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MORTALITY AND MORBIDITY PATTERN AND ASSOCIATED FACTORS IN PRETERM BABIES ADMITTED IN SICK NEWBORN CARE UNIT OF A DISTRICT HOSPITAL,NADIA,WEST BENGAL:A DESCRIPTIVE STUDY

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ABSTRACT

AIM:

To study the mortality and morbidity pattern in the preterm babies admitted in the district hospital setup in Krishnanagar of Nadia District, West Bengal.

MATERIAL AND METHODS: **STUDY SITE:** This hospital based observational study will be carried out in the sick newborn care unit (SNCU), Department of Pediatrics, at district hospital Nadia, Krishnanagar.

STUDY POPULATION:

All the admitted preterm neonates in the Sick Newborn Care Unit [SNCU] from May 2015 to April 2016, with the exclusion of term babies, those who don't give consent to participate in the study and babies with congenital anomalies.

Inclusion criteria: All the preterm neonates admitted, within the period of one year (from May 2015 to April 2016), to the SNCU of the District hospital Nadia, Kirshnanagar, West Bengal. Term babies, those who were not willing to participate in the study and babies with congenital anomalies were excluded.

Data was collected on antenatal care, maternal morbidity, mode and place of delivery, age, weight at admission, gestational age, diagnosis, relevant investigations, duration of stay, money spent on treatment and outcome.

RESULTS: A total of 198 neonates who are preterm births,were included in our study. Mean monthly family income (in rupees) was 5512.Around 65% of the mothers suffered from anemia during pregnancy. 9% developed ante-partum hemorrhage, around a third of the mother delivered the baby at 36 weeks of gestation. 12% of the women delivered at 28 weeks of gestation,mean birth weight was 1.63 kg, Only 12 babies had weight more than 2.5 kg at birth The mean birth weight of male babies was more than that of female babies, but it was not statistically significant,around 15% of the respondents died in the SNCU during the study period and amongst 30 who died in the SNCU during study period, majority died due to respiratory distress syndrome.Out of pocket expenditure of the parents/ guardians for treatment was 352 rupees. Majority of the babies were admitted with the provisional diagnosis of either Respiratory distress syndrome (RDS) or Early onset neonatal sepsis.There was a significant association of the birth weights of the babies with mortality maximum mortality was seen in neonates with birth weight less than 900 gm (50%).

CONCLUSIONS: RDS, Sepsis and Neonatal jaundice were the common morbidities among the premature babies. Overall mortality among premature

babies was 15% in our study, ELBW babies were at a higher risk with maximum mortality rate among the preterm babies. Anemia and ante-partum hemorrhage were the commonest antenatal risk factors for the premature births. Morbidity and mortality in late preterm infants is high. The guidelines for these nearterm premature babies need to be reviewed, looking for possible causes of prematurity, and trying to reduce their impact, as well as developing a protocol for their care and close monitoring to minimize the associated morbidity. There should be long-term monitoring to find out the consequences on their psychomotor development. The obstetrics group should be made aware of the true risks of births in the near-term gestational ages.

INTRODUCTION

Progress in neonatology is generally portrayed as inexorable: doing better and better with smaller and smaller. Issues on survival and disability of preterm babies

are important in perinatal medicine[1].In industrialized countries, preterm delivery is responsible for 70% of mortality and 75% of morbidity in the neonatal period. It also contributes to significant long-term neurodevelopment problems, pulmonary dysfunction, and visual impairment [2]. Mortality of VLBW neonates is 30 times more than that of newborns of normal weight[3]. India is the country responsible for maximum number of neonatal deaths from 1990–2009[4]. Simple interventions such as improved hygiene, timely effective neonatal resuscitation, temperature maintenance, advice on breast feeding and emergency obstetric care for surgical delivery in case of fetal distress can go a long way to reduce this rate[5].

According to the National Family Health Survey - 3 (NFHS-3) report[6], the current neonatal mortality rate (NMR) in India of 39 per 1,000 live births, accounts for nearly 77% of all the infant deaths (57/1000) and nearly half of the under-five child deaths (74/1000). The rate of the neonatal mortality varies widely among the different states of India, ranging from 11 per 1000 live births in Kerala to 48 per 1000 live births in Uttar Pradesh. According to National health mission studies the neonatal mortality rate in west Bengal for the year 2013 is 31 per 1000 live birth. Preterm birth and low birth weight babies are at increased risk of perinatal mortality and morbidity[7]. According to NNPD 2002-03 data, 62 % of all neonatal deaths were in premature babies. Perinatal asphyxia, sepsis, congenital malformations and hyaline membrane disease are the common causes of neonatal

mortality in premature babies[8]. The disease patterns in preterm babies vary from place to place and even from time to time in the same place[9].

Since 2000, when the United Nations Millennium declaration was signed, there have been ever greater efforts to reduce mortality among children less than five years of age. It will be difficult to reach the stated goal (cutting the rate by two-thirds by 2015) without reducing the number of neonatal deaths [10].

To the best of our knowledge, there are hardly any published studies from WEST BENGAL which provide the morbidity and mortality patterns in district hospital sick new born care units (SNCU).Hence it is necessary to carry out regular neonatal audit on major preterm morbidities so that we can develop strategies to handle them effectively. Present study was one such attempt.

AIMS&OBJECTIVES

AIM:

To study the mortality and morbidity pattern in the preterm babies admitted in the district hospital setup in Krishnanagar of Nadia District, West Bengal.

