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## Research Article

### NEONATAL MORBIDITY AND MORTALITY PROFILE OF NEWBORNS ADMITTED IN SNCU @ LT. LAM GOVERNMENT MEDICAL COLLEGE, RAIGARH, CHHATTISGARH

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#### ABSTRACT

**Introduction:** According to the SRS-2016 report, the current neonatal mortality rate (NMR) in India is 34 per 1,000 live births, accounts for nearly 67% of all the infant deaths and more than two third of the under-five child deaths. One of the millennium development goals (MDG-4) was to reduce child mortality (30/1000 live births) by upto two-thirds. In Chhattisgarh 39 infants die for every 1,000 live births. The State target is to bring down NMR rate to less than 10 by 2030. This target can be achieved by setting up Special Newborn Care Units (SNCUs) in every district for better outcome of babies and reduce the mortality rate.

**Aim:** The aim of the study is to assess the morbidity and mortality profile of neonates admitted in SNCU and study the difference between Inborn and outborn infants. **Material And Methods:** A descriptive, retrospective, observational study conducted in Lt. LAM Government Medical College, Raigarh, Chhattisgarh since August 2017 to July 2018. Sample size was 1895. All data were collected from SNCU online software recorded at the time of admission. **Result:** Out of 1895 admitted babies, Inborn babies were 1095 (57.78%) and outborn were 800 (42.22%), Males were 1037 (54.72%) and females were 858 (45.28%), most of the admitted babies were between 2499-1500 g (891 - 47.02%). Most of the babies admitted in NICU were preterm 1313 (69.29%) of which more babies were inborn than outborn (719 vs. 594). The chief morbidity for admission was Birth Asphyxia 542 (28.60%) followed by Prematurity 493 (23.16%), Neonatal jaundice 300 (15.83%) and Sepsis 257 (13.56%). The mortality rate in our study was 20.19%. The major causes of mortality are Birth Asphyxia 154 (40.41%) followed by prematurity related RDS 114 (29.92%), sepsis 92 (24.14%) and Extremely low birth weight 14 (3.67%). Deaths due to Birth Asphyxia were more in Inborn 80 (20.99%) than Outborn 66 (17.32%), deaths due to RDS (17.32% vs. 12.59%), Congenital Malformation (2.09% vs. 0.26%) were more inborn than outborn babies, but deaths due to sepsis 92 (10.23% vs. 13.91%), ELBW 14 (1.57% vs. 2.09%) were more in outborn than inborn babies. Mortality are more among preterm (56.9%) than Term babies (43.04%). Similarly mortality is high in LBW babies (75%). **Conclusion:** Low birth weight and prematurity were the common causes for admission in the NICU. Birth asphyxia, Prematurity, neonatal jaundice and Sepsis were some important and leading causes of morbidity in newborn babies. Commonest causes for mortality were Birth asphyxia, respiratory distress syndrome and sepsis.

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#### INTRODUCTION

Accurate data on morbidity and mortality pattern are very important. The Perinatal and the neonatal period are very short, but they are the most critical stage 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). According to the SRS-2016 report (3), the current neonatal mortality rate (NMR) in India of 34 per 1,000 live births, accounts for nearly 67% of all the infant deaths (39/1000) and more than two third of the under-five child

deaths (49/1000). One of the millennium development goals (MDG-4) was to reduce child mortality (30/1000 livebirths) by upto two-thirds.

As per NFHS-4 report (3) (2015-2016) more than 4/5<sup>th</sup> (82%) of under five died in Infancy. In most developing countries, a higher production of neonatal death are observed. The rate of neonatal mortality varies widely among the different states of India, ranging from 4.4 per 1000 live birth in Kerala to 45.1 per 1000 live birth in Uttar Pradesh (NFHS-4).

