ORIGINAL ARTICLE

Incidence, Risk Factors and Immediate Outcome of Preterm Neonates: A Hospital Based Study

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ABSTRACT

Introduction: Preterm birth is defined as birth before 37 completed weeks of gestation. It is one of the leading cause of infant morbidity and mortality in the world. **Aim:** The study was aimed to find out the incidence, possible risk factors and outcome of inborn preterm babies till they were discharged from the hospital. **Methods**: This is a prospective hospital based study**.** A total of 100 preterm babies delivered in Nepalgunj Medical College Teaching Hospital, Kohalpur and admitted in Neonatal Intensive Care Unit (NICU) were studied. Preterms were divided into 2 groups extremely to very preterm (<32 weeks) and moderate to late preterm (≥ 32 weeks). The preterm babies were evaluated for various morbidities sand mortality till they were discharged from the hospital. **Results:** Data of 100 babies was analyzed. Out of 100 preterm babies 40 were extremely to very preterm babies (<32 weeks) and 60 were moderate to late preterm babies (≥32 weeks). Significant risk factors associated with preterm deliveries were inadequate antenatal visits (73%), primi gravidity (58%), preterm premature rupture of membrane (55%), urinary tract infection (54%), anemia (53%), teenage pregnancy (43%), antepartum hemorrhage (41%) and pregnancy induced hypertension (33%). The total mortality was higher in extremely to late preterm than in moderate to late preterm. The most common causes of mortality were Neonatal sepsis (NNS), Hyaline Membrane Disease (HMD) and Birth Asphyxia. **Conclusion:** The hospital incidence of preterm neonates is still very high. The major risk factor seen in the study was inadequate antenatal visit. Preventive measures, early identification of risk factors will improve the outcome.

***Keywords*: Morbidity, Mortality, Preterm, Risk factor**

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INTRODUCTION

Preterm birth is the leading cause of infant morbidity and mortality in the world. World Health Organization (WHO) defines preterm birth as any birth before 37 completed weeks of gestation or fewer than 259 days since the first day of woman's last menstrual period (LMP).[1] It is subcategorized on the basis of gestational age: extremely preterm (<28 weeks), very preterm (28 to <32 weeks), moderate to late preterm (32 to <37 weeks). It has been reported that over 60-80% of all neonatal mortality and morbidity is due to preterm birth.[2] Preterm birth complications account for 35% of the estimated 3.1 million global neonatal deaths and are the second leading cause of death in children under 5 years of age.[3]The etiology of preterm birth is multi-factorial and categorized as either spontaneous or indicated. Spontaneous preterm birth occurs secondary to either preterm labor or preterm premature rupture of membranes (PPROM). Indicated preterm births are those that occur because of medical or obstetric problem that places either the mother or the fetus at risk; delivery is undertaken to preserve or improve the maternal or fetalstatus.[4]

In developing countries, the main causes of preterm births include infectious diseases and poor availability and accessibility of health care resources. Families of low socioeconomic status have higher rates of maternal undernutrition, anemia and illness, inadequate prenatal care, drug misuse, obstetric complications and maternal history of reproductive inefficiency (abortions, still-births, premature or low birth weight infants).[5] Preterm babies are at increased risk of mortality and morbidity, mainly due to infections and complications of prematurity. A better understanding of antenatal factors contributing to

preterm birth and need for improvement of perinatal care are necessary to prevent preterm births and to increase neonatal survival. Hence this study was conducted.

METHODS

A hospital based prospective study was carried out to estimate the incidence, risk factors and outcome of preterm neonates from May 2017 to April 2018., admitted in NICU department of Pediatrics, Nepalgunj Medcial College and Teaching Hospital Kohalpur.

They were divided in two groups extremely preterm (<32 weeks) and moderate to late preterm (>32 weeks). The consent was obtained from the Parents. Those not willing to take part in the study were excluded. Ethical clearance from Institutional Review Committee, NGMC, Kohalpur was obtained. Data regarding the demographic parameters like maternal age, parity, literacy status, socioeconomic status, antenatal checkup, gestational age, mode of delivery were recorded in structural questionnaire.

Neonatal parameters like perinatal asphyxia, Apgar score, sex, gestational age, birth weight were recorded for maximum one week. All the data were analyzed by using SPSS version 20.

