

# Maternal & Fetal Outcome of Preterm Premature Rupture of the Membranes in Secondary Level Hospital in Bangladesh

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## Abstract

**Background:** Premature rupture of membrane (PROM) is linked to significant fetal and maternal morbidity and mortalities. The maternal and fetal outcomes in PROM are very important to decrease maternal and child mortality and for better management and prevention of complications. **Objective:** To find out maternal & fetal outcomes of preterm premature rupture of the membranes. **Methods and Material:** This is a cross-sectional observational study carried out in the Department of Obstetrics & Gynaecology, 250 Beded District Hospital, Chapainawabganj, Rajshahi, Bangladesh from January 2016 to July 2016. 50 pregnant women with preterm premature rupture of the membranes. **Result:** The majority of patients with preterm PROM (30%) belong to the age group 31-35 years. The mean age of the patients and SD were 26.4±6.58. 60% of respondents were multipara and 40% primipara. Most of the patients had irregular antenatal checkups (56%), 24% had regular antenatal checkups, and 20% had no antenatal checkups. Twenty percent of patients developed labor pain within 15 hours of rupture of membrane, 24% within 16-30 hours, 56% within 31-45 hours, 10% within 46-60 hours, and 12% without the onset of labour pain. 37 (74%) patients with preterm PROM had a normal vaginal delivery, and 13(26%) delivered by caesarian Section. Forty-three percent of patients delivered within 24 hours of the ruptured membrane, followed by 24% of patients within 24-48 hours, and 28% of patients within more than 48 hours. Among 50 patients, 12 (24.0%) had a previous history of abortion, 24 (48%) had H/O preterm delivery due to PROM, 2 (4.0%) had H/O MR, and 6 (12.0%) had H/O D & C. Among 50 respondents with PPORM 4 (8.0%) had diabetes mellitus, (12.0%) had HTN, 15 (2.0%) had urinary tract infection and 10 (20.0%) had lower genital tract infection. In this study, the total number of the alive baby was 42, and the stillborn baby was 2. Out of 42 alive babies, 18(42.86%) were affected by the consequence of preterm PROM and the birth process. Among 48 alive babies, 6(12.50%) developed birth asphyxia, 5(10.42%) developed jaundice, 3(6.25%) developed neonatal sepsis, and 4 (8.33%) developed respiratory distress syndrome. Maternal morbidity were chorioamnionitis 4(8%) puerperal sepsis 5(10%), postpartum endometritis 2(4%), abruptio placenta 1(2%) and wound infection 2(4%). **Conclusion:** The incidence of preterm PROM was more in multipara. The majority of the patients were from lower- and middle-class families. This study found some factors, e.g., Coitus, the recent history of abortion, M.R., D & C, and previous history of PROM. The study was done with a small population, but it introduces us to certain risk factors that can be prevented. Proper health education, patient motivation, improved health hygiene, and adequate maternity and childcare services are needed to reduce morbidity and mortality.

**Keywords:** Premature rupture of membrane, Maternal outcomes, Fetal outcomes.

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## INTRODUCTION

Preterm premature rupture of the membrane is one of the common problems in obstetrical. It has a major impact on fetal & maternal outcomes. Despite progress in obstetric & neonatal care over the past 20

years, the perinatal outcome in preterm PROM remains dismal. Preterm PROM converts a normal pregnancy into a very risky pregnancy.

Preterm premature rupture of the membrane is defined as rupture of the total membranes before 37

weeks of pregnancy. It occurs in approximately 3% of all pregnancies [1]. Preterm PROM is the cause of approximately one-third of preterm deliveries and can lead to significant perinatal morbidity & mortality [2].

Rupture of the membrane is the most distinctive clinical feature of the three components of the final pathway of parturition. This usually occurs at the end of 1<sup>st</sup> stage of labour or the beginning of 2<sup>nd</sup> stage of labour. It becomes a major problem when it occurs before 37 weeks of pregnancy. It creates a problem for both mother & fetus & also for the obstetrician.