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In Chhattisgarh 39 infants die for every 1,000 live births (SRS-2016)(3). The State target is to bring down NMR rate to less than 10 by 2030. To achieve this target Chhattisgarh state formulate Chhattisgarh Newborn Action Plan (CNAP) in which setting up Special Newborn Care Units (SNCUs) in every district and Newborn stabilization Unit (NBSU) for better outcome of babies and reduce the mortality rate. This has resulted in showing improvement in the NMR.

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%), diarrhoea (3%)(4) . However in India the morbidity and the mortality pattern were different.

**Aim of the study**

The aim of the study is to assess the morbidity and mortality profile of neonates admitted to SNCU and study the difference between Inborn and outborn infants.

**MATERIAL AND METHODS**

This study was conducted in Special newborn care Unit (SNCU) of Department of Pediatrics, Lt. L A M Government Medical Collage, Raigarh, Chhattisgarh during August 2017 to July 2018.

**Study design**-It was a descriptive, retrospective, observational study.

**Study setting**-Study was conducted in Lt. L A M Government Medical Collage, Raigarh, Chhattisgarh.

**Duration of study** - Since August 2017 to July 2018.

**Study size** - Total 1895 neonates were admitted during the study period who were included in the study.

**Inclusion Criteria**

All Neonates <28 days admitted to SNCU during the Study period were included in the Study.

**Exclusion Criteria**

Babies >28days of life, babies brought dead to SNCU and Orphan babies admitted for Observational care.

**Statistical analysis**

After obtaining permission from head of the institute, data of all the admitted babies were collected from SNCU online software recorded at the time of admission by analyzing all the case sheets. All data were collected from SNCU online software recorded at the time of admission as inborn or outborn admission, sex, gestational age, referral centre, age at presentation, indications for admission, duration of hospitalization, complications encountered and outcome.

Primary disease was considered as final diagnosis even if the baby developed complications of primary disease or having more than one disease.

WHO definitions were used for Term, Preterm, Low Birth Weight(LBW), Very Low Birth Weight(VLBW), Extremely Low Birth Weight (ELBW) and congenital malformation. Meconium aspiration syndrome was neonates diagnosed on basis of history, clinical and radiological findings. Birth Asphyxia was diagnosed APGAR <7 @ 5 min. Neonatal

jaundice was diagnosed after assessment of serum bilirubin and in pathological zone as per AAP charts. Sepsis was diagnosed by clinical and appropriate lab screening tests.

**RESULTS**

**Table 1** Total admission. (n=1895)

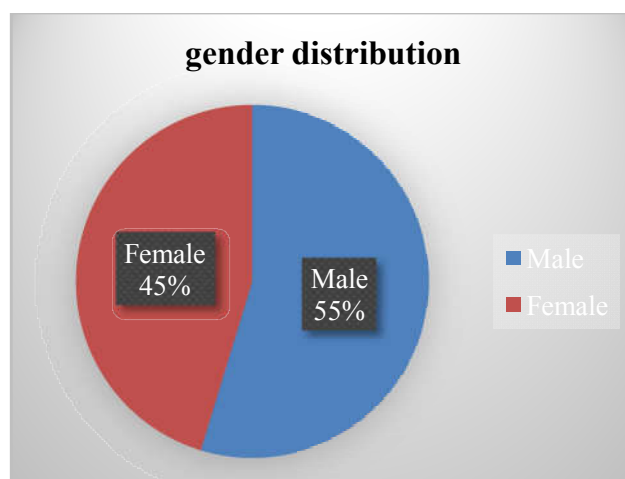
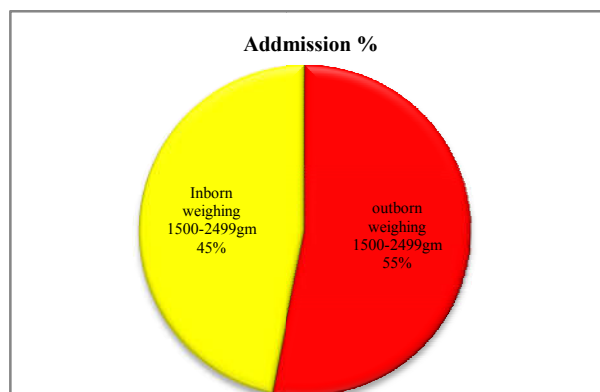
Admission	Number	Percentage
Inborn	1095	57.78
Outborn	800	42.22
Total	1895	

