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# Frequency of Maternal and Fetal Outcome in Pregnant Women Complicated By Preterm Premature Rupture of the Membranes before 34 Weeks of Gestation at Tertiary Care Hospital, Karachi

**Mehar Fryal Khan[1], Asma Ali Depar[1], Aiman Majeed[1]**

[1]Department of Obstetrics and Gynecology, Aga Khan University Hospital, Karachi, Pakistan

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**Correspondence to:** Mehar Fryal Khan, Department of Obstetrics and Gynecology, Aga Khan University Hospital, Karachi, Pakistan.
Email: mehar.fryal@gmail.com

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## ABSTRACT

**Introduction:** Significant perinatal morbidity and death may result from preterm premature rupture of membranes (PPROM) occurring before 34 weeks, which presents major hazards to the health of both the mother and the fetus. To maximize results, managing PPROM requires a precise diagnosis and educated choices. **Methodology:** Over the course of six months, from May 20 to November 20, 2021, this descriptive, prospective research was carried out at Aga Khan University Hospital in Karachi. Non-probability sequential sampling was used to enroll 110 individuals with PPROM before to 34 weeks. Singleton pregnancies and gestational age ≤34 weeks, as verified by the latest menstrual cycle and ultrasound, were among the inclusion criteria. Patient demographics, medical history, and markers like fetal activity and amniotic fluid properties were all part of the data gathering process. SPSS Version 20 was used to evaluate the results, and a chi-square test was used to check for significance (p-value < 0.05) after stratification. **Results:** The research found that newborn outcomes, with respiratory distress syndrome (RDS) being the most prevalent, and mother outcomes, such as chorioamnionitis and postpartum hemorrhage, were significant. 68.2% of patients needed NICU admission. Lower gestational age at rupture was linked to a higher risk of complications, underscoring the need of attentive prenatal care. **Conclusion:** Families and healthcare systems bear a heavy price as a result of PPROM's substantial contribution to poor mother and newborn outcomes. To successfully manage PPROM, a precise diagnosis and risk-benefit analysis are essential. Neonatal outcomes may be improved and healthcare expenses can be decreased with conservative treatment depending on gestational age.

## INTRODUCTION

About 2-3% of pregnancies worldwide result in preterm premature rupture of membranes (PPROM), which is defined as the rupture of fetal membranes prior to the commencement of labor in pregnancies shorter than 37 weeks [1]. The risk of unfavorable outcomes for both the mother and the fetus is greatly increased when PPROM occurs before 34 weeks. While the amniotic fluid promotes lung development and provides the baby with cushioning, the amniotic membrane is essential in shielding the fetus from infections and injuries [2, 3]. However, these defenses are undermined by early membrane rupture, increasing the risk of chorioamnionitis, placental abruption, and umbilical cord prolapse [4[. Management decisions are critical for balancing fetal growth with maternal safety, as these conditions can trigger a cascade of inflammatory responses affecting both the mother and the fetus [5, 6]. The treatment of PPROM has been thoroughly researched worldwide, particularly in high-resource environments with easy access to expert newborn care [7, 8]. However, results might vary significantly in low-resource settings where access to newborn intensive care may be limited. Prematurity-related problems include respiratory distress syndrome (RDS), intraventricular hemorrhage (IVH), sepsis, and necrotizing enterocolitis (NEC) may result from PPROM for the fetus [9]. These complications have a major influence on newborn morbidity and death rates. PPROM increases the mother's risk of infections including sepsis and endometritis, which might cause delayed recovery and need more medical measures [10]. Therefore, gaining a thorough grasp of how PPROM affects mother and newborn health continues to be a top goal worldwide.