The exact cause of preterm PROM is not known. Although numerous risk factors are associated with preterm PROM, risk factors include lower socioeconomic status. Smoking, sexually transmitted infection, previous preterm delivery, vaginal bleeding, uterine enlargement such as polyhydramnios, and multiple pregnancies [3]. Black patients are at increased risk of preterm PROM compared with white patients [4]. In one study of Bangladesh, past history of abortion was found in 46% of cases, and recurrence of PROM occurred in 15.3% of cases. Aerobic culture of the high vaginal swab was positive in 60% of cases [5]. Certain procedure may result in preterm PROM e.g. cerclage & amniocentesis. There is no single etiology of preterm PROM. Choriodecidual infection or inflammation may cause preterm PROM [6]. A decrease in the collagen content of the membrane has been suggested to predispose patients to preterm PROM [7].

The most typical complication of preterm PROM is preterm delivery. The latent period, which is the time from membrane rupture until delivery, is inversely proportional to the gestational age at which preterm PROM occurs. In preterm PROM, birth within one week is the most likely outcome & respiratory distress syndrome is the most common complication. Other serious forms of morbidity include necrotizing enterocolitis and intraventricular hemorrhage. 4.6% of the fetus with preterm PROM develop moderate to severe neurodevelopmental impairment, growth failure, and cerebral palsy [8]. A major impact on mothers of preterm PROM is the development of a sinus infection called chorioamnionitis, which is very dangerous for the mother, fetus & future pregnancy. The journal of the American Osteopathic Association published an article where maternal & fetal outcomes of 73 consecutive singleton pregnancies were complicated by preterm premature ruptures of amniotic membranes shown. There were 22(30.1%) stillbirths & 13 (17.8%) neonatal deaths, resulting in a perinatal death rate of 47.9%; maternal morbidity was minimal with puerperal endometritis in 5(68%), one of which became septic, however, there was on long term sequela Eight (15,7%) live-born infants had pulmonary hypoplasia, 5(62.5%) of which resulted in neonatal death [9]. Other complications that may occur with preterm PROM

include placental abruption—compression of the umbilical cord, cord prolapse, cesarean birth & postpartum infection.

Preterm PROM has a wide spectrum of research material. The basis for the current management trend is a combination of antibiotics, corticosteroids & tocolytics [10]. The exact cause of preterm PROM has yet not been explored. So felt the need for a study on maternal & fetal outcomes in preterm premature rupture of the membranes.

## AIMS AND OBJECTIVES

### General Objective:

To find out maternal & fetal outcomes of preterm premature rupture of the membranes.

### Specific Objective:

In order to fulfill the above general objectives, the following were set for the present study.

1. To study the clinical profile of preterm premature rupture of the membranes.
2. To find out the factors affecting the outcome.
3. To find out the maternal outcome in the preterm PROM.
4. To find out the fetal outcome in the preterm PROM.

## LITERATURE REVIEW

Preterm premature rupture of membranes is the rupture of membranes during pregnancy before 37 weeks gestation. It occurs in 3 percent of pregnancies and is the cause of approximately one-third of preterm deliveries [2]. Preterm premature rupture membranes are associated with 18% to 20% of perinatal deaths [11]. It is more common in women with previous PPROM. Previous preterm premature rupture has a 3.3-fold increased risk of preterm birth by preterm premature rupture and a 14-fold risk of PROM. Preterm labour, previous cervical surgery, uterine abnormalities, bacterial vaginosis, miscarriage, and recurrent bleeding. The aetiology of PPROM is uncertain, though probably multifactorial. The final common pathway usually involves sub-clinical chorioamnionitis following infectious organisms ascending the cervical canal. This may be facilitated via cervical changes leading to loss of integrity of the canal or particular organisms being present in the vagina allowing overgrowth of unwanted organisms.

