

# Premature rupture of membrane - Evaluation of incidence and risk factors in a tertiary Medical College Hospital

Ummul Nusrat Zahan<sup>1</sup>, Most. Nasrin Nigger<sup>2</sup>, Sheuly Akter<sup>3</sup>

DOI: <https://doi.org/10.3329/bccj.v11i2.69185>

## Abstract:

**Background:** Premature rupture of membrane (PROM) is defined as rupture of membrane before onset of true labour pain and one of the most common complications of pregnancy. It is associated with maternal morbidity and perinatal morbidity and mortality. Objective of this study is to determine the incidence and risk factors of pregnant woman with PROM admitted in a tertiary medical college in Bangladesh.

**Materials and methods:** This prospective observational study was conducted in the Department of Obstetrics and Gynaecology at Khawaja Yunus Ali medical college, Sirajgonj from 1<sup>st</sup> January 2021 to 31<sup>st</sup> December 2021. In this period total admitted antenatal patients were 8117. Among the pregnant patients with PROM were 665 and their weeks of gestation were > 28 weeks. Data was collected by an interviewer with semi structured questionnaire & check list.

**Results:** Incidence of PROM was 9.3%. PROM was found to be frequent (39.1%) in younger age group between 21-25 years. Majority of the patients were housewife (71%). Maximum (61%) patient's education level was up to secondary. PROM is extremely influenced by low socioeconomic status which was (49.1%) of cases in our study. It was also common in multigravida (67.2%) and term PROM was higher (56.4%) than preterm PROM (43.6%).

Analysis of risk factors revealed etiology was unknown in 53 (48%) cases, anemia (16%), lower genital tract infection (7.2%), UTI (19%), previous history of PROM (26.3%), malpresentation (15%) multiple pregnancy (6.7%) DM and GDM (10.5%) were commonly associated with PROM.

**Conclusions:** Early identification of various risk factors causing PROM and their management can prevent premature deliveries and its complications to some extent as well as serious maternal complication like Chorioamnionitis.

**Key words:** Premature rupture of membrane, Risk factors, Pregnancy.

## Introduction:

Premature rupture of membranes (PROM) is defined as the rupture of membranes before the onset of labor<sup>1</sup>. It occurs in approximately 2.7 to 17% of all pregnancies and in most cases happen spontaneously and without apparent causes and responsible for 35% of all preterm deliveries<sup>2</sup>. The membranes may rupture either at term, that is after 37 completed gestational weeks, or before term, when it is called preterm prelabour rupture of membranes (PPROM). Amniotic fluid is that fluid that is encased by amniotic membranes and it provides a protective environment for the developing fetus.

Theoretically, PROM may occur because of increased friability of the membranes, decreased tensile strength of the membrane or an increase in intrauterine pressure or both<sup>3,4</sup>. Under normal circumstances, the tensile strength of the membranes increases until 20 weeks and then plateaus until 39 weeks when it starts to decrease dramatically. The amniotic membranes are connective tissue structure, and their tensile strength depends on the synthesis, degradation and quality of their collagen<sup>4</sup>. 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.

Several epidemiological and clinical factors are considered precursors to PROM. These include maternal reproductive tract infections (e.g., bacterial vaginosis [BV], trichomoniasis, gonorrhea, Chlamydia and occult chorioamnionitis), behavioral factors (e.g., cigarette smoking, substance abuse, poor nutritional status, and coitus during pregnancy), obstetric complications (e.g., multiple gestation, polyhydramnios, incompetent cervix, gestational bleeding, prior cervical surgery and antenatal trauma)<sup>5-7</sup>. Environmental factors (e.g., stress, toxin exposure) and genetic predisposition also have been proposed.

PROM is a significant occurrence as it can cause maternal complications, increased operative procedures, and perinatal morbidity and mortality. Infection is closely associated either

1. Associate Professor of Obst. & Gynae Department, Bikrampur Bhuiyan Medical college & Hospital, Shrinagar, Bangladesh.
2. Assistant Professor of Obst. & Gynae Department, Khwaja Yunus Ali Medical college & Hospital, Sirajganj, Bangladesh.
3. Associate Professor of Obst. & Gynae Department, Khwaja Yunus Ali Medical college & Hospital, Sirajganj, Bangladesh.

