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Maternal Risk Factors and Perinatal Outcomes of Premature Rupture of Membranes(PROM).

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Abstract

Background: Premature rupture of membranes (PROM) is defined as rupture of foetal membranes before the onset of labour. PROM is a common obstetric problem which can cause serious maternal as well as foetal complications. Several risk factors lie behind the cause of PROM. **Methods:** This cross sectional descriptive study was carried out in the In-patient Department of Obstetrics and Gynecology at Dhaka National Medical College Hospital between March 2016 and February 2017.**Objectives:** The objectives of the study were to determine socio-demographic factors among the pregnant women developing PROM, to find out maternal risk factors of PROM and to observe the outcome of newborns of PROM pregnancies.**Results:** During this study period 1240 deliveries took place in this department. Sixty-four of them were admitted with complains of PROM. The prevalence of PROM was found 5.2%. Among them 34% was preterm PROM. The maternal age the women developed PROM ranges from18 to 32 years and mean maternal age was 24.82± 3.71 years. The most common age group was 20 to 30 years. Educational status revealed 95% of the women and about 97% of husbands were literate. About 86% women were housewives. Husbands were service holders and businessmen 56% and 33% respectively. Only 9.38% of the study population was from low socioeconomic condition. Others were from middle (15.63%), higher middle (42.18%) and affluent (32.81%) socio-economic condition. Antenatal checkup was received regularly by 68% of mothers. Supplementary iron, calcium, vitamins and minerals taken regularly and irregularly by 68.75% and 25% pregnant mothers respectively. Only 6.25% did not take any supplementary during their antenatal period. About 74% women took balanced diet during their pregnancy period. Sixty nine percent of the PROM cases were primigravida. History of abortion and PROM in previous pregnancy was present in 34% and 6% women respectively. Women with PROM were suffering from Hypertension (7%), Diabetes (5%), Respiratory tract infection (15%), Urinary tract infection (3%), Hyperpyrexia (7%), and Vaginitis (20%). Anemia was detected as mild, moderate and severe degree in 25%, 23.4% and 3% of women respectively. Majority (71%) of the mothers delivered by caesarian section. Rest delivered spontaneously (26%) and by medical induction or augmentation (3%). Indications of caesarian sections were foetal distress (31.82%), high head (22.73%), mal-presentation (11.36%), oligohydramnios (11.36%), intrauterine growth retardation (IUGR) 6.89%, and history of previous twice caesarian section (4.54%), prolonged labour (2.27%) and more than one indication (13.33%). Fifty two percent babies were male and 28% were of low birth weight (LBW). Respiratory depression was noticed among 32% newborns at 5th minute of birth by APGAR scoring. Perinatal death occurred in 14% neonates due to respiratory depression (77.78%) and septicemia (22.22%). Twenty-nine percent newborns needed to be admitted in NICU. Mean interval of PROM and hospitalization of PROM patients were 8.5 hours. Mean interval of PROM and delivery was13.2 hours.**Conclusion:** The study found no significant influence of socio-economic status and antenatal care on PROM. Maternal risk factors like: maternal systemic illness, infection, hyperpyrexia and vaginitis were detected as factors of PROM. History of abortion in previous pregnancy, maternal infection and vaginitis significantly influenced PROM. Neonatal outcome was unfavorable in preterm PROM.

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Keywords: PROM, Risk Factors, Perinatal Outcome.