The effect is a cascade of biochemical changes in the fetal membranes and decidua, ultimately leading to prostaglandin and cytokine release. And up-regulation of intracellular messengers. These changes lead to cervical ripening and membrane disruption, and PPROM. Increased uterine activity es often not far behind. There is probably a sub-group of women where there is a different aetiology which results in membrane disruption but not the inflammatory changes.

These are the cases that are often secondary to procedures such as amniocentesis, and in cases where there has been subchorionic bleeding in these cases, the prognosis may be better [12].

There is growing evidence associating upper genital tract infections with PPRM [13]. One possible mechanism by which infections might act is ascending from the cervical/ vaginal area and replicating the placenta, the decidua, and the membranes. Another hypothesis is that several organisms that are commonly present in the vaginal flora, including group B streptococci, *S. aureus*, and microorganisms that cause B.V. secrete proteases that degrade collagen and weaken the fetal membranes leading to Preterm PROM [14]. Researchers have postulated that Preterm PROM may be the result of direct bacterial insults that narcotize tissue leading to host-mediated auto-destruction [15].

## MATERIAL 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, 250 Beded District Hospital, Chapainawabganj, Rajshahi Bangladesh.

**Study Period:** 6 months, January 2016 to July 2016.

**Study population:** Pregnant women with preterm premature rupture of membrane admitted in the Department of Obstetrics & Gynaecology, 250 Beded District Hospital, Chapainawabganj, Rajshahi

**Sampling Method:** Purposive sampling.

**Sample size:** 50 pregnant women of preterm PROM. Patients were included in this study

### Inclusion Criteria

- Gravid women both primi & multi with preterm PROM.
- Pregnancy of more than 23 weeks duration & less than 37 weeks.
- Spontaneous rupture of the membranes.
- Patients, not in active labour

### Exclusion Criteria

- Women who will be admitted with the term PROM with established labour.
- Ruptured membranes with antepartum hemorrhage.
- Ruptured membranes with 37 completed weeks.
- Ruptured membrane with infection.

## METHODS

After admission, full history including duration of pregnancy, time & onset of rupture of membranes, past history of rupture of membranes, past obstetric history, social class, and personal history including coital habits all were recorded. Gestational age was determined from L.M.P. & from early U.S.G. Examination comprises a recording of pulse, Blood pressure, Temperature, fundal height & fetal conditions. Documentation of membranes rupture has to be made by a sterile speculum examination, visualizing the flow of the amniotic fluid from the cervical os & or its pooling in posterior vaginal fornix following fundal pressure, typical smell & staining with litmus paper. During speculum examination high vaginal swab is to be taken for bacteriological study.

Plan of management was decided according to presence or absence of active labour, duration of membranes rupture, congenital fetal anomaly, intervention already made & sign symptoms of chorioamnionitis:

- Maternal Temperature above 100.4°F
- Maternal tachycardia
- Fetal tachycardia
- Uterine tenderness
- Foul-smelling vaginal discharge
- Maternal leukocytosis.

Admitted patients with chorioamnionitis were given a combination of antibiotics by parental route, and pregnancy was terminated. Patients with no sign of infection were given broad-spectrum antibiotics for 48 hours. After 48 hours, this regimen changed to the oral form. These antibiotics were continued for several days if the patients remained undelivered. These patients were advised to bed rest with bathroom facilities. They were asked to wear a sterile vulval pad which was inspected every 4 hours to detect any change in the color of liquor & also to document the amount of loss. They were monitored daily every 4 hours. If any infection develops or the conservative approach fails, then pregnancy is terminated by induction/augmentation/caesarian section.

**Data Collection:** Data were collected by a standard questionnaire.

**Data processing and analysis:** All data were checked & analyzed after collection. Then the data were entered into a computer & analyzed using simple statistical methods. Some statistical calculation and percentage was done by using a scientific calculation, and the finding was arranged in tabular form.