Clinicians must balance the advantages of postponing birth to encourage fetal lung maturity against the risks of infection and other problems in order to effectively treat PPROM before 34 weeks. Expectant management and quick delivery are the two main strategies. While

premature birth is linked to increased infant morbidity, immediate delivery may reduce the risk of maternal infection [11]. On the other hand, expectant treatment aims to extend the pregnancy in order to lessen the severity of preterm problems, but this may raise the risk of infections for both the mother and the unborn child. Gestational age, fetal lung maturity, infection symptoms, and the accessibility of newborn care facilities are some of the factors that affect this decision. To lower the dangers of preterm, expectant management is often chosen in high-resource nations with well-equipped neonatal intensive care facilities [12]. However, due to restricted access to specialized newborn care, rapid birth is often emphasized in settings with limited resources. Local information on the treatment and results of PPROM is noticeably lacking in Pakistan, particularly before to 34 weeks of pregnancy [13]. Research from comparable low- and middle-income nations indicates that creating consistent treatment and care regimens is hampered by the lack of thorough data on PPROM outcomes. It is still challenging to determine the actual impact of PPROM on mother and newborn health and the efficacy of existing therapeutic strategies in the absence of localized research. In order to assist doctors improve the therapy of PPROM in settings with limited resources and ultimately guide better health outcomes for both mother and child, this research will be conducted in a tertiary care hospital in Karachi. It will also fill in data gaps [14].

The significance of local studies is highlighted by the fact that, despite the abundance of worldwide research on PPROM outcomes, regional differences in maternal and newborn health resources might result in different results. There is a dearth of information on PPROM in Pakistan due to its distinct healthcare circumstances, especially on its effects on mother and fetal outcomes in tertiary hospitals. By investigating the outcomes of pregnancies affected by PPROM before 34 weeks in a tertiary care hospital in Karachi, this research seeks to close this gap. In order to guide clinical decision-making and maybe impact hospital policies to enhance maternal and neonatal care, the study's findings will provide crucial insights on the kinds and frequency of maternal and newborn problems in a local setting. At a tertiary care hospital in Karachi, the goal is to ascertain the prevalence of maternal and fetal outcomes in pregnant patients whose preterm premature rupture of membranes occurs before 34 weeks of gestation.

## METHODOLOGY

**Study Design:** In order to examine maternal and fetal outcomes in instances with PPROM before 34 weeks of gestation, this research was carried out as a descriptive, prospective investigation.

**Study Setting:** The study was conducted at the Aga Khan University Hospital in Karachi, a tertiary care center offering specialized healthcare services for mothers and fetuses, in the Department of Gynecology and Obstetrics.

**Study Duration:** After the research protocol was approved by the College of Physicians and Surgeons Pakistan, the study was conducted over a six-month period, from May 20, 2021, to November 20, 2021.

**Sample Size:** This research had 110 patients in total. Based on a 95% confidence level, a 6% margin of error, and an 11.6% prevalence of respiratory distress syndrome (RDS) in PPROM patients, the sample size was determined. The WHO sample size calculation program was used to establish the sample size.

**Sampling Technique:** Patients who satisfied the study's inclusion requirements were recruited using a non-probability sequential sampling approach.

**Sample Selection:** In order to provide a targeted examination of maternal and fetal outcomes in instances of PPROM, the sample selection for this research included certain inclusion and exclusion criteria. Based on clinical evaluations and the detection of amniotic fluid in the vaginal canal, women with PPROM diagnoses were included. Participants' gestational ages required to be 34 weeks or fewer, as verified by a dated ultrasound and their last menstrual period (LMP). Only singleton pregnancies were taken into account, and ultrasound imaging had to confirm that the baby was in a cephalic presentation. It was also necessary for participants to be between the ages of 20 and 45.

On the other hand, participants who did not provide their permission were not included in the research. Pregnant women who had prior medical illnesses such as essential hypertension, thyroid issues, thrombophilia, chronic liver disease, heart disease, or type II diabetes mellitus were also excluded. Women having a history of polyhydramnios or gestational diabetes mellitus were also eliminated, as were cases of intrauterine growth restriction (IUGR). Additionally, the research excluded individuals with fetal abnormalities seen on ultrasound and those with pregnancy-related problems, such as pregnancy-induced hypertension. The goal of this meticulous selection procedure was to establish a uniform research group in order to precisely evaluate the results related to PPROM.

**Data Collection Procedure:** Eligible participants were included in the trial after informed consent. Pregnancy factors, such as age, parity, booking status, and the time at which membrane rupture began, were documented together with demographic data and clinical history. Information was collected on maternal symptoms, fetal movements, and additional indicators such as the quantity, color, and odor of the leaking amniotic fluid. A sterile speculum examination was performed and details regarding cervical status, fluid characteristics, and the presence of bleeding or meconium were documented to confirm the accumulation of amniotic fluid in the posterior fornix. Broad-spectrum intravenous antibiotics were given to all patients to lower the risk of infection and a steroid cover to improve fetal lung maturity. The researcher used the hospital data to track and document patient progress as well as maternal and fetal outcomes.

