ORIGINAL ARTICLE

# Maternal and perinatal outcome in preterm prelabor rupture of membranes

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**Abstract**

**Objectives:** To assess frequency of preterm premature rupture of membranes and evaluate maternal & perinatal outcome in pregnancies complicated by preterm premature rupture of membranes (PPROM) in our hospital.

**Setting:** Department of Obstetrics and gynecology Ziauddin hospital which is affiliated with Ziauddin University

**Period:** Three year from 24-January-2013 to 18-December-2016

**Study design:** This was a prospective cross sectional study.

**Material and Methods:** A total of 62 consecutive singleton pregnancies presenting in labor ward having gestational age between 28 to 36 weeks with complains of leaking per vaginum were included in the study after taking informed verbal consent. Frequency of preterm premature rupture of membranes (PPROM) in our hospital, Feto maternal out-come and leaking to delivery interval were noted. The data were analyzed using SPSS version 22.0 statistical package.

**Results:** The frequency of PPROM was 3.27%. The latency period was < 48 hours in 43.5% of patients who presented between 34-36 weeks gestation, while none of those who presented at or < 30 weeks delivered in the first 48 hrs. 35.5% babies were low birth weight (less than 2.5 kg). In 30.6% 5 minute Apgar score of <7 was observed; 34% developed RDS and Perinatal mortality was seen in 26% of babies. Chorio-amnionitis complicated 6.45% of pregnancies

**Conclusion:** Preterm premature rupture of membrane is associated with significant increase in perinatal mortality. Duration of Preterm premature rupture of membrane (PPROM), latency period and Apgar score at 5 minute is related with unfavorable fetal outcome. Increase in latency period is also associated with increased risk of chorio-amnionitis. Using the findings of this study obstetricians and neonatologists would be in a better position to provide advice to PPROM experiencing couples. Further studies related to long term neonatal morbidity need to have sample sizes that are much larger and should cover a larger number of institutions.

**Keywords:** preterm premature rupture of membrane (Pprom), latency period, maternal outcome, perinatal morbidity & mortality.

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**Introduction**:

Preterm pre labour rupture of the fetal membranes (PPROM) is defined as rupture of the fetal membranes at least one hour prior to the onset of labor at less than 37 week of gestation.[1] It complicates 2–3% of all pregnancies and contributes to 30–40% of preterm births.[2] PPROM in very early pregnancy of up to 26 weeks complicates approximately 1% of pregnancies in the United States and is associated with significant risk of neonatal morbidity and mortality.[3,4] Perinatal mortality is high if PPROM occurs when fetuses are of previable gestational age. Approximately 60% of cases will go in to labor within first week of PPROM at 24 weeks and about 80% at 34 weeks.[5] One of the most common compli-

cations of PPROM is early delivery. Preterm delivery results in still birth or neonatal morbidity and mortality. Surviving neonates may develop respiratory distress syndrome (RDS), birth asphyxia, apnea, sepsis, necrotizing enterocolitis (NEC) and neurologic disorder. The most significant maternal risk of term PPROM is intrauterine infection the risks of which increases with the duration of membrane rupture.[6] Preterm premature rupture of membranes is one of the significant causes of preterm delivery and is associated worldwide with increased rates of neonatal and maternal morbidity and mortality.

The management of pregnancies complicated by PPROM is challenging, controversial and should be individualized. However, it should focus on confirming the diagnosis, validating gestational age, documenting fetal wellbeing and deciding on the mode of delivery which depends on gestational age, fetal presentation and cervical examination.[7] Current evidence suggests aggressive antibiotic therapy which is effective for increasing latency period and reducing infectious infant morbidity. Corticosteroids can reduce many neonatal complications particularly respiratory distress syndrome and intraventricular hemorrhage.[8,9]

Pakistan lacks evidence based research data in this area. Therefore, we conducted this study to assess the frequency and maternal and perinatal outcome in pregnancies complicated by PPROM so that obstetricians and neonatologists would find it easy to counsel couples using the results and findings of this study.

**Material and Methods**:

This cross-sectional study was carried out in department of Obstetrics and Gynecology at Ziauddin University and hospital during a period of 3 years 24-January-2013 to 18-December-2016. Patients admitted in Obstetrics and Gynecology through outpatient & casualty department with gestational age between 28 to 36 weeks with preterm premature rupture of membrane (PPROM) confirmed by speculum examination and ultra sound for gestational age and AFI, were included regardless of their age. Data was taken from patients with diagnosis of PPROM Patients with Intra uterine growth restriction & Congenital anomalies along with those who presented with preterm premature rupture of membranes at term were excluded. PPROM was carried out after taking informed verbal consent from all patients who presented to labor room and met the inclusion criteria with complain of leaking per vaginum. Monitoring was done to detect evidence of chorio-amnionitis, placental abruption, onset of labor and non-reassuring fetal status. The criteria for infection was maternal temperature >38 C, on at least two occasions four hours apart, requiring antibiotic therapy. The outcome variables for this study were maternal and fetal outcomes, grouped as favourable (when the mother discharged with improvement from the hospital and neonate without complications) and unfavorable (when the mother or neonate died or experienced complications). Besides, age of mother, place of residence, gravidity, parity, duration of hospital stay, duration of PROM to delivery, history of previous PROM, mode of delivery, onset of labor, color of liquor, baby's birth weight, ICU admission, activity, pulse rate, grains, appearance, and respiratory rate were recorded.

