



Original Article

Maternal and Fetal Outcome of Preterm Prelabor Rupture of the Membranes in a Tertiary Care Hospital

Mst. Rokeya Khatun,¹ Nasrin Akter,² Md. Nowshad Ali³

Abstract

Objective: To describe the clinical presentation and fetomaternal outcome of preterm prelabor rupture of the membrane of patients admitted in a tertiary care hospital of Bangladesh.

Methods and Material: This is a cross-sectional observational type study carried out in Rajshahi Medical College Hospital, Rajshahi, Bangladesh during the year 2019 in the Department of Obstetrics and Gynecology. Sixty pregnant women with preterm prelabor rupture of the membrane (gestational age 28 to 37 weeks) were included in this study.

Results: The mean age of the women was 27.03±6.13 years. Forty (66.7%) of them were from rural area. Majority were studied up to primary school (33.30%). Sixty five percent were house wife. Thirty seven (61.7%) women were multi gravid. Mean gestational age of the patient was 34.43±2.75 weeks. Antenatal care of the women was low. Most of the women have associated one or more diseases like anemia (35%), Urinary tract infection (28.33%), Pregnancy induced hypertension (20%), Lower genital infection (13.33%), gestational diabetes mellitus (10%) and heart disease (3.33%). The mean time interval between membrane rupture and delivery was 29±9 hours. Thirty one patients (51.7%) were delivered by caesarian section. Twenty eight (46.7%) women did not experience any complication and other suffered from wound infection (20%), PPH (10%), puerperal sepsis (8.33%) and chorioamnionitis (11.7%). Mean birth weight of the newborns was 2.16±0.42 Kg. Thirty eight (63.33%) newborn suffered from complications like neonatal asphyxia (30%), respiratory distress syndrome (13.3%), neonatal jaundice (11.7%) and neonatal sepsis (3.3%). Neonatal death was noticed in three (5%) cases. Fetal outcome was found significantly ($p < 0.001$) associated with low gestational age.

Conclusion: Women with low education, associated co-morbidity, long latency and neonate with low birth weight have unfavorable outcome. Antenatal care is an important tool to prevent preterm prelabor rupture of the membrane by identifying the risk factors and its management. Optimum obstetric and medical care is essential for the reduction of these devastating complications.

Key words: Preterm prelabor rupture of the membrane (PPROM); maternal and neonatal outcome; risk factors.

TAJ 2020; 33: No-2: 01-09

Introduction

Prelabor rupture of membranes (PLROM) or premature rupture of membrane (PROM) is a syndrome characterized by spontaneous rupture of

the chorioamnion before the onset of labor. It occurs in approximately 10% of all pregnancies.¹ When PROM occurs before 37 completed weeks, it is called preterm prelabor rupture of the

¹ Associate Professor, Department of Obstetrics and Gynecology, Rajshahi Medical College, Rajshahi

² Assistant Registrar, Department of Obstetrics and Gynecology, Rajshahi Medical College, Rajshahi

³ Professor, Department of Pediatric Surgery, Rajshahi Medical College, Rajshahi

membrane (PPROM). It is responsible for approximately 35% of all preterm delivery and it complicates approximately 2%-3% of all pregnancies below 37 weeks gestation.² Incidence of PROM in Bangladesh is not known but a study shows that Incidence of PROM in Dhaka Medical College Hospital is 8.12% and 1.94% at Holy Family Red Crescent Hospital.^{3,4}

In majority of the condition, exact causes are unknown. The amniotic membranes are connective tissue structure and their tensile strength depends on the synthesis, degradation and quality of their collagen. An abnormal collagen structure may be responsible for PROM as evidenced by the high frequency of PROM in women affected by connective tissue disorders such as the Ehlers-Danlos syndrome.^{1,3} However, epidemiological studies have identified several risk factors associated with PROM. Genital tract infection (bacterial vaginosis) or colonization with various microorganisms, low socioeconomic condition, poor nutrition, anemia, poor hygiene, stress, high parity, smoking and ante partum hemorrhage have all been linked to an increased chance of PROM. Education plays a significant role in reducing the risk of PROM especially in developing countries.²

