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Fetomaternal Outcome of Preterm Premature Rupture of Membrane between 34 to 36 Weeks of Pregnancy

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Abstract **Original Research Article**

Background: Preterm premature rupture of membranes (PPROM) is a significant obstetric complication contributing to maternal and neonatal morbidity, particularly in late preterm pregnancies. It is associated with risks such as infection, preterm birth and adverse neonatal outcomes. Despite advances in obstetric care, optimal management strategies for PPROM between 34 to 36 weeks remain debated. This study aimed to evaluate the fetomaternal outcomes of PPROM between 34 to 36 weeks of gestation in a tertiary care setting. ***Methods:*** A prospective observational study was conducted at the Department of Obstetrics and Gynaecology, Enam Medical College, Dhaka, Bangladesh from January to December 2018. A total of 300 women with confirmed PPROM were included. Data on socio-demographic characteristics, latency period, mode of delivery, maternal complications and neonatal outcomes were collected and analyzed using SPSS version 25.0. ***Results:*** The majority of women were aged 20–29 years (59.3%) and primigravida (56.0%). Most deliveries occurred within 24 hours of membrane rupture. Vaginal delivery was the predominant mode (64.0%), while caesarean section was more frequent with prolonged latency. Maternal complications were observed in 34.0% of cases, with chorioamnionitis being the most common (9.3%). Neonatal outcomes showed that 32.0% required NICU admission. Respiratory distress syndrome (17.3%) and neonatal sepsis (12.7%) were the most frequent complications. Neonatal mortality was 3.3%. ***Conclusion:*** PPROM in late preterm gestation is associated with moderate neonatal morbidity despite relatively favorable maternal outcomes. Careful monitoring and timely clinical decisions are crucial to improving outcomes.

Keywords: Preterm premature rupture of membranes, PPROM, maternal outcome, neonatal outcome.

INTRODUCTION

Preterm premature rupture of membranes (PPROM) is defined as the spontaneous rupture of fetal membranes before the onset of labour and before 37 completed weeks of gestation. It remains a significant obstetric complication, contributing substantially to maternal morbidity and perinatal mortality worldwide. The incidence of PPROM is reported to range between 2–3% of all pregnancies but accounts for nearly one-third of preterm births [1, 2]. The condition poses a complex clinical challenge due to the delicate balance between risks of prematurity and intrauterine infection.

The etiology of PPROM is multifactorial, involving mechanical, biochemical and infectious processes. Infection and inflammation are considered major contributing factors leading to weakening of the fetal membranes [3, 4]. Other associated risk factors include low socioeconomic status, poor antenatal care, previous preterm birth and genital tract infections [2,5]. These determinants are particularly relevant in low-resource settings, where access to adequate antenatal services may be limited.

Maternal complications associated with PPROM include chorioamnionitis, postpartum infection, sepsis and hemorrhage, which may significantly affect maternal health outcomes [6,7]. Neonatal complications are largely related to prematurity and include respiratory distress syndrome, sepsis, birth asphyxia and increased need for neonatal intensive care unit (NICU) admission [8,9]. The risk of adverse outcomes is influenced by gestational age at membrane rupture and the duration of the latency period.

Management of PPROM, especially in the late preterm period (34–36 weeks), remains controversial.

Current guidelines suggest individualized management strategies balancing the risks of infection against neonatal prematurity [10,11]. Some studies advocate early delivery to reduce maternal infectious morbidity, while others support expectant management to improve neonatal outcomes [12,13]. The latency period plays a crucial role in determining outcomes, with prolonged latency associated with increased risk of infection but potentially improved fetal maturity [14,15].

Several studies have evaluated fetomaternal outcomes in PPROM; however, findings vary based on geographic and healthcare settings. For instance, Singh *et al.,* reported increased maternal morbidity with prolonged rupture duration [1], while Sultana *et al.,* highlighted significant neonatal complications in late preterm PROM cases in Bangladesh [3]. Similarly, Poovathi *et al.,* observed a high incidence of respiratory complications among neonates born following PPROM [4]. Despite these insights, there remains a need for region-specific data to guide clinical decision-making, particularly in developing countries.

In Bangladesh, limited prospective studies have examined outcomes of PPROM in the late preterm period. Variations in socioeconomic conditions, healthcare access and clinical practices necessitate local evidence to optimize management strategies. Understanding the patterns of maternal and neonatal outcomes in this population is essential for improving obstetric care and reducing associated morbidity and mortality.

Therefore, the present study aims to evaluate the fetomaternal outcomes of preterm premature rupture of membranes between 34 to 36 weeks of gestation in a tertiary care setting in Dhaka, Bangladesh. The findings of this study are expected to contribute to the existing body of evidence and support clinicians in making informed decisions regarding the management of PPROM.

Materials & Methods

This prospective observational study was conducted in the Department of Obstetrics and Gynaecology at Enam Medical College, Dhaka, Bangladesh from January to December 2018. A total of 300 pregnant women diagnosed with preterm premature rupture of membranes between 34 to 36 weeks of gestation were included. The study population comprised women admitted to the labour ward with confirmed PPROM based on clinical evaluation.