After data collection, analysis was done using SPSS version 21. Frequency and percentage were computed for categorical variables like gestational age, parity, latency period between onset of leaking and delivery and maternal fetal complications. Mean with standard deviation was computed for numerical variables like age. Post stratification chi square test was applied.

**Results**:

There were a total of 1895 deliveries during the three year of study period, 62 patients came with PPROM so, the frequency of PPROM was 3.27%. There were a total of 62 patients enrolled in the study who met the inclusion criteria, 37(59.7%) were booked and 25(40.3%) were un-booked. All un-booked patients were referred from some primary & secondary care hospitals. The average age was 27.8±4.9 years with the range (20-44). Most of the women 38(61.3%) were above 26 years. Approximately

*Table-1: Demographic characteristics of the study subjects (n=62)*

| | Frequency (%) | | Frequency (%) |
|---|---|---|---|
| **Booking Status** | | **Age Groups** | |
| Booked | 37(59.7%) | <=25 Years | 24(38.7%) |
| Un-Booked | 25(40.3%) | 26-35 Years | 33(53.2%) |
| **Blood Group** | | >36 Years | 5(8.1%) |
| A+ | 18(29%) | **Parity Distribution** | |
| AB+ | 8(12.9%) | Primi Para | 51(82.3%) |
| B+ | 15(24.2%) | Multi Para | 11(17.7%) |
| O+ | 1(1.6%) | **Duration PROM at 12Hour** | |
| O+ | 20(32.3%) | <=12 Hours | 38(61.3%) |
| **Mode of Delivery** | | >12 Hours | 24(38.7%) |
| Breech vaginal | 4(6.5%) | **Duration PROM at 24 Hours** | |
| LSCS | 33(53.2%) | <=24 Hours | 27(43.5%) |
| SVD | 25(40.3%) | >24 Hours | 35(56.5%) |
| **APGAR_SCORE_1MIN** | | **APGAR_SCORE_5MIN** | |
| <=7 | 34(54.8%) | <=7 | 19(30.6%) |
| >7 | 28(45.2%) | >7 | 43(69.4%) |
| **Weight Baby** | | | |
| <=2.5 Kg | 34(54.8%) | **Hospital Stay** | |
| >2.5 Kg | 28(45.2%) | <3 Days | 44(71%) |
| **NICU Duration** | | | |
| <=3 Days | 43(69.4%) | | |
| >3 Days | 19(30.6%) | | |

51 (82.3%) were primi-gravida & virtual primigravida. 12(19.4%) women presented at <30 weeks gestation, 20 (32.3%) at 31-33 weeks, while 30(48.4%) patients presented at 34 to 36 wks. 27(43.5%) women had latency period of less than 48 hours and 24(38.7%) women had latency period of more than 48 hours. It was noted women who came at gestational age at or below 30 weeks, no one delivered within 24 hours, in contrast to those who presented between 34-36 wks. The latency period was found to be inversely related to gestation at presentation. TLC count and CRP were high in 63.3% and 50% respectively. 40% showed no growth on high vaginal swab culture and sensitivity while candida was the most common organism found (33.3%) and 2 women (6.7%) had group-B Strepto-coccal (GBS) infection. Regarding risk of PPROM in index pregnancy only 14(19.3%) patients had insignificant history. Major risk was history of UTI in 27(43.5%) patients, PIH in 16 (25.8%), APH & threatened abortion in 12 (19.3%) and 7 (11.2%) were found anemic. Patients having in-significant history in current pregnancy were not actually free from risk factors rather they were at risk due to their demographic or obstetric & clinical background. As 12(19.35%) patients had previous history of either preterm or PPROM. 33(53.2%) women delivered by cesarean section while 29 patients (46.8%) delivered vaginally. Presenting part was cephalic in 53 (85.5%) and 9 (14.5%) had breech presentation. Among 62 neonates 22(35.5%) babies had weight less than 2.5kg while 40(64.5%) had weight more than 2.5 kg. In 30.6% 5 minute Apgar score of <7 was observed It was found that birth weight was inversely related to gestational age at the time of delivery. Similarly weight of baby was related to NICU referral & duration of stay in NICU. 15(50%) babies were referred to NICU. 34% developed RDS and Perinatal mortality was seen in 26% of babies. All the newborn babies who died were of birth weight less than 2kg. Out of thirty, 9 mothers and 7 newborns had prolonged hospitalization (>7 days). Women with a latency period of greater than 24 hours were 6.7 times more likely to experience unfavorable outcome than those with a duration of PPROM in delivering less than 24 hours. Neonates with birth weight less than 2.5kg were 5.0 times more likely to experience unfavorable outcomes than those with birth weight greater than 2.5Kg

