



NEONATAL OUTCOME OF PRETERM PREGNANCY IN A TERTIARY CARE HOSPITAL, MANIPUR: A RETROSPECTIVE CROSS-SECTIONAL STUDY

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ABSTRACT **Background:** Preterm birth is defined as birth before 37 completed weeks. They have varied complications namely hypoglycaemia, Respiratory Distress syndrome (RDS), need of resuscitation, hypocalcaemia etc. The present study was done to assess the neonatal outcome of preterm pregnancy in a tertiary care hospital in Manipur. **Materials and Methods:** This is a retrospective cross sectional study done in Neonatal intensive care unit (NICU) in the Department of Pediatrics at Shija Hospital and Research Institute, Manipur. Data collection was done from the record book of NICU over a period of three years from 1st January 2022 – 31st December 2024 by using structured proforma which includes variables such as gestational age, gender, birth weight, gravida, mode of delivery and neonatal morbidity outcomes namely need of resuscitation, hypoglycaemia, hypothermia, neonatal jaundice, apnea etc. Data analysis was done using IBM SPSS Version 25. The results were expressed in mean, standard deviation and frequency, percentages. For the association between the outcome variables and gestational age, Chi square test was used. P-value <0.05 was taken as statistically significant. **Results:** A total of 115 preterm babies were studied and 64.3% account for neonatal jaundice, which was the most common neonatal outcome followed by RDS which account for 58.3%. Significant statistical association was found with the incidence for need of resuscitation, hypoglycemia, apnea, ROP, hearing problem, hypocalcemia and gestational age. **Conclusion:** Preterm births require prolonged hospitalization posing great financial and economic burden on the family and the society. Empowering the primary care providers with skills and knowledge of preterm care avoiding late referral will benefit a lot. Our study might provide health care providers and policy maker with lots of data for taking steps in the management of complications of preterm birth from a developing country perspective.

KEYWORDS : Preterm babies, Neonatal jaundice, RDS, Tertiary Care Hospital, Manipur

INTRODUCTION

Preterm birth is defined as birth before 37 completed weeks of gestation. Preterm birth is often subdivided further based on gestational age. "Late preterm" infants are those born between 34 weeks and 37 weeks of gestation, "Moderate preterm" are those born between 32 weeks to less than 34 weeks of gestation, "very preterm" is defined as 28 weeks of gestation to fewer than 32 weeks of gestation, and "extremely preterm," is designated less than 28 weeks of gestational age [1]. Preterm infants in varied groups have various possible outcomes [2]. Adverse neonatal outcomes are markedly higher in the developing world. Viability is fifty per cent with or without medical care in near 34 weeks gestational age in low and middle-income countries [3]. Preterm birth remains the most important clinical and public health challenge [4,5]. As a public health challenge, it is associated with high rates of occurrence of mortality, short-term perinatal complications, and lifelong difficulties such as learning infirmities from audiovisual, visual disabilities, and cognitive impairments [6, 7, 8].

Complications of preterm birth are the single largest direct cause of neonatal deaths, responsible for 35% of the world's 3.1 million deaths a year, and it is the second most common cause of under-five deaths after pneumonia. One-third of all newborn deaths occur on the first day after birth, and nearly 75% of all neonatal deaths happen within the first week of life. Half of (49%) all deaths among children under five occurred in just five nations. [9,10].

Common short-term morbidities of preterm neonates are sepsis, birth asphyxia, hyperbilirubinemia, and respiratory distress syndrome [11,12]. Late and moderate preterm neonates are more likely to receive resuscitation at birth and also more likely to receive respiratory and nutritional support, and less likely to be fed breast milk than term infants [11]. Necrotizing enterocolitis is a common morbidity among preterm neonates [13].

The risk of adverse outcomes of preterm neonates declines with increasing gestational age [11, 14]. Birth weight, neonatal morbidities such as respiratory distress syndrome, sepsis, hypothermia, hypoglycemia, perinatal asphyxia and factors such as no antenatal

care, plurality of pregnancy, sex of neonate, mode of delivery, non-cephalic presentation, fifth minute APGAR score <7, maternal complication and who did not receive kangaroo mother care (KMC) influence the preterm survival [[15], [16], [17], [18], [19], [20], [21].

Despite WHO recommendations, preterm mortality is the primary cause of neonatal mortality nowadays. Implementation of the WHO recommendations of 2015 included corticosteroid injections for premature birth, antibiotics when her water breaks, and magnesium sulphate to prevent forthcoming neurological impairment of the infant and as well as thermal care, use of oxygen and surfactant to help infants breathe more effortlessly can decrease the chance of death and adverse health outcomes for preterm infants [22,23].

