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PATTERN OF MORBIDITY AND MORTALITY IN PRETERM NEWBORNS IN A TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT: OBJECTIVE: To study the morbidity and the mortality patterns in inborn preterm newborns admitted in NICU at a tertiary care teaching hospital. **DESIGN:** Retrospective study. The medical records of all the inborn preterm neonates (G. age ≤36W+6 days) who were admitted to the NICU were analyzed by using a pre-set proforma. **SETTINGS:** Neonatal Intensive Care Unit (NICU), Department of Pediatrics, Adesh Institute of Medical Science & Research Institute (AIMSR) Bathinda, Punjab. The study was carried out over a period of 2 years from January 2012 to December 2014. **PARTICIPANTS:** 80 preterm neonates who were born in AIMSR and were admitted with some illness to the NICU. **OUTCOME:** The patterns of the morbidity and the mortality among the preterm neonates who were admitted to the NICU. 'Survival' was defined as the discharge of a live neonate/ infant from the hospital. **RESULTS:** A total of 80 premature inborn infants were analyzed for the complications they encountered after birth while admitted in NICU. Out of 80 premature babies, 32 (40%) were male and 48 (60%) were female babies. Mean gestational age was and Mean birth weight was. Neonatal hyper- bilirubinemia, HMD/RDS and Neonatal sepsis were the commonest causes of morbidity. Among 80 premature babies 15(18.7%) died. The highest mortality was seen in babies those weighing less than 800 grams (100%). Male mortality is 34.4% and female mortality is 8.3%. **KEYWORDS:** Preterm neonates, Morbidity, Mortality, NICU, AIMSR.

INTRODUCTION: Preterm birth is one of the major clinical problems in neonatology, as it is associated with perinatal mortality, serious neonatal morbidity and in some cases leads to childhood disability.[1] Incidence of preterm birth is rising worldwide because of increased frequency of multiple births, due to increasing psychological stress and medically induced preterm delivery. Due to continued innovation in neonatal intensive care facilities during the last two decades, the survival of premature infants has significantly increased due to advancement in perinatal and neonatal treatment expertise and improvement in the care of high risk mother.[2] This increased survival rate in preterm babies is associated with increased morbidity and mortality rates.

Common Causes of preterm morbidity, Neonatal jaundice, Respiratory distress syndrome (HMD) Neonatal sepsis, Birth asphyxia, Necrotizing enteropathy (NEC), acute renal failure.[3]There is only scanty data which is available regarding the preterm neonatal morbidity and mortality patterns in the Indian neonatal intensive care units (NICU) and even if it is there, it is available mainly from the tertiary care level 3 NICUs in the metropolitan cities.[4] The data from the tertiary care NICUs in the rural areas which primarily serve the very poor people is scarce. To the best of our knowledge, there are hardly any published studies from which provide the morbidity and mortality patterns in tertiary care NICUs which are located in rural areas, which mainly serve the poor population. The objective of this study is to study the morbidity and mortality patterns in an NICU of a tertiary care teaching hospital which mainly serve the rural population of the area.

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OBJECTIVES:
1. To know the pattern of morbidity and mortality in preterm neonates admitted in NICU of Adesh Institute of Medical sciences and Research.
2. To know the maternal risk factors associated with preterm birth.

MATERIALS AND METHODS: This hospital based retrospective study was carried out in the neonatal intensive care unit (NICU), Department of Pediatrics, Adesh Institute of Medical Science & Research Institute.

Based on reported literature with retrospective studies on this topic and feasibility in this center, it has been decided to enroll all consecutive preterm neonates babies (<37 weeks) who were born and admitted to NICU from Jan. 2012 to Dec. 2014. The institutional research & ethical committee approved the study protocol.

Our hospital caters mainly to rural and semi-urban patients, with a significant number of them being below the poverty line (BPL) income group patients. Data in relation to demographic profile, antenatal risk factors, neonatal complications, treatment profile and outcome was collected with the help of case sheets of premature babies obtained from Medical Record Section and analyzed with percentages and proportions.

Inclusion Criteria: All inborn infants delivered before 37 weeks of gestation and admitted in Neonatal Intensive Care Unit.

