



COMPARATIVE STUDY OF INBORN AND OUTBORN NEONATAL UNITS IN ASPECT OF MORBIDITY AND MORTALITY PROFILES

Paediatrics

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ABSTRACT

Objective: To compare the inborn and outborn neonatal units in aspect of morbidity and mortality.

Design: Retrospective analytic study.

Setting: Outborn and Inborn neonatal intensive care units of department of paediatrics, SSMC & associated Gandhi memorial hospital, Rewa, MP.

Material and methods: Total 1000 newborn admitted in inborn and outborn unit in duration of one year from July 2016 to June 2017. Data were taken from neonatal case records. Data was tabulated, analyzed and various parameters were compared with the help of Chi-square test and unpaired t-test.

Results: In present study, inborn unit had 8.0% mortality as compared to 20.4% in outborn. Among inborn cases, prematurity (38.73%) was the commonest cause of mortality while in outborn it was birth asphyxia (33.8%). In terms of morbidity, Asphyxia (18.4%) was the most common cause followed by PT RDS (16.8%) and Sepsis (15%) in inborn unit, while in outborn neonatal sepsis (22.6%) was the commonest cause followed by Birth Asphyxia (20.4%) and Preterm RDS (17.75%).

Conclusion: The outborn units have significantly higher mortality than inborn. The main causes of outborn mortality and morbidity were birth asphyxia and sepsis which are preventable causes.

KEYWORDS

Inborn, Outborn, Birth asphyxia, Neonatal sepsis

INTRODUCTION

Newborn babies in need of critical medical attention are normally admitted to the neonatal intensive care unit(1). Globally every year four million babies die in the neonatal period (1st 4 weeks of life), with India contributing to one-fourth of the total mortality burden (2).75% of the neonatal deaths occur in the first week of life and at least 50% occur in the first day of life (3).

The India Newborn Action Plan (INAP) was launched in September 2014with the aim of ending preventable newborn deaths and stillbirths and brings them in to single digit neonatal mortality rate by 2030. Evidence based interventions especially facility based care can lead to significant reduction in neonatal mortality rate. A recent review assessing the effectiveness of community-based intervention packages shows benefits on reducing maternal morbidity (by 25%), stillbirths (19%), perinatal mortality (23%), and neonatal mortality (26%)(4). Thus a three level facility based neonatal care has been started in India. Level I include the Newborn Stabilization Unit (NBSU) at the First Referral Units (FRU); Level II refers to the Special Care Newborn Unit (SCNU) at the district hospital. Level III refers to the Neonatal ICU at a regional level.

Currently in India neonatal mortality rate is twenty-nine per thousand which accounts for sixty-nine percent of infant death and fifty-six percent of under-five child mortality and it is one and half times more in rural areas as compared to urban areas (5).

MATERIAL AND METHODS

Study design- Retrospective analytic study

Setting- Neonatal intensive care unit in tertiary level hospital in central India.

The present study has been carried out in the SCNU is out born unit and NICU is inborn unit of tertiary care center. Both units have same treatment facilities as regards to equipment's, drugs and protocols. Also the same number of staff is available per patient.

Study period- Data were collected from the files of both units over the twelve months duration from July 2016 to June 2017.

Inclusion criteria- The study included all neonates admitted in both the units with various gestational age and weight within this period.

Exclusion criteria- The babies who died during the first twelve hours

of NICU admission or in the delivery room, and those with inevitable lethal congenital CNS, Renal, and Cardiac anomalies were excluded from the study.

Data collection and analysis- Data collected from files included, gestational age which was recorded as per protocol of the unit by new Ballard scoring system. However out born neonates who presented later than seven days gestational age was recorded according to the obstetric records. Body weight was recorded for each neonate as soon as arrived to NICU and SNCU. The survival time (admission time till death) was recorded. Age at presentation for the out born group and the way of transport either through ambulance or private vehicle with oxygen or without oxygen and its impact was studied. The main presentation on admission was recorded including respiratory presentation (RDS, Pneumothorax, Meconium aspiration pneumonia and neonatal pneumonia) diagnosed by x-ray. CNS presentation (IVH, HIE, Seizures) diagnosed by clinical evaluation and confirmed by cranial ultrasound. Every case was discussed with consultants and was treated according to the treatment protocol of our hospital.

We also used Kangaroo mother care in inborn and outborn unit as it is a recommended practice for care of LBW and VLBW neonates.

Statistical methods- The data was tabulated using Microsoft Excel® and statistical analysis were done by using Graph pad Instate®. We used unpaired t-test, paired t- test and chi-square test for statistical analysis-Value was considered significant if it is <0.05.

