

Prospective observational study of clinical profile in tertiary care center, Hyderabad

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ABSTRACT

Background: Population specific, systematic comprehensive strategies are needed to reduce the morbidity and mortality of the neonates at the national level. Neonatal age group usually contributes to a major disease burden. **Objective:** The objective of the study was to identify the morbidity and mortality patterns in our neonatal tertiary care referral center. **Materials and Methods:** This was a prospective observational study done over a period of 1 year, 1 month from January 2019 to January 2020. **Results:** Admissions in early 7 days were more at 86.4% to after 7 days at 13.6%. Males were 50.9% with almost equal to female population 49.1%; preterm and low birth weight (LBW) babies were 49.3% and 49.75%, respectively, and term babies more than 2.5 kg babies were 50.7% and 51.25%. The LBW babies were admitted about 28.07% and 26.98% inborn and outborn babies. In preterm babies, more babies admitted in 34 weeks–37 weeks gestational age, 16.50% and 15.56% in inborn and outborn babies, respectively. As per morbidity profile, in inborn babies, the common reasons for admission were respiratory distress 22.09% and neonatal jaundice contributing about 22.03%. The common causes of admission in outborn were sepsis which was 27.45% and hypoxic ischemic encephalopathy which was contributing about 20%. **Conclusion:** In our study, we found that major portion of the babies were preterm and LBW babies. This shows changing trend toward preterm delivery. It is good in the sense of antenatal steroid coverage which was 80–90% but antenatal magnesium sulfate covered in 39% outborn babies only. Prematurity, infections, asphyxia, and neonatal jaundice were the leading cause of admissions into our neonatal unit.

Key words: Clinical profile, Neonate, Premature delivery


Neonatal mortality is a major contributor of overall mortality in India and major causes of mortality are easily preventable [1]. Neonatal outcome is a sensitive indicator of availability, utilization, and effectiveness of obstetrics and neonatal health care in the community. Knowing hospital-based patterns and profiles is critical to improving the quality of health care delivery systems [2]. Knowing of major disease burden is necessary to implement new strategies and to prevent disease burden [3,4]. Changing pattern of disease burden also tells about effectiveness of the health-care interventions on disease burden and where to concentrate at present situations to prevent major morbidity and mortality.

Regular audits are needed in health-care system to help the policy-makers to invest the funds in weaker areas. Ohio Perinatal Quality Collaborative launched the first statewide initiative aimed at reducing the number of non-medically indicated scheduled

births before 39 completed weeks by analyzing the previous data [5]. Therefore, knowing our own hospital admission, statistics is also important in prioritizing and strengthening our health-care system. The present study was conducted to analyze the disease burden in our hospital for the past 1 year.

MATERIALS AND METHODS

It was a prospective cross-sectional study, done over a period of 1 year and 1 month from January 2019 to January 2020 at a tertiary care center of South India. We collected the data from hospital records. We took standard definitions from recent WHO National Neonatology Forum protocols to categorize the data on gestational age, weight, early-onset sepsis, late-onset sepsis, birth asphyxia, and others [6-10]. We included all admissions within 28 days of life and excluded babies who went against medical advice without any definitive diagnosis, brought dead babies, and preterm babies after 40 weeks of corrected gestational age/above 2.5 kg. There were three babies with ambiguous genitalia who were included in

Access this article online	
Received - 12 May 2020 Initial Review - 23 May 2020 Accepted - 18 June 2020	Quick Response code 
DOI: 10.32677/IJCH.2020.v07.i07.003	

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the study after the determination of their sex. Before the initiation of the study, ethical clearance was taken from the Institutional Ethical Committee. Written informed parental consent was taken.

We created all tables and percentages from Microsoft Office Excel. In inborn admission diagnosis, data were directly taken from our computerized data. Data were analyzed using SPSS 25.0 for Windows (SPSS Inc., Chicago, USA). $p < 0.05$ was considered statistically significant.