OBJECTIVES:

1. To evaluate the pattern of mortality and morbidity of the preterm babies in the district hospital, Nadia, West Bengal.

2. To find out the factors associated with common morbidities and mortality in preterm babies.
3. To find out the out of pocket expenditure of parents for the treatment of their newborns.

MATERIAL AND METHODS

STUDY SITE: This hospital based observational study will be carried out in the sick newborn care unit (SNCU), Department of Pediatrics, at district hospital Nadia, Krishnanagar.

STUDY POPULATION: All the admitted preterm neonates in the Sick Newborn Care Unit [SNCU] from May 2015 to April 2016, with the exclusion of term babies, those who don't give consent to participate in the study and babies with congenital anomalies.

STUDY DESIGN: A prospective, descriptive, observational study.

TIME PERIOD: One year (May 2015 to April 2016).

Inclusion criteria: All the preterm neonates admitted, within the period of one year (from May 2015 to April 2016), to the SNCU of the District hospital Nadia, Kirshnanagar, West Bengal.

Exclusion Criteria:

1.Term babies

2.Those who do not give consent to participate in the study.

3.Babies with congenital anomalies.

All the admitted preterm neonates in the SNCU of District hospital Nadia, Krishnanagar were enrolled on a semi-structured protocol, which included the data on antenatal care, maternal morbidity, mode and place of delivery, age, weight at admission, gestational age, diagnosis, relevant investigations, duration of stay, money spent on treatment and outcome.

The following variables were carefully studied in the admitted preterm neonates such as: Intra uterine growth restriction (IUGR), respiratory distress syndrome, neonatal jaundice, neonatal sepsis, neonatal seizures, perinatal (birth) asphyxia, and necrotizing enterocolitis. All the babies in the study were followed daily for the whole period they have stayed in the hospital. ‘Survival’ was defined as the discharge of a live neonate/ infant from the hospital. In case of death of any neonate, the cause was evaluated and noted in the proforma sheet.The data collected was entered in MS Excel 2016. The data was analyzed by IBM SPSS version 22.0.

Ethical consideration: The permission to conduct the study was taken from the superintendent of the District Hospital, Krishnanagar. The Institute Ethics Committee of the College of Medicine and JNM Hospital, WBUHS, Kalyani gave

the ethical clearance to conduct the study after it was cleared from the Scientific Research Committee of the same medical college.

RESULTS&OBSERVATIONS

All together 198 neonates admitted in the sick new born care unit (SNCU) of the district hospital, Krishnanagar were enrolled in the study. The analysis of the data is presented below in the form of tables and relevant figures.

1. Sex

54% of the neonates were boys (figure 1).

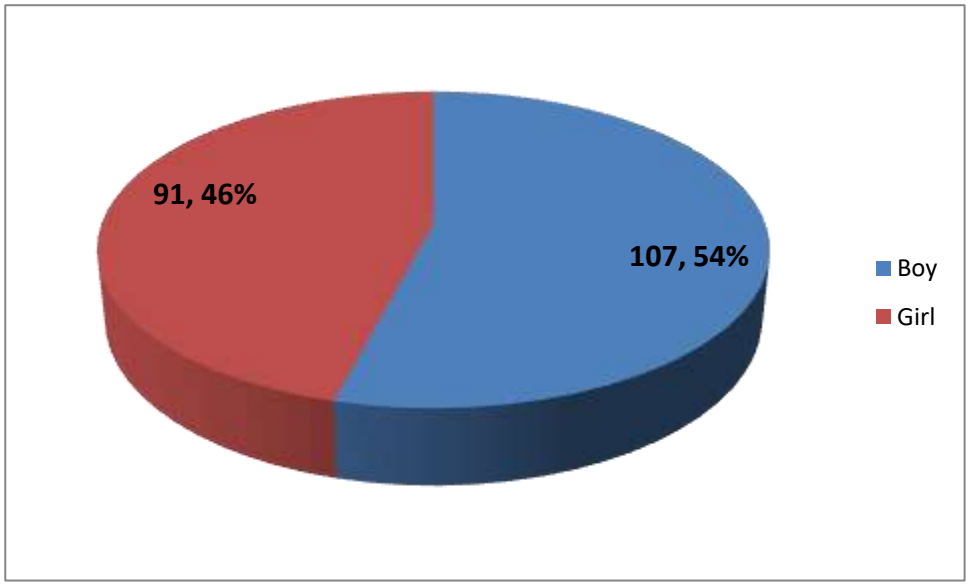

Figure 1: Sex distribution of the participants

2. Age at admission

The mean (SD) age of the newborn at admission to SNCU was 2.15 (2.124) days. The median age at admission was 1 day. The minimum and maximum age of the newborn at admission was 1 day and 13 days respectively (table 1).

Table 1: Age-group of the participants

Age at admission (in completed days)	Frequency	Percentage
1	125	63.1
2	19	9.6
3	21	10.6
4	10	5.1
5	12	6.1
6	2	1.0
≥ 7	9	4.5
Total	198	100.0

3. Monthly family income

Table 2 shows the monthly family income of the respondents.

Table2: Monthly family income of the participants

Item	Monthly family Income (In INR)

Mean	5512.63
Standard Deviation	2505.546
Median	5000.00
Interquartile range	4000.00
Minimum	1500.00
Maximum	12000.00

B. Maternal history of the respondents

1. Problems of mother during pregnancy

Around 65% of the mothers suffered from anemia during pregnancy. 9% developed ante-partum hemorrhage (table 3).