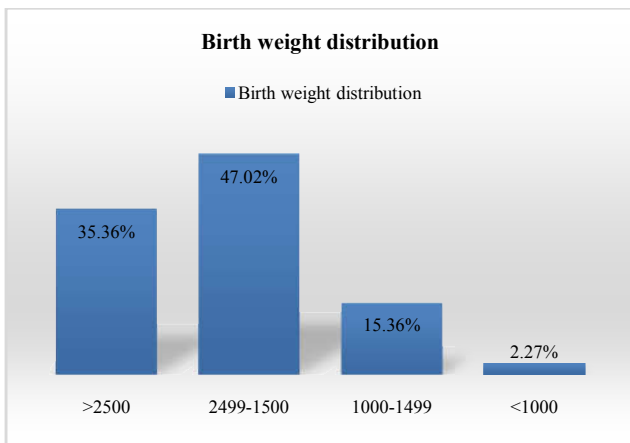
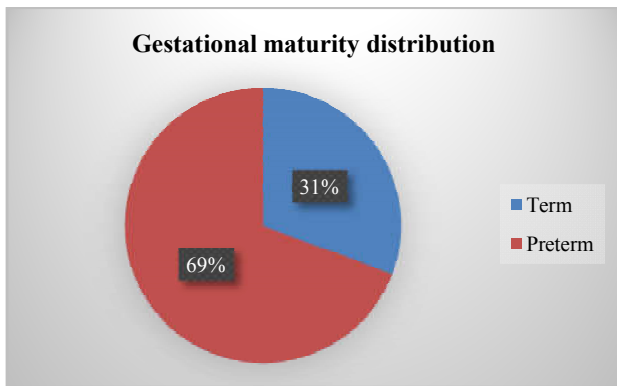
Out of 1895 admitted babies, Inborn babies were 1095 (57.78%) and outborn were 800 (42.22%).

**Table 2** Distribution as per Gender, Birth weight, Gestation age. (n=1895)

Gender	Inborn	Outborn	Total
Male	605(31.93%)	432 (22.80%)	1037 (54.72%)
Female	490 (25.86%)	368 (19.42%)	858 (45.28%)
Total	1095	800	1895
Distribution as per birth weight			
>2500	450 (23.75%)	220 (11.61%)	670 (35.36%)
2499-1500	495 (26.12%)	396 (20.90%)	891 (47.02%)
1499-1000	130 (6.86%)	161(8.50%)	291 (15.36%)
<1000	20 (1.06%)	23 (1.21%)	43 (2.27%)
Gestation age at time of Admission			
Term	376 (19.84%)	206 (10.87%)	582 (30.71%)
Preterm	719 (37.94%)	594 (31.35%)	1313 (69.29%)

Males were 1037 (54.72%) and females were 858 (45.28%). As per birth weight, most of the admitted babies were between 2499-1500 g (891 - 47.02%) of which inborn were 55.55% and outborn were 44.44%. Most of the babies admitted in SNCU were preterm 1313(69.29%) of which more babies were inborn than outborn (719 vs. 594).