## Corresponding Author:

Dr. Ummul Nusrat Zahan  
Associate Professor  
Obst. & Gynae Department  
Bikrampur Bhuiyan Medical college & Hospital  
Shrinagar, Bangladesh  
email: drnusrat77@gmail.com

as an etiologic factor or as a consequence of PROM. From the maternal point of view, chorioamnionitis is a major problem that can lead to intrapartum and postpartum sepsis and rarely, septicemia. Fetal deformities as a consequence of longstanding oligohydramnios and neonatal morbidity and mortality due to sepsis and prematurity are the important neonatal problems in PROM<sup>3</sup>. PROM is very often seen in a busy obstetric ward in our country. Proper diagnosis, close monitoring of the patients, appropriate antimicrobial therapy can improve the maternal and fetal outcome.

#### Methods:

PROM was diagnosed from history, clinical examination & investigations. Examination included inspection using Sim's vaginal speculum. Aseptic per vaginal digital examination was done to exclude the possibility of cord or fetal limb prolapse and to assess cervical dilatation & effacement.

This prospective study was carried out at the Department of Obstetrics & Gynaecology of KhwajaYounus Ali Medical College Hospital from January 2021 to December 2021. From all admitted pregnant patients, only cases of PROM were taken who were more than 28 weeks of pregnancy for the study. After formulation of aim of the study, a clinical data sheet was made for recording all information of the pregnant women. A verbal informed consent was taken from each woman. After history taking, previous antenatal records were checked and clinical examination was done. Diagnosis of PROM was confirmed from history of gush of fluid coming from the vagina, demonstration of amniotic fluid leakage from the cervix by a sterile speculum examination (P/S) or pooling of amniotic fluid in posterior vaginal fornix and observation of oligohydramnios by amniotic fluid index (AFI) through USG. During P/S examination, a high vaginal & endocervical swab was taken from all the patients and sent for culture & sensitivity, a blood sample for leukocyte count and urine for routine examination & culture sensitivity (C/S) was sent. E. coli was the most common pathogen. Plan of management of patients with PROM was decided according to the condition of the patient, duration of gestational age, duration of membrane rupture, associated any complicating factors, maternal & fetal condition and also neonatal intensive care facility. Prophylactic antibiotic (Erythromycin base 250 mg by mouth four times per day for 7 days for the study) was given. Patients with gestational age less than 34 weeks were put on conservative management and given dexamethason and follow-up was done to rule out signs of chorioamnionitis. Patients more than 37 weeks were put on conservative management till 24 hours, if no sign of labour was seen, then they were induced with PGE2 gel/Misoprostol (PGE1) or oxytocin. Labour monitoring was done with partogram and continuous fetal monitoring. If there was any deviation of progress of labour, then lower segment cesarean section (LSCS) was done. All data were recorded on an Excel spreadsheet and statistical analysis was done using Chi Square test.

#### Results:

During 12 months study, there were 2040 antenatal patients, of which 197 patients came with spontaneous rupture of

membrane giving an Incidence of PROM 9.3%. PROM was found to be frequent (39%) in younger age group between 21-25 years. Majority of the patients were housewife (71%) than employed (29%). Maximum (61%) patients' education level was up to secondary level. PROM is extremely influenced by low socioeconomic status which was 49% in our study, and 21.8% patients came from higher socioeconomic group.

Regarding obstetrics characteristics, PROM was common in multigravida (67.2%) than primigravida (32.8%), 8.2% pregnancy were twin and term PROM was higher (56.4%) than preterm PROM (43.6%) and 26.3% patients had previous history of PROM.

Analysis of risk factors revealed etiology was unknown in 53 (48%) cases, anemia (16%), lower genital tract infection (7.2%), UTI (19%), malpresentation (5.4%), multiple pregnancy (6.7%) DM and GDM (10.5%) were commonly associated with PROM.

**Table I:** Demographic characteristics of the patients with PROM (n-110)

SL No	Variables	Categories	No of patients	Percentage
1.	Age (years)	16-18	15	13.6
		21-25	43	39.1
		26-30	30	27.3
		>30	22	20
2.	Education level	Up to HSC	67	61
		Above HSC	43	39
3.	Occupation	Housewife	78	71
		Employee	32	29
4.	Socioeconomic condition	Low	54	49.1
		Middle	32	29.1
		High	24	21.8

**Table II:** Obstetric characteristics of the patients (n-110)

SL No	Variables	Categories	No of patients	Percentage
1.	Gravity	Primigravida	36	32.8
		Multigravida	74	67.2
2.	Gestational age	28 weeks-36 weeks+6 days	48	43.6
		>37-42 weeks	62	56.4
3.	Number of fetus	Single	101	91.8
		Multiple	9	8.2
4.	Past obstetric history	History of PROM	29	26.3
		History of abortion	11	11
		History of MR	5	4.5
		History of D & C	7	6.3

