Original Research Article

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Morbidity and mortality profile of preterm neonates admitted in neonatal intensive care unit of a tertiary care centre in Western Uttar Pradesh, India

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ABSTRACT

Background: Preterm birth is a major cause of mortality and morbidity for newborns. Complications of prematurity are becoming more common as more survivors are spending time in Neonatal intensive care unit.

Methods: A retrospective hospital based clinical observational study was conducted in NICU in Sharda hospital, a tertiary care centre in Greater Noida. Data regarding neonates' age, sex, clinical presentation, maternal risk factors, complications and outcome were recorded.

Results: A total of 133 preterm neonates were enrolled in the study. Maternal risk factors like Pregnancy induced hypertension (PIH) was seen in 19.5% cases, Urinary tract infection in 15% and Antepartum haemorrhage in 14.2% cases. Among the complications of prematurity, RDS was noted in 38.3% cases, Hyperbilirubinemia in 16.5% and feed intolerance in 15% cases. Sepsis was present in 3% of the preterm. Mortality rate was 7.5%. Most common cause of death was RDS.

Conclusions: Pregnancy induced hypertension and Antepartum haemorrhage were important maternal risk factors for prematurity. Respiratory distress syndrome and perinatal asphyxia were the important causes of mortality in the present study.

Keywords: Morbidity, Mortality, Neonates, Preterm, Profile, Uttar Pradesh

INTRODUCTION

Preterm birth is a major cause of mortality and morbidity for newborns and imposes a considerable burden on limited health care resources.¹ It has been estimated that each year, 11% of all deliveries in the world are premature, and one million out of six million child deaths are due to complications of prematurity.^{2,3} The global incidence of preterm birth accounts for 12.9 million (9.6%), of which 85% is concentrated in Asia and Africa. This marks the preterm births as a significant perinatal problem across the globe, which is associated with mortality and short and long term morbidity.⁴

A number of factors have been linked with the increase in premature births: new fertilization methods have increased the number of twin and multiple pregnancies; an increasing number of women are having children after the age of 35; and there is an increasing number of medical indications for interrupting pregnancy, which are a result of increased use of technology to monitor pregnancies. Survival of extremely premature infants has increased significantly during the last two decades. Complications of prematurity are becoming more common as more survivors are spending time in Neonatal intensive care unit (NICU). Hence this study was undertaken to outline the morbidity and mortality pattern

of preterms admitted to NICU of a tertiary care center in Western Uttar Pradesh (UP).

METHODS

A retrospective hospital based clinical observational study was conducted between the months of January and December in the year 2018 in NICU in School of Medical Science and Research, Sharda hospital, a tertiary care center in Greater Noida. The hospital has babies referred from various places of Western UP. Both Inborn and Out born babies were included in the study. Neonates with gestational age >37 weeks or <26 weeks, birth weight <500gms or presence of lethal congenital anomalies were excluded from the study. Preterms whose records were not up to the mark or those preterms who left against medical advice or were referred to a higher center were also excluded from the study.

Data collection and analysis

Case records of all the preterm neonates who were admitted to NICU were retrieved. Data regarding neonates' age, sex, clinical presentation, maternal risk factors, complications and outcome were recorded. The qualitative variables were expressed in terms of percentages and analysed using Chi-square test.

Outcome

Out of total of 133 preterms admitted to NICU and who were included in the study, 123(92.5%) survived to be discharged home while 10 (7.5%) neonates died.

RESULTS

A total of 133 neonates with a gestational age < 37 weeks who fulfilled the inclusion criteria were included in the study. Inborn preterms accounted for 84% of admitted preterms as compared to 16% of Out born. In the present study, preterm births were observed to be at their peak in the months of May and June.

Incidence of prematurity was found to be more in males 99 (74.5%) than females 34 (25.5%). Male to female ratio was 2.9. Out of 133 preterm neonates, majority 125 (93.9%) were admitted in NICU within 24 hours of birth while only 8 (6.1%) were admitted after 24 hours of birth.

Ninety four (70.8%) preterms had birth weight between 1.5-2.5 kg, while 36 (27%) and 3 (2.2%) preterms had birth weight between 1-1.5 kg and < 1 kg respectively. Based on gestational age, majority 90 (67.6%) of preterm babies had a gestational age between 34-37 weeks, while 36 (27%) and 7 (5.4%) were between 32-34 and less than 32 weeks respectively. Among 133 preterm babies, 84 (63.2%) were Appropriate for gestational age (AGA), while 49 (36.8%) were Small for gestational age (SGA). (Table 1).

