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Original Article

Identification of Maternal Risk Factor with Preterm LBW Babies in a Tertiary Care Hospital

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Abstract

This study was aimed to identify risk factors of preterm LBW babies by following a cross sectional type of comparative study. This study was conducted at inpatient department of paediatrics of Rajshahi Medical College Hospital from January 2009 to December 2010. A total 150 preterm babies were included in this study. The mothers of the babies were studied to identify some selected risk factors. Maternal poor nutritional status (p<.001), low age at conception (p<.003), poor antenatal care (p<.001) and low level of education (p<.002) were found significant socio-economic risk factors. Maternal health related conditions like Antepartum haemorrhage (p<.001), Premature rupture of the membrane (p<.001), toxemia of pregnancy (p<.005), anaemia (p<.002) all were found as the significant contributors of preterm birth. This study might help to reduce the incidence of mortality and morbidity of preterm infants by providing information regarding risk factors.

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Introduction

Globally an estimated 9.6% (13 million) births are preterm births and in Bangladesh prevalence of preterm birth is 11.1%.[1] Approximately 12.7% of all USA birth are premature and almost 2.0% are less than 32 weeks gestation.[1] There are multiple factors responsible for preterm birth. It is very difficult to completely separate factors associated with prematurity from those with IUGR.[2] In Bangladesh, During the last 3 decades, under 5 mortality and infant mortality rate decreased significantly, but neonatal mortality remains very high (36/1000 live birth), and complication of preterm is one of the three leading cause of neonatal death.[3] of the 4 million Neonatal death occur World wide each year, 1 million directly due to preterm birth (27%).[4]

So it is very important to identify the risk factors, problems and immediate outcome because it might help to recommend intervention strategies designed to reduce incidence, morbidity and mortality of preterm infants and for effective management of high risk mothers during pregnancy and high-risk neonates at birth to prevent and reduce the sequelae of preterm infant.

Methodology

It was a cross-sectional comparative type of study done in the department of Paediatrics and Gynae & Obs. of Rajshahi Medical College hospital. The present study had been conducted for a duration of 2 years starting from January 2009 to December 2010. Total 150 Preterm LBW babies admitted in

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the Pediatric wards of Rajshahi Medical College hospital were included in the study. The infants born < 37 completed weeks of gestation having birth weight < 2.5 Kg (within 7 days of birth).Neonate <28 weeks gestation and birth weight <500 gram and neonate suffering from significant congenital anomaly. Babies who delivered at term in Rajshahi Medical College Hospital were selected as comparison group to identify maternal risk factors for the present study. Birth weight was measured by using standard scale. For length, crown heel length was recorded by infantometer. Head circumference was measured by using a non elastic tape. The necessary laboratory investigations e.g. Hb%, CBC, blood culture, blood glucose estimation, CRP, Serum billirubin and electrolytes, urinalysis, CSF study, x-ray, USG were done as indicated by clinical evaluation. The standard management of the preterm infant was offered according to the individual need the findings of the study were presented with the help of frequency distribution tables, charts and diagrams.

Results

This study had been carried out with the objective of find out some maternal risk factors of preterm birth babies during their hospital stay. The collected data has been analyzed and presented in the following section with the help of tables, charts and graphs. Among the cases, majority of the babies were male 78(52.0%) and were female 72(48.0%) respectively. Among the comparison group, majority were male 83(55.3%) and 44.7% were female respectively. Out of 150 studied preterm LBW babies, the gestational age of the majority babies 102(68.0%) were 31 to 34 weeks, 35(23.3%) were found to be 28-30 weeks of gestation. The study revealed that out of 150 preterm babies, majority of them 78(52.0%) born to mothers aged 21 – 30 years. It was also found that 54(36.0%) babies born to mothers aged ≤ 20 years and 18(12.0%) babies born to 31-40 yrs of maternal age group. Among the comparison group, majority of the babies 106(70.7%) born to mothers aged 21 – 30 years, 35(23.3%) were born to mothers aged ≤20 years, and 9(6.0%) babies born to mothers aged 31 – 40 years. The result showed that the difference of age of the mothers between case and comparison group were found to be statistically highly significant.

Regarding distribution of 300 mothers by medical and obstetric condition, It was reported that 5(3.3%) mothers of preterm babies had UTI and 2(1.3%) mothers were in comparison group. Anaemia was present in 18(12.0%) of mothers of preterm baby and 4(2.7%) in comparison group. H/O previous preterm delivery, PET, APH, fever during labour and PROM was present 16(10.7%), 18(12.0%), 30(20.0%), 17(11.3%), 27(18.0%) respectively among the mothers of preterm babies. No significant problem was found in 42(28.0%) in mothers of preterm babies and it was found 103(68.7%) in the comparison group (Table 1). It indicates that the relationship between utilization of ANC by the mothers and outcome of preterm was found to be statistically highly significant (Table 3).