INTRODUCTION

Premature rupture of membrane (PROM) is defined as rupture of membranes at any time before the onset of uterine contraction. PROM before 37 weeks of gestation is called preterm PROM and PROM after 37 weeks is referred as term PROM.[1] The incidence of PROM ranges from 5% to 10% of all deliveries.[2-5] Approximately 70% of all PROM occurs at term but more than 50% occurs in preterm pregnancies in referral hospitals,[1] PROM results in maternal and neonatal complications. Among the maternal complications chorioamnionitis is the most common after PROM. Other complications are endometritis, abruption placenta, and antepartum haemorrhage, increased rate of caesarian section, retained placenta, postpartum haemorrhage, maternal sepsis and even maternal death. Foetal complication after PROM includes infection and foetal distress due to umbilical cord compression or placental abruption. Many studies mentioned possible neonatal outcome in PROM may include respiratory distress syndrome, hypothermia, hypoglycaemia, intraventricular haemorrhage, necrotizing enterocolitis bronchopulmonary dysplasia etc. Serious perinatal morbidity can lead to long term consequences such as chronic lung disease, visual or hearing difficulties, intellectual disabilities, developmental and motor delay, cerebral palsy or death.[6,7] PROM is one of the major causes of prematurity and infection and leading cause of neonatal death. Prediction and prevention of PROM would offer the best opportunity to prevent its complications. To predict PROM the risk factors have been identified in several studies. The most important risk factors of PROM are prior PROM, vaginal bleeding, maternal infection, genital tract infection specially repeated vaginitis in first trimester, recurrent urinary tract infection, sexually transmitted infection, cigarette smoking, polyhydramnios, and heavy work during pregnancy, malnutrition and low socioeconomic status.[8,9] Hence PROM is an obstetric condition which is poorly defined with an obscure aetiology and associated with significant maternal and neonatal morbidity and mortality. The present study was conducted to analyze the risk factors and perinatal outcomes in premature rupture of membranes.

MATERIALS AND METHODS

This prospective cross-sectional study was carried out at the In-patient Department of Obstetrics and Gynaecology in Dhaka National Medical College Hospital for the period of one year between March 2016 and February 2017. Pregnant women withpremature rupture of membrane (PROM) confirmed by a speculum examination recruited for this study purposively. Those whose gestational age was less than 28 weeks were excluded from the study.A detailed menstrual and obstetric history was taken from the pregnant motherby face-to-face interviewing.

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Sociodemographic characteristics, maternal parameters and foetal conditions were recorded.General, systemic and detailed obstetrical examination were done. All cases received prophylactic antibiotics.Steroid was given for lung maturity in preterm pregnancies.APGAR score of the newborn was noted at 1 and 5 minutes of birth. Data was collected and analysed in SPSS version 19 and statistical significance was calculated using Chi- square test.

Inclusion criteria: Mothers of 28 or more weeks pregnancy with PROM were included in this study.

Exclusion criteria: Pregnancyless than 28 weeks gestational age were excluded from the study.

RESULTS

During this study period 1240 pregnant women were admitted in the department of Obstetrics and Gynaecology for delivery. Sixty four of them had complaints of PROM. The prevalence of PROM was found 5.2%. Among them term and preterm PROM was 66% and 34% respectively. Age the women developed PROM ranges from18 to 32 years and mean maternal age was 24.82± 3.71 years and the most common age group was 20 to 30 years. Educational status revealed 95% of the women and about 97% of husbands were literate. About 86% women were housewives. Husbands were service holders and businessman 6% and about 34% respectively. Majority of the women came from higher middle (42.18%) and affluent (32.81%) socio-economic condition. Obstetrical history revealed 69% percent of the population were prim gravida (Table I). Antenatal checkup was received regularly by 68 % of mothers. Supplementary iron, calcium, vitamins and minerals was taken regularly and irregularly by 68.75% and 25% pregnant mothers respectively. Only a few (6.25%) did not take any supplementary drugs during their antenatal period. About 74% women took balanced diet in their meal (Table II). About 34% and 6% had history abortion and PROM in previous pregnancy (Figure I). Women with PROM were suffering from Hypertension (7%), Diabetes (5%), Respiratory tract infection (15%), Urinary tract infection (3%), hyperpyrexia (7%), and vaginitis (20%) (Figure II). Anaemia was detected in 25%, 23.4% and 3% as mild, moderate and severe degree (Figure III). Majority (71%) of the mothers delivered by caesarian section. Others delivered spontaneously and by medical induction or augmentation 26% and 3% respectively. Indications of caesarian sections were foetal distress (31.82%), high head (22.73%), malpresentation (11.36%), oligohydramnios (11.36%), low birth weight LBW (6.89%), history of previous twice caesarian section (4.54%), prolonged labour (2.27%) and more than one indication (13.33%) (Figure IV). Fifty two percent babies were male and 48% werefemale. Among the newborns 28% were LBW babies. Birth asphyxia was noticed among 32% newborns (Table III). Perinatal death occurred in 14% neonates due to respiratory depression (77.78%) and septicemia (22.22%) (Table IV). Twenty nine percent newborns needed to be admitted at NICU. Mean interval of PROM and hospitalization was 8.5 hours. Mean interval of PROM and delivery was13.2 hours (Table V).