Exclusion Criteria: Term neonates, out borns and Pre-term newborns who had any congenital malformation were excluded from the study**.**

Study Procedure: To find out the morbidity pattern, in each preterm neonate at the time of admission in NICU, following blood investigations like TLC/DLC (Total count/Differential count), P/S (Peripheral smear), ESR (Erythrocyte sedimentation rate), Band count, CRP (C-reactive protein) and Blood sugar levels were done wherever necessary. Other investigations were carried out, as and when thought to be necessary like X ray chest/or other, sr. electrolytes, sr. blood urea, sr. Calcium, Blood Culture, Cranial ultrasound, EEG, CT and MRI study.

Data Recording and Analysis: Data in relation to demographic profile, antenatal risk factors, neonatal complications, treatment profile and outcome was collected with the help of case sheets of premature babies obtained from Medical Records dept. (MRD) of AIMSR. Data was recorded in a predesigned Performa and was entered in a Microsoft excel sheet and was analyzed with percentages and proportions using a suitable computer programme. The significance level was set at p value <0.05.

OBSERVATIONS: We have done a study on 80 premature infants and we analyzed the complications they face after birth while admitted in NICU. Out of 80 premature babies, 32(40%) were male and 48 (60%) were female babies. Out of 80 premature babies 21(26.2%) were SGA, 16(20.0%) LGA and 43 (53.5%) were AGA. Mean gestational age was and Mean birth weight was. Twenty six (32.5%) babies had birth weight <1500 grams and 54(67.5%) babies had birth weight >1500grams.

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Disease	Number (n=80)	Percentage of Babies
Jaundice	57	71.2%
RDS	29	36.2%
Sepsis	27	33.7%
Birth Asphyxia	6	7.5%
AKI	8	10%
Hypoglycemia	9	11.2%
Seizure	11	13.7%
NEC	10	12.5%
Table 1: Clinical Profile Of Premature Babies		

\# Conditions are mutually exclusive.

Eighteen babies had blood culture proven sepsis and Klebsiella species were the commonest to be isolated and 5 (33.3%) death occurred due to sepsis. At the time of admission a complete septic screen was done which included total and differential leukocyte count, absolute neutrophils count, platelet count, CRP, chest X-ray and blood culture. CRP was measured at the time of admission and 8-24 hours later, on the next morning, using a semi-quantitative technique with a detection limit of 6mg/L. AKI accounted for 10% of the cases and Sepsis was found to be the commonest cause of neonatal AKI in the present study. Oliguria was present in 70.3%. Peritoneal dialysis (PD) was required in two neonates, both died.

Among 80 preterm babies 15(18.7%) died. Mortality of the premature babies in relation to their birth weight and their gender wise distribution of mortality and their cause of death was as below.

Gender	Number	Deaths	Mortality %
Male	32	11	34.4%
Female	48	4	8.3%
Table 2: Gender Wise Mortality			

In the modern era of neonatal management, male infants still have higher mortality and poorer long-term neurologic outcome. Male mortality is 34.4% and female mortality is 8.3% and male infants needed more ventilator and circulatory support.

| Birth Weight (gms)	No.	Death	Mortality %
<999	9	9	100%
1000-1499	11	3	27.2%
1500-2499	49	2	4.08%
>2500	11	1	9%
Table 3: Mortality of the Preterm Babies in Relation to their Birth Weight			

The highest mortality was seen in babies those weighing less than 999 grams (100%).

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Cause of Death	No.	Percent (n=80)
RDS	7	46.60
SEPSIS	5	33.30
ARF	2	18
NEC	1	9
TOTAL	15	100
Table 4: Cause of mortality among died preterm babies		
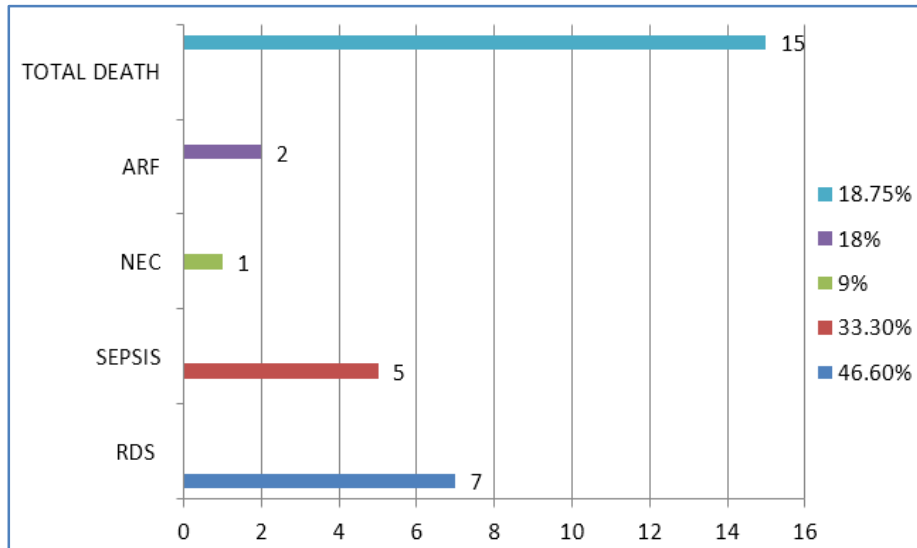
Graph-1