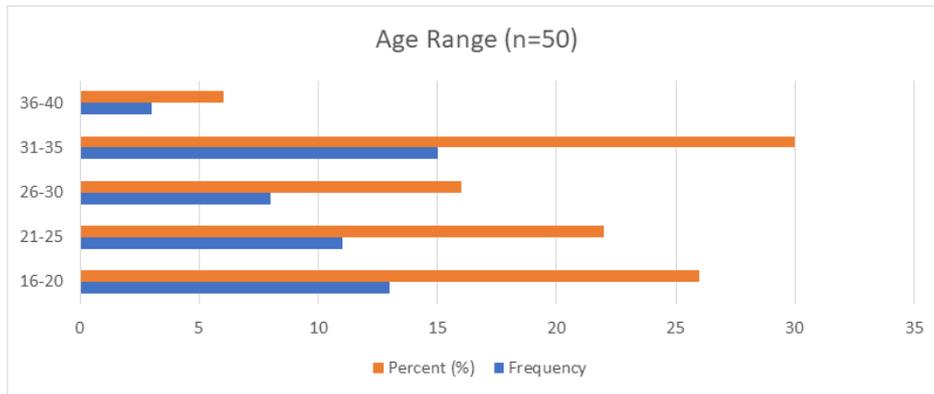
## RESULT

It was based on the observation and results.

**Table 1: Frequency distribution of respondents with different age ranges (n=50)**

Age range	Frequency	Percent (%)
16-20	13	26
21-25	11	22
26-30	08	16
31-35	15	30
36-40	03	06

Table 1 in the present study, the age of the patients ranged from 16-40 years. The majority belong to the age group 31-35 years. Mean age S.D. 26.4±6.58.



**Fig 1: Respondents with different age ranges (n=50)**

**Table 2: Frequency distribution of the time interval between the rupture of membrane and delivery**

Duration between PROM and delivery	Frequency	Percentage (%)
<12 hours	10	20
12-24 hours	14	28
24-48 hours	12	24
>48 hours	14	28
Total	50	100

Table 2 shows that 48% of patients delivered within 24 hours of ruptured membrane and 24% of patients within 24-48 hours.

**Table 3: Frequency distribution of respondents with gestational age and time interval of membrane rupture to the onset of labor pain (n=50)**

Time interval of rupture of membrane and onset of labour pain (Hour)	Gestational age in a week	Gestational age in a week			Total
		29-31	32-34	35-37	
1-15	Count	00(00.00%)	06 (30%)	14(70%)	20(100%)
16-30	Count	00(00.00%)	04(33.33%)	08(66.67%)	12(100%)
31-45	Count	01(14.29%)	03(42.85%)	03(42.85%)	07(100%)
46-60	Count	02(40.00%)	03(60.00%)	00(00.00%)	05(100%)
No Labour Pain	Count	04(66.67%)	02(33.33%)	00(00.00%)	06(100%)
Total	Count	07(14.00%)	18(36.00%)	25(50.00%)	50(100%)

L.P = Time interval of rupture of membrane and onset of labour pain.

Table 3 shows the frequency distribution of respondents with gestational age and the time interval of membrane rupture to the onset of labor pain.

**Table 4: Frequency distribution of presentation of fetus (n=50)**

Presentation of fetus	Frequency	Percentage (%)
Cephalic	40	80
Breech	08	16
Shoulder	02	04
Total	50	100

Table 4 shows that out of 50 respondents' 80% presented with cephalic presentation and 16% by Breech.

**Table 5: Distribution of associated diseases (n=50).**

Variable	Present	Absent	Total
Diabetes Meilitus	04(08.0%)	46(92.0%)	50(100%)
Hypertension	06(12.0%)	44(88.0%)	50(100%)
Urinary Tract Infection	15(30.0%)	35(70.0%)	50(100%)
Lower Genital Tract Infection	08(16.0%)	42(84.0%)	50(100%)

Table 5 Among 50 responses with PPROM 4(8.0%) had diabetes mellitus, 6(12.0%) had HTN,

15(2.0%) had urinary tract infection and 8(15.0%) had lower genital tract infection.