It was revealed that 36 mothers were illiterate. Among them majority 31(86.1%) survived and 5(13.9%) expired. It was also found that 39 mothers had primary education. Among them majority babies 23(59.0%) survived and 16(41.0%) babies died. Forty mothers attended class VI-X. Among them majority babies 32(66.7%) survived and 16(33.3%) babies expired. Among the mothers with higher educational level, most of the babies (92.6%) survived and only (7.4 %) babies died. The result showed that the survival rate of preterm babies increased gradually (59.0%) with primary education, (66.7%) secondary educated mothers, 92.6% among mothers with class XI and above respectively) with that of educational level of the mothers. On the other hand mortality rate is higher among the mothers with low level of education. The findings of the present study indicate that there is a statistically highly significant relationship between level of education of mothers and outcome of preterm babies death. It was revealed in the study that out of 150 preterm babies, 36 delivered at home. Among them majority 19(52.8%) survived and 17(47.2%) babies expired. Ninety-five babies were delivered in hospital, among them majority 76(80.0%) survived and 19(20.0%) babies expired.

Among the babies who delivered at different clinics, majority of them 16(84.2%) survived and 3(15.8%) babies expired. The findings indicate that the survival rate was higher in clinic (84.2%) and hospital delivery (80.0%) than that of home delivery (52.8%). At the same time the death rate is higher among the babies of home delivery (47.2%) than that of clinic (15.8%). From the study it was evident that the association between place of delivery and outcome of preterm LBW babies was found statistically highly significant (Table 2). It was revealed that out of 39 deaths, the cause of death of 13(33.3%) preterm babies was septicaemia, 11(28.2%) babies was perinatal asphyxia. It was also found that extreme prematurity with apnoea caused death to 17.9% babies.

Table 1: Risk factors 0f maternal medical and obstetric condition and gestational outcome of the study population (n=300)

Maternal condition	Case		Comparison group		Total		P value
	N	%	N	%	N	%	
UTI	5	3.3	2	1.3	7	2.3	0.231
Heart disease	2	1.3	0	0.0	2	0.7	0.156
Hypertension	5	3.3	0	0.0	5	1.7	0.024
Lung disease	6	4.0	2	1.3	8	2.7	0.152
Fever & rash	3	2.0	0	0.0	3	1.0	0.082
Anaemia	18	12.0	4	2.7	22	7.3	0.002
DM	2	1.3	1	0.7	3	1.0	0.562
Previous preterm delivery	16	10.7	0	0.0	16	5.3	0.000
Events	10	6.7	13	8.7	23	7.7	0.515
PET	18	12.0	5	3.3	23	7.7	0.005
Eclampsia	5	3.3	9	6.0	14	4.7	0.274
APH	30	20.0	3	2.0	33	11.0	0.000
Maternal fever	17	11.3	4	2.7	21	7.0	0.003
PROM	27	18.0	5	3.3	32	10.7	0.000
No problem	42	28.0	103	68.7	145	48.3	0.000

Table 2: Relation between Outcome and place of delivery of preterm baby (n=150)

Place of delivery	Outcome				Total	
	Improved		Expired			
	N	%	N	%	N	%
Home	19	52.8	17	47.2	36	24.0
Hospital	76	80.0	19	20.0	95	63.3
Clinic	16	84.2	3	15.8	19	12.7
Total	111	74.0	39	26.0	150	100.0

(χ^2 =11.234, df = 2, p = 0.004)

Table 3: Outcome of preterm baby in relation of maternal antenatal checkup (n=150)

Utilization of ANC	Outcome				Total	
	Survived		Expired			
	N	%	N	%	N	%
Regular (4 or more visit)	59	86.8	9	13.2	68	45.3
Irregular	46	63.0	27	37.0	73	48.7
No visit	6	66.7	3	33.3	9	6.0
Total	111	74.0	39	26.0	150	100.0

(χ^2 =10.590, df = 2, p = 0.005)

Discussion

Preterm infants accounts for a high percentage of morbidity, mortality and disability in our country. Though majority of LBW infants in developing countries are small for dates rather than preterm low birth weight, the mortality is twice than that of infants with IUGR and 13 times higher than that of term infants.[5] An estimated 11.1% of births are preterm births in Bangladesh.[1]About frequency distribution of babies by sex, it was found that, among the cases, majority of the babies (52.0%) were male and 48.0% were female respectively. Among the comparison group, majority (55.3%) of them was male and 44.7% were females respectively. The proportion of male babies was higher than that of female in the present study. This is similar to the findings of other studies (male 52.8%, female 47.2%)[6] and male female ratio is 1.1:1.

