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ORIGINAL ARTICLE

Determine the Frequency, Causes and Outcomes of Neonates Admitted in Neonatal Intensive Care Unit

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ABSTRACT

Objective: To determine the frequency of admissions in neonatal intensive care unit and also find out the causes and outcomes of admitted neonates.

Study Design: Cross-sectional study

Place and Duration: Department of Paediatrics**,** Doctors Trust Hospital Sargodha from 15th January 2021 to 15th July 2021.

Methodology: Five hundred and eighty neonates admitted in NICU during the study period with ages 0 to 28 days, were analyzed. Patient's detailed demographics were recorded after taking written consent from parents/guardians. Causes of admission to NICU, outcomes in term of discharged and death were determined.

Results: Four hundred and twenty (72.41%) neonates were male while 160 (27.59%) were females. Majority of neonates 325 (56.03%) were admitted during first seven days of life. Sepsis was the most common cause of admission found in 230 (39.66%) neonates followed by neonatal jaundice, birth asphyxia, prematurity with respiratory distress syndrome, pneumonia, congenital heart disease, IUGR and IDM in 145 (25%), 120 (20.69%), 38 (6.55%), 30 (5.17%), 5 (0.86%), 4 (0.69%) and 4 (0.69%) neonates respectively. Out of 580 neonates 40 (6.90%) neonates were died while 510 (87.93%) were discharged after complete recovery and 30 (5.17%) patients left against medical advice.

Conclusion: Sepsis, neonatal jaundice and birth asphyxia were the most common causative factors for admissions to NICU. Mortality rate was also high among these patients.

Keywords: Neonatal Intensive Care Unit, Sepsis, Neonatal Jaundice, Birth Asphyxia, Prematurity, Recovery, Mortality

INTRODUCTION

The first 28 days of life; the neonatal period is the most critical time for child survival. The world health organization reported 2.4 million deaths or roughly 47% of all under-five deaths occurred in 2019, up from 40% in 1990.Neonatal mortality decline rate, from 1990 to 2019, has been slower than other children mortality under 5 years age.[1] Nevertheless, neonatal mortality fell by 49% from 37 deaths per 1000 live births in 1990 to 19 in 2016.[2,3] Sub-Saharan Africa accounts to two-third of global neonatal death as 27 deaths per 1000 live births followed by Asia having 24/1000 in 2019 (Pakistan ranked 3rd) and Africa also accounting half of global under five deaths.[1,3,4] Although developing countries have been given highest priority to achieve the global target of less than ten deaths per 1000 live births by 2035; it is projected that the sub-Saharan Africa will have 33% of births and 60% of deaths in 2030, compared to 25% births and 50% deaths in 2013.[5,6]

The world has made substantial progress in reducing under five deaths from causes such as diarrhea, pneumonia and measles (3.3 million fewer deaths in 2013 versus 2000). Nevertheless, congenital anomalies, prematurity, neonatal sepsis and birth injury remain leading causes of death.[6]Several previous studies have identified a number of predictors that lead to neonatal deaths such as preterm birth (28%), sepsis (26%) and asphyxia (23%). In developing countries, sepsis is the most common cause of neonatal mortality and is probably responsible for 30-50% of the total neonatal deaths each year.[1,7,8]

Literatures showed that neonatal mortality is the outcome of complex relationship between neonatal, maternal and health care system related factors. In spite of many efforts by the government and other institutions, non-significant decline has been achieved in the last 20 years.[9,10] The present study was conducted to determine the frequency and causes of admission to NICU and their outcomes in term of discharge and death.

MATERIAL AND METHODS

This study was conducted at Rai Medical College, Doctors Trust Teaching Hospital Sargodha from15thJanuary 2021 to 15thJuly 2021. A total of 580 neonates admitted to NICU during the study period with ages, 0 to 28days were analyzed. Patient's detailed demographic data including age, sex, birth weight and mode of delivery were recorded after taking written consent from patient's parents/guardian. Neonates with incomplete record, revisited patients and infants with ages above 28 days were excluded.

Complete medical examination was done. Causes of admission to NICU such as sepsis, neonatal jaundice, prematurity, birth asphyxia, pneumonia, respiratory distress syndrome, IUGR and meconium stained liquor etc were determined. Hospital stay and outcomes in terms of complete recovery and mortality were also analyzed and recorded.

Data was analyzed by SPSS 24.0. Chi-square test was done to analyze the association of mortality with gestational age. P-value <0.05 was significantly considered.

