

## Original Article

# PROBLEMS AND COMPLICATIONS OF PRE-TERM INFANTS IN THE NEONATAL UNIT

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**Objective:** To assess the complications of preterm infants in neonatal intensive care unit and compare them with those faced by preterm infants in western setup.

**Material and Methods:** This study was conducted in Paediatrics department, Shaikh Zayed Hospital Lahore. All neonates delivered before 37 weeks and admitted to the neonatal Intensive care unit (NICU, SZH) were included in the study. The study population included 170 preterm neonates. For the purpose of study, these infants were divided into three gestational age groups i.e. < 30 weeks gestational age, 30 to 35 weeks gestational age, and > 35 weeks gestational age. These neonates were then prospectively followed till discharge from NICU.

**Results:** Out of the 170 preterm infants admitted to NICU, 128 infants survived and were discharged under stable conditions, while 42 infants expired. Maximum number of complications and highest mortality i.e. 87% was seen among the most premature group, i.e. below 30 weeks gestational age. Mortality in the gestational age group 30 to 35 weeks was 43%, while it was 9% in the gestational group >35 weeks.

**Conclusion:** Mortality and risk of complications among preterm infants is inversely related to age at birth.

**Keywords:** Preterm, NICU, Survival and Prematurity.

## Introduction

A premature infant is defined as a live born infant delivered before 37 weeks from the 1<sup>st</sup> day of the last menstrual period. Although rapid advance in perinatal & neonatal medicine has improved survival of preterm infants, prematurity still carries high morbidity and mortality especially in developing countries like Pakistan. The only solution to this problem is to provide best of neonatal care to these tiny infants and improve their survival. Premature infants are prone to certain complications because of their low birth weight and also because of the immaturity of various organ systems. Recently it has been found that morbidity as well as mortality relates more to gestational age than to weight at birth.<sup>1</sup> Preterms make a large share to the total number of admissions to NICU. In one analysis of 4 years admission to NICU in Peshawar, it was seen that 39.4% admissions were of preterms.<sup>2</sup> Even after discharge from nursery, preterms require re-hospitalization more than the term infants.<sup>3</sup> Infants born preterm are at increased risk of Sudden Infant Death Syndrome, hypoglycemia, hypothermia, and hypocalcaemia. Preterms are also reported to be at highest risk for developing intraventricular hemorrhage, ischemic brain injury as well as developmental disabilities.<sup>4</sup> Thus prematurity is a

major cause of perinatal mortality and infant morbidity.<sup>5</sup> Measures should be taken to improve neonatal services. In Pakistan, well-equipped NICUs are available in very few tertiary centers. In order to study the common complications in preterm infants in our setup a prospective study was conducted at NICU at Sheikh Zayed Hospital, Lahore.

## Material and Methods

This study was carried out at the neonatal intensive care unit (NICU) in Sheikh Zayed Hospital, Lahore. It was a prospective study conducted over a period of one year from 1st December 1997 to 30th November 1998. All 170 preterm neonates admitted to NICU were included. For the purpose of study, these neonates were divided into three groups according to gestational age group, i.e. below 30 weeks, 30-35 weeks and 35-37 weeks. A detailed antenatal record of each patient was obtained and a detailed physical examination was carried out within twenty-four hours of birth. Based upon this examination, each child was assigned initial diagnosis at the time of admission to NICU. Each baby was followed closely till discharge and the complications, the outcome developed by neonate was also recorded. Relevant laboratory tests were also recorded. Later this information was correlated to assess the course &

Outcome of preterms in our set up.

## Results

Out of the total 170 patients included in our study 16 (9%) belonged to gestational age group of less than 30 weeks, 56 (33%) patients belonged to gestational age group 30-35 weeks and 98 (58%) were more than 35 weeks gestational age, 47% were male and 53% were females. 138 preterm neonates (81%) were delivered in SZH, and 32 (19%) were delivered elsewhere and referred to NICU. 148 (87%) infants in our study population were appropriate for gestational age (AGA), 7 (14%) infants were large for

gestational age (LGA), while 15 (9%) were small for gestational age (SGA). 50 (29%) preterm infants had the primary diagnosis of sepsis, 15 (9%) infants had RDS, 8 (5%) infants had birth asphyxia, 5 (3%) infant where cases of meconium aspiration, 3 (2%) infants had jaundice neonatorum, and 1% had multiple congenital anomalies while 88 (51%) infants were otherwise healthy, at the time of admission and were admitted for preterm care and observation.

The incidence and distribution of complications among our study population among these gestational age groups is shown in **Table 1**.