Inclusion Criteria Included:

(i) Singleton pregnancy,
(ii) Gestational age between 34–36^{+6} weeks,
(iii) Confirmed diagnosis of PROM and
(iv) Willingness to participant.

Exclusion Criteria Included:

(i) Multiple pregnancy,
(ii) Major fetal congenital anomalies,
(iii) Intrauterine fetal demise,
(iv) Maternal chronic medical disorders and
(v) Cases with incomplete clinical data.

Data were collected using a structured and pre-tested data collection form. Upon admission, a detailed history including age, parity, booking status and socioeconomic condition was recorded. Clinical examination was performed to confirm PROM using sterile speculum examination. Relevant laboratory investigations were conducted as per hospital protocol. Patients were followed throughout labour and delivery and the latency period was recorded. Mode of delivery and indications for caesarean section were documented. Maternal outcomes such as chorioamnionitis, postpartum fever, sepsis, urinary tract infection and hemorrhage were assessed. Neonatal outcomes including birth weight, Apgar score, NICU admission and complications were recorded immediately after delivery and during hospital stay. Informed written consent was obtained from all participants before inclusion. Confidentiality and anonymity were strictly maintained throughout the study process and all procedures adhered to ethical standards.

Statistical analysis was performed using SPSS version 25.0. Data were expressed as frequency and percentage. Descriptive statistics were used to summarize variables. Associations between latency period and mode of delivery were analyzed using appropriate comparative methods, with significance interpreted based on observed distribution patterns.

Results

Table 1: Socio-demographic and Obstetric Characteristics of Study Participants (n = 300)

Variable		Frequency (n)	Percentage (%)
Age Group (years)	<20	42	14.0
	20–29	178	59.3
	30–35	64	21.3
	>35	16	5.4
Parity	Primigravida	168	56.0
	Multigravida	132	44.0
Gestational Age at PROM	34–34 weeks	124	41.3
	35–35 weeks	98	32.7

Variable		Frequency (n)	Percentage (%)
	36–36 weeks	78	26.0
Booking Status	Booked	186	62.0
	Unbooked	114	38.0
Socioeconomic Status	Low	162	54.0
	Middle	108	36.0
	High	30	10.0

Table 1 presents the socio-demographic and obstetric characteristics of the study participants. The majority of women (59.3%) were aged 20–29 years, followed by 21.3% aged 30–35 years. Primigravida constituted 56.0% of the sample. Most cases of PROM occurred at 34–34^{+6} weeks (41.3%), followed by 35–35^{+6} weeks (32.7%). A higher proportion of women were booked (62.0%) compared to unbooked (38.0%). More than half of the participants (54.0%) belonged to a low socioeconomic group.

Table 2: Latency Period and Mode of Delivery (n = 300)

Variable		Frequency (n)	Percentage (%)
Latency Period (PROM to Delivery)	<12 hours	132	44.0
	12–24 hours	96	32.0
	>24 hours	72	24.0
Mode of Delivery	Vaginal Delivery	192	64.0
	Caesarean Section	108	36.0
Mode of Delivery vs Latency (>24h)	Vaginal (≤24h)	158	70.5
	Vaginal (>24h)	34	47.2
	Caesarean (≤24h)	66	29.5
	Caesarean (>24h)	38	52.8

Table 2 shows the latency period and mode of delivery among participants. A latency period of less than 12 hours was observed in 44.0% of cases. About 32.0% delivered within 12–24 hours, while 24.0% had latency exceeding 24 hours. Vaginal delivery was the predominant mode (64.0%), whereas 36.0% underwent caesarean section. Among women with a latency greater than 24 hours, caesarean delivery (52.8%) was more frequent compared to vaginal delivery (47.2%).

Table 3: Maternal Outcomes Following PROM (n = 300)

Maternal Outcome	Frequency (n)	Percentage (%)
No Complication	198	66.0
Clinical Chorioamnionitis	28	9.3
Postpartum Fever	22	7.3
Wound Infection (CS cases)	18	6.0
Postpartum Hemorrhage	12	4.0
Urinary Tract Infection	14	4.7
Sepsis	8	2.7

Table 3 describes the maternal outcomes following PROM. Most women (66.0%) experienced no complications. Clinical chorioamnionitis was observed in 9.3% of cases. Postpartum fever occurred in 7.3% and wound infection in 6.0% of caesarean cases. Other complications included urinary tract infection (4.7%), postpartum hemorrhage (4.0%) and sepsis (2.7%).

Table 4: Neonatal Outcomes in Late Preterm PROM (n = 300)

	Neonatal Outcome	Frequency (n)	Percentage (%)
Birth Weight	<2.0 kg	54	18.0
	2.0–2.5 kg	168	56.0
	>2.5 kg	78	26.0
Apgar Score at 5 min	<7	48	16.0
	≥7	252	84.0
NICU Admission		96	32.0
Common Neonatal Complications	Respiratory Distress Syndrome	52	17.3
	Neonatal Sepsis	38	12.7

	Neonatal Outcome	Frequency (n)	Percentage (%)
	Hyperbilirubinemia	44	14.7
	Birth Asphyxia	26	8.7
	Neonatal Mortality	10	3.3

Table 4 presents neonatal outcomes associated with late preterm PROM. The majority of neonates (56.0%) had a birth weight between 2.0 and 2.5 kg. Apgar score ≥7 at 5 minutes was observed in 84.0% of neonates. NICU admission was required in 32.0% of cases. Respiratory distress syndrome was the most common complication (17.3%), followed by hyperbilirubinemia (14.7%) and neonatal sepsis (12.7%). Neonatal mortality was reported in 3.3% of cases.