**Diagnosis and Management:** The results of the sterile speculum examination, which included fluid characteristics and cervical status, were used to diagnosis PPROM. Following diagnosis, conventional PPROM care procedures were carried out, which included administering broad-spectrum intravenous antibiotics to reduce the risk of infection and steroids to promote fetal lung maturity. Throughout the hospital stay, the health of the mother and fetus was continuously checked.

**Data Analysis:** SPSS Version 20 was used to analyze the gathered data. Mean and standard deviation values were

computed for quantitative factors such birth weight, gestational age, and mother age. Parity, gravidity, gestational age, booking status, method of delivery, maternal outcomes (e.g., chorioamnionitis), and fetal outcomes (e.g., RDS, hyperbilirubinemia, newborn sepsis, NICU hospitalization, and stillbirth) were among the qualitative variables for which frequencies and percentages were calculated. Data were stratified according to maternal age, parity, gravidity, gestational age, booking status, form of induction, and monthly family income in order to account for possible impact modifiers. After stratification, a chi-square test was used; a p-value of less than 0.05 was deemed statistically significant.

## RESULTS

The majority (65%) of the 110 patients with PPROM identified before 34 weeks were between the ages of 20 and 30. The mean maternal age was 28.4 ± 4.5 years. 57% of the individuals were multigravida, and the mean gestational age at PPROM was 30.5 ± 2.1 weeks. Prenatal care inadequacies were highlighted by the noteworthy fact that 45% of the patients were unbooked at the time of hospital admission (Table 1).

**Table 1**

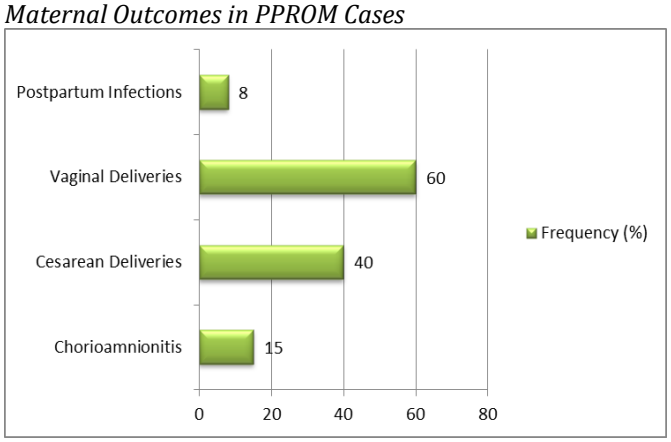
*Demographic and Clinical Characteristics of Study Participants*

| Characteristic | Frequency (%) |
|---|---|
| Maternal Age (Mean ± SD) | 28.4 ± 4.5 |
| Gestational Age (Mean ± SD) | 30.5 ± 2.1 |
| Multigravida | 57 |
| Unbooked Cases | 45 |

According to maternal outcomes, 15% of patients had chorioamnionitis, suggesting a significant risk of infection in PPROM. 60% of women were delivered vaginally, with 40% undergoing cesarean sections, mostly as a result of fetal distress or other obstetric difficulties. Antibiotics were also effective in treating postpartum infections, which included fever and wound infections, which affected 8% of the mothers (figure 1).

**Figure 1**

*Maternal Outcomes in PPROM Cases*




Breathing distress syndrome (RDS) was a PPROM-related problem for fetal outcomes, affecting 23% of newborns, many of whom needed NICU breathing assistance. Twenty percent of patients had neonatal sepsis, which led to the early use of broad-spectrum medicines. Additionally, phototherapy was a successful treatment for hyperbilirubinemia, which afflicted 12% of infants. Overall, RDS, sepsis, or other prematurity-related problems necessitated NICU stay for 35% of newborns. The study had a 3.6% stillbirth rate, were mostly related to serious problems.