**Table 1.** The incidence and distribution of complications among various gestational age groups.

Complications	Total N=170		<30 Wks N=16		30-35 Wks N=56		>35 Wks N=98	
	No	%	No	%	No	%	No	%
Sepsis (Presumed)	73	43	16	10	37	66	20	20
RDS	15	09	07	144	08	14	-	-
Apnea	12	07	05	31	07	12	-	-
Pulmonary hemorrhage	08	05	04	25	04	07	-	-
Meconium aspiration	05	03	-	-	-	-	05	05
Pneumothorax	04	02	02	12	02	04	-	-
ADA	07	04	04	25	03	05	-	-
Anaemia	23	14	12	75	11	20	-	-
Jaundice Neonatorum	124	73	16	100	45	80	63	64
DIC	14	08	07	44	05	09	02	02
Necrotizing enterocolitis	11	06	04	25	09	11	01	01
Hypoglycemia	19	11	07	44	09	16	03	03
Hypothermia	12	07	08	50	04	07	-	-
Hypocalcemia	55	32	13	81	27	48	15	15
Hyponatremia	06	04	04	25	01	02	01	01
Intraventricular Hemorrhage	22	13	09	56	10	18	03	03
Hypoxic ischemic encephalopathy	06	04	00	00	03	05	03	03
Neonatal seizures	13	08	07	44	05	09	01	01

128 (75%) infants survived and were discharged under stable condition, while 42 (25%) infants expired. Mortality in the gestational group < 30 weeks was 87% (14 infants died). 43% (24 infants) in gestational group 30 to 35 weeks died and 9% (4 infants) mortality was observed in gestational group more than 35 weeks. Septic shock, disseminated intravascular coagulation, intracranial hemorrhage, hypoxic ischemic encephalopathy and Respiratory

Distress Syndrome were among the common causes of death in our study group.

## Discussion

During the past few decades improvement in the neonatal intensive care has led to marked reduction in neonatal mortality.<sup>6</sup> A large share of this improvement is due to the increasing survival among premature infants.

Unfortunately reduced morality among preterm infants is accompanied by increase in morbidity. So the emphasis has now been shifted from concerns of mortality towards a better understanding of the scope and nature of morbidity.

Results of our study showed that the prominent group of patients admitted to N.I.C.U was more than 35 weeks gestation age and very few preterm i.e. 9% with gestational age less than 30 weeks were brought to NICU. This could be partly due to improved obstetrical strategies to prevent or at least delay preterm labor; the other reason might be that in our setup mortality increases sharply below 30 weeks gestation. Analysis of our study revealed that 51% preterms were brought to NICU for care and monitoring, while 29% had the primary diagnosis of sepsis. Among the other infants admitted, prominent diagnosis was RDS 9% , birth asphyxia 5%, JNN 2% , meconium aspiration 3%, and multiple congenital anomalies 1% .

During stay in NICU 43% infants had presumed sepsis either as a primary diagnosis or afterwards (culture proven 32%). The highest incidence of sepsis was seen in the gestational group <30 weeks i.e. 100%. This high percentage can be explained on the fact that suspicion of early onset of sepsis is almost universal to the very low birth weight preterm infants. The overall incidence of RDS was found to be 9%, it was 44% in infants below 30 weeks, which compares favorably to the incidence of RDS given 60-80% below 28 weeks gestational age and 15-30% below 32- 36 weeks.<sup>8</sup>

The overall mortality for preterms with RDS was quite high i.e. 9%. The results of our study showed 5% incidence of pulmonary hemorrhage and 2% incidence of pneumothorax with the highest incidence again seen in infants below 30 weeks gestational age i.e. 25% and 12% respectively. The incidence of anemia was 14% among our study population and about 75% infants below 30 weeks gestational age developed anemia requiring blood transfusion. 8% infants developed disseminated intravascular coagulation, which proved fatal in all the infants. A total of 22 (13%) infants developed intraventricular hemorrhage; another study conducted in Pakistan codes an overall incidence of 75% PVH-IVH in infants less than 34 weeks gestation,<sup>9</sup> which is very high as compared to our study.

The overall mortality of our study infants was 25% as expected maximum survival was seen among infants more than 35 weeks gestational age i.e. 96%

and survival was lowest among infants less than 30 weeks gestational i.e. 13%. While survival rate for infants 30-35 weeks gestational age was 55% this survival rate is quite low when we compare it with studies conducted in the west. One study has given 95% survival rate for 30-31 weeks gestation;<sup>10</sup> another study has coded 25% mortality for infants less than 32 weeks gestation<sup>11</sup> which is in sharp contrast to our study which showed 87% mortality in infants below 30 weeks gestation and 45% mortality at 30-35 weeks gestation.

There are a number of factors that contribute to the marked difference observed in mortality of preterm infants between our hospitals and the west. Umbilical and arterial catheterization and central venous lines are used in the west for providing nutrition, as well as for taking blood samples, which may minimize infection.

However in our set up peripheral veins and small arteries are used for the purpose of phlebotomy tests and for providing nutrition; repeated pricking leads to increased chances of infection. The nurse to neonate ratio works to a disadvantage when compared to the developed countries thus septicemia remains a major cause of neonatal morbidity and mortality in the developing world.<sup>12,13</sup>

The important inference from our study is that a premature baby is a catastrophe, emotionally for the parents, psychologically for the obstetrician, economically for the nation and challenge for the pediatrician. Shorter gestational age is usually associated with a need for invasive procedures, mechanical ventilation and prolonged hospital stay. More immature the infant, greater are the chances of developing complications like RDS, IVH, sepsis and NEC etc.

All these factors contribute to high morbidity and mortality seen among the preterms. Another important inference from our study is the high incidence of sepsis which as already discussed is due to the lack of resources, limited number of nursing staff, very frequently done arterial pricks and putting intravenous branulas daily or every second or third day. Thus we need to improve the quality of our neonatal intensive units and neonatal services in order to reduce the high morbidity and mortality associated with prematurity.

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