**Table 6: Distribution of Maternal Morbidity (n=50).**

Maternal Outcome	Present	Absent	Total
Chorioamnionitis	04(08%)	46(92%)	50(100%)
Puerperal Sepsis	05(10%)	45(90%)	50(100%)
Postpartum Endometritis	02(04%)	48(96%)	50(100%)
Abruptio Placenta	01(02%)	49(98%)	50(100%)
Wound Infection	02(04%)	48(96%)	50(100%)

Table 6 Show that maternal morbidity were chorioamnionitis, puerperal sepsis, postpartum endometritis, abruptio placenta, wound infection.

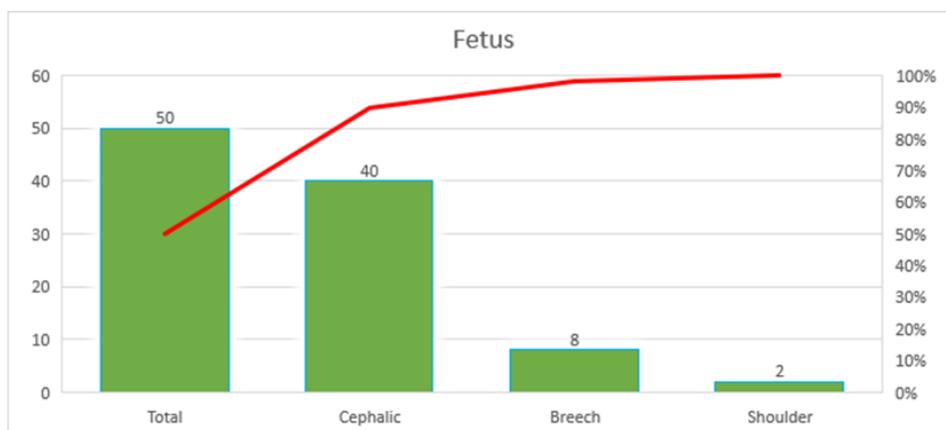
**Table 7 Frequency distribution of parity and time interval of membrane rupture to delivery of respondent (n=50).**

Time interval of membrane rupture to delivery		Parity		Total
		Primi	Multipara	
<12 hours	Count	03	07	10
	Percent within TI range	30.00%	70.00%	100%
12-24 hours	Count	05	09	14
	Percent within TI range	35.71%	64.29%	100%
24-48 hours	Count	04	08	12
	Percent within TI range	33.33%	66.67%	100%
>48	Count	08	06	08
	Percent within TI range	57.14%	42.86%	100%
Total	Count	20	30	50
	Percent within TI range	40.00%	60.00%	100%

**TI= Time interval of membrane rupture to delivery**

Table 7 shows that 3(30%) primi and 7(70%) multipara respondents had time Interval of membrane rupture to delivery below 12 hours Within 24-48 hours:

primi 4 (33.33%) and Multipara 8 (66.67%) and > 48 hours primi 8 (57.14%) multipara 6 (42.86%).



**Fig 2: Presentation of fetus (n=50)**

**Table 8: Distribution of fetal outcome, (n=42), Stillborn = 2**

Fetal outcome	Present	Absent	Total
Neonatal asphyxia	06(12.50%)	42(87.50%)	48(100%)
Fetal jaundice	05(10.42%)	43(89.42%)	48(100%)
Neonatal Sepsis	03(6.25%)	45(93.75%)	48(100%)
Respiratory distress syndrome	04(8.33%)	44(91.67%)	48(100%)
Fetal morbidity	18(37.50%)	30(62.50%)	48(100%)