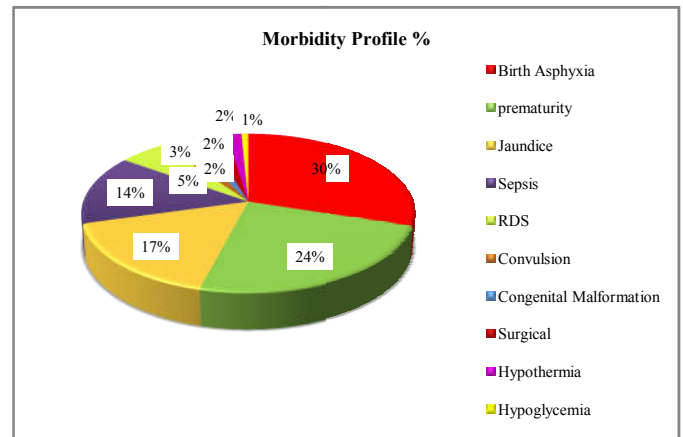
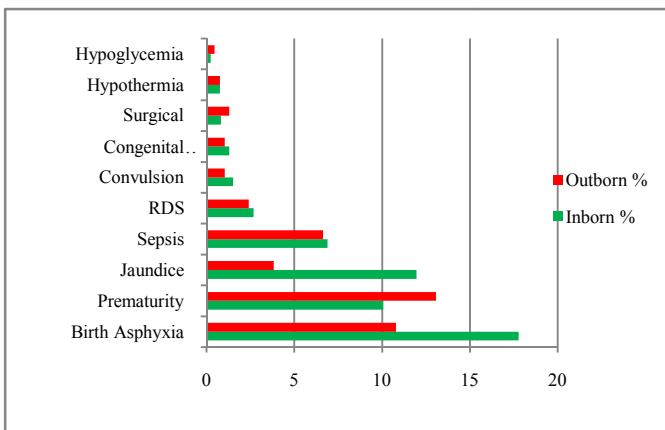




**Table 3** Morbidity profile (n=1895)

Morbidity	Inborn	Outborn	Total
Birth Asphyxia	337 (17.78%)	205 (10.81%)	542 (28.6%)
Prematurity	191 (10.07%)	218 (13.08%)	439 (23.16%)
Jaundice	227 (11.97%)	73 (3.85%)	300 (15.83%)
Sepsis	131 (6.91%)	126 (6.64%)	257 (13.56%)
RDS	51 (2.69%)	46 (6.64%)	97 (5.11%)
Convulsion	29 (1.53%)	20 (1.05%)	49 (2.58%)
Congenital Malformation	25 (1.31%)	20 (1.05%)	45 (2.37%)
Surgical	16 (0.84%)	25 (1.31%)	41 (2.16%)
Hypothermia	15 (0.79%)	15 (0.79%)	30 (1.58%)
Hypoglycemia	5 (0.26%)	9 (0.47%)	14 (0.73%)

The chief morbidity for admission was Birth Asphyxia 542 (28.60%) followed by Prematurity 493(23.16%), Neonatal jaundice 300(15.83%) and Sepsis 257(13.56%).



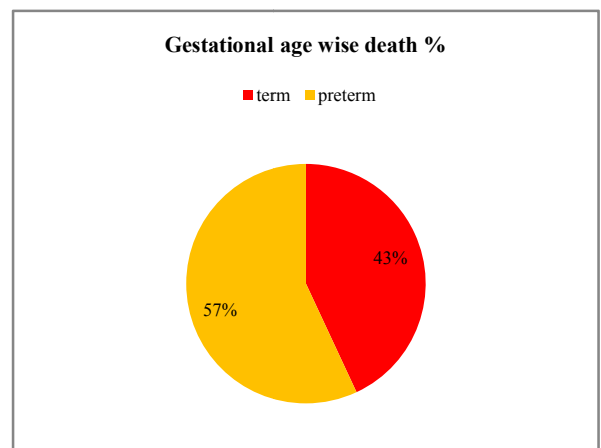
**Table 4** Mortality profile of Neonates (n=381)