When PROM occurs earlier from term, there are significant risks of maternal and perinatal morbidity and mortality.⁵ Patients with premature rupture of membranes may present with leakage of vaginal fluid or vaginal bleeding but without contractions. If infection sets in, patients may also present with symptoms and signs of chorioamnionitis.⁶ Feto-maternal outcome is depend on many factors, such as gestational age, interventions (antibiotics, steroids) done, duration of labor, development of intrapartum chorioamnionitis etc.⁷ Infection is closely associated either as an etiologic factor or as a consequence of PROM. From the maternal point of view, chorioamnionitis is a major problem which can lead to intrapartum and postpartum sepsis and rarely, septicemia. Among women with PPRM, clinically evident intra-amniotic infection occurs in approximately 15–25%. Abruptio placentae can cause PPRM or occur subsequent to membrane rupture and affects 4% to

12% of these pregnancies.^{8,9} It can also lead to maternal morbidity such as postpartum endometritis, disseminated intravascular coagulopathy, delayed menses and Asherman syndrome.¹⁰ Thus PPRM is associated with a higher frequency of cesarean delivery, prolonged maternal febrile morbidity, and an increased rate of neonatal infection, all of which result in prolonged hospitalization and expense for mother and neonate. The consequences of PPRM for the neonate fall into three major overlapping categories. The first is the significant neonatal morbidity and mortality associated with prematurity. Secondly the complications during labor and delivery increase the risk for neonatal resuscitation and thirdly infection. The relative contributions of prematurity and perinatal infections to perinatal mortality are responsible for most of the controversy surrounding the optimal management of PPRM. Complications such as respiratory distress syndrome (RDS), intraventricular hemorrhage (IVH) and necrotizing enterocolitis (NEC) contribute to most of the cases of neonatal mortality.^{11,12}

PROM and PPRM are commonly seen in the obstetric ward in our country. There are very limited studies about PPRM. The aim of this study was to study the clinical profile and feto-maternal outcome of preterm prelabor rupture of the membrane.

Materials and Methods

Study Design: This is a prospective, cross-sectional, observational study.

Place of Study: The study was conducted in the Department of Obstetrics & Gynaecology of Rajshahi Medical College Hospital, Rajshahi, Bangladesh.

Study Period: 12 months, January to December 2019.

Study population: Pregnant women between the gestational age of 28 – 37 weeks who presented with preterm prelabor rupture of membranes (PPROM).

Sampling Method: Purposive sampling.

Sample size: Total 60 patients were included in this study.

Selection criteria:

Inclusion criteria: 1) Age: >18 years of age 2) Diagnosed case of PPRM. 3) Gestational age 28-37 weeks 4) Willing to participate.

Exclusion criteria: 1) Patients with congenital anomalies 2) Multiple pregnancies 3) Pre-eclampsia 4) Eclampsia 5) Diabetes Mellitus 6) Polyhydramnios 7) Placental abruption along with those who presented with preterm premature rupture of membranes at term 8) Patient with history of preterm PROM with labour pain 9) Chorioamnionitis.

Operational definitions:

Preterm prelabour rupture of the membrane: Pre term pre labor rupture of membranes (PPROM) refers to rupture of the fetal membranes prior to the onset of labor before 37 completed weeks of gestation.

Maternal outcome was defined by the presence of, 1) Chorioamnionitis. 2) Percentage of continuation of pregnancy. 3) Percentage of termination of pregnancy. 4) Placental abruption. 5) Operative interference. 6) Puerperal sepsis. 6) Wound site infection. 7) Postpartum hemorrhage

Fetal outcome was categorized to the following-1) Prematurity. 2) Low birth weight. 3) Severe birth asphyxia. 4) Respiratory distress syndrome. 5) Neonatal sepsis. 6) Death. 7) Referred to other center.

Study procedure

Before commencement of the study, formal ethical approval was taken from ethical review committee of RMC. Women who came with premature prelabor rupture of membrane were approached for inclusion of the study. The diagnosis of ruptured membranes was made by history of a gush of fluid from the vagina, observation of vaginal pooling on speculum evaluation. Written Informed consent was obtained from the patients and/or guardian. During admission, patients' demographic variable and complete obstetric history was recorded. Face to face interview was

conducted by using a semi-structured questionnaire containing socio-demographic parameters and relevant information about the outcome of both mother and her foetus. Finally data analysis was done SPSS 23.

