studies from Africa[10] show more admissions due to sepsis, jaundice, and tetanus. In the developed countries, the scenario is different with extreme prematurity, asphyxia, and congenital anomalies being the chief causes as seen in a study in Canada by Simpson et al.[11] Referral rate was low, and the rate of LAMA was similar to NNPD and studies in medical colleges hospital elsewhere[12] but much lower than studies in other hospitals of North India.[13] In the present study, prematurity (10.5%) was the main cause of death followed by sepsis/pneumonia/meningitis (14.0%), Birth asphyxia with HIE (25.4%), and RDS (34.2%). This is similar to the causes of the rest of India NNPD and Asian countries[14] where infections (36.0%), prematurity-related conditions (26.5%), perinatal hypoxia (10.0%), and malformations (7.8%) were the chief causes. However, African countries show higher death rates due to jaundice and tetanus.[9] The results are in contrast to developed countries where extreme prematurity-related conditions, especially gastrointestinal complications and congenital malformations, are the main causes as better neonatal care ensures lesser sepsis and better survival of children with respiratory distress, MAS, and jaundice.[11] Asphyxia contributes to about 10% of deaths in both developing and developed countries; however, the rate in our

study is much higher (21.2% for inborn to 16.9% of outborn). The higher rate is probably due to lack of regular antenatal care, delayed referral of high-risk mothers, and lack of prompt and effective neonatal resuscitation. Transport is also a weak link for children who are resuscitated as they are referred without stabilization, temperature maintenance, oxygenation, and ventilation if in apnea. The mortality rate of 4.9% in the current study is much higher than developed countries like Canada[11] (7.6%) which are equipped with better facilities like Extra Corporeal Membrane Oxygenation (ECMO), total parenteral nutrition (TPN), and a higher doctor to patient and nurse to patient ratio. However, even developing countries like Nigeria and Sudan[10] have a better survival rate. The mortality rate is slightly better than countries like Nepal and Kenya.[14] Among the 15 countries with the highest NMRs, 12 were from the African region, and three were from the Eastern Mediterranean (Afghanistan, Somalia, and Pakistan). Throughout the period 1990–2009, India has been the country with the largest number of neonatal deaths. In 2009, the five countries with most deaths accounted for more than half of all neonatal deaths (1.7 million deaths = 52%), and 44% of global live births: India (27.8% of deaths, 19.6% of global live births), Nigeria (7.2%, 4.5%), Pakistan (6.9%, 4.0%), China (6.4%, 13.4%), and Democratic Republic of the Congo (4.6%, 2.1%).[15] Even in comparison to rest of India NNPD,[16] the mortality rate is higher. The mortality rate for inborn neonates is comparable to the rate in rest of India. It is the very high rate in outborn neonates that needs urgent attention.

CONCLUSION:

In conclusion, Mortality is essentially higher than created and indeed, even a lot higher than other non-industrial nations also, rest of India essentially because of the helpless forecast of alluded (outborn) youngsters. This investigation distinguishes respiratory misery disorder, Meconium Aspiration Syndrome, neonatal sepsis, neonatal hyperbilirubinemia, and HIES as the significant reasons for grimness. With Low Birth Weight and rashness being the commonest patrons of death, endeavors to delay the pregnancy every week may improve the neonatal result impressively. Perinatal asphyxia and contamination are significant preventable reasons for mortality, which must be direly tended to, if India would like to accomplish Millennium Development Goal.

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