**Table III:** Risk factors for PROM

SL No	Variables	No of patients	Percentage
1.	Idiopathic	53	48
2.	UTI	21	19
3.	Anemia	18	16
4.	DM and GDM	7	6.3
5.	Malpresentation	6	5.4
6.	Lower genital infection tract	8	7.2
7.	Abnormal vaginal discharge	15	13.6

**Table IV:** Mode of Delivery (n=110)

SL No	Variables	No of patients	Percentage
1.	LSCS	74	67.3
2.	NVD	36	32.7

**Discussion:**

The cause of PROM is multifactorial. Incidence of PROM varies from country to country and from hospital to hospital in the same country. It is due to the socioeconomic condition of the patient and also of the country. Incidence among such a small number of patients does not reflect the total hospital incidence of the nation. In our study the incidence of PROM was 9.3%. This incidence is much higher than the study done by Nazneen S<sup>8</sup> which was 6.3%. A study undertaken at Dhaka Medical College Hospital (DMCH) in 1995 showed the incidence of PROM to be 8.12%<sup>9</sup> and in 2001 it was 9.05%<sup>10</sup>.

The majority (43%) of the patients belonged to the age group 21-25 years which is similar to the studies done by Nazneen S et al, Tasnim S and Begum A et al<sup>8,9,10</sup>. The apparent higher incidence of PROM in age group 21-25 years was due to fact that patients complete their childbearing in 3rd decade. Most of the patient's (71%) were housewife which was higher than the study showed by Assefa N et al<sup>11</sup> which was 58.8%. Most of the women in our country are housewife so the incidence is higher in comparison to their study. The highest group of patients (61%) education level was secondary level which is higher than the study by Mohan S et al which was 40.2%<sup>12</sup>. Poverty and illiteracy are interrelated and they affect nutrition, living standard, personal hygiene, immunity and consciousness of the patient. Low socio-economic status is an important risk factor. In our study 75% patients came from low socio-economic status. In a study by Begum N<sup>13</sup> 49% patients were in the group of low socioeconomic condition having no or irregular antenatal check-up which is almost similar to this study.

During the study period, 56.4% patients were admitted with term PROM (>37weeks) and 43.6% patients came prior to 37 weeks (PPROM), which is similar to the study of Nazneen S et al<sup>8</sup>. In the present study maximum patients were multipara (67.2%) which is almost similar to the study of Nazneen S and other study Tasneem<sup>9</sup> and Begum N<sup>10</sup>. Most of the patients are

uneducated and poor.

Although it is widely accepted that aetiology of PROM is multifactorial, in majority of the condition causes is not known<sup>14</sup>. Theoretically, PROM may occur because of increased friability of the membranes, decreased tensile strength of the membrane or an increase in intrauterine pressure or both<sup>3,4</sup>. In our study most of the causes were idiopathic (48%) which is similar to the study done by Hossain S et al<sup>14</sup> and in their study it was 46.09%. Among other associated factors urinary tract infection was the most important factor 19%, followed by anemia (16%) which was similar to the study done by S Akhter where findings were 34% and 26% respectively<sup>15</sup>. Another important risk factor for PROM is lower genital tract infection and abnormal vaginal discharge which was 7.2% and 13.6% respectively. In our study the incidence of DM & GDM was 6.3% and malpresentation were 5.3% which is lower than the study Yeasmin M S,<sup>16</sup> where the findings were respectively 10.5% and 15%.

This study also showed that previous PROM to be the strongest risk factor for premature ruptures of membranes. This might be due to untreated genitourinary infection and short cervical length. In our study previous history of PROM complicated 26.3% of cases which was almost similar to the study of Yeasmin MS<sup>16</sup> (28%) and higher than Lovreen S et al<sup>17</sup> where the finding was 16.3%.

In this series, 67.3% patients were delivered by caesarean section & 32.7% patients were delivered vaginally which was consistent with the study of Nazneen S where the rate of Cesarean Section was 77.2%. But Begum N shows that only 32% patients were delivered by C/S 13. Indications of LSCS in these cases were previous twice LSCS (1 case), post Caesarean Section (CS) with breech presentation (1 case), transverse lie (2 cases), post C.S. with Intra Uterine Growth Retardation (IUGR) (1 case), breech presentation (3 cases) & fetal distress (5 cases).

