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Immediate Problems and Clinical Outcome of Preterm Infants

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Summary:

This prospective study was done to understand the immediate problems and clinical outcome of preterm infants. A total of 50 consecutively hospitalized preterm infants were enrolled into this study, 56% of them were male and 44% were female. Among them 40% and 2% were very low birth weight (VLBW) and extreme low birth weight (ELBW) respectively and 58% were low birth weight (LBW) infants. Eighty percent of study population survived, 18% died and 2% were discharged against medical advice. Each baby had one or a combination of problems like infection (32%), perinatal asphyxia (20%), jaundice (24%), poor feeding (24%), apnoea (14%) and convulsion (10%). Perinatal asphyxia (45%) and septicaemia (22%) were the major causes of death. Mortality rate was highest (75%) among babies having gestational age 28 weeks or less and lowest (8.40%) in those having gestational age 35 weeks and above. In addition to prematurity, birth weight was the important factor influencing the mortality. The study concludes that neonatal infection, perinatal asphyxia, poor feeding, jaundice, apnoea and convulsion are the major problems of preterm newborns. High case fatality rates among preterm infants were due to perinatal asphyxia, neonatal infection and ELBW.

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Introduction:

A liveborn infant delivered before 37 weeks from the first day of the last menstrual period is termed preterm by the World Health Organization[1]. Preterm infants account for the majority of high-risk newborns[2]. The preterm infants faced a variety of physiological problems like apnoea, infection and poor feeding. A preterm infant may be appropriate for gestational age or small for gastational age, depending on birth weight above or below 10th centile for gestational age respectively. In Bangladesh, the incidence of low birth weight (LBW) is about 30%[3]. In one hospital-based study, it was shown that incidence of preterm was 16.3%[4]. Among them preterm weighing more than 2.5 kg was 32% and preterm LBW was 68%. In another study, it was found that 9.57% babies were preterm[5].

Prematurity is related to difficulty in extra-uterine adaptation due to immaturity of organ system. Apnoea of preterm babies occurs in 25% of preterm low birth weight babies[6]. Incidence of respiratory distress syndrome (RDS) in preterms is 6.56%[7]. Twenty percent of premature infants develop necrotizing enterocolitis (NEC)[2]. Preterm infants are vulnerable to infection as compared to term neonate. Preterm babies have a highest risk of death during the neonatal period[8]. Preterm LBW infants are five times as likely to die as term low birth weight infants[9]. So far it is known, no study has been done regarding the problems and outcome of preterm infants in this country. The present study was conducted with the aim to find out the immediate problems and clinical outcome of preterm infants.

Materials and methods:

This prospective study was done in neonatal unit of Department of Paediatrics, Bangabandhu Sheikh Mujib Medical University during September 2003 to February 2004. The neonatal department of this hospital has intensive care unit facilities having incubators, radiant warmer and ventilator support system. A total of 50 consecutively admitted infants were included in the study. The inclusion criterion was inborn and outborn neonates with gestational period less than 37 completed weeks and the exclusion criterion was inborn and out born neonates with gestational period 37 completed weeks and more. After taking the verbal consent from the attendent, the relevant information from the history and physical

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findings were recorded within 24 hours of admission in a purposely prepared questionnaire. Elaborate antenatal, natal and postnatal histories were taken. New Ballard Scoring system was used for assessment of gestational age[10]. Birth weight was taken by using standard scale with 50 grams sensitivity. The necessary laboratory investigations e.g. haemoglobin estimation, complete blood count, blood culture, blood glucose estimation, CRP, urine analysis, CSF study, X-ray and ultrasonography were done as indicated by clinical evaluation. The standard management of the preterm infants was then offered according to the individual need. Each infant was reassessed daily till discharge or death to assess the problems and outcome. Data were recorded in a pretested questionnaire and analysed using relevant software.

Results:

A total of 50 preterm infants were included in this study, 28 (56%) of them were male and 22 (44%) were female. Ten babies (20%) had gestational age of 30 weeks or below and 40 (80%) had gestational age of 31-37 weeks. Irrespective of sex one (2%) had normal birth weight, 28 (56%) were of LBW, 20 (40.0%) were VLBW and one (2%) was of ELBW.