It is necessary to conduct the outcomes of neonates frequently as it varies from place to place and even from time to time in a similar place [24] because preterm infants' outcomes offer vital information to parents, clinicians, and policymakers and used to mark clinical and policy judgments, to design for the provision of medical care, to allocate resources and to advance the effectiveness of care. Preterm infants' outcome data are also used for advocating and decision-making earlier and subsequently to birth, benchmarking regional outcomes, and identifying research questions and hypotheses.

Based on the health target of Sustainable Development Goals (SDGs) by 2030, all countries aimed to lessen neonatal mortality to as low as 12 per 1000 live births. Therefore, identifying preterm neonatal outcomes substantially affects the efforts to meet the SDG targets for windup-preventable child deaths by 2030 in India.

Objectives

- 1) To assess the Neonatal outcome of Preterm Pregnancy in Shija Hospital and Research Institute (SHRI)
- 2) To determine the association of neonatal outcome of preterm pregnancy and gestational age

MATERIALS AND METHODS

This is a retrospective Cross Sectional Study done in Neonatal Intensive Care Unit in the Department of Pediatrics at Shija Hospital

and Research Institute (SHRI), Manipur. A total of 115 preterm babies who delivered between 24 completed weeks to 37 weeks of gestation and admitted at NICU of Shija Hospital and Research Institute, Langol during the study period of three years from January 2022 to 31st December 2024 were included in the study. Babies with congenital anomalies were excluded from the study. Data was collected using structured proforma. Universal sampling method was used. The data variables were gestational age, gender, gravida, mode of delivery, birth weight and neonatal outcomes such as need for resuscitation, hypoglycemia, hypothermia, neonatal jaundice, apnea, Transient Tachypnea of Newborn (TTNB), Respiratory distress syndrome (RDS), Meconium Aspiration Syndrome (MAS), sepsis, hypocalcemia, Retinopathy of Prematurity (ROP), Intraventricular Hemorrhage (IVH) and Hearing problems. Data were retrieved from the achieved records and entered and coded in Microsoft Excel sheet 2010, analysis was done using IBM SPSS Version 25. The results were expressed in mean, median and standard deviation, frequency and percentages. For the association between various outcome variables and gestational age, Chi square test was used. P-value <0.05 was taken as statistically significant.

Ethical clearance was obtained from the Institutional Ethics Committee of Shija Academy of Health Sciences, SAHS.

Following Operational definitions were used in our study.

- 1) Need of resuscitation -Those baby whose APGAR Score at 5 mins <7.
- 2) Hypoglycemia -Blood glucose level <60mg/dl.
- 3) Hypothermia -Those baby whose core temperature measuring <36.5degree F.
- 4) Neonatal jaundice -TSB value based on AAP guidelines for phototherapy and exchange transfusion for infants 35 or more weeks gestation; Infants < 1000g- phototherapy within 24 hrs, exchange transfusion-10-12 mg/dl; Infants 1000g -1500g, phototherapy at TSB -7-9 mg/dl, exchange transfusion-12-1 mg/dl; Infants 1500g -2000g, phototherapy at TSB -10-12 mg/dl, exchange transfusion -15-18 mg/dl; Infants 2000g - 2500g, phototherapy at TSB -13-15 mg/dl, exchange transfusion -18-20 mg/dl
- 5) Apnea - Cessation of breathing for > 20 secs or shorter in duration with significant bradycardia (HR< 80 Beats per min) or change in skin colour (pallor or cyanosis)
- 6) Transient Tachypnea of newborn (TTNB)- Respiratory distress developing shortly after birth (generally within 6hrs) with clinical features characterised by tachypnea, grunting and which resolves within 4-72hrs of life. CXR findings include retained lung fluids in fissures, perihilar streaking, relative cardiomegaly and slightly hyperexpanded lungs.
- 7) Respiratory Distress Syndrome (RDS) - Respiratory distress which occurs in first 6 hrs of life with CXR findings of poor lung expansion with air bronchogram, reticulogranular pattern and ground glass opacity.
- 8) Meconium Aspiration Syndrome (MAS) - Respiratory distress in neonate born through meconium stained amniotic fluid (MSAF), with onset within first 2 hrs of life and lasting for atleast 12 hrs with typical CXR findings of B/L diffuse patchy infiltrates with areas of hyperinflation.
- 9) Sepsis- Those baby who are having strong clinical suspicion even with negative sepsis screen or, those baby having positive >= 2 panel of sepsis screen.
- 10) Hypocalcemia - Total serum calcium<7 mg/dl (1.75mmol/l)
- 11) Retinopathy of Prematurity (ROP) - Any preterm who fits into ICROP
- 12) Intraventricular Hemorrhage (IVH) - All preterm babies who shows hemorrhage in cranial Ultrasound.
- 13) Hearing Problems-Those baby who does not pass OAE in one or both ears