Ethical issues: Patients (subjects) and key relatives were clearly informed about the scope and limitations of the study. Informed Written consent was obtained from the patients (subjects).

Data Processing and Analysis:

After collecting the data, it was checked and rechecked for omission, inconsistencies and improbabilities. After cleaning the data, it was coded and entered into the computer. For statistical analysis, SPSS 23.0 version was used. Result was presented in tables, figures. Confidence interval was set as 95% level. The qualitative variables were expressed as frequency and percentage and the quantitative variables were expressed as mean \pm standard deviation. During analysis, chi-square test was done to estimate the relationship or association between variables and in all cases p value <0.05 was considered statistically significant.

Results

This is a cross sectional observational study which was conducted in Department of Obstetrics & Gynaecology, Rajshahi Medical College Hospital, Rajshahi. During study period a total 60 women, who attended at the hospital due to PPRM were included in this study. Socio- demographic profile of the women is projected in Table 1. Mean age of respondents was 27.03 \pm 6.13 years. Forty women (66.7%) hailed from rural area. Educational level was poor, only 11.7% women were graduate and 65 percent respondents are house wife. Majority (61.7%) were multi gravid. Mean gestational age of the women were 34.43 \pm 2.75 week. Antenatal care was taken regularly 18.3% and irregularly 46.7%. Most of the women have associated one or more diseases like anemia (35%), Urinary tract infection (28.33%), Pregnancy induced hypertension (20%), Lower genital infection (13.33 %), GDM (10%) and heart disease (3.33%)(Table 2).The mean time interval between membrane rupture and delivery was 29 \pm 9 hours.

Thirty one patients (51.7%) were delivered by LUCS and 48.3% were by NVD. Apgar's score at 5 minute of the newborn was <7 were 61.7% and >7 were 38.3%. Twenty eight (46.7%) women did not experience any complication and other suffered from wound infection (20%), PPH (10%), puerperal sepsis (8.33%) and chorioamnionitis (11.7%) (table 3). Mean birth weight of the newborns was 2.16 ± 0.42 KG (Table 4). Thirty

eight (63.33%) newborn suffered from complications like neonatal asphyxia (30%), respiratory distress syndrome (13.3%), neonatal jaundice (11.7%) and neonatal sepsis (3.3%). Neonatal death was noticed in three (5%) cases (Table 5). Fetal outcome was found significantly ($p < 0.001$) associated with low gestational age (Table 6).

Table 1: Socio-demographic and obstetric profile of the respondents (n=60).

Variables	Frequency (n)	Percent (%)
Age (Years)		
≤20	7	11.7
21-25	14	23.3
26-30	22	36.7
31-35	11	18.3
≥35	6	10
Mean age 27.03 ± 6.13		
Residence		
Urban	20	33.3
Rural	40	66.7
Education		
Primary school	7	11.7
SSC	15	25
HSC	13	21.7
Graduate	7	11.7
No education	5	8.3
Occupation		
House wife	39	65
Service	11	18.3
Business	4	6.7
Others	5	8.3

Gravity		
Primi	23	38.3
Multi	37	61.7
Gestational age (week)		
28-30	7	11.7
31-34	14	23.3
34-37	39	65
Mean 34.43±2.75		
ANC		
Regular	11	18.3
Irregular	28	46.7
No	21	35
Duration of PPRM (hours)		
≤12	14	23.3
12-24	21	35
25-48	12	20
≥48	13	21.7
Duration of PPRM to delivery (hours)		
≤24	21	36
≥24	39	64
Mode of delivery		
NVD	23	38.3
LUCS	31	61.7
Apgar's score in 5 minute		
≤7	37	61.7
≤7	23	38.3

Table 2: Distribution of respondents by presence of associated disease (n=60)

Disease	Frequency (n)	Percentage (%)
Anemia	21	35
Urinary tract infection	17	28.33
Pregnancy induced hypertension	12	20
Lower genital tract infection	8	13.33
Gestational diabetes mellitus	6	10
Heart disease	2	3.33

*Multiple responses considered

Table 3: Distribution of respondents by maternal complication (n=60)

Maternal Complication	Frequency (n)	Percentage (%)
No complication	28	46.7
Postpartum haemorrhage	6	10
Puerperal sepsis	5	8.33
Wound infection	12	20
Chorioamnionitis	7	11.7

