



ORIGINAL RESEARCH PAPER

Pediatrics

A study of morbidity and mortality profile of neonates in special newborn care unit at tertiary care teaching institute of Jhalawar, Rajasthan

KEY WORDS: Morbidity, Mortality, Newborn, Neonatal intensive care unit

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ABSTRACT

Background: The accurate data of morbidity and mortality pattern are useful for many reasons. The Perinatal and the neonatal period are so short but they are the most critical faces of human life.¹ It reflects the general health and the socio-biological features of the most vulnerable groups of the society, the mothers and the infants. The objectives of this study was to investigate the morbidity and mortality pattern of neonates admitted in Special Newborn Care Unit (SNCU) of tertiary care hospital.

Methods: Retrospective study was carried out at the Special Newborn Care Unit (SNCU), Department of Pediatrics, Jhalawar Medical College, Jhalawar (Rajasthan) admitted in the period between January 2019 to June 2019. Both inborn and outborn admissions were included. Newborns admitted in SCNU were analyzed for causes of morbidity and mortality.

Results: Total 2119 neonates were admitted in SNCU during the study period, 117 were excluded from study. 61.4% were Males, 38.6% were Females, 60.2% were inborn, 29.8% were outborn, 69.5% were term babies and 49.8% had normal birth weight. Major causes of morbidity were Neonatal jaundice 598 (29.9%), Perinatal asphyxia 425 (21.2%), Preterm/LBW 462 (16.1%), sepsis 252 (12.6%) and RDS 148 (7.4%). The overall mortality rate was 9.8% with statistical significant difference between inborn (7.3%) and outborn (13.6%) babies (P<0.0001). The major causes of mortality were perinatal asphyxia 67 (34.2%), followed by sepsis 51 (26%), Respiratory distress syndrome 38 (19.4%) and prematurity 23 (11.7%). The survival of term as well as normal birth weight babies was statistically significant over preterm (P<0.0001) and Low Birth Weight (LBW), Very Low Birth Weight (VLBW), Extreme Low Birth Weight (ELBW) neonates (P<0.0001) respectively.

Conclusions: Perinatal asphyxia, prematurity, neonatal sepsis and respiratory problems were major causes of both mortality and morbidity. There is need to strengthen services to address these problems more effectively.

INTRODUCTION:

The accurate data on morbidity and mortality profile of neonates are important for the health care providers, administrators to decide and design interventions for the prevention and treatment, to implement and evaluate health care programmes. The Perinatal and the neonatal period are so short, but they are the most critical faces of human life.¹ It reflects the general health and the socio-biological features of the most vulnerable groups of the society, the mothers and the infants.² Out of 130 million babies born every year about 4 million die in the neonatal period.³ About ¼th of global neonatal deaths occur in India.⁴ According to the Sample Registration System(SRS) statistical report 2016 the current neonatal mortality rate in India is 24 and ranges from 14 in urban to 27 in rural areas.⁵

The percentage of neonatal deaths to infant deaths is 70.6% at national level and varies from 60.9% to 71% in rural areas. Among the bigger states the neonatal mortality ranges from 47 in Madhya Pradesh to 8 in Goa.⁶

The neonatal mortality rate in Rajasthan is 41 per 1000 live births, is higher than that of the national figure, so there is need for improvement in health care particularly in survival of LBWs and VLBWs.⁵ In a report published in the lancet the major direct causes for neonatal deaths were preterm (27%), infection (26%), asphyxia (23%), congenital anomalies (7%), others (7%), tetanus (7%), diarrhea (3%).⁷ However in India the morbidity and the mortality pattern were different, that too in a state like Rajasthan. We have undertaken this study to ascertain the predominant causes of morbidity and mortality in the neonates who are admitted in Intensive Care Unit so as to find out the burden of preventable causes, which in turn will help in formulating strategies for control of neonatal mortality.