**Table 2**

*Fetal Outcomes and Complications*

| Fetal Outcome | Frequency (%) |
|---|---|
| Respiratory Distress Syndrome (RDS) | 23 |
| Neonatal Sepsis | 20 |
| Hyperbilirubinemia | 12 |
| NICU Admissions | 35 |
| Stillbirths | 3.6 |

Additionally, stratification analysis showed statistically significant relationships between maternal and fetal outcomes according on booking status, gestational age, and maternal age. Higher RDS incidence was strongly correlated with younger maternal age (<30 years) and earlier gestational ages (<32 weeks) ($p \leq 0.05$). Higher incidences of chorioamnionitis were seen in unbooked patients and multiparous women, with statistically significant differences ($p < 0.05$) also noted in these groups.

**Table 3**

*Stratification of Maternal and Fetal Outcomes by Demographic Factors*

| Factor | Outcome | p-value |
|---|---|---|
| Maternal Age (<30 years) | Increased RDS | ≤ 0.05 |
| Gestational Age (<32 weeks) | Higher RDS | ≤ 0.05 |
| Booking Status (Unbooked) | Chorioamnionitis | ≤ 0.05 |
| Parity (Multiparous) | Chorioamnionitis | ≤ 0.05 |

## DISCUSSION

The study's conclusions on the outcomes for mothers and fetuses in PPROM instances are consistent with other studies on the significant hazards associated with PPROM. 15% of patients in this research had chorioamnionitis, which is in line with data that point to infection being a common side effect of PPROM brought on by protracted membrane rupture [15]. High rates of cesarean birth in PPROM have also been documented in earlier research, often as a result of maternal problems or fetal distress. The 40% cesarean rate in this research is consistent with the frequency of surgical procedures documented elsewhere, confirming that managing complications from PPROM often requires a deviation from spontaneous vaginal birth [16].

In terms of fetal outcomes, 23% of newborns had RDS, which is consistent with research showing that RDS is more prevalent in preterm deliveries associated with lung immaturity. The study's 20% newborn sepsis rate is also consistent with earlier evidence showing that early membrane rupture compromises the barrier, increasing the prevalence of sepsis [17]. The 12% hyperbilirubinemia rate in this case is within the typical range documented in the literature, especially for preterm newborns who are more likely to have problems with bilirubin metabolism. 3.6% of cases had stillbirths, which is in line with research that indicates PPROM pregnancies had higher stillbirth rates than term pregnancies [18]. The 35% NICU admission rate is also consistent with data demonstrating

that newborns with PPROM often need specialist care because of prematurity-related problems, underscoring the vital role that NICU assistance plays in treating these patients [19].

The stratification of maternal and fetal outcomes by demographic characteristics was one of the study's unique features. It showed substantial relationships, especially between parity, booking status, and maternal age. For example, lower gestational age during PPROM and younger maternal age were strongly linked to RDS, highlighting the increased risks in younger mothers who had experienced rupture episodes earlier. The difficulties caused by insufficient prenatal care, which has not been sufficiently addressed in previous research but is crucial for comprehending context-specific maternal hazards, are reflected in the greater frequency of chorioamnionitis in unbooked patients.

### Limitations and Future Suggestions

The results of this research may not be as generalizable to other healthcare settings since it was only carried out at one tertiary care facility. Furthermore, even though the research had a large sample size, selection bias might be introduced due to the non-probability sampling technique. A multicenter approach might be useful for future research to confirm these results across a range of demographics. To improve comprehension, extended follow-up times and a randomized sample technique should be used to evaluate long-term neonatal outcomes. Last but not least, more information on maternal interventions—like improved prenatal care procedures or extra infection control measures—could help improve PPROM treatment recommendations.

## CONCLUSION

PPROM is a significant underlying cause of preterm birth and stands as a major contributor to perinatal morbidity, mortality, and maternal complications. A precise diagnosis and a thorough evaluation of the advantages and disadvantages of a prompt delivery vs a continuation of the pregnancy are necessary for managing PPROM. This research highlights the importance of early prenatal care, careful observation, and well-informed decision-making in enhancing results. Targeted management becomes especially vital considering the substantial burden that preterm infant care imposes on families, healthcare systems, and the overall economy. In order to provide the best possible outcomes for both mothers and newborns, conservative management measures are guided by an understanding of gestational age-dependent hazards.

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