Table 1: Description of preterms.

Characteristics	Frequency	Percentage
Gender		
Male	99	74.5
Female	34	25.5
Place of birth		
Inborn	112	84
Out born	21	16
Birth weight		
< 1kg	3	2.2
1-1.5kg	36	27
1.5-2.5kg	94	70.8
Gestational age		
<32wks	7	5.4
32-34wks	36	27
34-37wks	90	67.6
SGA/AGA/LGA		
SGA	49	36.8
AGA	84	63.2
LGA	00	00

Eighty nine (67%) preterms were born by Lower segment caesarean section (LSCS) as compared to 44 (33%) preterms who were born by vaginal delivery. Preterms born to mothers with age > 35 years were 60.2% as compared to preterms born to mothers with age < 35 years (39.8%). Pregnancy induced hypertension (PIH) was the commonest maternal risk factor for prematurity as seen in 26 (19.5%) cases. Urinary tract infection was the next common risk factor observed in 20 (15%) cases. Other important risk factors were Ante partum haemorrhage (APH) 19 (14.2%), Premature rupture of membranes (PROM) > 18 hours 15 (11.2%), eclampsia 9 (6.7%) and Gestational diabetes mellitus (GDM) 6 (4.5%) (Table 2).

Table 2: Maternal risk factors associated with prematurity.

Maternal risk factors	Frequency	Percentage
Maternal age		
18-35 yrs	53	39.8
>35 yrs	80	60.2
Mode of delivery		
Vaginal	44	33
LSCS	89	67
PROM >18hrs	15	11.2
Multiple births	4	3
APH	19	14.2
UTI	20	15
PIH	26	19.5
Eclampsia	9	6.7
GDM	6	4.5
Polyhydramnios	5	3.7

Most common morbidity associated with prematurity was Respiratory distress syndrome (RDS) and was noted in 51 (38.3%) cases. Hyperbilirubinemia was present in 22 (16.5%) cases. It was followed by feed intolerance in 20 (15%) cases. Incidence of seizures, perinatal asphyxia and hypoglycemia was equally present in 15 (11.2%) preterms. Other morbidities associated with prematurity were Apnea 12(9%), hypocalcemia 10 (7.5%) and congenital heart diseases 9 (6.7%), other congenital anomalies 8 (6%) and Intraventricular hemorrhage (IVH) 2 (1.5%) (Table 3).

Table 3: Morbidity profile of preterms.

Morbidity in preterm	Frequency	Percentage
RDS	51	38.3
Hyperbilirubinemia	22	16.5
Sepsis	4	3
Seizures	15	11.2
Feed intolerance	20	15
NEC	4	3
Apnea	12	9
Hypoglycemia	15	11.2
Hypocalcemia	10	7.5
Perinatal asphyxia	15	11.2
CHD	9	6.7
Other congenital anomalies	8	6
IVH	2	1.5

In the present study, Sepsis was present in 3% of the preterms. Organisms isolated and responsible for sepsis were Coagulase negative staphylococcus (CONS) (1.5%), Pseudomonas (0.75%) and Micrococcus (0.75%). Out of 133 preterms, 51 (38.3%) had Respiratory distress syndrome (RDS), but surfactant was administered to only 14 (10.5%) of the preterms. Surfactant was not administered in 7 preterms with RDS due to non affordability by the parents while 30 had mild form of RDS which responded to Continuous positive airway pressure (CPAP). A total of 94 (70.6%) required some form of respiratory support, the most common being Humidified high flow nasal cannula (oxygen by nasal canula) in 73 (54.8%), followed by Nasal CPAP in 56 (42.1%) and Conventional ventilation in 30 (22.5%) (Table 4).

Table 4 : Respiratory support in preterms.

Respiratory support	Frequency	Percentage
Surfactant administration	14	10.5
Nasal CPAP	56	42.1
Oxygen by nasal canula	73	54.8
Conventional ventilation	30	22.5

A total of 123 (92.5%) preterms survived to be discharged home while 10 (7.5%) preterms died. Mortality rate was 7.5%. Most common cause of death

was RDS. Other causes of death were Perinatal asphyxia and Congenital heart disease.