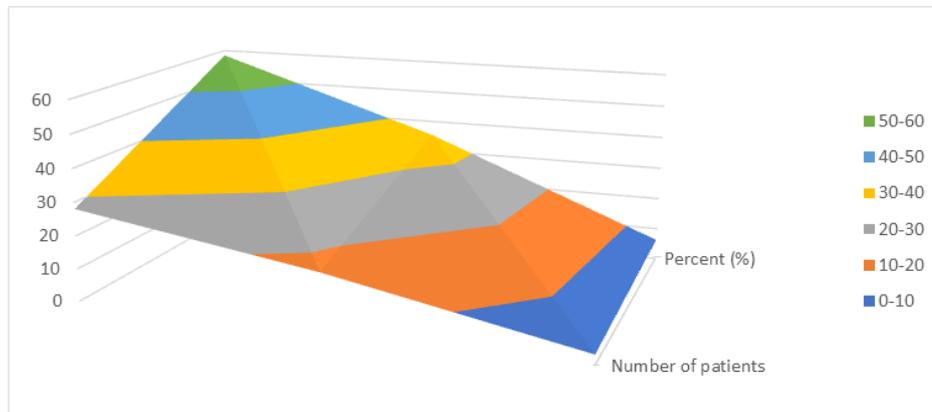
Table 8 in this study, out of 48 alive babies 18(37.50%) were affected by the consequence of preterm PROM and birth process among 48 alive

babies, 6(12.50%) developed birth asphyxia, 5(10.42%) developed jaundice 3(6.25%) developed neonatal sepsis and 4(8.33%) developed respiratory distress syndrome.

**Table 9: Fetal outcome: Apgar score at 5 minutes (n=42)**

Apgar score	Number of patients	Percent (%)
>7	28	58.33
5-7	17	35.41
<5	03	6.26

Table 9 Study shows that Apgar score at 5 minutes was >7 in 58.33% of babies, 5-7 in 35.41%, and < 5 in 6.26% of babies.



**Fig 3: Fetal outcome**

**DISCUSSION**

Preterm premature membrane rupture is the rupture of the membrane during pregnancy before 37 weeks gestation. Preterm PROM is one of the common complications of pregnancy where a traditional pregnancy can turn into a high-risk pregnancy. Preterm PROM is associated with an increased risk of perinatal as well maternal morbidity and mortality.

The aim of the study was to identify the maternal and fetal outcomes of preterm PROM. In this study, most patients with preterm PROM (30%) are 31-35 years old. Mean age SD= 26.4±6.58. In this study, the incidence of PPRM was more in multipara (60%) [16].

This study showed that the majority of respondents were educated up to the S.S.C level (44%). 76% of respondents were housewife. Due to a lack of relevant literature, it cannot be compared to other study findings.

In this study, the monthly family income was 4000-8000 taka in 46% of the study population as patients were selected from 250 Beded District Hospital, Chapainawabganj, Rajshahi. where the majority came from lower- and middle-class families. Low socioeconomic status is a risk factor for the occurrence of PPRM. The occurrence of chorcomniotic infection following PROM seems to be greater in hospitals caring for low socioeconomic segments of the population than in institutions taking care of the affluent. The study showed that most of the patients who came for the treatment of PPRM had antenatal checkups (56%), 24% had regular, and 20% had no antenatal checkups. This result is similar to the study of Nazneen A. She stated that irregular antenatal checkup was 40%, regular 35%, and 25% never [17].

The study found that 50% of respondents were between 35-37 gestational weeks. The incidence of premature rupture of the membrane is increased with increasing gestational age. This study showed that most of the patients (40%) developed labour pain within 15

hours of rupture membrane, 24% of patients within 16-30 hours and 12% had no onset of labour pain. It is revealed that 37 (74%) patients with PPRM were delivered by normal vaginal delivery, and 13 (26%) were delivered by cesarean section. It has also been shown that 48% of patients delivered within 24 hours of ruptured membrane and 24% of patients within 24-48 hours.