METHODS

This is a hospital based retrospective study done in the Special Newborn care unit in the department of the Pediatrics of Jhalawar medical college and hospital, Jhalawar for a period of 6 months from 1st January 2019 to 30th June 2019. The study has been approved by our institution ethical committee.

Inclusion criteria

- All neonates less than 28 days admitted in Special Newborn Care Unit (SNCU) during the study period.

Exclusion criteria

- Babies more than 28 days of life.
- Babies discharged against medical advice.
- Babies referred to higher centre.

The babies delivered in our hospital are categorised as inborn and babies delivered elsewhere are categorised as outborn. The data were recorded in a pre-designed performa and was analysed by appropriate statistical in SPSS-20 statistical software (P value of <0.05 is taken as significant).

World Health Organisation (WHO) guidelines were used in categorising the babies based on Gestational age and Birth weights and National Neonatology Forum (NNF) guidelines were used in diagnosing the disease conditions.

RESULTS

A total of 2119 babies were admitted in our SNCU of which 88 babies were referred to higher institute and 29 babies left the hospital against medical advice were excluded from the study. A total of 2002 babies were included for the data analysis. Of these 2002 babies, there were 1205 (60.2%) inborn babies and 797 (29.8%) outborn babies (Table 1).

Table 01: Mode of Admission

Mode of admission	Total	Percentage
Inborn	1205	60.2
Outborn	797	29.8
Total	2002	100

There were 1229 (61.4%) male babies and 773 (38.6%) and female babies and the ratio of male and female was 1.6:1 and difference between admissions of male and female babies was not statistically significant (P value 0.22). 998 (49.8%) babies had birth weight of more than 2500 grams, 790 (39.5%), 164 (8.2%) and 50 (2.5%) belonged to LBW, VLBW and ELBW respectively (Fig.01). There were 610 (30.5%) preterm babies and 1392 (69.5%) term babies. (Table 2)

Table 02: Admission profile based on gender, birth weight and gestational age

	Inborn	Outborn	Total
Gender			
Males	739(61.3%)	490(61.5%)	1229(61.4%)
Females	466(38.7%)	307(38.5%)	773(38.6%)
Birth weight (in grams)			
>2500	635(52.7%)	363(45.5%)	998(49.8%)
1500-2499	438(36.3%)	352 (44.2%)	790(39.5%)
1000-1499	95 (7.9%)	69(8.6%)	164(8.2%)
<1000	37(3.1%)	13(1.6%)	50(2.5%)
Gestational age (in weeks)			
>37	854(70.8%)	538(67.5%)	1392(69.5%)
34-37	226(18.8%)	204(25.6%)	430(21.5%)
<34	125(10.4%)	55(6.9%)	180(9.0%)

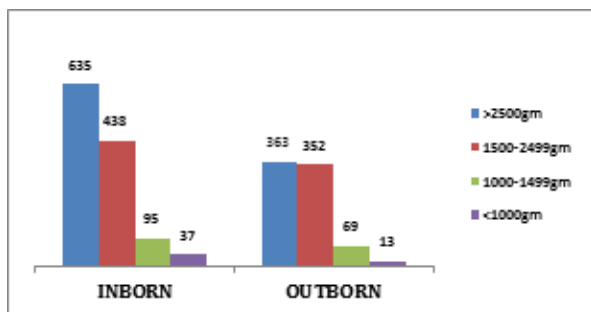


Fig. 01: Admission profile according to birth weight

The major causes of morbidity Neonatal jaundice 598 (29.9%), Perinatal asphyxia 425 (21.2%), Preterm/LBW 323 (16.1%), sepsis 252 (12.6%) and Respiratory distress syndrome 148 (7.4%). Neonatal jaundice, Perinatal asphyxia and prematurity were major morbidities found in inborn, whereas Prematurity, sepsis, Perinatal asphyxia and Neonatal jaundice were the major morbidities found in outborn. (As shown in Table 03)

Table 03: Morbidity profile of newborns admitted in SNCU from January 2019 to June 2019