**Conclusion:**

From the above study, we found that the majority of the patients were poor; their access to antenatal care was poor. It might be due to lack of awareness and/ or knowledge. It was presumptive that PROM was malnutrition and poverty related disease. Prelabor rupture of membranes has significant impact on perinatal outcome. Antenatal care is an important tool to prevent PROM by identifying risk factors and its proper management can ensure healthy mother and healthy baby.

**References:**

1. Veleminsky M, Sak P. Management of pregnancy with premature rupture of membranes (PROM). *J Health Sci Manag Public Health* 2006;192-7.
2. Willium's Obstetric Gynaecologic: Pretemlabour, Prelabour rupture of membrane. 19 Edition 1993. Appleton and Lenge, California, USA. Page 361. 3. Usha R. Krishna and Monisa H. Shah. Prelabour Rupture of Membranes, Obstetrics and Gynecology for Postgraduates, edited by S.S. Ratnam, K. Bhasker Rao and S. Arulkumaran, 2nd edition-1999; Vol-1, 96-108.

4. Arias F, Daftary SN, Bhide AG. Premature Rupture of Membrane, Practical Guide to High Risk Pregnancy & Delivery, A South Asian Perspective, 3rd edition-2008; 240-61.
5. Macones GA, Parry S, Elkousy M, Clothier B, Ural SH, Strauss JF., III A polymorphism in the promoter region of TNF and bacterial vaginosis: preliminary evidence of gene-environment interaction in the etiology of spontaneous preterm birth. *Am J Obstet Gynecol.* 2004;190(6):1504–8.
6. Burns DN, Landesman S, Muenz LR, et al. Cigarette smoking, premature rupture of membranes, and vertical transmission of HIV-1 among women with low CD4+ levels. *J Acquir Immune Defic Syndr.* 1994; 7(7): 718–26.
7. Silverman RK, Wojtowycz M. Risk factors in premature rupture of membranes. *Prim Care Update Ob Gyns.* 1998; 5(4):181.
8. Nazneen S, Begum F, Nargis S. Premature Rupture of Membrane-A clinical study in Comilla Medical College Hospital. *Bangladesh J Obstet Gynaecol.* 2013; 28(2): 82-7.
9. Tasnim S. Clinical profile and outcome of pregnancy in premature rupture of membrane in Dhaka Medical College Hospital as study of fifty-five cases (Dissertation) Dhaka. Bangladesh College of Physicians and Surgeons. 1995.
10. Begum A, Ghani T, Paul SK, Hussain T, Noor Jahan, Begum N. Outcome of premature rupture of membranes –A study of 120 cases in Dhaka Medical College Hospital. *J Dhaka Med Coll.* 2016; 25(2): 82-6.
11. Assefa N, Berhe H, Girma F, et al. Risk factors of premature rupture of membranes in public hospitals at Mekele city, Tigray, a case control study. *BMC pregnancy and child birth.* 2018; 18:386.
12. Mohan S, Thippeveeranna C. Singh N, Singh L. Analysis of risk factors, maternal and fetal outcome of spontaneous preterm premature rupture of membranes: A cross sectional study. *Int J Reproduction, contraception, obstetrics and Gynecol.* 2017; 6(9): 3781-7.
13. Begum N. Epidemiology of premature Rupture of Membrane and Management in Rangpur Medical College Hospital. Dissertation, Bangladesh College of Physicians and Surgeons. 2004.
14. Hossain, S, Sultana, SS, Biswas JR, Noor MS, & Farzana S. Clinical Profile and Feto-Maternal Outcome of Preterm Prelabour Rupture of The Membrane in a Tertiary Level Hospital. *KYAMC Journal* 2021; 12(3), 166–71. <https://doi.org/10.3329/kyamcj.v12i3.56560>.
15. Akter S, Akther R, Rashid Z. Preterm prelabour rupture of the membrane and feto-maternal outcome: An observational study, *J Bangladesh Coll Phys Surg.* 2010; 28:1:17-23.
16. Yeasmin MS, Uddin MJ, Biswas RSR, Azdar A, Chowdhury S, & Nourin NA. Risk Factors of Premature Rupture of Membrane in A Tertiary Care Hospital, Bangladesh. *Chattagram Maa-O-Shishu Hospital Medical College Journal,* 2020; 19(2), 5–8. <https://doi.org/10.3329/cmoshmcj.v19i2.50014>.
17. Lovereen S, Khanum A, Nargis N, Begum S, Afroze R. Maternal and neonatal outcome in premature rupture of membranes. *Bangladesh Journal of Medical Science.* 2018; 17(3): 479-83