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RESULTS

Four hundred and twenty (72.41%) neonates were male while 160 (27.59%) were females. Majority of neonates, 325 (56.03%) were admitted during first seven days of life and 255 (43.97%) neonates were ages above 7 days. 310 (53.45%) neonates had birth weight <2.5 kg and 270 (46.55%) had weight >2.5 kg. 370 (63.79%) patients delivered normally (vaginal) while 210 (36.21%) neonates were delivered by C-section. 358 (61.72%) neonates were full term while 222 (38.28%) neonates were delivered as premature. (Table 1)

Table 1: Baseline details of all the neonates

Characteristics	No.	%
Gender		
Male	420	72.41
Female	160	27.59
Age (days)		
< 7	325	56.03
>7	255	43.97
Birth weight (kg)		
<2.5	310	53.45
>2.5	270	46.55
Mode of delivery2		
Normal	370	63.79
C-Section	210	36.21
Gestational age		
Term	358	61.72
Preterm	222	38.28

Sepsis was the most common cause of admission found in 230 (39.66%) neonates followed by neonatal jaundice, birth asphyxia, respiratory distress syndrome, pneumonia, congenital heart disease, IUGR and infant of diabetic mother in 145 (25%), 120 (20.69%), 38 (6.55%) 30 (5.17%), 5 (0.86%), 4 (0.69%), and 4 (0.69%) neonates respectively(Table 2).

Out of 580 neonates, 40 (6.90%) neonates were died while 510 (87.93%) were discharged after complete recovery and 30 (5.17%) patients were left against medical advice (Table 3)

According to the association of mortality with gestational age, we found that in 222 preterm neonates 28 were died and in term neonates 12 were died ($p<0.05$) (Table 4)

Table 2: Causes of admission to NICU

Cause	No.	%
Sepsis	230	39.66
Neonatal Jaundice	145	25.00
Birth Asphyxia	120	20.69
RDS	38	6.55
Pneumonia	30	5.17
CHD	5	0.86
IUGR	4	0.69
Infant of diabetic mother	4	0.69

Table 3: Final outcomes among all the neonates

Variable	No.	%
Died	40	6.90
Recovered	510	87.93
LAMA	30	5.17

Table 4: Association of mortality with gestational age

Mortality	Term(n=358)	Preterm(n=222)	P value
Yes	12 (3.35)	28 (12.61)	0.002
No	346 (96.65)	194 (87.39)	

DISCUSSION

Neonates with ages less than 7 days are at high risk of admission to neonatal care unit because of many causative factors such as infection, prematurity, low birth weight, birth asphyxia and other metabolic disorders.[11] Many of studies reported that neonates within first 24 hours of life had a high prevalence of admission to NICU 35% to 75%.[12,13] The present study was conducted to determine the frequency, causes and outcomes of neonates admitted to NICU. In this regard we found, 580 neonates were admitted to NICU during the study period in which majority 72.41% were males and 27.59% were females. Majority of neonates were having ageless than 7 days. These results showed similarity to many of previous studies in which male neonates were predominant as compared to females and majority of neonates were admitted in first 24 hours of life.[14,15]

In present study we found that 310 (53.45%) neonates had birth weight <2.5 kg and 270 (46.55%) had weight >2.5 kg. 370 (63.79%) patients delivered normally (vaginal) while 210 (36.21%) neonates were delivered by C-section. 358 (61.72%) neonates were full term while 222 (38.28%) neonates were delivered as premature. Low birth weight and prematurity were the most important risk factors in admission to NICU. Many of previous studies demonstrated that neonates with prematurity and low birth weight had high rate of morbidity and mortality.[16,17]

In our study, sepsis was the most common cause of admission found in 230 (39.66%) neonates followed by neonatal jaundice, birth asphyxia, respiratory distress syndrome, pneumonia, congenital heart disease, IUGR and infant of diabetic mother in 145 (25%), 120 (20.69%), 38 (6.55%) 30 (5.17%), 5 (0.86%), 4 (0.69%), and 4 (0.69%) neonates respectively. These results were similar to several previous studies in which sepsis was the commonest cause of admission to NICU among neonates and accounted 30 to 55% followed by neonatal jaundice and birth asphyxia.[18,19] Some of studies reported that after sepsis, respiratory distress syndrome was the commonest cause of admission to NICU.[15,20]

In present study we found that out of 580 neonates, 40 (6.90%) neonates were died while 510 (87.93%) were discharged after complete recovery and 30 (5.17%) patients were left against medical advice. According to the association of mortality with gestational age, we found that in 222 preterm neonates, 28 were died and in term neonates, 12 were died ($p<0.05$). A study conducted by Khan et al[21] reported that out of 5797 neonates whom were admitted to NICU, 18.75% were died while 76.43% were discharged after complete recovery. Another study by Jan et al[22] regarding prevalence and causes of admission to NICU reported the mortality rate was 8.3% and 88.4% were discharged after full recovery, out of 4900 neonates.

CONCLUSION

The sepsis, neonatal jaundice and birth asphyxia were the most common causative diseases for admission to NICU. The mortality rate was 6.9% and it was quite high. Prematurity had a significant association with mortality. Proper antenatal care, skilled care at birth, early and accurate diagnosis and better management may help to reduce the morbidity and mortality among neonates admitted to NICU.

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