RESULTS

Out of 12,000 deliveries, only 1824 babies were admitted in intramural babies. Most of the babies in both outborn (85%) and

inborn (94%) groups were admitted within 7 days. Males were more in both groups, that is, 50.9% and 50.5% in extramural and intramural babies, respectively. Among extramural babies, preterm and low birth weight (LBW) babies constituted 49.3% and 50.1%, respectively. In intramural babies, most of the babies were preterm (53.72%) (Table 1).

The morbidity profile of the study population is depicted in Table 2. The most common cause of admission, in both inborn and outborn babies, was sepsis (24.8%). In inborn, transient tachypnea of newborn (TTNB) (20.09%) was the most common followed by neonatal jaundice (NNJ) (20.03%). In inborn babies, hypoxic ischemic encephalopathy (HIE) Stage 1 cases were more common (4.87%) compared to HIE 2 being more common among outborn babies (14.96%).

Table 3 describes the admissions according to birth weight and gestational age. A majority of the inborn babies were more than 2.5 kg at birth (52.96%). Preterm babies less than 37 weeks were seen in 46.28% of inborn and 40.55% of outborn admissions.

DISCUSSION

The data we retrieved in our study were similar to other studies but with minor noticeable differences. In our study, early admissions below 7 days of life were 86.14%. In studies by Shakya *et al.* and Sarnat and Sarnat, they found 44.5% and 66% admissions, respectively, within 24 h of life which explains the importance of early admission [11,12]. In neonates, major changes occur in early postnatal life such as patent ductus arteriosus closure,

Table 1: Demographic profile of the neonates

Characteristics	Outborn (%)	Inborn (%)	Total (%)
Age at admission			
0–7 days	10,756 (85)	1715 (94)	12,471 (86.14)
7–28 days	1897 (15)	109 (6)	2006 (13.86)
Gender			
Male	6453 (50.9)	921 (50.5)	7374 (50.9)
Female	6200 (49.1)	903(49.5)	7103 (49.1)
Gestational age			
Preterm	6110 (49.3)	844 (46.28)	6954 (49.3)
Term	6543 (51.7)	980 (53.72)	7523 (50.7)
Birth weight			
<2500	6345 (50.16)	858 (47.1)	7203 (49.75)
≥2500	6308 (49.84)	966 (52.9)	7274 (51.25)

Table 2: Morbidity profile of neonates admitted to NICU

Morbidity profile	Inborn (%)	Outborn (%)	Total (%)
Respiratory distress syndrome	162 (8.9)	1742 (13.76)	1904 (13.15)
Meconium aspiration syndrome	174 (9.5)	1201 (9.49)	1375 (9.49)
Respiratory distress	403 (22.09)	113 (0.89)	516 (3.56)
Early-onset sepsis			
Sepsis	19 (1.04)	1020 (8.06)	1635 (11.2)
Pneumonia	30 (1.64)	372 (2.94)	
Meningitis	8 (0.43)	186 (1.47)	
Late-onset sepsis			
Sepsis	54 (2.96)	1265 (9.99)	1980 (13.6)
Pneumonia	11 (0.60)	359 (2.83)	
Meningitis	17 (0.9)	274 (2.16)	
Hypoxic ischemic encephalopathy			
HIE 1	89 (4.87)	372 (2.94)	2666 (18.4)
HIE 2	26 (1.42)	1893 (14.96)	
HIE 3	11 (0.60)	275 (2.17)	
Neonatal jaundice	402 (22.03)	1440 (11.38)	1842 (12.72)
Congenital anomaly	79 (4.33)	166 (1.31)	245 (1.69)
Hypothermia	33 (1.80)	69 (0.54)	102 (0.70)
Hypoglycemia	61 (3.34)	74 (0.58)	135 (0.9)
Prematurity	202 (11.07)	1588 (12.55)	1790 (12.3)
Others	43 (2.35)	244 (1.92)	287 (1.9)
Total	1824	12653	14,477

HIE: Hypoxic ischemic encephalopathy

Table 3: Profile of admitted babies according to birth weight and gestational age