DISCUSSION

The present study evaluated fetomaternal outcomes in pregnancies complicated by preterm premature rupture of membranes (PPROM) between 34 to 36 weeks of gestation. The findings demonstrate that PPROM in the late preterm period is associated with a moderate risk of maternal and neonatal complications, with outcomes influenced by the latency period and gestational age at rupture.

In this study, the majority of women were aged 20–29 years and primigravida constituted more than half of the cases. Similar demographic patterns have been reported by Singh *et al*., who observed a higher prevalence of PPROM among younger women and primigravida, suggesting a potential association with biological and socioeconomic factors [1]. Addisu *et al.,* also highlighted the role of limited antenatal care and low socioeconomic status as contributing factors, which aligns with the predominance of low-income participants in the present study [2].

The latency period analysis revealed that most women delivered within 24 hours, while a smaller proportion experienced prolonged latency beyond 24 hours. This finding is consistent with Baser *et al*., who reported that shorter latency periods are more common in late preterm PROM due to increased uterine activity at advanced gestation [14]. Importantly, the current study found a higher rate of caesarean section among women with prolonged latency. This observation is supported by Frenette *et al*., who demonstrated that extended latency is associated with increased obstetric interventions due to rising risks of infection and fetal compromise [16].

Vaginal delivery was the predominant mode in this study, which is comparable to findings by Kayiga *et al*., who reported that vaginal delivery remains the preferred mode in PPROM cases unless obstetric indications necessitate caesarean section [17]. However, the increased caesarean rate in cases with longer latency may reflect clinical decision-making aimed at minimizing adverse outcomes.

Maternal outcomes in this study were generally favorable, with two-thirds of participants experiencing no complications. Among complications, chorioamnionitis was the most frequent, followed by postpartum fever and wound infection. These findings are in agreement with Dars *et al*., who reported similar rates of maternal infectious morbidity in PPROM cases [7]. The occurrence of chorioamnionitis is clinically significant, as it reflects ascending infection following membrane rupture, a mechanism well described by Etyang *et al.,* in their systematic review on inflammatory markers in PPROM [18]. The relatively low incidence of severe complications such as sepsis in this study may indicate timely clinical management and monitoring.

Neonatal outcomes revealed that the majority of infants had birth weights between 2.0 and 2.5 kg and satisfactory Apgar scores. However, NICU admission was required in nearly one-third of neonates, indicating a substantial burden of neonatal morbidity. Comparable findings were reported by Poovathi *et al*., who observed increased NICU admissions among late preterm infants following PPROM [4]. The predominance of respiratory distress syndrome (RDS) in this study is consistent with the well-established relationship between prematurity and pulmonary immaturity, as described by Manuck *et al.,* [9].

Neonatal sepsis was observed in a notable proportion of cases, which aligns with findings from Drassinower *et al*., who demonstrated an increased risk of neonatal infection with prolonged rupture duration [15]. This underscores the importance of timely delivery and infection surveillance in managing PPROM cases. Hyperbilirubinemia was also frequently observed, which may be related to prematurity and immature hepatic function, as reported in similar studies [4].

The neonatal mortality rate in this study was relatively low. This finding may reflect improved neonatal care facilities and early intervention strategies in the study setting. Yu *et al.,* similarly reported reduced mortality rates in tertiary care centers, emphasizing the role of advanced neonatal support systems [8].

The relationship between the latency period and outcomes remains a critical aspect of PPROM management. While prolonged latency may enhance fetal maturity, it also increases the risk of infection. Lorthe *et al.,* demonstrated that extended latency is associated with both improved survival and increased infectious morbidity, highlighting the need for individualized clinical decision-making [19]. The findings of the present study support this balance, as

increased caesarean rates and maternal complications were observed with longer latency.

Overall, the study findings are consistent with existing literature, confirming that PPROM in the late preterm period is associated with a complex interplay of maternal and neonatal risks. Effective management requires careful monitoring, timely intervention and consideration of both maternal and fetal well-being.

Limitations of the Study

There was some limitation of the study, which were:

1. Single-center study limits the generalizability of findings.
2. Lack of long-term neonatal follow-up data.
3. Potential selection bias due to hospital-based sampling.

CONCLUSION

Preterm premature rupture of membranes between 34 to 36 weeks is associated with favorable maternal outcomes but notable neonatal morbidity. The latency period influences the delivery mode and complications. Early recognition, close monitoring and timely intervention are essential to optimize fetomaternal outcomes and reduce associated risks in late preterm PROM cases.

Conflicts of Interest: None.

Ethical Approval: This study approved by the institutional ethical review committee.

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