Table3: Maternal problems during pregnancy

Maternal problem	Frequency	Percentage
Anemia	128	65
Ante-Partum Hemorrhage (APH)	18	9.1
Eclampsia	8	4.0
Bleeding PV	4	2.0
Gestational diabetes mellitus (GDM)	4	2.0

Breech Presentation	2	1.0
Foul Smelling Discharge	1	.5
Premature Rupture of Membrane (PROM)	1	.5
Respiratory distress	1	.5
Pharyngitis	1	.5
None	30	15.1
Total	198	100.0

2. Gestational week

Around a third of the mother delivered the baby at 36 weeks of gestation. 12% of the women delivered at 28 weeks of gestation (figure 2).

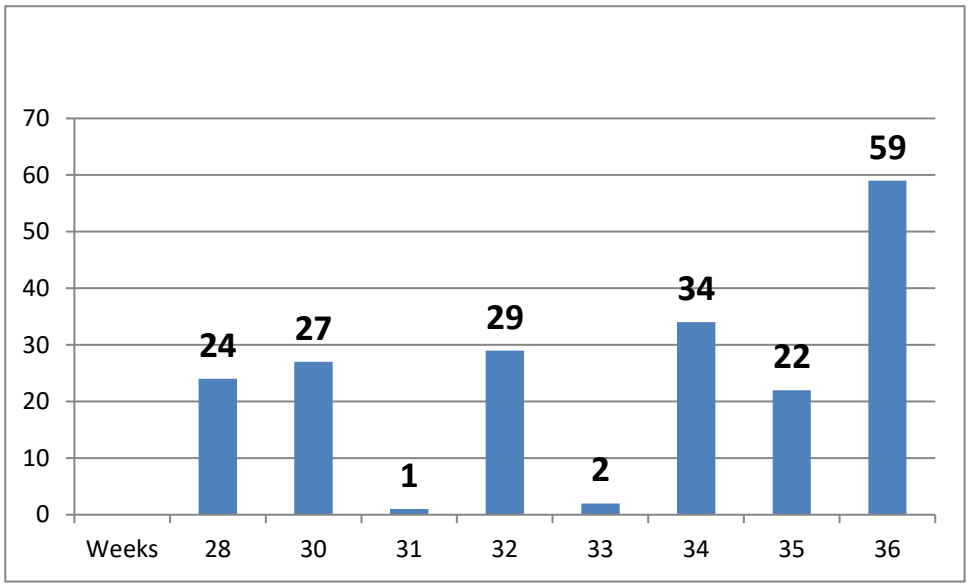

Figure 2: Gestational age of the mother at delivery

C. Birth history of participants

1. Place of birth

53% of the neonates were born at the district hospital, Krishnanagar, the study site (figure 3).

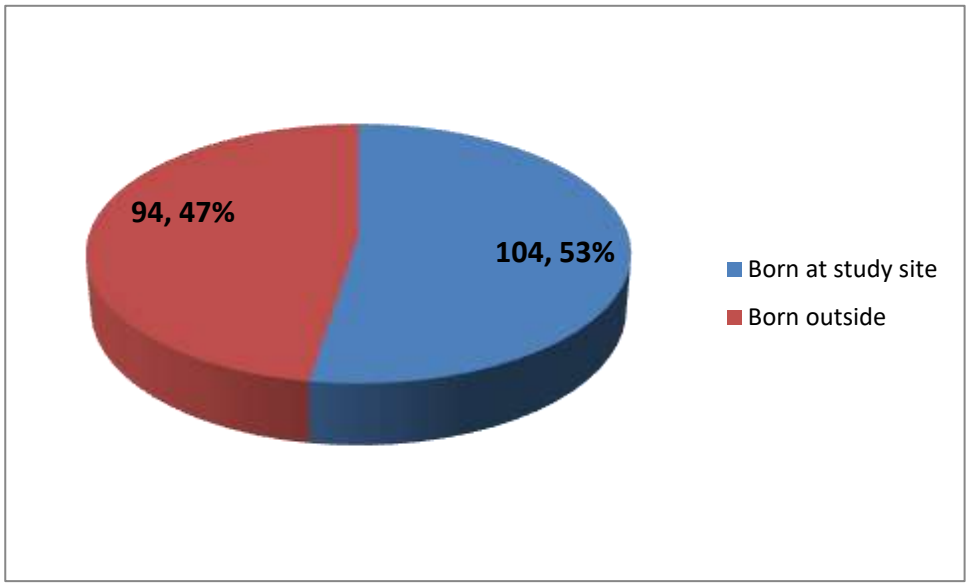

Figure 3: Place of birth of the participants

2. Type of delivery

62% of the babies were born by normal vaginal delivery (figure 4).