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Table I: Socio-demographic characteristics of women. (n=64)

Maternal age	n	%
<20	6	9.37
20to25	28	43.75
>25to30	28	43.75
>30	2	3.13
Total	64	100
Maternal education		
Illiterate	3	4.68
Primary	10	15.63
Upto VII	5	7.81
Upto X	7	10.93
SSC	14	21.87
HSC	18	28.12
Graduate & above	7	10.93
Total	64	100
Maternal occupation		
n	%	
House wife	55	85.94
service	4	6.25
student	2	3.13
others	3	4.68
Total	64	100
Husband's occupation	n	%
Service	36	56.25
Business	21	32.81
Unemployed	3	4.69
Student	3	4.69
Others	1	1.56
Total	64	100
Family Income		
BDT	n	%
upto 10,000	6	9.38
>10.000-30,000	10	15.63
>30,000-50,000	8	12.5
>50,000-100,000	19	29.687
>100,000	21	32.81
Total	64	100
Parity	n	%
Primi	44	69
Multi	20	31
Total	64	100

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Table II: Distribution of women according to Antenatal care received. (n=64)

Antenatal checkup	n	%
Regular	43	68
Irregular	19	29
No	2	3
Total	64	100
Balanced diet intake	n	%
Yes	47	74.2
No	17	25.8
Total	64	100
Supplementary Iron, calcium, vitamins, minerals	n %	
Regularly	44	68.75
Irregularly	16	25
No	4	6.25
Total	64	100

Table III: Characteristics of newborns. (n=64)

Sex	n	%
Male	33	52
Female	31	48
Total	64	100
Matuirity	n	%
Term	42	66
Preterm	22	34
Total	64	100
Birth weight (in kg)	n	%
<2.5	18	28
2.5 to3	30	47
>3	16	26
Total	64	100
Birth Asphyxia (APGAR scoring at 5 min)		
0-3	4	6
4-6	16	26
7-10	44	68
Total	64	100

Table IV: Perinatal Morbidity and Mortality among Term and Preterm PROM. (n=64)

	Term PROM		Preterm PROM	
	n	%	n	%
Newborn delivered	42	65.62	22	34.38
LBW	2	3	16	25
Asphyxia	6	9.37	14	21.87
Septicemia	3	4.69	3	4.69
Jaundice	12	18.75	18	28.12

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Birth defect	1	1.56	2	3.12
Mortality	1	1.56	8	12.5

Table V:PROM- Delivery interval vs Delivery Neonatal outcome.(n=64)

PROM-Delivery interval	Newborns delivered		Asphyxia		Sepsis		Mortality	
	N	%	n	%	n	%	n	%
<12 hr	48	75	10	20.83	4	8.33	6	12.5
>12 hr	16	25	10	62.5	8	50	3	18.75

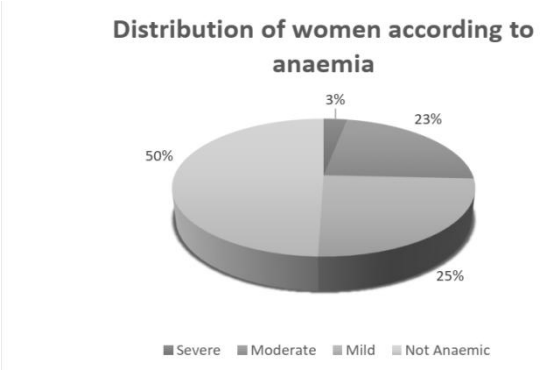

Figure I: Distribution of women according to anemia. (n=64)

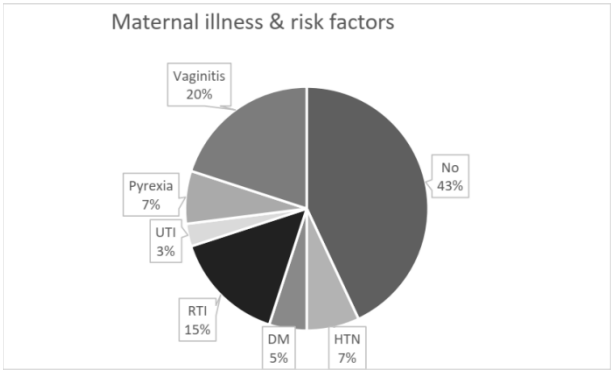

Figure II: Distribution of women according to maternal illness and risk factors (N=64).