RESULTS-

In the study period, total of 2974 babies were admitted, of which 1416 were admitted in the inborn unit while 1560 babies were admitted in the outborn unit. In the inborn unit 39.6% were of normal birth weight while 60.3% were LBW. In the outborn unit, 37.9% were normal birth weight while 62.1% were LBW. As per birth criteria, overall 38.8% were ≥ 2.5 kg (Normal Birth Weight), 51% were 1.5-2.49kg (LBW) category, 8.6% were 1-1.49kg (VLBW) category while 1.3% were < 1kg (ELBW) category (Table 1).

Table 1: Profile of babies admitted to SCNU according to birth weight.

Birth wt.(kg)	Inborn	Outborn	Total	Percentage
<1 kg	13	26	39	1.3%
1-1.49kg	117	141	258	8.6%
1.5-2.5kg	724	799	1523	51%
>2.5kg	562	592	1154	38%

Table 2: Showing the morbidity profile of admitted babies

Disease	Inborn	Outborn
PT RDS	238 (16.8%)	277(17.75%)
MAS	78(5.5%)	39(2.5%)
Asphyxia	260(18.4%)	318(20.4%)
Sepsis	213(15%)	352(22.6%)
Jaundice	187(13.2%)	161(10.3%)
Hypoglycemia	94(6.6%)	38(2.4%)
Congenital malformation	34(2.4%)	50(3.2%)
Others	312(22.0%)	325(20.8%)

In the inborn unit, Asphyxia (18.4%) was the most common cause of admission followed by PT RDS (16.8%) and Sepsis (15%). Jaundice occurred in 13.2% cases while Hypoglycemia and Meconium aspiration syndrome occurred in 6.6% and 5.5% of babies respectively.

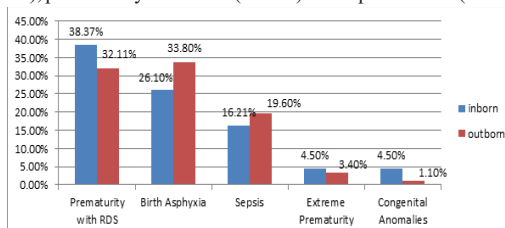
Morbidity profile of outborn neonates: Neonatal sepsis (22.6%) was the commonest cause of admission followed by Birth Asphyxia (20.4%) and Preterm RDS (17.75%). 10.3% of neonates presented with Jaundice.

The overall incidence of Birth asphyxia among neonates was 19.4% (n=578 out of 2974) followed by sepsis and preterm RDS 18.99% and 17.3% respectively. (Table-2)

Table 3: Disease specific mortality

Disease	Inborn (111)	Outborn (352)
Preterm RDS	43 (38.73%)	113 (32.1%)
MAS	5 (4.5%)	19 (5.3%)
Birth asphyxia	29 (26.1%)	119 (33.8%)
Sepsis	18 (16.21%)	69 (19.6%)
Congenital malformation	5 (4.5%)	4 (1.1%)
Extreme prematurity	5 (4.5%)	12 (3.4%)
Others	5 (4.5%)	7 (1.9%)

Among inborn cases, prematurity (38.73%) was the commonest cause of death followed by birth asphyxia (26.1%) and sepsis (16.21%). Outborn mortality also shows a similar pattern with birth asphyxia (33.8%), prematurity with RDS (32.1%) and sepsis 19.6%. (Table - 3)

**Figure 1: Show case fatality rate of the causes of mortality**

The major cause of mortality was prematurity with respiratory distress syndrome among both group followed by birth asphyxia and sepsis (Figure - 1)

Table 4: Outcome of admitted patients

Outcome	Inborn	Outborn
Discharge	1286 (90.8%)	1158 (74.2%)
Referral	17 (1.2%)	40 (2.5%)
LAMA	2 (0.1%)	10 (0.6%)
Death	111 (7.8%)	352 (22.6%)

Inborn patients: 90.8% (n=1286) of inborn babies were successfully discharged from the unit. 0.1% of cases left against medical advice (LAMA) while 1.2% was referred mainly for surgical reasons .The overall inborn mortality was 7.8% (male 5.1%, female 2.6%). The male female ratio is 1.9:1.

Outborn patients: 74.2% (1158) of outborn babies were successfully discharged from the unit. 0.6% of cases left against medical advice (LAMA) while 2.5% was referred. The overall outborn mortality was 22.6% (male 16.2%, female 6.2%). (Table -4)

DISCUSSION

In the present study incidence of low birth weight was almost similar in both groups which is around 51% which is much higher than NHFS-4 survey (5).