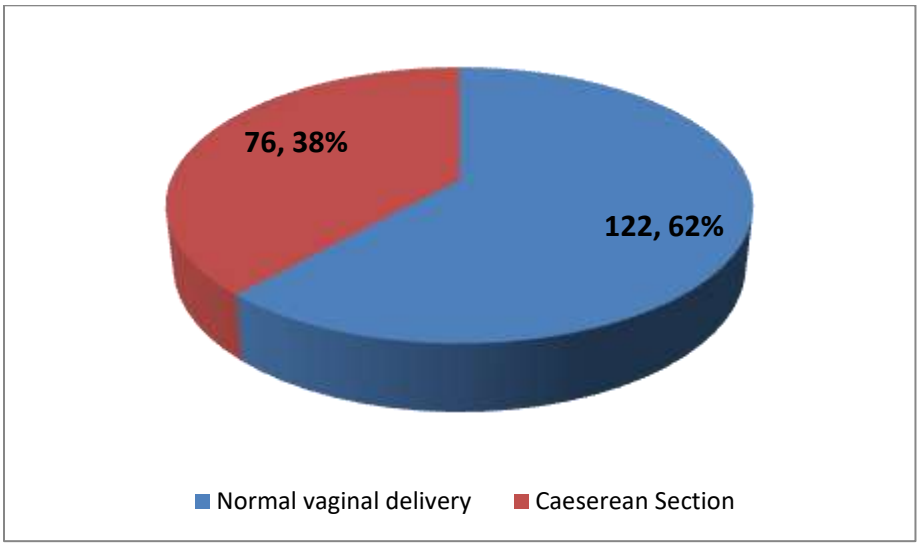

Figure 4: Type of delivery of the participants

3. Birth weight

The birth weight of the babies are shown in table 4. Only 12 babies had weight more than 2.5 kg at birth (table 5). The mean birth weight of male babies was more than that of female babies, but it was not statistically significant (1.68 kg vs 1.57 kg, p value: .059)

Table4: Birth weight of the participants

Item	Birth weight (in Kg.)

Mean	1.63
Standard Deviation	.42
Median	1.55
Interquartile range	.600
Minimum	.800
Maximum	3

Table 5: Category of birth weight

Birth weight	Frequency	Percentage
2500 gm and above	12	6.1
1500 – 2500 gm (Low birth weight)	124	62.6
1000 – 1500 gm (Very low birth weight)	56	28.3
< 1000 gm	6	3.0
Total	198	100.0

D. Status in SNCU

1. Weight at admission

The weight of the babies on the day of admission to SNCU are shown in table 6.

Table6: Weight of the participants on the day of admission to SNCU

Item	**Birth weight (in Kg.)**
Mean	1.61
Standard Deviation	.42
Median	1.54
Interquartile range	.600

Minimum	.800
Maximum	3

2. Feeding history

87% of the respondents were on exclusive breast feeding (figure 5).

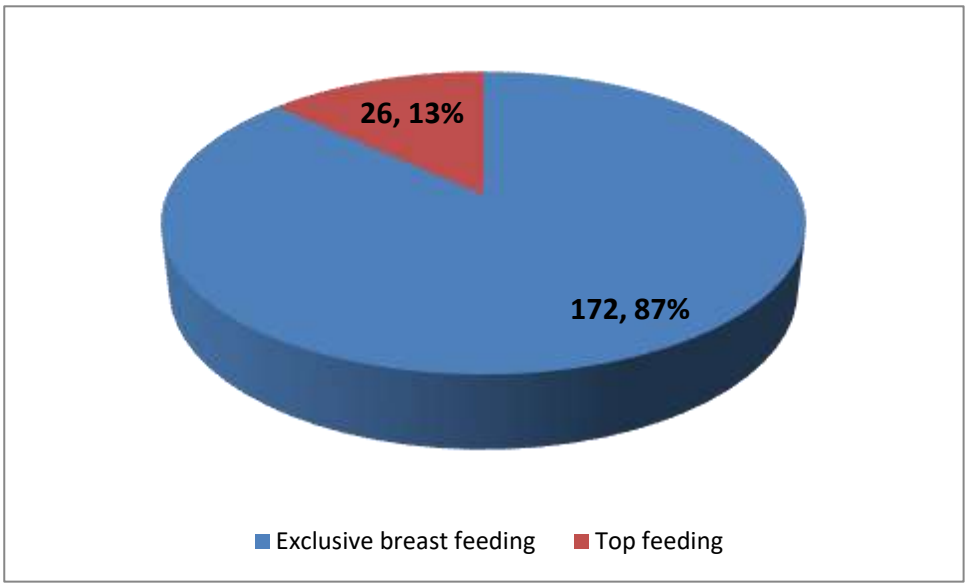

Figure 5: Feeding history of the participants

3. Final outcome

Around 15% of the respondents died in the SNCU during the study period (figure 6).