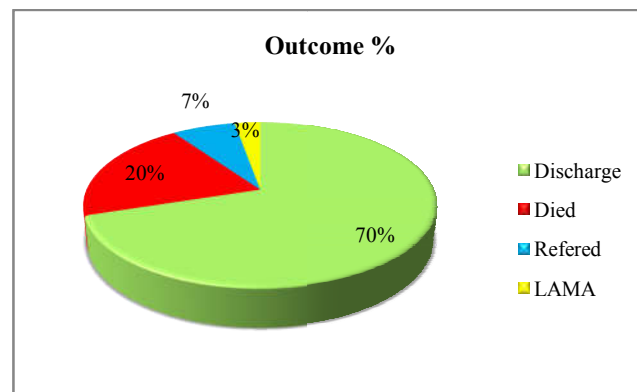
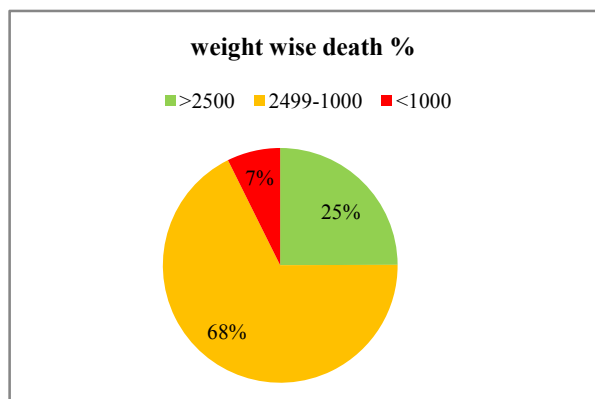
Mortality	Inborn	Outborn	Total
Birth Asphyxia	80 (20.99%)	66 (17.32%)	154 (40.41%)
RDS	66 (17.32%)	48 (12.59%)	114 (29.92%)
Sepsis	39 (10.23%)	53 (13.91%)	92 (24.14%)
ELBW	6 (1.57%)	8 (2.09%)	14 (3.67%)
Congenital Malformation	8 (2.09%)	1 (0.26%)	9 (2.36%)
Other	4 (1.04%)	2 (0.52%)	6 (1.57%)
Total	203 (53.28%)	178 (46.71%)	381

The mortality rate in our study was 20.19%. The major causes of mortality are Birth Asphyxia 154(40.41%) followed by prematurity related RDS 114(29.92%), sepsis 92(24.14%) and Extremely low birth weight 14 (3.67%). Deaths due to Birth Asphyxia were more in Inborn 80(20.99%) than Outborn 66(17.32%), deaths due to RDS (17.32% vs. 12.59%), Congenital Malformation (2.09%vs. 0.26%)were more inborn than outborn babies, but deaths due to sepsis 92(10.23% vs. 13.91%), ELBW 14(1.57% vs. 2.09%) were more in outborn than inborn babies.

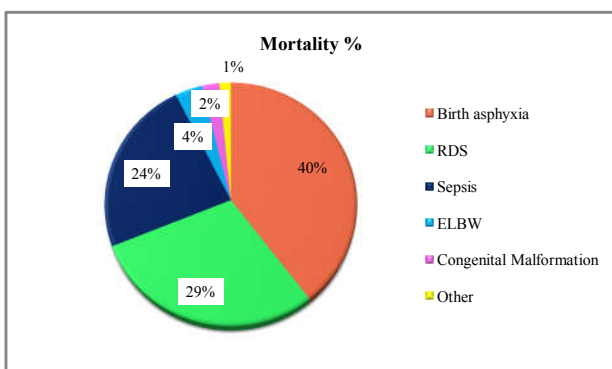
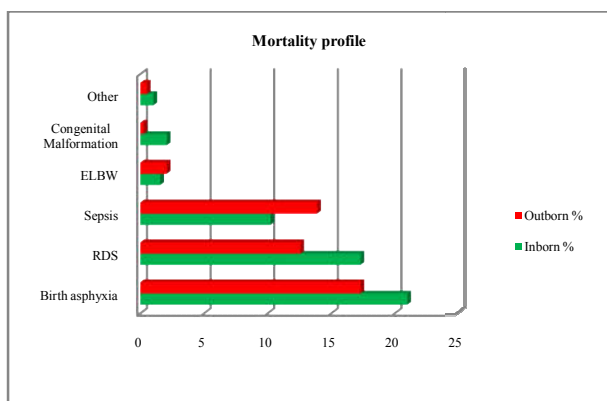
**Table 5** Gestational age and weight wise admission & death