Infection was found in 32% babies and found to be the major problem in preterm babies (Table-I). Other problems that were found included perinatal asphyxia (20%), poor feeding (24%), jaundice (24%), apnoea (14%), convulsion (10%), NEC (4%), temperature instability (6%), hypoglycaemia (8%), hyperglycaemia (6%), hypocalcaemia (6%), RDS (6%), patent ductus arteriosus (4%), intraventricular haemorrhage (2%), acute renal failure (2%) and congenital malformation (4%). Majority of infants had more than one problem.

Table-II shows the outcome of 50 preterm babies of different gestational age groups. It is evident from the table that as the gestational age increased the rate of survival increased. Out of total 50 preterms, 80% survived, 18% died and 2% was discharge against medical advice. Among four babies at gestational age of 28 weeks and below, three died and rest was taken away by the parents against medical advice. Out of 12 infants of 35 - 37 weeks of gestational age group, 91.60% survived and 8.47% died.

Table III shows the mortality in different birth weight categories. The single neonate in the less than 1000 gm group died, causing the mortality rate to be 100%. An increased birth weight caused increased survival. In 1500 - <2500 gm weight group babies, mortality rate was 17.8% and there was no mortality in the 2500 grams or more weight group.

Table IV shows the causes of death in preterm babies. Perinatal asphyxia was the commonest cause of death (45%). Other causes were septicaemia (22%), apnoea (11%), RDS (11%) and intraventricular haemorrhage (11%).

Table-I

Distribution of preterm babies by immediate major problems. (n=50)

Problems	Number	Percentage
Infection	16	32.00
Perinatal asphyxia	10	20.00
Poor feeding	12	24.00
Jaundice	12	24.00
Apnoea	07	14.00
Convulsion	05	10.00
Necrotizing enterocolits	02	4.00
Temp. instability	03	6.00
Hypoglycaemia	04	8.00
Hyperglycaemia	03	6.00
Hypocalcaemia	03	6.00
Respiratory distress syndrome	03	6.00
Patent ductus arteriosus	02	4.00
Intraventricular haemorrhage	01	2.00
Acute renal failure	01	2.00
Congenital malformation	02	4.00

Table-II

Outcome of preterm babies by gestational age (n=50).

Gestational age (weeks)	Total Number	Survived		Died		Discharged against medical advice	
		Number	Percentage	Number	Percentage	Number	Percentage
28 and below	04	00	0.0	03	75.00	01	25.00
29-30	06	05	84.0	01	16.00	00	0.00
31-32	12	10	83.0	02	17.00	00	0.00
33-34	16	14	87.5	02	12.50	00	0.00
35-37	12	11	91.6	01	8.40	00	0.00
Total	50	40	80.0	09	18.00	01	2.00

Table-III

Outcome of preterm babies by birth weight (n=50).

Weight in grams	Total number	Survived		Died		Discharged against medical advice	
		Number	Percentage	Number	Percentage	Number	Percentage
<1000	01	00	00	01	100	00	00
1000-<1500	20	16	80	03	15	01	05
1500-<2500	28	23	82	05	18	00	00
2500	01	01	100	00	00	00	00
Total	50	40	80	09	18	01	02

Table IV

Mortality of preterm babies by cause of death (n=9).

Causes of death	Number of death	Percentage
Perinatal asphyxia	04	45.00
Septicaemia	02	22.00
Apnoea	01	11.00
RDS	01	11.00
IVH	01	11.00
Total	09	100.0

Discussion:

Preterm infants account for a high morbidity, disability and mortality all over the world[10]. In this study, infection was found to be the commonest problem (32%) in preterm babies. A recent study from Malaysia reported neonatal sepsis as common as 5-10% in preterm babies[11]. Prematurity increases the risk of infection by 20-fold[12]. Higher incidence of infection in this study is probably due to improper antenatal care regarding maternal infection screening and treatment, inadequate aseptic precaution during delivery and inadequate infection control programme including hand washing, lack of visitor control during hospital care etc.