In inborn group 90.8% neonates survived and discharged out of 1416 neonates. While in outborn group it was only 74.2% out of 1560 neonates. In inborn mortality was 7.8% compare to outborn where it was 22%. The mortality data shows much higher mortality in outborn (22%) compared to inborn (7.8%). The higher outborn mortality highlights important issues like delayed referral, lack of pre-transport stabilization and inadequate functioning of peripheral neonatal facilities like NBSUs. The overall mortality of the SCNU (15.5%) is higher than that reported by Sridhar et al (7.2%) (6).

On comparing the survival among the different weight groups, it was seen that there were significant differences between Mortality rates for different weight group. It was clear that mortality rate increased as birth weight of neonate decreased. Basus et al (2008) reported the survival rate was found to increase with the increase in birth weight and gestational age (7).

The morbidity pattern in both group mainly prematurity, sepsis and birth asphyxia. The incidence of sepsis much higher in outborn group (22%) compare to inborn group (15%) the NNPD data shows similar rate of sepsis in outborn neonates. The higher incidence of sepsis may be because of lack of knowledge of neonatal practice, unhygienic delivery practice, lack of manpower and instruments.

The incidences of birth asphyxia almost similar in both groups but it were higher than NNPD data (8.3%). The higher incidence of birth asphyxia may be because of late recognition of high risk pregnancy, lack of prompt intervention and not timely referral. The incidences of prematurity were 16.8% and 17.7% in inborn and outborn group respectively. This was lower than others Sridhar et al 23.4%.

Analysis of disease specific mortality shows that prematurity, birth asphyxia and sepsis was the major causes. In inborn major cause of mortality was birth asphyxia while in outborn it was prematurity. Costello A, et al shows that most common causes of death in the neonatal period are infections, including septicemia, meningitis and respiratory infections followed by birth asphyxia and injuries and prematurity (8).

As compare to case fatality rate in outborn 37% cases of birth asphyxia was died as compare to inborn where it was only 11%. Similarly higher death due to other causes seen in outborn vs. inborn unit was RDS 40% vs. 18%, sepsis 19% vs. 8%. Prematurity and Low birth weight were two important factors which were associated with increased mortality .Premature newborn were 41.5% and low birth weight newborn were 78.6% of the admitted newborn. Vaid et al reported the major cause of neonatal mortality to be prematurity 35.3%, respiratory distress syndrome 23.5%, birth asphyxia 20.5% and septicemia 20.6% (9).

Limitations of the study

The present study being retrospective in nature could not analyses the epidemiological factors related to neonatal health especially socioeconomic background, maternal antenatal, intra natal and post natal factors that could have influenced the outcome. The morbidity and mortality data were dependent of the extent of data available retrospectively from case records and monthly reports.

CONCLUSION

The outborn have significantly higher mortality than inborn. The main causes of outborn mortality were birth asphyxia and sepsis which are preventable causes. Health education on essential newborn care should be integrated with routine antenatal services, strengthening of health facility at various levels such as effective neonatal resuscitation, a sepsis, adequate manpower and equipment's. All these measure not only decreased neonatal morbidity and mortality but also ensure intact survival.

REFERENCES

- World Health Organization (WHO). WHO recommendations on postnatal care of the mother and newborn. Geneva: WHO; 2013.
- Lawn JE, Cousens S, Zupan J; Lancet Neonatal Survival Steering Team. 4 million deaths: when? Where? Why? Lancet 2005;2005:365:891-900
- Toolkit for setting up of special care newborn units and newborn corners. NewDelhi: United Nations Children's Fund,2008.9p (http://www.unicef.org/India/SCNU_book_1_April_6_pdf, accessed on 12/05/2016
- Lassi ZS, Haider BA, Bhutta ZA. Community-based intervention packages for reducing maternal and neonatal morbidity and mortality and improving neonatal outcomes. Cochrane Database Syst Rev 2010; 11: Cd007754.
- National Institute for Population Sciences, National Family Health Survey (NFHS IV), 2015-16.

6. P V Sridhar, P S Thammanna, M Sandeep; Morbidity pattern and Hospital outcome of Neonates admitted in a Tertiary care Teaching Hospital, Mandya : International Journal of Scientific study; 2015; Vol3, Issue 6: 126-129.
7. Basu R. High ambient temperature and mortality: a review of epidemiologic studies from 2001 to 2008. Environmental Health. 2009 Sep 16;8(1):40.
8. Costello A, Francis V, Byrne A, Puddephatt C. State of the World's Newborns: A Report from Saving Newborn Lives. Save the Children, Department of Public Affairs and Communications, 54 Wilton Road, Westport, CT 06880; 2001.
9. Vaid A, Mammen A, Primrose B, Kang G. Infant mortality in an urban slum. The Indian Journal of Pediatrics. 2007 May 1;74(5):449-53.