*Multiple responses considered

Table 4: Distribution of neonates by birth weight (n=60)

Birth weight (kg)	Frequency (n)	Percentage (%)
≤1.5	8	13.3
1.6-2	20	33.3
2.1-2.5	13	21.7
>2.5	19	31.7
Mean ± SD	2.16±.42	

Table 5: Distribution of respondents by fetal complication (n=60)

Fetal Complication	Frequency (n)	Percentage (%)
No complication	22	36.7
Neonatal asphyxia	18	30
Neonatal Jaundice	7	11.7
Neonatal sepsis	2	3.3
Respiratory Distress Syndrome	8	13.3
Neonatal Death	3	5
Total	60	100

*Multiple responses considered

Table 6: Association between gestational weeks and fetal outcome (n=60)

Gestational age	Fetal Complication		Total	*p value
	Yes	No		
28-30 weeks	7	0	7	
31-34 weeks	14	0	14	<.001
35-37 weeks	17	22	39	
Total	38	22	60	

*p value was determined by chi square test

Discussion

Premature rupture of membrane (PROM) refers to the disruption of fetal membranes before the beginning of labor, resulting in spontaneous leakage of amniotic fluid¹³. PROM, which occurs prior to 37 weeks of gestation, defined as preterm PROM. PROM occurs in approximately 5%–10% of all pregnancies and associated with 30–40 % of preterm birth and is one of the most common underlying causes of preterm delivery and perinatal death.¹⁴ In Bangladesh, every year, around 28,000 women die due to complications of pregnancy and childbirth. Nonscientific intervention in PROM made at various levels aggravates the pregnancy complications and thereby leading many more deaths of fetus and newborn. Proper diagnostic facilities, proper monitoring facilities and a standard protocol in the management can improve the maternal and fetal outcome.¹⁵ This study was a cross sectional study which was done to evaluate maternal and fetal outcomes of preterm PROM in tertiary medical college hospital of Bangladesh.

Majority respondents were in age group 26-30 years (36.7%) with a mean age of 27.03 ±6.13 years. The average maternal age of our subjects showed similarity with that reported in some other studies; those values were 27.46 years in Galletta et al's study¹⁶ 26.36 years in Flores's study.¹⁷ In contrast, our patients had a lower average maternal age than those reported by Dars et al.¹⁸, 30 years by Frenette et al.¹⁹, 29.7 years by Garite et al.²⁰ Higher maternal age could be related to the more frequent presence of maternal diseases, such as

hypertension and diabetes, or obstetric pathologies, such as twinning and fetal malformations. But in our country, women are getting married at a early age which can be the reason of this disagreement.

About 66.7% respondents hailed from rural area. Regarding educational level 33.30% were studied up to primary school, 25% up to secondary school, 21.70% up to higher secondary school, 11.7% up to graduation and only 8.30% were illiterate. Sixty Five Percent respondents were housewives and 81.70% belonged lower-middle socio economic class according to their monthly income. This study was held in a Govt. tertiary level hospital of Northern Bangladesh. So, people residing in nearby rural area belonging lower-middle class of society were seen in majority in number in this study. Rural life style and illiteracy is interrelated and it affects nutrition, living standard, personal hygiene, immunity and consciousness of the patient. According to Ferguson et al, PROM seemed to be more common in patients who resided from rural area and belonged to lower socio economic condition.²¹

Majority respondents were multigravida (61.7%) in this study. Multiparity might aid to PPROM due to long standing infection, previous trauma to cervix and patulous os. Khade et al., and Nakubulwa et al. also found more frequency of multigravida in their study. Mean gestational age of respondents was 34.43 (±2.75) weeks. One of the most important functions of antenatal care (ANC) is to offer the woman information about the appropriate place of delivery, given her own

particular circumstances and health status. ANC is also an opportunity to inform women about the danger signs and symptoms for which assistance should be sought from a health care provider without delay. More than half of study population received Antenatal was taken irregularly by 46.7% and regularly by 18.3% pregnant women. One study shows among Bangladeshi Women 33.41% participants didn't receive any ANC visit during pregnancy and 66.49% participants receive at least one ANC visit.²²