In this study, perinatal asphyxia was found in 20% cases, which is much higher than other observations. The incidence of perinatal asphyxia is about 1-1.5% in most centers of developed countries[13]. The incidence of perinatal asphyxia is usually related to gestational age and birth weight. It occurs in 9% of infants less than 36 weeks gestational age and in 0.5% of infants more than 36 weeks gestational age[12]. High incidence of perinatal asphyxia in this study could be due to inadequate antenatal and perinatal care. Poor feeding was observed among 24% cases in this study in contrast to another study that found 14.81% cases with this problem[14]. High incidence of feeding

problems could be due to the fact that more sick infants like asphyxiated and septicaemic preterm babies were included in this study.

Jaundice is another common problem in preterm newborns. In this study, 24% cases of preterm babies developed jaundice which is higher than what was observed by other workers[14,15]. Greater incidence of jaundice in this study could be explained by the fact that asphyxia and infection were found more in this study population. No infant developed kernicterus due to early treatment with phototherapy and exchange transfusion as and when needed.

Apnoea was found in 14% cases in this study. Tabib et al in their study found that 8.33% preterm infants had apnoea[14]. James et al found apnoea of prematurity occurring in at least 25% of preterm low birth weight babies[6]. Panja et al found apnoeic spell as one of the major causes of death in preterm babies[16]. Low incidence in the present study may be due to the fact that less number of VLBW and ELBW babies were included. Another factor may be that, cases of apnoea were missed due to lack of continuous monitoring by apnoea alarms.

Ten percent cases had convulsion which is consistent with the study done by Hosne ara et al (11.5%)[7]. Higher result (20%) was found by another observation[16]. Convulsion in this study population was associated with asphyxia, septicaemia, hypoglycaemia and hypocalcaemia.

Three (6%) preterm babies presented with RDS in this study which is consistent with findings of Tabib et al who found RDS in 5.55% preterm babies[14]. Another study found incidence of RDS to be as high as 13.43%[17]. Panja et al in their study found RDS in as high as 10.0-15.0% of study subjects[18]. Occurence of RDS is inversely proportional to gestational age and occurs in all parts of the world. The incidence is 1.0-3.0% of all births irrespective of birth weight and gestational age but it is important as it is responsible for the deaths of many preterm infants[12].

In the present study, necrotizing enterocolitis (NEC) and patent ductus arteriosus (PDA) was found in 4% cases each and hypothermia in 6% preterm babies. Another study observed much higher incidence of NEC, PDA and hypothermia which were as high as 30%, 47% and 54% respectively[19]. Lower incidence of NEC, PDA and hypothermia in this study probably reflects inclusion of less number of VLBW and ELBW babies in this study.

While analyzing the immediate outcome, 80% preterm babies survived, 18% expired and 2% was discharged against medical advice. Seventy five percent died at gestational age of 28 weeks or below and 8.4% died with gestational age 35 - 37 weeks. It was found that as gestational age increased, mortality rate decreased and happened at statistically significant level. Other studies also showed similar findings[14,15,17,]. Two studies done earlier by Manajjir et al and Tabib et al in the same institute showed 20% and 28.12% mortality among babies with gestational age of 33 - 37 weeks which were much higher than the observations of similar age group in the present study[14,15]. The lower rate of mortality in this study may be explained by the recent improvement in the management of very sick and preterm infants in this institute.

The major cause of death in the present study was perinatal asphyxia (45%). Death due to perinatal asphyxia might be related to lack of proper antenatal care, obstetric complications, late referral for admission to neonatal unit and overall lack of appropriate nursing care. In this study 22% deaths were due to possible septicaemia alone or in combination with other problems. Different studies in this country have found 42.67%, 42.0% and 14.82% of deaths due to perinatal asphyxia and 21.87%, 25.0% and 22.2% due to septicaemia respectively[14,16,17]. Eleven percent of deaths due to RDS in this study is consistent with the findings of other studies[16].

In this study, perinatal asphyxia, neonatal infection, poor feeding, apnoea and convulsion were the major problems of preterm newborns. High case fatality rates among preterm infants were mostly due to perinatal asphyxia and neonatal infection. Eighteen percent of the preterm newborns died in the present series.

The study recommends further study covering large sample size including urban and rural population to assess the health status of preterm infants in our country. This study also recommends strengthening of antenatal and perinatal care in the country.

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