A previous history of PPRM is a significant risk factor for recurrence. As an example, the Preterm Prediction Study, a large prospective study conducted by the National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network, observed that women with a history of PPRM had a 13.5 percent rate of PPRM in a subsequent pregnancy compared to 4.1 percent in women with no such history. Women with a history of PPRM are at risk for recurrent PPRM or preterm birth without PPRM [18].

Genital tract infection is the single most common identifiable risk factor for PPRM. Three lines of epidemiologic evidence strongly support this association: (1) women with PPRM are significantly more likely than women with intact membranes to have pathogenic microorganisms in the amniotic fluid, and (2) women with PPRM have a significantly higher rate of histologic chorioamnionitis than those who deliver preterm without PPRM, and (3) the frequency of PPRM is significantly higher in women with certain lower genital tract infections (e.g., bacterial vaginosis) than in uninfected women [19].

The occurrence of abortion or M.R. in previous pregnancy may increase the risk of PPRM. Its study shows that among 50 patients, 12 (24%) had a previous history of abortion, 24 (48%) had H/O preterm delivery due to PROM, 2 (4%) had a history of MR & 6(12%) had a story of D& C. Nazneen A agree with some of this finding [20]. Maternal disease has an impact on PPRM. In this study, 8% had diabetes Mellitus, 12% had hypertension, 30% had urinary tract infection, and 20% had H/O lower genital tract infection. This study correlates with the study of Akhter. S. [16].

It is common among respondents of lower educational backgrounds. Coitus ceased the chance of PPRM and is said to be a significant risk factor that may facilitate entrance into the upper reproductive tract. This study shows that 54% of PPRM cases reported sexual intercourse within one week. Cervico-vaginal infection is the most common etiological association with PPRM. The anaerobic culture is limited in our institution. In this study, the incidence of positive H.V.S. culture was high 22 (44%). The most common microorganism found was *E. coli* (24%) which correlate to the study by Begum.M. [21].

From this study, it is found that cervical effacement was 0-50% majority (70%) of respondents, and cervical dilatation was <2 cm in the majority (76%) of PROM patients on admission. In this study, maternal morbidity was chorioamnionitis 4(8%) and puerperal sepsis 5(10%). Partum endometritis 2(4%), abruptio placenta 1(2%), and wound infection.

This study found that (37.50%) of newborn babies had been suffering from some complications. Among them are neonatal asphyxia 12.50%, fetal jaundice 10.42%, neonatal Is 6.25%, and respiratory distress syndrome 8.33% [16].

## CONCLUSIONS

The incidence of preterm PROM was more in multipara by 60%. Majority of the patient from lower- and middle-class families. The risk factors of preterm PROM identified were those with a history of PROM in a previous pregnancy (48%) and prior history of abortion (24%). Maternal morbidity, like chorioamnionitis, puerperal sepsis, and Postpartum endometritis, Occurred in a substantial number of cases. Regarding fetal outcomes, 37.50% suffer from various morbidity in the form of neonatal asphyxia 12.50%, fetal jaundice 10.42%, neonatal sepsis 6.25%, respiratory distress syndrome 8.33%. From this study, we can obviously say that attention towards risk factors will decrease the incidence of preterm PROM. The obstetricians should be cautious enough when dealing with a case of preterm PROM to avoid possible maternal and bad fetal outcomes.

## RECOMMENDATION

This study is not the actual representation of the whole population. The findings probably reflect specific characteristics. Suspected risk factors such as the history of M.R., abortion, previous history of PROM, and history of Coitus should be studied further carefully, and statistical analysis should be done in a large-scale population. This study shows the majority of respondents were multipara. So multiple pregnancies should be avoided to reduce the occurrence of preterm PROM. Evidence suggests that genital tract infection is associated with a higher incidence of preterm PROM. So, proper antibiotic treatment during antenatal checkups may reduce the incidence of preterm PROM. So, utilization of available health facilities and improved health hygiene shall prevent the problems of preterm PROM and ensure a better pregnancy outcome.

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