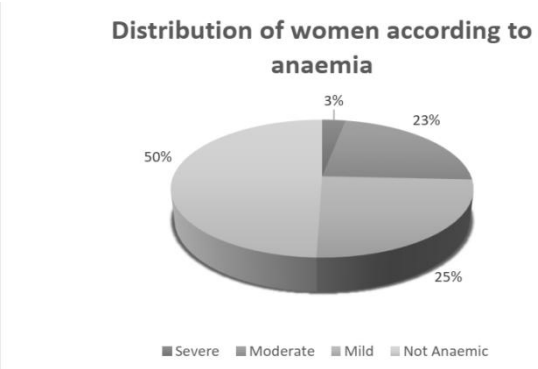

Figure III: Past obstetrical history. (n=64)

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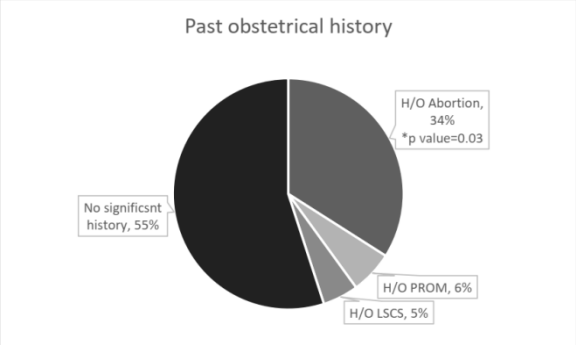
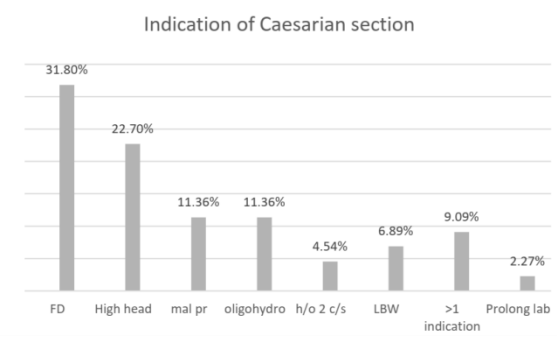


Figure IV: Indications of Caesarian section (N=64).



DISCUSSION

This one-year study conducted at In-patient Department of Dhaka National Medical College Hospital shows the prevalence of PROM 5.2% which is similar to that of other studies 6-9%, 2.7-17% and 5-10%.[2,4,5] Worldwide, there is a slight difference in the prevalence of PROM and this could be due to the difference in the population studied. Here PROM occurred more frequently in term pregnancy (66%) than preterm pregnancy (34%). Another author also found higher percentage of term PROM than preterm PROM in a study at Dhaka.[10] In this study the mean age of pregnant women of PROM was found 24.82±3.71 which is of no difference in comparison to other studies by Begum H[10], Michael Moretti et al,[11] Begum A Chowdhury[12] and Tasnim S.[13] In present study increased percentage (69%) of PROM observed in prim gravida than multigravidas which is exact to and near to the results of Endale et al[14] (69.7%) and SurayapalemS etal[15] (58%) but dissimilar to several other studies (60%, 71%, 70%).[10-12] They found multi-parity is a risk factor for PROM due to long standing infection, trauma to cervix and patulous os. Actually, in current study prim gravida were admitted more in number for delivery which results the number of prim gravida PROM higher.Current study found no relationship between PROM and socioeconomic status, antenatal check- up, diet and nutrition intake. Whereas others found incidence of PROM was high in cases of low socioeconomic status.[14] Poor nutritional status leads to decreased antibacterial activity and increased defects in foetal membranes causing rupture of membrane. In this study, only a small portion of the population were from low socioeconomic status who did not receive antenatal checkup, supplements and nutritious diet which causes the dissimilarity in results with others.This study found anaemia, respiratory tract infection, urinary tract infection, pyrexia and vaginitis as risk