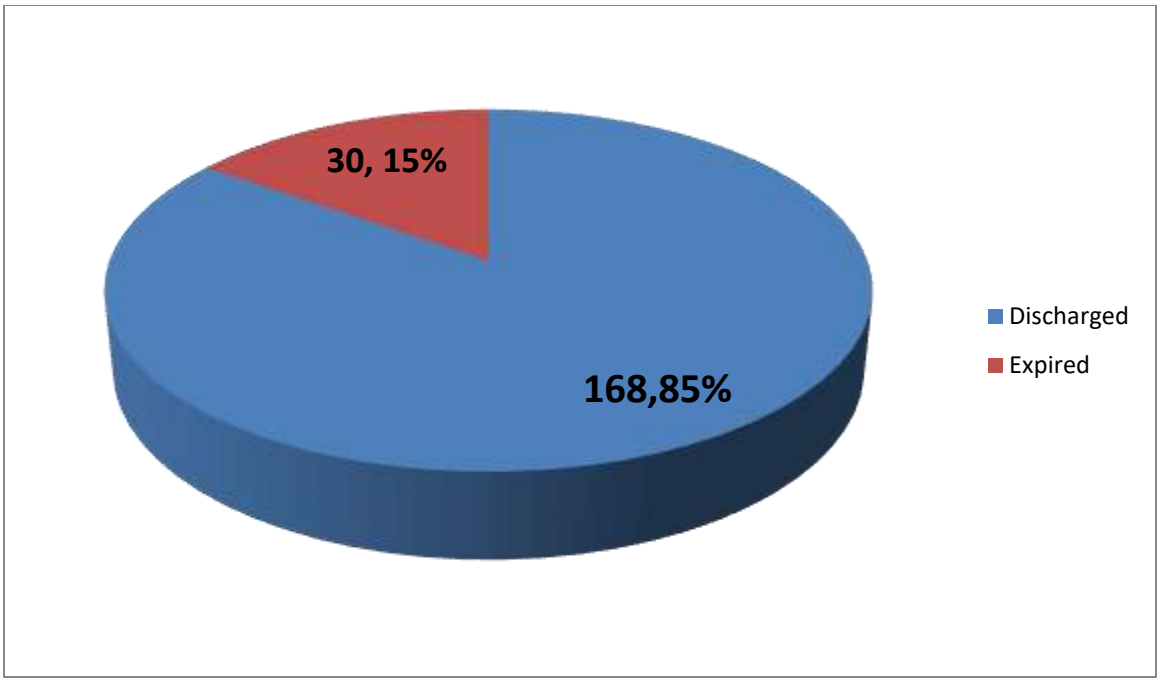

Figure 6: Final outcome of the participants

4. Cause of death

Amongst 30 who died in the SNCU during study period, majority died due to respiratory distress syndrome (figure 7).

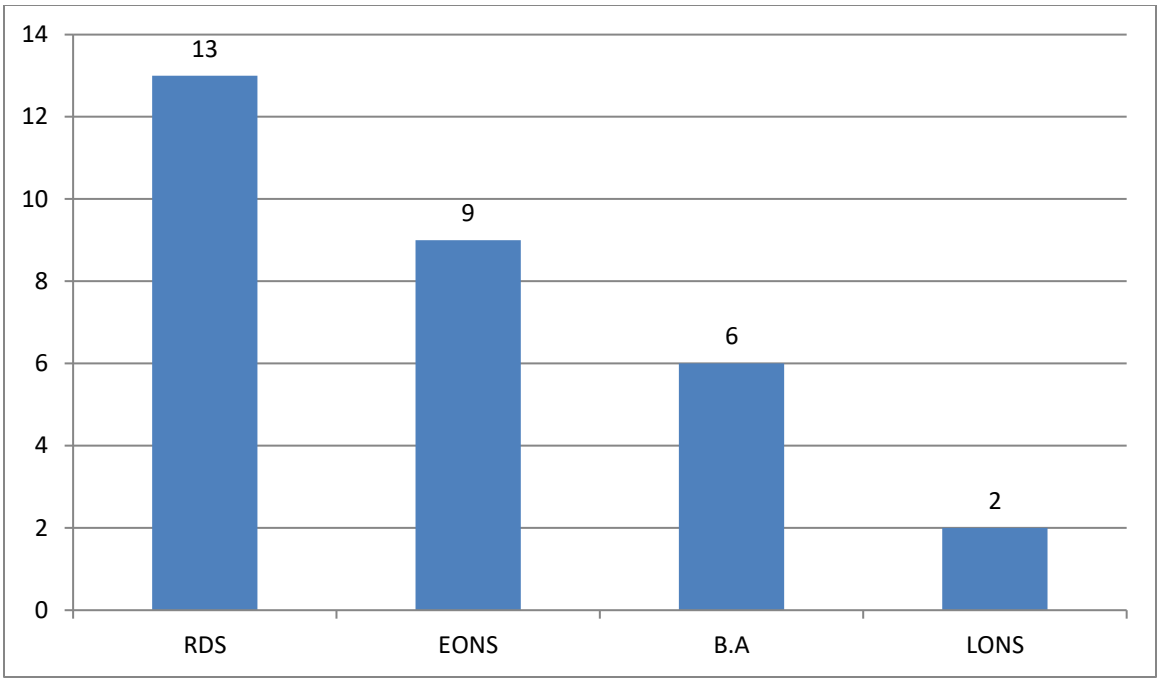

Figure 7: Cause of death of infants (n=30)

5. Hospital stay

The mean (SD) hospital stay for babies was 11.8 (8.25) days. The minimum and maximum number of days which any baby was admitted in the SNCU was 1 and 45 days respectively (table 7).

Table7: SNCU stay of the participants

Number of admission days (in days)	Frequency	Percentage
1 – 7 days	84	42.4
8 – 14 days	51	25.8
15 – 21 days	40	20.2
22 – 28 days	14	7.1
> 28 days	9	4.5
Total	198	100.00

6. Out of pocket expenditure

Table 8 shows the expenditure incurred by the guardian/ parent of the admitted babies on the treatment at SNCU.

Table8: Out of pocket expenditure related to treatment

Item	Expenditure for treatment (In INR)
Mean	352.27
Standard Deviation	355.96
Median	300.00
Interquartile range	250.00
Minimum	100.00
Maximum	2000.00

7. Morbidity

Majority of the babies were admitted with the provisional diagnosis of either Respiratory distress syndrome (RDS) or Early onset neonatal sepsis (table 9).

Table9: Morbidity profile of the participants

Morbidity	Frequency	Percentage

Respiratory distress syndrome (RDS)	75	37.9
Early onset neonatal sepsis (EONS)	40	20.2
Neonatal jaundice	33	16.7
Low birth weight, very low birth weight, extremely Low birth weight	19	9.6
Neonatal convulsions	18	9.1
Feed intolerance	6	3.5
Late onset neonatal sepsis	3	1.5
Hypothermia	2	1.0
Birth asphyxia	1	0.5
Total	198	100.00

8. Final diagnosis

Final diagnosis of the babies were more or less similar to the provisional diagnosis (table 10).

