Original Research Article

A study of pattern of admission and outcome in a neonatal intensive care unit at Rural Haryana, India

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Abstract

Background: Neonatal mortality rate contributes significantly tounder five mortality rates. Data obtained from pattern of admission and outcome may uncover various aspects and may contribute andhelp in managing resources, infrastructure, skilled hands for better outcome in future. **Method**: This was a retrospective study done in NICU at MM Institute of Medical Sciences. and Research, Ambala, India. Data of all admitted neonates were analyzed with regard toageof babies, sex, weight, cause of admissions and their outcome. **Results:** During study period a total of 175 neonates were analyzed. Male were predominant over female with maleto female ratio 1.21:1. Majority of newborns were to belonged to low birth weight (46.28%) followed bynormal birth weight (30.28%), very low birth weight (18.28%) and ELBW babies. Maximum number of babies were premature (54%) followed by neonatal sepsis (12.57%), meconium aspiration syndrome (9.17%) and birth asphyxia (9.14%). Out of 175 babies 29 (17.14%) were died. Highest mortality were found with prematurity (62%) followed bybirth asphyxia (20.69%) and neonatal sepsis (10.34%). **Conclusion**: Prematurity, neonatal sepsis, birth asphyxia and meconium aspiration syndrome were the major indications of admissions. Prematurity, birth asphyxia and neonatal sepsis were major causes of mortality in my study. These mortalities can be reduced with improved management of antenatal and perinatal period, early recognition of conditions, timely intervention and early referral to higher centre.

Key words: Prematurity, Birth Asphyxia, Neonatal Sepsis, Low Birth Weight

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Introduction

According to World Health Organization (WHO) 4 million newborn deaths occur worldwide every year [1]. Among these approximately 98% deaths occur in developing countries and are caused by infections, asphyxia, complications of prematurity and low birth weights [2].

Neonatal mortality accounts for nearly two-thirds of infant mortality rate and one-third of under-five mortalities world wide [3-5]. Neonatal period of a child is most vulnerable period. Infant mortality rate of anycountry reflects its socioeconomic status as well as health care efficiency, effectivenessand its outcome [6]. Neonatal immunity status is in maturity phase, so they are more pronetoinfections. Admissions in an Intensive Care Unit depend upon many factors like socioeconomic status, their cultural behavior, literacy, traditional believes and gender bias [7].

Gradually care of neonates are improving globally specially in developing countries and more trained hands and resources are continuously growing. Prematurity, infections and birth asphyxia are the most common causes of neonatal mortality. Many

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causes of neonatal morbidity and mortality are preventable. Besides vulnerability of newborn, morbidity and mortality also depends upon the level of care [8].

A knowledge of pattern of admissions and their outcomes in an NICU helps in making future planning, proper management and utilization of skilled hands and resources available.

The aim of this study was to assess the major causes leading to admissions in our NICU and their causes of death in relation to their conditions, to address past uncovered aspectsand gaps so that these willhelp to identify the more appropriate inter ventions that canbe instituted for a better outcome.

Material and Methods

This study was a retrospective observational study done at Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana, Ambala, India. All the babies admitted between March 2016 to December 2016 in NICU were analyzed with respect to their age in days, sex, birth weight, cause of admission, hospital stay and their outcome. Babies having incomplete data andthose babies kept for observation only for less than 24 hours were excluded from the study. The catchment area of our NICU are local villages and villages specially from Saharanpur district of Uttar Pradesh, India. Facilities in our NICU are as 12 beds having 10 multipara monitors, 2 neonatal ventilator, 12 radiant warmers, 8 phototherapy (LED type) units and 6 syringe pumps.

All the diagnoses were made by their standard definitions. Chi-Square tests were applied to see the statistical differences between categorical variables. A p value less than 0.05 were taken as statistically significant.

Results

During the study period, total 175 neonates were admitted to NICU. Table 1. shows out of 175 babies 107 were males and 88 were females with male to female ratio 1.21:1. The difference was found statically significant.

Table-1: Gender Based Admission Pattern.

Gender	No. of admissions	Percentage	p value
Males	107	61.14	0.0381
Females	88	38.86	
Total	**175**	**100**	

Table-2: Birth Weight Based Admission Pattern.

Birth weight	Admissions	Percentage	p value
>2.5kg	53	30.28	<0.00001
LBW	81	46.28	
VLBW	32	18.28	
ELBW	9	5.14	
Total	175	100	

Table 2 shows the distribution of babies admitted according to their birth weights. ELWL were 9 (5.14%), VLWL were 32 (18.28%) and LBW were 81 (46.28%) and remaining were normal birth weight neonates. The difference was found statistically significant.

Table 3 shows distribution of conditions causing NICU admissions. Maximum number of babies were preterm 96 (54%), more than half of all the babies, followed by sepsis 22 (12.57%), birth asphyxia 16 (9.4%), neonatal jaundice 12 (6.85%), Meconium aspiration syndrome. 10 (5.71%) and the difference was statistically significant.

Table-3: Cause based admission pattern.

Cause	Admission	Percentage	P value
Preterm	96	54.85	<0.00001
Neonatal Sepsis	22	12.57	
MAS	17	9.71	
Birth Asphyxia	16	9.14	
Neonatal jaundice	12	6.85	
Post term	3	1.71	
Surgical	4	2.28	
MAS	17	9.71	
Hypoglycemia	1	0.05	
Others (CHD, congenital malformation, aspiration)	4	2.28	

Table- 4: Pattern of admission and death based upon the birth weight.