factors of PROM. Maternal infection (p value=0.0004) and vaginitis (p=0.0001) were found as significant risk factors of PROM which were statistically highly significant too. Other studies in India reported anaemia, genitourinary infections as risk factors of PROM.[15] In addition, this study found important past obstetrical history like, history of PROM and abortion in prior pregnancies. History of Abortion is noticed as a statistically significant risk factor of developing PROM (p value= 0.03%). Dr. V. Revathi, et al also showed in their study the incidence of premature rupture of membranes higher in women with previous history of abortion and premature rupture of membranes.[16] This recurrent cause of PROM is possibly due to cervical incompetence or patulous os. The present study showed occurrence of Caesarian section is significantly high (71%) among PROM mothers (p value=0.003). Here, foetal distress was found the commonest indication of caesarian section which is of no difference from the results (32.73%) of Surayapalem S et al.[7] Other authors also found women with PROM have a higher risk of caesarian delivery for non-reassuring foetal heart rate.[1,6] Beside this, to avoid other complication like chorioamnionitis, prolonged labour, placental insufficiency and formalpresentations caesarian sections were performed.The study found LBW among 28% of newborns of PROM. Prematurity was the main cause of LBW in this study. Mondol A and KanungoS[17] found 20% of LBW among PROM cases. The incidence of prematurity in PROM reported by Calkins LA,[18] Taylor ES[19] and Gunn GC[20] ranged between 9-40% with an average of 20%. Current study found birth asphyxia among 31.25% newborns by APGAR scoring at 5th minute of birth. Another author found lower percentage (23.8%) of birth asphyxia among the newborns of PROM cases.[21] In current study, prematurity (21.87%) and lengthening of PROM-delivery interval (62.5%) was found as factors of birth asphyxia. There is always an association of perinatal morbidity and mortality with PROM. Here, complications among the newborn of PROM like, septicaemia (6%), neonatal jaundice (30%), and birth defect (3.1%) were noticed. Many newborns were referred to another hospital for better neonatal care, so follow up of all ill babies were not possible and exact percentage of morbidity could not be mentioned. The study found LBW (25%), asphyxia (21.86%), jaundice (28.12%), birth defect (3.12%) and mortality (12.5%) with increased percentage among preterm PROM than term PROM. Another author also found birth weight less than 2500 gm was associated with an eight-fold increase in unfavourable outcome.[21] This study found perinatal mortality 14% (n=9) among the newborn of PROM which is almost similar to the results of Padmaja J and Swarupa K[22] (15%). This study found perinatal death mostly (89%) among the preterm PROM newborns. Among them 6 (66.67%) died from birth asphyxia and 2(22.22%) due to septicaemia. One perinatal death (11.11%) in term PROM was due to respiratory distress syndrome (RDS). Another author found perinatal mortality due to RDS (53%), sepsis (27%) and birth asphyxia 20%. Current study found unfavorable neonatal outcome more among preterm PROM in comparison to term PROM. In addition, neonatal morbidity and mortality were higher where PROM-Delivery interval was prolonged. Similarly, there was an association between increased likelihood of foetal unfavorable outcomes and longer duration of PROM in the studies of Alam MM et al[23] and Ash AK.[24] Prolonged PROM-delivery interval increases the risk of

sepsis which is an important cause of unfortunate neonatal outcome.

Limitation of the study:

The study did not include a non-PROM group for comparison. Moreover, the sample size of population in the current study was small and was limited to one hospital, so it could not represent the picture of whole population of Bangladesh. Therefore, large scale studies of longer duration are necessary to get a real picture of risk factors and outcomes of PROM.

CONCLUSION

To conclude, in present study no association was found between socioeconomic factor, antenatal care and PROM. The study found maternal infection, vaginitis and history of abortion in previous pregnancy as significant risk factor of PROM. Besides, anaemia and history of PROM in prior pregnancy was detected as risk factors in index pregnancy. Rate of caesarian section was increased in PROM and foetal distress was the commonest indication. Preterm PROM results in unfavorable perinatal outcomes. With increase PROM -delivery interval perinatal asphyxia, sepsis and mortality increased. Therefore, to avoid PROM and reduce perinatal morbidity andmortality maternal risk factors should be detected and corrected early. Appropriate antibiotic coverage and termination of pregnancy in time will reduce perinatal infectious morbidity and asphyxia.

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