**Discussion**:

This study investigated maternal and fetal outcomes of PPROM and associated factors. According to our findings, the frequency of PPROM was 3.27%, which is less than the range of 5%–10% reported elsewhere.[10] However, it is in accordance with the study of Dars S., et al. (2014).[11] It was observed that most patients belonged to low socio-economic class and had less education or they were referred from some primary or secondary care center. The association of PPROM with low socio-economic status and less education has been observed in many studies.[12] In our study 19.35% cases of PPROM had history of previous pre-term delivery or PPROM.[13] MC parland and Ayesha Malik reported the recurrence risk in subsequent preg-

nancy of 21-32% and 32.2% respectively. This difference may be due small sample size in our study.[14]

82.3% of our patients were primi-gravida which is similar to Malik's findings[11] who also reports PPROM more in primi-gravidae. The mean maternal age was 27.8 years (range 20-44 years) and 70% were booked, thus the booking status of the mothers does not appear to reduce the risk of PPROM. In the present study, the duration of PPROM and latency were significantly associated with unfavorable maternal outcome. Mothers with duration of PPROM greater than or equal to 12 hours were more likely to experience un-favorable outcome than those with duration of PPROM less than 12 hours. This finding corroborates the results of other studies.[15-17] where a latency period of 24 hours and above was associated with approximately a three fold increase in unfavorable outcome.

In our study, there was no maternal mortality, which is lower than 0.26% maternal mortality reported from Gujarat, India.[18] This may be due to difference in management of PPROM. The most common cause of maternal morbidity and mortality is puerperal sepsis.[19]

In this study, birth weight less than 2500g was approximately associated with an 8-fold increase in unfavorable fetal outcomes. Low birth weight (LBW) is considered as an important predictor of infant mortality, especially in the first month of life.[14]

43.5% of women in this study had gestational age between 34-36 wks. It was noted that latency period was longer in women with PPROM at early gestation and shorter when membranes ruptured later in pregnancy. 27(43.5%) women had latency period of less than 48 hrs and 35(56.5%) women had latency period of more than 48 hours This longer latency period of our study is due to prophylactic antibiotic cover and minimal vaginal examination, which is similar to study of Noor, Shehla, et al. 2010.[20]

In our study 63.3% patient had shorter hospital stay of less than a week while remaining stayed more than 10 days this is also proved by many other studies. The cost of delivery due to prolong hospital stay of mother and baby or postnatal care of these very premature babies is very high so it is associated with psychosocial disruption.[21]

In our study 26.7% patients needed induction out of which 16.7% delivered vaginally and 10% under-went caesarean section. The overall caesarean section rate was 30% (including both induced and non-induced). This contradicts with the study by Cox & Leveno which reported the incidence of 12%.[11] The incidence of vaginal delivery was 70% which is similar to other studies.[22,23]

According to our study mean gestational age of delivery was 32.5 wks. In 30.6% 5 minute Apgar score of <7 was observed. 35.5% babies had weight less than 2.5 kg. Neonatal jaundice was the major reason for NICU admission and 23% required admission for more than a week.

23.3% had neonatal sepsis. 34% developed RDS and Perinatal mortality was seen in 26% of babies. The major cause of deaths was IRDS. This is higher than Yang, L. C., et al. who demonstrated a rate of respiratory distress syndrome of 13% and Khan. S. who found IRDS in 5% of his neonates.[19, 24]

The neonatal mortality of 26% observed by this study contrasts with. 14.7% given by a study conducted at Faisalabad and 1.4% reported by Cox work. Comparison of neonatal outcome in relation to wt. of new born showed that most of babies who did not survive or had NICU admission had birth weight <2 kg indicating that wt. of baby at birth affect neonatal outcome in terms of decreased mortality with increasing birth wt. In his study Hanke, K., et al. (2015) also reported increased neonatal morbidity with birth weight < 2kg.[26]

**Conclusion**:

PPROM is associated with significant increase in perinatal mortality. Duration of PPROM, la-

tency period and Apgar score at 5 minute is related with unfavorable fetal outcome. Increase in latency period is also associated with increased risk of chorio-amnionitis

Using the findings of this study obstetricians and neonatologists would be in a better position to provide advice to PPROM experiencing couples. Further studies related to long term neo-natal morbidity need to have sample sizes that are much larger and should cover a larger number of institutions.

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**Role and contribution of authors**:
Dr Shazia, concept and designing and data collection

Dr Shahina Ishtiaq, data analysis

Dr Urooj Malik, data analysis

Aqsa Zoey Akhai, helped in data collection.

Khasheaa Nadeem, helped in data collection

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