RESULTS

Out of 115 enrolled preterm babies, Gestational age 24-27week account for 2.6%, 28-31 weeks account for 36.5% and 32-37 weeks account for 60.9%. 44.3% were male and 55.7% were female. In our study, 60.9% were born by primigravida mother and 39.1% by multigravida mother. 22.6% of preterm babies were born by normal vaginal delivery and 77.4% were born by caesarean section. In our study, 7.8% had normal birth weight, 47% had low birthweight (LBW), 40.9% had very low birth weight (VLBW) and 4.3% had Extremely low birth weight (ELBW). The mean weight of the study is 1721 ± 687 gm and mean gestational age is 31.94 ± 2.6 week.

Table 1: Distribution of Neonatal Variables.

VARIABLES	SUB VARIABLES	FREQUENCY (N=115)	PERCENT
Gestational Age	24-27 week	3	2.6
	28-31 week	42	36.5
	32-37 week	70	60.9
Sex	Male	51	44.3
	Female	64	55.7
Gravida	Primi	70	60.9
	Multi	45	39.1
Mode of Delivery	NVD	26	22.6
	LSCS	89	77.4
Birth weight	Normal	9	7.8
	LBW	54	47.0
	VLBW	47	40.9
	ELBW	5	4.3

Table 2: Neonatal Morbidity Outcomes in the Study

Neonatal Outcome	Present N (%)	Absent N (%)	Total N (%)
1. Need for resuscitation	15(13)	100 (87)	115 (100)
2.Hypoglycemia	17(14.8)	98(85.2)	115 (100)
3.Hypothermia	2(1.7)	113(98.3)	115 (100)
4.Neonatal Jaundice	74(64.3)	41(35.7)	115 (100)
5.Apnea	37(32.2)	78(67.8)	115 (100)
6.Transient Tachypnea of new-born	13(11.3)	102(88.7)	115 (100)
7.Respiratory Distress syndrome	67(58.3)	48(41.7)	115 (100)
8.Meconium Aspiration Syndrome	5(4.3)	110(95.7)	115 (100)
9.Sepsis	34(29.6)	81(70.4)	115 (100)
10.Hypocalcemia	19(16.5)	96(83.5)	115 (100)
11.Retinopathy of prematurity	13(11.3)	102(88.7)	115 (100)
12.Intravenous Haemorrhage	0 (0)	115(100)	115 (100)
13.Hearing problem	13(11.3)	102(88.7)	115 (100)

In our study, we analysed the incidence of various neonatal outcomes. We found that neonatal jaundice was the most common outcome and seen in 64.3% preterm neonates. Respiratory distress syndrome (RDS) was seen in 58.3% as second most common complication after neonatal jaundice. 13% needed resuscitation in delivery room. 32.2% of preterm babies had apneic episodes. 11.3% suffered from TTNB, 29.6% of preterm neonates are diagnosed with neonatal sepsis. 14.8% of preterm neonates had hypoglycemia. Only 1.7% suffered from hypothermia. 11.3% developed Retinopathy of Prematurity (ROP) and hearing problems each. In our study, we also found only 4.3% had meconium aspiration syndrome (MAS) and 16.5% had hypocalcemia. (Table 2)

More so, this worsening perinatal morbidity decreased with advancing gestation. In our study, we analysed the neonatal outcome in terms of gestational age groups of 24-27 week, 27-31 weeks and 32-37week groups. Statistically significant association was found with the incidence for need of resuscitation, hypoglycemia, apnea, ROP, hearing problem, hypocalcemia and gestational age. Analysis of hypothermia, neonatal jaundice, TTNB, RDS, MAS, Sepsis with gestational age was not found to have a statistically significant association in our study.

Table 3: Association of Neonatal Morbidity Outcomes with Gestational Age

NEONATAL MORBIDITY OUTCOME	27week N=3	28-31 week N=42	32-37week N=70	P value
NEED OF RESUSCITATION	1	10(23.8%)	4(5.7%)	0.013**
HYPOLYCEMIA	0	11(26.2%)	6(8.5%)	0.03**
HYPOTHERMIA	0	0	2	0.52
JAUNDICE	2	32(76.1%)	40(57.1%)	0.125
APNEA	2	20(47.6%)	15(21.4%)	0.007**
TTN	0	3(7%)	9(12.8%)	0.309
RDS	3	26(61.9%)	38(54.2%)	0.243
MAS	0	1	4	0.657
SEPSIS	0	16(38%)	18(25.7%)	0.199
HYPOLALCEMIA	0	14(33.3%)	5(0.7%)	0.001**
ROP	1	10(23.8%)	2(2.8%)	0.002**
HEARING PROBLEM	1	10(23.8%)	2(2.8%)	0.002**

** p<0.05

DISCUSSION

This study showed the short - term morbidities of preterm infants admitted in Neonatal care unit in a tertiary care centre. In our study, 60.9% babies were born from primigravida mother. LSCS delivered preterm babies account for 39.1% while in the study conducted by Mathai S et al, the mode of delivery in majority of the preterm patients (86.8%) was vaginal delivery. Only 13.1% of the patients required cesarean section.[26].