RESULTS

There were 3978 birth during the study period. Total alive preterm babies were 367 (9.22%). Among them 71 (19.34%) were extremely to very preterm and 296 (80.65%) were moderate to late preterm. (Figure 1)

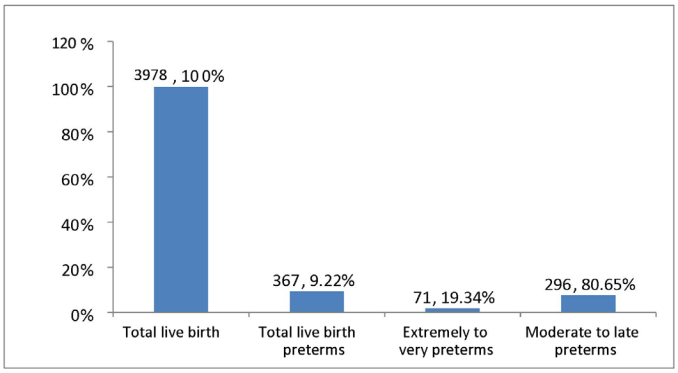

Figure 1 : Incidence of preterm birth at hospital

Out of 1410 NICU admission, 192(13.61%) preterm were admitted in NICU and 57 (29.68%) were extremely to very preterm and 135 (70.31%) were moderate to late preterm. The Parents of 92 preterm babies in NICU did not consent to take part in the study. Hence 100 preterm were taken out of which 40 were extremely to very preterm (<32 weeks) and60 were moderate to late preterm (>32 weeks).

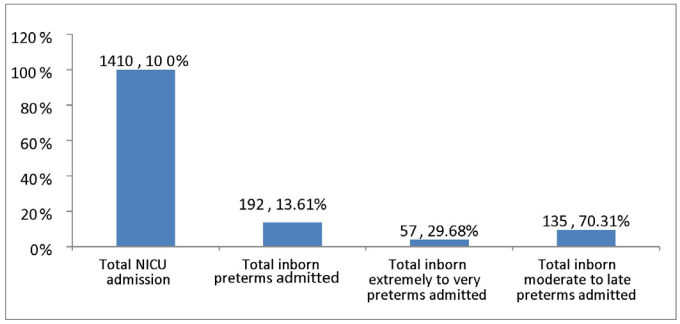

Figure 2: Preterm babies admitted in NICU

When the risk factors were analyzed it was found that the inadequate antenatal visits (73%) was the commonest cause of preterm births followed by prim gravidity (58%), PROM (55%). (Table I)

Risk factors	Number of patients	Percentage
Inadequate antenatal visits	73	73
Primigravidity	58	58
Preterm Premature Rupture of membrane (PPROM)	55	55
Urinary Tract Infection (UTI)	54	54
Anemia	53	53
Teenage pregnancy	43	43
Antepartum hemorrhage (APH)	41	41
Pregnancy Induced Hypertension (PIH)	33	33

Table I : Risk factors for preterm births in relation with maternal illnesses

In our study, maximum number of extremely to very preterm group (<32 weeks) belonged to very low birth weight (≥1000-1500 gm) comprising of 85% while maximum number of moderate to late preterm babies (≥32 weeks) belonged to low birth weight (>1500-2500 gm) comprising of 50%. These values also showed a statistically significant association between gestational age and birth weight (p<0.05). (Table II)

Birth weight (gms)	Gestational age				Total	p-value
	<32 weeks		≥32 weeks			
	Number	%	Number	%		
<1000	3	7.5	1	1.6	4	
≥1000-1500	34	85	29	48.4	63	< 0.01
>1500-2500	3	7.5	30	50	33	

Table II : Relation between gestational age and birth weight

Among extremely to very preterm babies, 31 (77.5%) out of 40 survived whereas 57 (95%) out of 60 of moderate to late preterm survived. The main causes of mortality were Neonatal Sepsis (NNS), Hyaline Membrane Disease (HMD) and Birth Asphyxia. (Table III)

Survival	Gestational age				Total	p - value
	<32 weeks		≥32 weeks			
	Number	%	Number	%		
Alive	31	77.5	57	95	88	
Deaths	9	22.5	3	5	12	< 0.01
Total	**40**	**100**	**60**	**100**	**100**	

Table III : Survival of preterm babies

Various immediate outcomes of preterm in extremely to very preterm (<32 weeks) and moderate to late preterm group (≥32 weeks) are shown in Table IV. Majority morbidities and majority of morbidities were observed in extremely to very preterm group (<32 weeks).

Outcomes	Gestational Age		Total (%)
	< 32 weeks (n=40)	≥ 32 weeks (n=60)	
Neonatal Sepsis (NNS)	36 (90%)	32 (53.3%)	68
Neonatal Jaundice (NNJ)	30 (75%)	29 (48.4%)	59
Hyaline Membrane Disease (HMD)	20 (50%)	9 (15%)	29
Birth Asphyxia	16 (40%)	15 (25%)	31
Apnea of Prematurity	6 (15%)	4 (6.6%)	10
Hypoglycemia	6 (15%)	5 (8.33%)	11
Anemia	6 (15%)	2 (3.33%)	8
Hypothermia	3 (7.5%)	1 (1.6%)	4
Necrotising Enterocolitis (NEC)	1 (2.5%)	1 (1.6%)	2

Table IV : Morbidities of Preterm Babies

DISCUSSION

In our study the hospital based incidence of preterm babies was 9.22% of total live birth with 19.34% extremely to very preterm (<32 weeks) and 80.65% moderate to late preterm (≥32-37 weeks).This is comparable to hospital incidence of preterm neonates in Tribhuwan University Teaching Hospital (TUTH) which was reported as 6.8% of total live births as shown by Shrestha et al[6]with 10.5% severe preterm, 28.5% moderate preterm and 61% late preterm.