Table10: Final diagnosis of the participants

Morbidity	Frequency	Percentage
Respiratory distress syndrome (RDS)	74	37.4
Early onset neonatal sepsis	42	21.2
Neonatal jaundice	33	16.7
Intra uterine growth retardation	20	10.0

Birth asphyxia	15	7.6
Low birth weight, very low birth weight, extremely Low birth weight	5	2.6
Feed intolerance	3	1.5
Neonatal convulsions	2	1.0
Late onset neonatal sepsis	2	1.0
Hypothermia	2	1.0
Total	198	100.00

E. Factors associated with mortality

1. Sex and outcome

Table 11 shows the final outcome of the enrolled babies. Sex did not influence the mortality status (p value: .631).

Table11: Outcome in different genders

Sex/ Outcome	Discharged	Expired	Total
Boy	98	9	107
Girl	81	10	91

Total	179	19	198

2. Feeding habit and outcome

Table 12 shows the final outcome of the enrolled babies according to their feeding habit. Feeding habit did not influence the mortality status (p value: .721).

Table12: Outcome status according to feeding habit

Feeding status/ Outcome	Discharged	Expired	Total
Exclusive breast feeding	156	16	172
Top feeding	23	3	26
Total	179	19	198

3. Birth weight and outcome

Table 13 shows the final outcome of the enrolled babies according to their brith weight categories. The outcome was significantly associated with the birth weight status of the babies (p value: .002).

Table13: Outcome in different birth weight categories

Birth weight category/ Outcome	Discharged	Expired	Total
Normal birth weight	12	0	12
Low birth weight	116	8	124
Very low birth weight	48	8	56
Extremely low birth weight	3	3	6
Total	179	19	198

Preterm babies are more prone to mortality and various morbidity due to inherent immaturity of different organs for being born early, resulting in prolonged stay at SNCU as well in the hospital.

Mean duration of stay in the hospital, in our study was 11.8 days (range 1-45 days). The duration of stay in the hospital ranged from 1 to 72 days with a mean duration of 13.33±12.05 days in study done by Onyaye E et al[9].

In the present study RDS (37.9%), EONS (20.2%), Neonatal Jaundice (16.7%), were major factors contributing to morbidity. IUGR (10%), neonatal convulsions (9.6%), Birth asphyxia (7.6%), feed intolerance (3.5%), LONS (1.5%).

In a study by Harsha et al[11] the IUGR incidence was 13.46% comparable to our study, where the common morbidities were RDS and Jaundice.

A study done by Onyaye E et al[9] (January 2010 to December 2012, total 138 preterm) showed commonest medical conditions seen in preterm babies were respiratory problems in 95(68.8%), jaundice in 94(68.1%) followed by sepsis in 54 (39.1%). Other problems in descending order were asphyxia (29%, 40), anemia (20.3%, 28), bleeding disorder (10.9%, 15), NEC (8.7%, 12), acyanotic congenital heart disease (5.8%, 8), birth defect (5.8%, 8), birth trauma (5.1%,7), hypoglycemia (5.1%,7) and seizures (2.2%,3). In a study by Onalo and Olateju in Abuja, Nigeria reported jaundice as the commonest morbidity in their preterm patients whereas another study by Onwuanaku et al[13]. in Jos University Teaching Hospital Nigeria, reported sepsis as the commonest morbidity, followed by jaundice. Yet another study by Ugochukwu EF et al[14] (may 1988 to oct 2000) reported sepsis, asphyxia, jaundice, anemia and hemorrhagic disease of newborn as major morbidities.

In a prospective analysis of etiology and outcome of pretermlabour done by Singh Uma et al[15] (2005), septicaemia, RDS and birth asphyxia were important contributors to preterm morbidity.

A few studies on ELBW and VLBW by Sehgal et al[55] who retrospectively studied (August 2000- 2001) immediate outcome in these babies showed neonatal hyperbilirubinemia (78%) and RDS (65%) were most common causes of morbidity. Arias et al[17] reported apnea (30%), RDS (64%), IVH (27%), NEC (8%) sepsis in (30%) in his study.

In a retrospective by K. K. Roy et al(2001-04)[18] on immediate outcome in ELBW and VLBW babies, the common complications seen in both groups were neonatal jaundice (47.2% in ELBW and 24.2% in VLBW) and RDS (38.8% in ELBW and 17.1% in VLBW). Other morbidities were ROP (33.3% in ELBW and 15.7% in VLBW), culture proven sepsis (25% in ELBW and 14.2% in VLBW), birth asphyxia (16.6% in ELBW and 12.8% in VLBW), PDA in (16.6% in ELBW and 5.6% in VLBW) and IVH (16.6% in ELBW and 2.8% in VLBW).

In a retrospective study by Parappil et al[19] done on 28(+1) to 32 (+0) weeks babies found IVH Grade III (0.84%), IVH Grade IV (0.5%), cystic PVL (0.5%), ROP>/=stage 3 (5.69%). Tommiskal et al(1996-1997)[20] study of short term follow up in ELBW babies showed, RDS (76%), blood culture positive septicemia (22%), IVH Grade 2 to 4(20%) and NEC with bowel perforation (9%).In the present study no baby presented with NEC. Shankar Narayan et al[21] reported hyperbilirubinemia

(65%), RDS (65%), sepsis (52%), IVH (29%), pneumonia (25%) and ROP (24%) in a study on ELBW babies.