Characteristics	Inborn (%)	Outborn (%)
Birth weight		
1	126 (6.90)	862 (6.81)
1–1.5	220 (12.06)	2068 (16.34)
1.5–2.5	512 (28.07)	3415 (26.98)
More than 2.5	966 (52.96)	6308 (49.85)
Gestational age		
≤28 weeks	103 (5.64)	738 (5.83)
28 weeks–32 weeks	193 (10.58)	1031 (8.14)
32 weeks–34wks	269 (14.74)	1392 (11.00)
34–37 weeks	301 (16.50)	1969 (15.56)
>37 weeks	980 (53.72)	7523 (59.45)

maturation of germinal matrix, and synthesis of surfactant in lungs (for acclimatization in the extrauterine environment). This explains early admission due to unsuccessful transition.

In our case study, males were more than females, which was similar to other studies done in Africa and Nepal [13,14]. An Indian study done by Shreshtha *et al.* also showed similar results [15]. This may be because of physiological susceptibility (low immunity in males compared to females, effect of testosterone on surfactant maturation) of male neonates and gender preference.

In our study, 12.5% were inborn and 87.5% were outborn babies contrary to other studies done by Malik *et al.* and Baruah and Panyang [16,17]. Our study showed a high percentage of LBW babies among intramural (47.04%) and in extramural (50.15%) babies. An estimated 15 million babies are born too early annually. Approximately 6–17% of total births, that is, 1 million children die each year due to complications of preterm birth in all over the world [18]. Preterm birth is a predominantly human phenomenon, result of evolutionary pressures to maintain the advantages of bipedal ambulation, high intelligence, and modern technology [19]. In other studies, LBW admissions were between 23% and 50% as in their studies, study population was usually intramural babies. India contributes to majority of the world's LBW babies [20,21].

In intramural babies, asphyxia (7%) and respiratory distress syndrome (RDS) (8.9%) were less because of institutional deliveries and coverage of antenatal steroids. In extramural babies, preterm (12.55%) and asphyxia (20%) were more but decreased compared to previous years due to implementation of government policies and antenatal steroids. In our present study, the most common cause for inborn admissions were TTNB (22.09%). NNJ also contributes 22.03% of inborn admissions which was explained by more admissions due to tertiary care center and increased screening. A study done by Simiyu reported high incidence of 35% [13]. In inborn newborns, less asphyxia (7%) and sepsis (7%) cases were noted due to safe and aseptic deliveries. In outborn admissions, asphyxia (20%), sepsis (15%), and preterm (12.55%) were the leading causes similar to the study done by Gauchan *et al.* [22].

National Neonatal Perinatal Database 2018–2019 shows that sepsis 36% (24.8%), prematurity 26.5% (46.28%), and perinatal

asphyxia 10% (18.4%) were the common morbidities responsible for admission [23]. In the premature group (12.3%), we included only premature babies who needed exclusive preterm care without any comorbid conditions such as RDS, TTNB, and sepsis. Congenital malformations were seen in 4.33% of the inborn babies compared to 1.31% in outborn babies. It was explained by having separate sub-specialty clinics such as pediatrics, surgery, and pediatric neurology for outborn babies. Overall, we noticed only 1.37% of congenital anomalies, which was less compared to other studies [24]. Hypothermic and hypoglycemic babies were also common in outborn babies than the inborn babies due to lack of proper transport.

The study had a few limitations. As it is a single center study, it lacked external validity. Most of our patients hailed from a low socioeconomic status, thus the results of our study may not be reflecting the actual burden of the disease in the community.

CONCLUSION

Prematurity, infections, asphyxia, and neonatal jaundice were the leading causes of admissions into our neonatal unit. The root causes should be prevented by stopping early marriages and looking after female nutrition and female education. Antenatal programs to prevent prematurity and LBW babies should be strengthened.

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Funding: None; Conflicts of Interest: None Stated.

How to cite this article: Nirmala C, Paramesh P, Kotha R, Konda KC, Singh H. Prospective observational study of clinical profile in tertiary care center, Hyderabad. *Indian J Child Health*. 2020; 7(7):291-294.