In our study, 43% of mothers were teenagers. In a study by Shrestha et al [6] teenage pregnancy was reported in 34.7%. Similarly, in another study by Onyaye et al[7] 6.5% mothers were teenagers.

In our study 58% mothers were primi. In another study by Mohsenzadeh et al[8] 56.3% of mother giving birth to preterm were primigravida which is comparable with our figures. The higher percentage of primi mother leading to preterm birthin the present study could be due to higher percentage of teenager and thereby leading to preterm birth due to early age of marriage, and poor perinatal care.

Majority of the mothers (73%) in the present study had received inadequate antenatal care (ANC) visits (<4). While study by Shrestha et al[6] showed 52% of mother had inadequate antenatal visit.

Majority of the mothers in our study were found to have UTI (54%). This is comparable to a study by Halimi et al[9] where 43.5% of mothers had UTI.

A significant association (53%) was seen between maternal anemia and preterm babies. Similar observation was made by Halimi et al [10] who pointed that 48.3% of the mothers had anemia. A higher incidence of association of anemia in mothers giving preterm birth in our study may be because of the fact that majority of mothers belonged to teenage group and had inadequate ANC visits.

In the present study, 41% of mothers had a history of antepartum hemorrhage. In a similar study by Shrestha et al[6] APH wasseen in 23.3%.The higher number of mothers with APH could be due to majority of mothers belonging to teenage group and inadequate antenatal checkup.

Out of 100 mothers, 33 (33%) had a history of PIH. Our results are comparable to the results of Shrestha et al[11] where 26% of mother had history of PIH. Similar result was also seen in a study by Onyaye et al[7] where 23.9% mothers had PIH.

Majority of mothers in the present study had PPROM comprising 55%. This is comparable to a study by Onyaye et al [7] where 46.5% of mothers had PPROM. Similarly in a study by Halimi et al[9] 77.1% mothers of preterm had PPROM.

Regarding neonatal outcome, in the present study, 4% preterms were less than 1000 grams, 63% between 1000- 1500 grams and 33% more than 1500 grams. In similar study done by Shrestha et al[6] 6.7% of preterm babies were <1000 grams while 28.7% preterm babies were between 1000-1500 grams and 64.7% preterm babies had weight more than 1500 gram. In another study by Das et al[10] 19.4% of preterm had weight <1.5 kg while 71.5% had weight between 1.5-2.5 kg and 9.1% had >2.5 kg weight at the time of birth.

Out of 100 preterms in our study, 31 out of 40 (77.5%) of extremely to very preterm babies survived whereas 57 out of 60 (95%) of moderate to late preterm survived. And the total mortality was 12% with 22.5% of the extremely to late preterm and 5% of moderate to late preterm. In a similar study by Shrestha et al[11] overall mortality was found to be 12%. In another study done by Onyaye et al[7] the overall survival rate was 65.9%. The survival rate was significantly higher in the

mild preterm category, 83.8% compared to the very preterm, 47.8% and extremely preterm, 11.1%.

The most important complication in our study was NNS in 68% of preterm, followed by Neonatal Jaundice 59%, Birth Asphyxia 31%, HMD 29%, Apnea of Prematurity 10%, Hypoglycemia 11%, Anemia 8%, Hypothermia 4%, and Necrotizing Enterocolitis (NEC) 2%.In similar study by Shrestha et al.,[6] sepsis was found in 66.7% followed by NNJ in58.8%, Birth Asphyxia in 26.8%, HMD in 23.5%, NEC in 13.1%, Hypothermia in13.1%, Hypoglycemia in 9.8%, Hyponatremia in 6.5%,Intra ventricular hemorrhage (IVH) in 3.9%, Hypocalcemia in 3.9% and Apnea in 3.3%.

LIMITATION

This study only looked into the immediate outcome. Further study is needed to assess the long term (One year) outcome of these babies. The neurological outcomes are not assessed.

CONCLUSION

Significant maternal risk factors associated with preterm babies were inadequate antenatal visits, preterm premature rupture of membrane, teenage pregnancy, urinary tract infection, anemia, antepartum hemorrhage, pregnancy induced hypertension.

Common morbidities among preterm babies were Neonatal sepsis followed by Neonatal Jaundice, Birth Asphyxia, Hyaline Membrane Disease, Apnea of Prematurity, Hypoglycemia, Anemia, Hypothermia, and Necrotizing Enterocolitis. Overall mortality was 12%. The main causes of mortality were NNS, HMD and Birth Asphyxia.

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