Birth weight	Death	Percentage	P value
>2.5 kg	7	24.13	0.6258
LBW	7	24.13	
VLBW	10	34.48	
ELBW	5	17.24	
Total	**29**	**100**	

Table 4 shows the distribution of mortality in relation with their birth weight. Out of 29 deaths maximum belonged to VLBW group accounting 34.48%, followed by LBW7 (24.13%) and babies having normal birth weight (24.13%) and ELBW (17.24%) and the difference was found non-significant.

Table- 5: distribution of diseases causing death.

Cause of death	No. of deaths	Percentage	P value
Preterm	18	62.00	5.334
Birth Asphyxia	6	20.69	
Neonatal sepsis	3	10.34	
MAS	2	6.89	
Total	**29**	**100**	

Table 5 shows distribution of causes of death. Out of 175 admitted babies 29 were died with a mortality rate of 17.14%. Maximum number of death were observed with preterm, 18 out of 29 with 62%, their various complications followed by birth asphyxia (20.69%). Third commonest cause of mortality was sepsis (10.34%) which is followed by MAS (6.89%) and was found statistically non- significant.

Discussion

The benefits of neonatal intensive care are clear and there has been a significantfall in neonatal mortality ratein developed countries with the advent of mechanical ventilation and the concept of neonatal intensive care [7,9]. In our study, a total of 175 babies were analyzed retrospectively. Male neonates predominate over female neonateswith a male to female ratio of 1.21:1. The male predominance inour study is consistent with other studies [6,10]. This predominance of male babies indicates that male neonates are more vulnerable during the neonatal period, a finding in agreement with the well described biological survival of girls [11].

With regard to birth weights of neonates admitted, maximum number of neonates belonged to LBW

(46.28%) followed by normal birth weight and VLBW (18.28%). Similar findings were observed in studies done by Bhagat et aland Prasad V et al [12,7].

More than half (62%) of neonates were preterm and were found as most common indications of admission in NICU. Similar observations were found in studies done by Bhagat et al, Elizabeth U et al, and Prakash J et al [9, 12, 13]. Many studies reported lesser number of preterm admission in comparison to ourstudy [14,6,7].

Second most common indications of NICU admission in our study were neonatal sepsis. Similar observation was found by Syed R. Ali [15]. Many researchers reported birth asphyxia as second most common cause of NICU admission [12]. Other important causes of indication of admission in NICU were birth asphyxia (20.69%), meconium aspiration syndrome (9.71%) and neonatal jaundice (6.85%). Narayan R reported neonatal jaundice as most common cause of admission as most of the babies in their NICU came from high altitude [6].

Out of 175 neonates 29 (17.14%) died in our study. Similar observations were found in studies of Bose O Toma etal, Ike Elizabeth U et aland Walanaet al. [16,9,17]. NarayanR found 8% mortalty in their study. Mortality rate of any neonatal intensive care unit depends upon many factors other thanthe clinical condition of the baby such as the infrastructure, man power, skilled hands etc. Hence the mortalityratereports vary widely in different studies from different regions. Mortality rate in relation tobirthweight were observed as in Normal weight (24.13%), VLBW (34.48%), LBW (24.13%) and ELBW (17.24%).

Most common condition causing highest mortality were preterm associated with their different complications. Second most common cause of mortality wasbirth asphyxia and third commonest was neonatal sepsis followed by meconium aspiration syndrome. Similar obser-vations were found by Bhagat et al[9].

Low birth weight is one of the leading cause of admission and mortality in most of the developing countries [18]. Immaturity tends to increase the severity and complications of most of the neonatal diseases.

Immature organs, therapeutic complications and specific conditions and complications in premature babies contribute to high rate of morbidity and mortality. Morbidity and mortality inversely related to their gestational age.

Therefore, prevention of morbidity and mortality related to prematurity will significantly reduce overall morbidity and mortality. Appropriate antenatal care, good obstetric practices, proper referral, improvement of facilities for caring for preterm babies as well as proper newborn care practices have been found to reduce morbidity and mortality from prematurity[19]. Neonatal sepsis is a significant cause of neonatal morbidity and mortality particularly in preterm, LBW babies [20, 21]. In our study it was the third most common cause of morality.

The incidence of neonatal sepsis in the developed countriesis 1-10/1000 where as it is roughly three times in developing countries [22].

It is estimated that around 23% of all newborn deaths are caused by birth asphyxia [23]. Following improvement in antenatal and obstetrical care in most of the developed countries the incidence of birth asphyxia has reduced significantly and less than 1 per 1000 live births die from this. Syed R Ali et al and Saleem M etal found birth asphyxia asmost common cause of mortality in their studies [15,10].

Conclusion

Prematurity, low birth weight, birth asphyxia, neonatal sepsis, meconium aspiration syndrome, neonatal jaundice were the leading causes of admission in NICU. Prematurity, birth asphyxia neonatal sepsis were the most common causes of mortality. These mortalities can be reduced with better management of antenatal care, improved perinatal care, promoting institutional delivery, early recognition and timely intervention with early referral to tertiary care centre.

Limitations of Study: Surgical cases after initial stabilization transferred to pediatric surgeryward were not followed.

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