        Amongst maternal risk factors, anemia (Hb <10g/dL) was the commonest (65%) followed by previous pre term delivery. 44% mothers did not receive adequate antenatal care (ANC) and babies born to them had unfavorable outcome. Antenatal steroids were given to 15 mothers.

        The discharge weight in majority of the survivors was between 1500 grams and 1550 grams (Median 1530grams, range 1400 to1640grams), while the average weight gain was ~16 grams /day. The mean duration of hospital stay was 34 days (Range 25 to 43 days).

Ventilatory Support: 30 babies were mechanically ventilated out of which 25 survived and 5 deaths occurred due to RDS. Four babies were oxygen dependent for more than 28 days but they were discharged in satisfactory condition and no death occurred.

Screening for ROP: ROP screening could be done in 35 babies during their stay in nursery and was normal in 31 of them. The incidence of ROP was highest in babies of less than 28 weeks gestation and those weighing <999 grams at birth.

DISCUSSION: In this study commonest morbidities among preterm babies were Jaundice, RDS and Sepsis. Similar findings observed by Arvind Sehgal et al,[5] in their study. While Wei-Qin Zhou et al,[6]

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found RDS, Sepsis and Pulmonary hemorrhage were the commonest morbidities among preterm babies.

In this study overall mortality was 18.7% which is almost similar to the study conducted by Mehta B. et al,[7] where the overall mortality was 17% and comparable with the study by Singh Uma et al[1] where overall mortality was 12.7%. Common causes of mortality in our study were RDS (46%), Sepsis (33%) and were similar with the study conducted by Singh Uma et al[1] where common causes for mortality were RDS (62%), Sepsis (16.8%) and Birth asphyxia (9.2%) and were similar with the study conducted by Satish D et al,[8] where Common causes of mortality were RDS (85.4%), Sepsis (10.4%) and Aspiration pneumonia (4.1%).

Gender difference in our study favored females, which was similar to another study by lapine TR et al,[9] which had reported both improved survival and decreased neuro-developmental morbidity in girls as compared to boys.

Gestational age and clinical condition of the baby determined initiation of feeds. The feed was initiated in hemodynamically stable babies, to prevent NEC, beginning with "trophic feeding". All efforts were made to give expressed breast milk; otherwise special low birth weight formulas were given. Non-nutritive sucking at the breast was initiated gradually and with increasing maturity; feedings with a special utensil called "Palade" were started. With these practices, an average weight gain of ~16 grams per day was achieved which concurs with the expected intra-uterine accretion rate of ~15gm./kg/day.

Amongst the Indian population, a very high incidence of maternal anemia has been noticed and is a known cause of prematurity and growth retardation. In the present study, amongst maternal risk factors, anemia was the commonest (65%) followed by previous pre term delivery which was similar to the studies by Roy K K et al,[10] and Arvind Sehgal et al,[5] where the Anemia was commonest (32.6% and 65% respectively) maternal risk factor noted. 44% mothers did not receive adequate antenatal care (ANC) and babies born to them had unfavorable outcome. Mayur Bavaliya et al,[11] also found that lack of antenatal care (72%), Anemia (68%) and maternal illnesses like hypertension (58%) were the commonest maternal risk factors in their study.

CONCLUSION: Jaundice, RDS and Sepsis were the common morbidities among the premature babies. Overall mortality among premature babies was 16% in our study. Anemia and previous preterm delivery and lack of antenatal care were the commonest antenatal risk factors for the premature births.

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