Presenting associated disease among respondents was anemia (35%), UTI (28.33%), PIH (2%), LGTI (13.33%), GDM (10%) and heart disease (3.33%). Infection is the most common cause of PPRM and Anemia, hypertension and diabetes are also established associated risk factors of PPRM by affecting nutrition and immunity of the patient produce PROM.²³

Time interval between membrane rupture and delivery was 12-24 hours among 35% respondents, <12 hours among 23.3% respondents, >48 hours among 21.7% respondents and 25-48 hours among 20% respondents. Majority respondents' delivery was done by LSCS (52.7%) and 48.3% underwent vaginal delivery. Chakrabarti et al. found 89.47% patients were delivered by caesarean section & 10.53% patients were delivered vaginally.²⁴ Singh, Kanti and Verma found 54.36% LSCS and 45.63% Vaginal delivery.²⁵

About 46.7% respondents did not experience any maternal complication. Among others, major complications were wound infection (20%), PPH (10%), Puerperal sepsis (8.33%) and chorioamnionitis (11.7%). Lovereen et al. also found puerperal sepsis, PPH, wound infection and chorioamnionitis as common complications corresponding to present study.⁷ Majority neonates' birth weight was 1.6-2 kg (33.3%) with a mean of 2.16 ±.42 kg. About 61.70% neonates had Apgar's score at 5 minutes less than 7. About 36.7% neonates did not have any complication. Among others, complications were neonatal asphyxia (30%), Respiratory Distress Syndrome (13.3%), neonatal jaundice (11.7%) and neonatal sepsis (3.3%). Neonatal death was noticed in 5%

cases. Twenty Five Percent neonates needed NICU admission. Mohokar, Bava and Nadanwar also found neonatal jaundice, birth asphyxia, sepsis and RDS as common complication.²⁶ Sultana and Kormokar assessed mean neonatal weight as 2.60 kg and found neonates suffering from neonatal asphyxia (43%), respiratory distress syndrome (15%), neonatal jaundice (22.5%) and neonatal sepsis (10.5%).²⁷

PPROM is linked to significant ($P < 0.001$) maternal and fetal morbidity and mortality. Necessary steps should be taken for prevention and early management from community level.

Conclusion

From this study we observed that more than half of the patients were delivered by LUCS. More than half of the study population experienced maternal complications and more than two thirds experienced neonatal complications including death. Women with low education, associated comorbidity, long latency and neonate with low birth weight have unfavorable outcome. Antenatal care is an important tool to prevent PPRM by identifying the risk factors and its management. Optimum obstetric and medical care is essential for the reduction of these devastating complications.

References

1. Nazneen S, Begum F, Nargis S. Premature rupture of membrane - A clinical study in comilla medical college hospital. Bangladesh J Obstet Gynecol. 2013;28(2):82-7.
2. Akter S, Akther R, Rashid M. Preterm Prelabour Rupture of the Membrane & Feto-Maternal outcome: an Observational Study. J Bangladesh Coll Physicians Surg. 2010;28(1):17-23.
3. Dutta DC. Prelabour Rupture of the Membranes. 6th ed. 2006. 317-320 p.
4. Tasnim S, Bhuiyan A. Outcome of premature rupture of membranes. Bangladesh J Obstet Gynaecol. 1998;13(1):16-20.
5. Afza NS, Nargis W, Ahamed BU, Sikder NH. The incidence, risk factors and common foetal outcome of chorioamnionitis in women with Preterm Premature Rupture of Membrane (PPROM): A single centre study. Bangladesh J Obstet Gynecol. 2011;26(1):10-9.
6. Khan S, Khan AA. Study on preterm pre mature rupture of membrane with special reference to