The reported incidence of RDS in our country varies from 6.8% to 14.1% in preterm live births with incidence being about 58% in <30 weeks, 32% in 31-32 weeks and 10% in 33-34 weeks of gestational age in preterm (KarthikNagesh,2003)[22].

Morbidity pattern as reported by different studies were highly variable depending on health care facilities and practicing methods. But major common morbidities were RDS, Sepsis and Jaundice in almost all of them, same was the observation in our study. So in our district hospital SNCU, there should be more focus on the above mentioned conditions to reduce the morbidity in preterm babies.

Gender difference in our study favored males, which was opposite to another study by Lapine TR et al[23], which had reported both improved survival and decreased neuro-developmental morbidity in girls as compared to boys. This might be because of the difference in the sample size between our both studies and a major portion of babies admitted in belonged to late preterm category, in the present study. Further studies are needed to determine whether this is due to gender bias

prevalent in India where male children are given more care or a greater tendency of male children to face neonatal complications.

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 ante-partum hemorrhage which was similar to the studies by Roy K K et al[17], and Sehgal A et al[14], where the Anemia was commonest (32.6% and 65% respectively) maternal risk factor noted.

Bavaliya M et al[24], 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.

Around a third of the mothers delivered the baby at 36 weeks of gestation. 12% of the women delivered at 28 weeks of gestation. So there were increased number of late preterm births in the present study.

It was comparable to the study by Gausch et al which also showed that, the prematurity rate increased from 3.9% to 9.8%, exclusively at the expense of the late preterm (79%). The rate of mortality in late preterm was 5 per thousand compared to 1.1 per thousand in the term (P <0.0001, OR 4.71, 95% CI 2.3-

9.5).This shows that, there is an increased morbidity and mortality seen in the preterm babies more focus should be given to the late preterm babies.

Out born versus inborn neonates (47% vs 53%) were quite opposite to a study by Orimadegun and Owa JA et al[9]in Nigeria, a developing country (55.3% vs 44.7%). This was due to various governments both central and state aided programmes to promote more hospitalized deliveries by sponsoring the expenses required for the deliveries and neonatal care.

The mean out of pocket expenditure of participants during the hospitalization was Rs.352.27. More research should be done in this aspect to reduce the economic burden for the parent/guardian.

In this study overall mortality was 18.7% which is almost similar to the study conducted by Mehta B et al[25], where the overall mortality was 17% and comparable with the study by Singh U et al[15] 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 U et al 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[26], where Common causes of mortality were RDS (85.4%), Sepsis (10.4%) and Aspiration pneumonia (4.1%).

The mortality rate of 20.53% in the current study is much higher than developed countries like Canada[66] (7.6%)which are equipped with better facilities like ExtraCorporeal Membrane Oxygenation (ECMO), total parenteral nutrition (TPN), and a higher doctor to patient and nurse to patient ratio. However, even developing countries like Nigeria and Sudan[28, 29]havea better survival rate. The mortality rate is slightly better than countries like Nepal and Kenya[29,30].

In the present study, the mortality based on birth weight was observed, out of 124 LBW babies 8 expired (6.5%), 116 discharged successfully, 56 VLBWs 8 expired (14.3%) and 48 were discharged successfully, among the 6 ELBWs admitted 3 expired (50%) and 3 were discharged successfully, and there were no deaths in babies with birth weight >2.5kg, all 12 were discharged successfully. The outcome was significantly associated with the birth weight status of the babies (p value: .002) making low birth weight babies as an independent factor for mortality in preterm babies.There were few limitations for this present study, as it was a hospital based study and as most of the patients had a low socio-economic status, the results of this study may not reflect the true burden which is prevalent in the community as a whole. Maternal details were not studied in detail, in the present study.

CONCLUSION

RDS, Sepsis and Neonatal jaundice were the common morbidities among the premature babies. Overall mortality among premature babies was 15% in our study, ELBW babies were at a higher risk with maximum mortality rate among the preterm babies. Anemia and ante-partum hemorrhage were the commonest antenatal risk factors for the premature births. Morbidity and mortality in late preterm infants is high. The guidelines for these near term premature babies need to be reviewed, looking for possible causes of prematurity, and trying to reduce their impact, as well as developing a protocol for their care and close monitoring to minimize the associated morbidity. There should be long-term monitoring to find out the consequences on their psychomotor development. The obstetrics group should be made aware of the true risks of births in the near-term gestational ages.

LIST OF REFERENCES

1. Hack, M., D.J.Flannery,M. Schluchter, et al. 2002. Outcomes in young adulthood for very-low-birth-weight infants.N.Engl. J. Med. 346: 149–157.
2. Challis, J.R., S.J. Lye, W. Gibb, et al. 2001. Understanding preterm labor. Ann. N.Y. Acad. Sci. 943: 225–234.

3. Kabir ARML, Kawser CA, Shahidullah M, Hassan MQ, Talukder MQK.Situation analysis of child health in Bangladesh. 1994. Bangladesh J Child Health 1995;19: 53-60.

4. Lawn JE, Cousens S, Zupan J. Lancet Neonatal Survival Steering Team. 4 million neonatal deaths: When? Where? Why? Lancet 2005; 365:891-900.