Morbidity	Inborn	Outborn	Total
Neonatal Jaundice	438(36.3%)	160(20.1%)	598(29.9%)
Perinatal Asphyxia	261(21.7%)	164(20.6%)	425(21.2%)
Preterm/LBW	142(11.8%)	181(22.7%)	323(16.1%)
Sepsis	73(6.1%)	179(22.4%)	252(12.6%)
Respiratory Distress syndrome	105(8.7%)	43(5.4%)	148(7.4%)
Transient tachypnoea of newborn	97(8.1%)	10(1.2%)	107(5.3%)

Major congenital malformation	42(3.4%)	33(4.1%)	75(3.7%)
Meconium aspiration Syndrome	33(2.7%)	14(1.8%)	47(2.3%)
Hypoglycemia	13(1.1%)	10(1.2%)	23(1.1%)
Hypothermia	01(0.08%)	03(0.37%)	04(0.2%)

There were 196 deaths during the study period and the overall mortality rate was 9.8% (Table 05). The major causes of mortality were perinatal asphyxia 67 (34.2%), followed by sepsis 51 (26%) and respiratory distress syndrome/RDS 38 (19.4%). Major cause of mortality among inborn babies were perinatal asphyxia (30.7%), followed by RDS (28.4%), prematurity (17.1%), and sepsis (14.8%), whereas among outborn babies leading causes were perinatal asphyxia (37.1%), followed by sepsis (35.2%) and RDS (12.1%) as shown in Table 04.

Table 04: Mortality profile.

Cause of death	Inborn	Outborn	Total
Perinatal asphyxia	27(30.7%)	40(37.1%)	67(34.2%)
Sepsis	13(14.8%)	38(35.2%)	51(26%)
Respiratory distress syndrome (RDS)	25(28.4%)	13(12.1%)	38(19.4%)
Prematurity	15(17.1%)	8(7.4%)	23(11.7%)
Major congenital malformation	3(3.4%)	3(2.8%)	6(3.1%)
Meconium aspiration syndrome	1(1.1%)	0	1(0.5%)
Others	4(4.5%)	6(5.5%)	10(5.1%)
Total	88(100%)	108(100%)	196(100%)

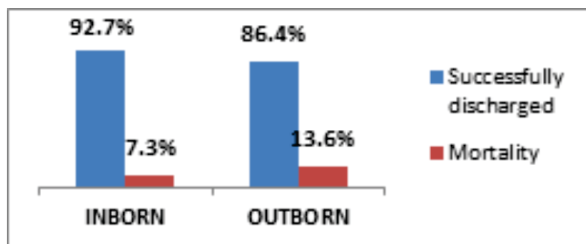


Fig. 02: Outcome profile

The outcome of inborn and outborn babies were analysed, and observed that among 1205 Inborn babies, 88 (7.3%) babies died and among 797 outborn babies, 108 (13.6%) babies died and there was statistically significant difference in the outcome of inborn and outborn babies (P value <0.0001). (As shown in fig.02)

Table 05: SNCU outcome in different birth weight group

Birth weight	No. Admission	Survived	Death	Death rate
>2500gm	998	934	64	6.4%
1500-2499gm	790	729	61	7.7%
1000-1499gm	164	132	32	19.5%
<1000gm	50	11	39	78%
Total	2002	1806	196	9.8%

As seen in table 5, on comparing the survival among the different groups based on birth weights, there were statistically significant difference between LBW and normal birth weight (P <0.005), VLBW and normal birth weight (P <0.0001) and ELBW and normal birth weight (P <0.0001). The

relative risk of deaths in the VLBW and ELBW groups as compared to normal birth weight groups were 3.04 and 12.18 times higher respectively.