Gestational age	No. of newborn admitted	No. of death (n=381)
Term	582	164 (43.04%)
Preterm	1313	217 (56.9%)
Weight wise admission and death		
>2500gm	670	95 (24.93%)
2499-1000gm	1182	258 (67.71%)
<1000gm	43	28 (7.34%)
Total	1895	381





Mortality is more among preterm (56.9%) than Term babies (43.04%). Similarly mortality is high in LBW babies (75%).



**Table 5** Outcomes of Neonates (n=1886)

	Inborn	Outborn	Total
Discharge	809 (42.89%)	512 (27.14%)	1321 (70.03%)
Died	203 (10.76%)	178 (9.43%)	381 (20.19%)
Referred	52 (2.75%)	79 (4.18%)	131 (6.93%)
LAMA	26 (1.37%)	27 (1.43%)	53 (2.8%)

## DISCUSSION

Accurate data on the morbidity and mortality are very useful for many reasons. It is important for the providers of primary care, investigators, and local and national health administrators and for the decision makers to design interventions for prevention and treatment and to implement and evaluate health care programs.

In our study major admission were Inborn babies (57%) than Outborn babies, which is similar to the studies done by Sridhar PV *et al*, Modi R *et al*, Kumar MK *et al* (5,6,7).

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 (8). But in our study 64.6% of neonates were low birth weight and 69% of neonates were preterm & which is similar to Veena Prasad and Nutan Singh’s study in Uttarakhand(9), these similar pattern of admission in SNCU is in concordance with National Neonatal Perinatal Database (NNPD)(10). This reflects the poor maternal health, antenatal check-up and socio-economic status of the rural society as our hospital caters people from tribal areas and from low socio-economic groups. Various studies from all over India reported much higher LBW rates As in Modi R *et al* (72%) and Babu MC *et al* (70%)(6,11).

In Our study maximum admission were due to Birth asphyxia (28.6%) and prematurity (23.16%), among birth asphyxia majority were Inborn 17.78%, these morbidity can be prevented by antenatal checkup, identification of high risk pregnancy, essential newborn care in which a trained person in Neonatal Resuscitation is required.

There is broad agreement that infants >2.5 kg the death is influenced by obstetric management and those who are LBW it is quality of neonatal care that has an important bearing on the outcome. According to the National Neonatal Perinatal database (2002-03)(10), the commonest cause of Neonatal death is Birth Asphyxia in both Inborn (54.9%) & Outborn (48.7%). The database which comprised 18 tertiary care neonatal units across India. The findings are similar to our study that major cause of mortality is Birth Asphyxia (40.4%).

The mortality rate in our study (20.19%) is higher than the rate reported in the study conducted by Veena Prasad *et al* in Uttarakhand(9)

## CONCLUSION

According to our study, low birth weight and prematurity were the common causes for admission in the SNCU. Birth asphyxia, Prematurity, neonatal jaundice and Sepsis were some important and leading causes of morbidity in newborn babies. Commonest causes for mortality were Birthasphyxia, respiratory distress syndrome and sepsis. Most of the morbidities and the mortalities can be prevented by improving and effective implementation of important preventive services like maternal care and essential newborn care, timely interventions and timely referral to tertiary care centres for delivery of high risk pregnancies and care of neonates in high risk situation. Need of the hour is to make people aware of the existing SNCU neonatal facilities with modern gadgets and equipment. The SNCUs should be strengthened with setting up Newborn stabilizing Unit (NBSU) at CHC level and availability of CPAPs and surfactants to improve survival of premature neonates.

### Limitation of Study

1. This is a hospital-based study and does not represent community data.
2. We were unable to diagnose inborn errors of metabolism due to lack of diagnostic facilities.

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