5. Oestergaard MZ, Inove M, Yoshida S, Mahanani WR, Gore FM, Cousins S, *et al*. United Nations Inter-Agency Group for Child Mortality Estimation and the Child Health Epidemiology Reference Group. Neonatal mortality levels for 193 countries in 2009 with trends since 1990: A systematic analysis of progress, projections,and priorities. PLoS Med 2011;8:e1001080.

6. NFHS-3: Ministry of Health and Family Welfare, Govt. of India. Available at URL: http://www.mohfw.nic.in/NFHS-PRESENTATION. html. Accessed on Feb. 14th, 2015.

7. Bhutta ZA. Priorities in newborn management and development of clinicalneonatology in Pakistan. J Coll Phys Surg Pak 1997; 7:231-4.

8. ON Bhakoo, Kumar P, Sheik S. Prematurity in India: what does the future hold?.Journal of Neonatology. 2007; 21(2): 79-81.

9. Onyaye E. Kunle-Olowu, OliemenPeterside, Oyedeji O. Adeyemi. Prevalence and Outcome of Preterm Admissions at the Neonatal Unit of a Tertiary Health Centre in Southern Nigeria. Open Journal of Pediatrics. 2014, 4: 67-75.

10. Zupan J. Perinatal mortality in developing countries. N Engl Med 2005; 352:2047-8.

11. Harsha P. J, Chandrakala R. Iyer, Rathod AD, Nagendra K, Chandan C. K, Gornale VK. "A Prospective Observational Study of Short Term Morbidity Pattern in Preterm Newborns Delivered in A Tertiary Care Hospital". Journal of Evidence based Medicine and Healthcare. 2015; 2(35): 5432-5437.

12. Jaiswal, A., Murki, S., Gaddam, P. et al. Early neonatal morbidities in late preterm infantsIndian Pediatr.2011; 48: 607-1.

13. Ugochukwu EF, Ezechukwu CC, Agbata CC, Ezumba I. Admissions in a special care Baby unit: The Nnewi Experience. Nigerian Journal of paediatrics. 2002; 29: 75-76.

14. Singh U, Singh N, Seth S. A Prospective analysis of etiology and outcome of preterm labour.J obstetGynecol India. 2007; 21(3): 48-52.

15. Sehgal A, Telang S, Passah SM, Jyothi MK. Maternal profile and immediate outcome in extremely low birth weight babies. Delhi Trop Doct.2004; 34: 165-6.

16. Arias F, Tomich P. Etiology and Outcome of LBW and preterm infants.Obstet and Gynecol. 1982: 60; 277-81.

17. Roy K K, Baruah J, Kumar S, Malhotra N, Deorari AK, Sharma JB. Maternal antenatal profile and immediate outcome in VLBW and ELBW Babies. Indian Journal of peddiatrics. 2006; 73(8): 669-73.

18. Parappil H, Rahman S, Salma H, Al Rifia H, Parambil NK, EL Ansari. Outcomes of 28+1 to 32+0 weeks gestation babies in the state of Qatar: finding facility- based cost effective options for improving the survival of

preterm neonates in low income countries. Int J environ Res public health. 2010 ; 7(6): 2526-42.

19. Tommiska V, Heinonen K, Ikonen S, Kero P, Pokela ML, Renold M et al. A national short term follow up study of extremely low birth weight infants born in Finland in 1996-97. Pediatrics. 2001; 107(1): 2-5.

20. Narayan S, Aggarwal R, Upadhyay A, Ashok K Deorari AK, Meharban Singh, Vinod K Paul. Survival and morbidity in ELBW infants.Indian Pediatrics.2003; 40: 130-35.

21. Nagesh K. Surfactant Replacement Therapy in Neonates.Journal of Neonatology. 2003; 17(4): 32-43.

22. Rekha S, R RBattu. Retinopathy of prematurity; Incidence and risk factors.Indian Pediatrics.1996 ; 39: 999-1003.

23. Lapine TR, Jackson C, Bennett FC. Outcome of infants weighing less than 800 grams at birth: 15-year experience. Pediatrics 1995; 96: 479- 483.

24. Bavaliya M, Bela Shah, Sucheta Munshi: Study of Risk Factors for Preterm Neonates International Journal of Science and Research. 2014; 3(1):9-10.

25. Mehta B, Kulkarni B, Kaul S, Gupta V, Balan S. Outcome in VLBW infant. In: Kler N, Dadhich JP, editors. 21st Annual Conference of National Neonatology Forum 2001 Nov 7-11; Guwahati, India. Guwahati: Saralgaht Publishers; 2001; Pp 72.

26. Satish D. Ashtekar, Suresh K. Kumbhar, Renuka S. Ashtekar. “Study of Premature Babies in Relation to its outcome and Antenatal Risk Factors at General Hospital Sangli”. Journal of Evolution of Medical and Dental Sciences. 2014; 3(30): 8506-8510.

27. Simpson CD, Ye XY, Hellmann J, Tomlinson C. Trends incause-specific mortality at a Canadian outborn NICU. Pediatrics2010;126: e1538-44.

28. Elhassan M, Elhassan L, Hassanb A, Mirghani OA, Adam I. Morbidityand mortality pattern of neonates admitted into nursery unit in WadMedani Hospital, Sudan. Sudan JMS 2010;1:13-5.

29. Simiyu DE. Morbidity and mortality of neonates admitted in generalpaediatric ward at Kenyatta National Hospital. East Afr Med J .2003;80(6):11-6.

30. Shrestha S, Karki U. Indications of admission and outcome in anewly established neonatal intensive care unit in a developingcountry (Nepal). Nepal Med Coll J. 2012;14:64-7.