Table 06: SNCU outcome in different gestational group

Gestation	No. Admission		Death		Death rate	
	Inborn	Outborn	Inborn	Outborn	Inborn	Outborn
Term	854	538	28	72	3.3%	13.4%
Preterm	351	259	60	36	17.1%	13.9%
Total	1205	797	88	108	7.3%	13.5%

Out of the total 196 neonatal deaths, 96 were preterm and the risk of dying due to prematurity was statistically significant ($P < 0.0001$) (Table 06). As the gestational age of the babies increases, the survival rate of the baby increases correspondingly.

DISCUSSION

Accurate data on morbidity and mortality profile of neonates are important for the health care providers, administrators to decide and design interventions for the prevention and treatment, to implement and evaluate health care programmes.

In present study the admissions of male babies were more than that of female babies. It is due to the biological vulnerability of male gender and may be due to the preference of male child in the society. Similar findings were reported from various studies conducted in different parts of India.⁸⁻¹⁴

In our study, inborn admissions were about 60.2% and outborn admissions were 39.8%, which is similar to the studies done by Sridhar PV et al, Modi R et al, Kumar MK et al and Ravikumar SA et al.^{9,10,13,15}

According to the United Nation Children's Fund (UNICEF), "The state of world's children's report 28% of neonates were born with low birth weight in India."¹⁶ But in our study 50.2% of neonates were low birth weight and 30.5% of neonates are born prematurely. This reflects the poor maternal health, antenatal check-up, undernutrition, anemia, and socio-economic status of the rural society as our hospital caters people from rural areas and from low socio-economic groups. These results are consistent with study done by Ravikumar SA et al.¹⁵

In our study, the most common morbidities were Neonatal jaundice (29.9%), Perinatal asphyxia (21.2%), prematurity (16.1%), sepsis (12.6%) and Respiratory distress syndrome/RDS (7.4%). The incidence of Perinatal asphyxia is more in inborn (21.7%) when compared to outborn (20.6%) which is consistent with Malik S et al and Babu MC et al.^{11,12}

The overall mortality rate observed in our study was 9.8% which is much less when compared to study conducted by Saharia N et al (13%) and Malik S et al (26%), the major contributor of mortality were perinatal asphyxia (34.2%), followed by sepsis (26%), RDS (19.4%) and prematurity (11.7%) which is consistent with studies conducted in South India, Sridhar PV et al.^{8,9,11}

Our study shows that babies with VLBW/ELBW and Gestational less than 32 weeks were strongly attached with high mortality which is similar to study conducted by Yasmin S et al.¹⁷

We observed that babies who were referred from other centres have a higher mortality when compared to inborn babies and in that Perinatal asphyxia stands first. The outcome of this study reveals the need for the hour regarding the timely perinatal interventions in primary and secondary care. There is a broader agreement that in infants with more than 2500 grams of birth weight and death is influenced by the obstetric

management that in those who are LBW, was the quality of the neonatal care that had an important on the bearing of the final outcome. With the present study having identified perinatal asphyxia, Neonatal sepsis, RDS and prematurity are the major causes of death. Mortality can be reduced substantially if we focus on better obstetric care and effective disinfection in hospital settings and hygiene practices as part of essential newborn care in community.

Limitation of the present study was that as this is a retrospective institutional study, which caters the patients predominantly from low socio-economic status and rural areas, the results may not reflect the true burden of population. Maternal illnesses contributing the neonatal outcomes are not studied in the present study.

CONCLUSION

This study identifies the major causes of morbidity are neonatal jaundice, perinatal asphyxia, Preterm/LBW, sepsis and RDS. The incidence of preterm and LBW can be prevented by appropriate measures and antenatal checks ups so that the neonatal outcome can be improved considerably. Training sessions and hands on workshop must be given to all the health care providers involved in conducting delivery as the perinatal asphyxia outcome mainly depends upon the appropriate timing and manner of interventions. Appropriate and recurrent training sessions must be conducted at all district levels in order to ensure proper essential newborn care by imparting adequate knowledge of maintaining warmth, cleanliness, feeding and preventing asphyxia, so that India hopes to achieve its Millennium Development Goal 4.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee.

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