The etiology of preterm birth is multifactorial.[2] About common maternal risk factors like age, parity, nutritional status, level of education, antenatal care socioeconomic status, chronic diseases and various obstetric complications during current pregnancy, Previous preterm delivery and multiple gestations were investigated in this study. The relationship between the above risk factors and preterm birth and its outcome were well established in this study. About the gestational age of study subjects, it was found in this study that the gestational age of the majority babies (68.0%) was 31 to 34 weeks and 23.3% were found to be 28-30 weeks gestation and 8.7%were 35-36 weeks gestation. In other study of Bangladesh done by Begum S. is was found 8.0% were 28 weeks or below, 68% were 29-34 weeks and 24% were 35-37 weeks respectively.[7]

In this study, it was revealed that majority of the mother of preterm (52.0%) were in the age group of 21 – 30 years. It was also found that (36.0%) babies born to mothers aged ≤ 20 years. Among the comparison group, majority of the babies (70.7%) born to mothers aged 21–30 years, 35(23.3%) were born to mothers aged ≤20 years. The findings suggest that the difference of age of the mothers between case and comparison group were found to be statistically highly significant (χ^2=11.317, *df* = 2, *p* = 0.003). Teenage mothers are well known for adverse pregnancy outcome. The result was consistent with the other studies where 53.45% and 47.2% of preterm LBW babies were delivered by mothers of ≤ 20 years of age.[8,9]

For the present study maternal weight was used to measure nutritional status. Maternal underweight is a common occurrence with potential adverse perinatal outcomes. The study revealed the body weight of majority of the mothers of preterm babies (64.0%) was less than 45 Kg and 54(36.0%) mothers had more than 45 Kg. Among the comparison group the body weight of majority of the mothers (91.3%) was more than 45 Kg. The mean maternal weight was (45.43±6.61) kg in study group and in the comparison group it was (49.56±3.27) kg respectively. The results indicate that there was statistically highly significant difference of the body weight of mothers between case and comparison group (χ^2 = 99.270, *df* =1, *p*=0.000). Other studies showed the similar results.[10,11,12] Malnutrition is regarded as one of the important maternal and child health problem which is strongly associated with high incidence of preterm and low birth weight with poor outcome of babies. Mothers need to be educated on nutrition which will help them to optimum weight gain during pregnancy.

It is evident that poor education of the mothers is associated with poor outcome of baby and mother's health. Regarding maternal level of education among cases and comparison groups, it was revealed that 24.0% mothers were found to be illiterate, 26.0% mothers had primary education and 18.0% mothers crossed class XI to above. It was also found that, 23.3% mothers were illiterate among the comparison group, 10.7% mothers had primary education and 48.7% mothers had schooling up to class VI-X. It was evident that the difference of level of education of mothers between case and comparison group was found to be statistically highly significant. The findings was in conformity with earlier reports by Joshi et al and Mondal et al.[8,13] This may be explained by increased awareness of educated women regarding health services. The study suggests that pregnant women should be educated on various aspects of

health and nutrition for better outcome of pregnancy. About utilization of ANC by the mothers and incidence of preterm babies, it was found that 41.3% mothers received ANC regularly. Among them, majority (54.8%) delivered preterm low birth weight babies and 56 (45.2%) mothers had term babies. It was also found that 56.2% mothers with irregular ANC visits delivered preterm babies. The study showed that 19.6% non-recipient of ANC mothers delivered preterm baby. The study showed that among the mothers of preterm babies, higher proportion of them with irregular visits for ANC, delivered preterm low birth weight babies (56.2%) than that of regular utilization of ANC (54.8%). The findings indicate that the association between pattern of utilization of ANC and incidence of preterm low birth weight babies is statistically highly significant.

This is conformity with other studies.[14,8] So, proper ANC is an important factor for reducing the risk of birth of preterm babies either by early diagnosis and treatment of pregnancy related complications or by eliminating or reducing modifiable risk factors

Primiparous mother produces more preterm babies than multiparous mother in this study. This was also seen in other studies.[15,8] Keeping birth space at optimum interval bears tremendous positive impact on women health as well as it helps to improve birth weight of babies in underdeveloped communities.

Regarding multiple gestation and incidence of preterm low birth weight, it was found that the proportion of incidence of preterm babies in multiple gestations was higher (80.0%) among the cases than that of comparison group (20.0%). In case of single tone gestation the proportion of incidence of preterm baby among the cases was found to be less (47.9%) than that of comparison group. Therefore, the difference between incidence of preterm low birth weight baby and types of gestation is statistically highly significant (χ^2= 7.714, *df* =1, *p* = 0.005). Other investigators also found multiple gestation as a risk factor for preterm birth.[16] Care should be taken to provide adequate health care services to pregnant women with multiple gestations in order to prevent and manage the dreadful conditions associated with pregnancy and pregnancy related causes. In the present study there was no identifiable maternal antepartum or obstetrical complication in 28% mothers of preterm babies. The major maternal factors associated significantly with preterm birth were antepartum haemorrhage, PROM, PET, Previous preterm birth and maternal anaemia. The occurrence of APH was 20.0% (P<0.001) and similar to other studies.[14] Premature Rupture of the membrane occurred in 18% cases (P<0.001), Toxaemia of pregnancy was present in 12% of mothers (P<0.005), Maternal anaemia also found in 12% (P<0.002) and previous maternal history of preterm birth was present in 10.7% (P<0.001) cases. These are also consistent with different studies[14,16,12,10] (Table 1). The study showed that, various maternal illness may influence over preterm birth which can be easily identifiable and preventable.

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