60.9% of babies fall in moderate to late preterm group while 36.5% to very preterm group while only 2.6% babies were extreme preterm. Similar incidences were found in the study conducted by Ananya Das et al [27]. In their study, gestational age at birth of >34 weeks accounts for 65%, 32-34 weeks accounts for rest 15.8% and less than <32wk accounts 19.2%.[27]. In the study conducted by Habtamu et al less than 32 weeks comprised 16.7%, 32-34wk comprised 43% and above 34wk 40.4%.[28]. In our study 4.3% babies were extremely low birth weight and 40.9% were very low birth weight and 47% LBW while 67.1% babies had weight between 1.5- 2.49kg, 25.4% less than 1.5kg and 19.3% less than 700g in the study conducted by Habtamu et al [28]. Among the total preterm neonates 13% needed resuscitation in delivery room in our study. E layne et al mentioned 17.5% moderate to late Preterm babies more likely to receive resuscitation at birth [33]. Habtamu et al found 15.1% neonates had APGAR 5 minute less than 7.[27]. In our study, Neonatal jaundice, being the most common outcome was presented by 64.3% of babies. And RDS was the second most common complication accounting 58.3%. 32.8% have apneic episodes which was followed by sepsis (29.6%). In the study conducted by Mohapatra V et al, Neonatal sepsis, jaundice requiring phototherapy, birth asphyxia, and RDS were the most frequent complications.[25]. Habtamu et al found RDS in 25.4% Hypothermia in 89.9% Sepsis in 36%, Jaundice in 12.3%[28]. Ankur Gupta et al found 35% neonatal jaundice, 27% Respiratory Distress Syndrome (RDS), and Sepsis 18 %.[29]. Tinu philip et al found that most common complication of prematurity in their study was Hyaline Membrane Disease and pneumonia.[30]. According to Sehgal et al., neonatal hyperbilirubinemia (78%) and RDS (65%) are the most common causes of morbidity in 28-32 weeks.[34]. In our study we found 16.5% cases of Hypocalcemia, 14.8% Hypoglycemia, 11.3% cases each of TTN, ROP and Hearing problems. Mohapatra V et al found Hypothermia in 0.90% and Hypoglycemia in 1.26% neonates.[25]. Habtamu et al documented Hypoglycemia in 7.9%.[28]. Dannapaneni et al found ROP in 32% preterm neonates and abnormal BERA 1.5% neonate.[32]. In our study we observed incidence of Neonatal jaundice, 76.1%(28-31wk), 57.1%(32-37wk). RDS incidence was 61.9% in (28-31wk) group and 54.2% in (32-37wk) group. We found sepsis in 38% in (28-31wk) group, 25.7% in 32-37wk group. Ananya Das et al found incidence of neonatal 80%(28-32wk), 37.8%(28-32wk) 6.7% (32-34wk) 9.2%(34-37wk). RDS incidence was 49%(28-32wk), 29.2%(32-34wk), 11.4%(34-37wk). They found sepsis in 43.5% (28-32wk) groups, 6.7% in (32-34wk) group and 10.6% (34-37wk) group. [27].

Regarding perinatal morbidity, we found we found significant association amongst the 3 groups of gestational age (24-27 weeks, 28-31 weeks and 32-37 weeks) of preterm births with the outcomes namely need of resuscitation (p value=0.01), hypoglycemia (p=0.03), apnea (p=0.007), hypocalcemia (p value 0.001), ROP and Hearing problems (p=0.002). Ananya das et al found significant differences amongst the 3 groups of gestational age (28-32 weeks, 32-34 weeks and >34 weeks) of preterm births with hyperbilirubinemia, sepsis, HMD and mortality. [27].

The limitation of the study included the retrospective design. The sample size of 27week group is too small and also lack a control samples.

CONCLUSION

Preterm births require prolonged hospitalization posing great financial and economic burden on the family and the society at large inspite of advances made in neonatal services. Empowering the primary care providers with skills and knowledge of preterm care avoiding late referral will benefit a lot. Our study might provide health care providers and policy maker with lots of data for taking steps in the management of complications of preterm birth from a developing country perspective.

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