DISCUSSION

The present study highlights the morbidity and mortality profile of preterms admitted in NICU in Western Uttar Pradesh. A total 133 neonates with gestational age < 37 weeks who fulfilled the inclusion criteria were included in the study. Ninety nine (74.5%) were males and 34 (25. 5%) were females. Similar sex pattern has been reported earlier by Shrestha et al, Males are cared for more in Indian society which may be a reason for the male preponderance in the study.⁷ Majority of preterms 125 (93.9%) were admitted at the age less than 24 hours while only 8 (6.1%) preterms were admitted to NICU at an age more than 24 hours. On the contrary, in a study by Hoque et, a lesser proportion of preterm neonates 60 (65.2%) were admitted within 24 hours and 32 (34.8%) were admitted after 24 hours up to 7 days of age, perhaps because there was no obstetric unit attached to the hospital where the study was carried out.8

Interestingly, in the present study, 36 (27%) preterms had birth weight between 1-1.5 kg, 3 (2.2%) preterms had birth weight less than 1 kg while majority 94 (70.8%) of preterms had birth weight between 1.5-2.5 kg. Similarly, 7 (5.4%) and 36 (27%) of preterms had gestational age less than 32 weeks and between 32-34 weeks respectively while majority 90 (67.6%) of preterms had gestational age between 34-37 weeks. Also, 49 (36.8%) of preterms were SGA as compared to 84 (63.2%) of preterms who AGA were. A similar birth weight and gestational age distribution has been seen in several other studies. 9,10,11

The present study showed that 60.2% of preterms were born to mothers of more than 35 years age as compared to 39.8% preterms born to mothers with age less than 35 years. Other risk factors associated with prematurity were PIH 26 (19.5%), UTI 20 (15%), APH 19 (14.2%), PROM>18hours 15 (11.2%), eclampsia 9 (6.7%) and GDM 6 (4.5%). In a study by Shrestha et al, 51% of cases had obstetrical reasons for prematurity. 7 These were different in comparison to data described from a study done in USA by Ananth CV et al that showed the cause of premature delivery to be idiopathic in 40-50%, PROM in 30%, medical indication in 15-20%. This difference can be explained by the fact that complicated cases are referred from different parts of Western UP to Sharda hospital, which is a tertiary care centre.12 Respiratory distress syndrome was the commonest morbidity associated with prematurity in 51 (38.3%) cases. Other associated problems were Feed intolerance 20 (15%), Hypoglycaemia and Perinatal hypoxia occurring equally in 15 (11.2%), Apnea 12 (9%), Hypocalcemia 10 (7.5%), Other congenital anomalies 9 (6.7%), Congenital heart diseases 8 (6%) and IVH 2 (1.5%). This data on morbidity profile of preterms is in line with several other studies.^{7,9,13} In the present study, 3% of preterms were diagnosed as sepsis on the basis of

positive blood culture. Organism grown were CONS (1.5%), Pseudomonas (0.75%) and micrococcus (0.75%). Culture positivity rate was much lower in the present study as compared to another study by Pai et al who found 10.2% preterms having sepsis. 13 Studies by, Shrestha et al, Hoque et al and Ahmed ASMNU et al showed 29.8%, 37% and 35% sepsis respectively. 7,8,14 A larger proportion of preterms admitted to NICU was Inborn. This may have accounted for a lower rate of sepsis in the present study. Surfactant was administered to 14 (10.5%) preterms. A total of 94 (70.6%) preterms required some form of respiratory support. Oxygen by nasal canula, CPAP, and conventional ventilation was needed in 73 (54.8%), 56 (42.1%) and 30 (22.5%) preterms respectively. In a study by Shrestha et al, 28 (30%) babies required nasal CPAP, out of which 7 (25%) also required mechanical ventilation.⁷ Baki MA et al, also used assisted ventilation in form of CPAP and mechanical ventilation in 37.5%.15 Mortality rate was 7.5% in this study which was much less than similar studies done by Shrestha et al, and Khan MR et al, where the mortality rate was 12% and 14% respectively.^{7,16} According to Baki MA et al, mortality rate was 36% and was related to gestational age, birth weight, respiratory distress, syndrome and requirement of ventilation.¹⁵

CONCLUSION

As in other parts of India, preterm births lead to a significant mortality and morbidity among the population of Western Uttar Pradesh. Pregnancy induced hypertension, Antepartum haemorrhage and Premature rupture of membranes > 18 hours were important maternal risk factors for prematurity. Respiratory distress syndrome and perinatal asphyxia were the important causes of mortality in the present study.

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