- maternal and its fetal outcome. Page Int J Reprod Contraception, Obstet Gynecol [Internet]. 2016;55(8):2768–74.
7. Lovereen S, Khanum A, Nargis N, Begum S, Afroze R. Maternal and Neonatal outcome in premature rupture of membranes. Bangladesh J Med Sci. 2018;17(03):479–83.
 8. Sirak B, Mesfin E. Maternal and Perinatal Outcome of Pregnancies With Preterm Premature Rupture of Membranes (Pprom) At Tikur Anbessa Specialized Teaching Hospital, Addis Ababa, Ethiopia. Ethiop Med J. 2014;52(4):165–72.
 9. Gonen R, Hannah ME, Milligan JE. Does prolonged preterm premature rupture of the membranes predispose to abruptio placentae? Obstet Gynecol. 1989 Sep;74(3):347–50.
 10. Okeke T, Enwereji J, Okoro O, Adiri C, Ezugwu E, Agu P. The Incidence and Management Outcome of Preterm Premature Rupture of Membranes (PPROM) in a Tertiary Hospital in Nigeria. Am J Clin Med Res. 2014;2(1):14–7.
 11. Phupong V, Taneepanichskul S. Outcome of preterm premature rupture of membranes. J Med Assoc Thail. 2000 Jun ;83(6):640–5.
 12. Rajan R, Menon V. Preterm premature rupture of membranes : correlates and pregnancy outcome in a tertiary care setting. Int J Res Med Sci 2016;4(8):3310–6.
 13. Ladfors L. Prelabour rupture of the membranes at or near term. Clin Epidemiol Stud. 1998;12(3):95.
 14. Duff P. Premature rupture of membranes in term patients: induction of labor versus expectant management. Clin Obs Gynecol [Internet] 1998;41(1):883–91. Available from: [https:// insights.ovid.com/pubmed?pmid=9917943](https://insights.ovid.com/pubmed?pmid=9917943)
 15. Begum A, Ghani T, Paul SK, Hussain T, Begum N. Outcome of Premature Rupture of Membranes A Study of 120 Cases in Dhaka Medical College Hospital. J Dhaka Med Coll. 2017;25(2):82–6
 16. Galletta MAK, Bittar RE, Agra I, Guerra ECL, Francisco RPV, Zugaib M. Epidemiological profile of patients with preterm premature rupture of membranes at a tertiary hospital in São Paulo, Brazil. Clinics 2019; 74:e1231.
 17. Miranda Flores A. Maternal and perinatal outcomes of conservative management of premature rupture of membranes in pregnancies of 24-33 weeks. Acta Médica Peru. 2014;31(2):84–9.
 18. Dars S, Malik S, Samreen I, Kazi RA. Maternal morbidity and perinatal outcome in preterm premature rupture of membranes before 37 weeks gestation. Pak J Med Sci 2014;30(3):626–9.
 19. Frenette P, Dodds L, Armson BA JK. Preterm prelabour rupture of membranes: effect of latency on neonatal and maternal outcomes. J Obs Gynaecol Can 2013;35(8):710–7.
 20. Garite TJ, Combs CA, Maurel K, Das A, Huls K PR. A multicenter prospective study of neonatal outcomes at less than 32 weeks associated with indications for maternal admission and delivery. Am J Obs Gynecol 2017;217(1):72.e1-72e9.
 21. Ferguson S. Preterm premature rupture of membranes Nutritional and socioeconomic factors. Obstet Gynecol. 2002 Dec;100(6):1250–6.
 22. Amina A. An Analysis of the Status of Antenatal Care in Bangladesh. Int J Sci Res Methodol. 2016;5(2).
 23. Ashley S. Roman, MD, MPH&Martin L Pernoll M. Late pregnancy complication, Current obstetric Gynecologic Diagnosis and treatment. 8th ed. 1994. 286–87 p.
 24. Chakravartty DA. Sociodemographic Profile and Outcome of Preterm Premature Rupture of Membranes. J Med Sci Clin Res. 2018;6(8):514–21.
 25. Singh J, Kanti V, Verma V. Study of fetomaternal outcome in cases of premature rupture of membrane at tertiary care rural institute of Western Uttar Pradesh. Int J Reprod Contraception, Obstet Gynecol. 2019;9(1):77.
 26. Shweta Anant Mohokar, Amarjeet Kaur Bava YSNA. Analysis of Maternal and Perinatal Outcome in Cases of Preterm Premature Rupture of Membranes Shweta. Int J Reprod Contraception, Obstet Gynecol. 2018;7(11):4499.
 27. Shweta Anant Mohokar, Amarjeet Kaur Bava YSNA. Analysis of Maternal and Perinatal Outcome in Cases of Preterm Premature Rupture of Membranes Shweta. Int J Reprod Contraception, Obstet Gynecol. 2018;7(11):4499.
 27. Sultana DF. A study on Maternal and fetal outcomes of preterm premature rupture of membrane in Tertiary Medical College Bangladesh. J Med Sci Clin Res. 2019;7(2):184–92.