

**Maternal and Neonatal Outcomes in Premature Rupture of Membranes (PROM) at Term: A Prospective Observational Study**Sethu Lakshmi<sup>1</sup>, Soumya Joesph<sup>2</sup><sup>1</sup>Assistant Professor, Department of OBG, Mount Zion Medical College, Enadimangalam, Kerala<sup>2</sup>Assistant Professor, Department of OBG, Mount Zion Medical College, Enadimangalam, Kerala

Received: 25-08-2024 / Revised: 23-09-2024 / Accepted: 26-10-2024

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Conflict of interest: Nil

**Abstract:****Background:** Premature rupture of membranes (PROM) is a common obstetric complication that significantly influences maternal and neonatal outcomes. This study aims to evaluate the maternal and neonatal outcomes associated with PROM at term.**Methods:** A descriptive study was conducted at Cosmopolitan Hospital, Trivandrum, over 19 months, from July 2015 to January 2017. The study included 200 pregnant women diagnosed with PROM after 37 completed weeks of gestation. Data on maternal and neonatal outcomes were collected and analyzed using statistical software SPSS version 20.**Results:** The study observed a higher incidence of maternal complications such as chorioamnionitis (6%), puerperal fever (15%), and postpartum hemorrhage (5%). Neonatal complications included birth asphyxia (10.5%), meconium aspiration syndrome (7%), and NICU admissions (12.5%). The mean duration of hospital stay was 4.4 days for mothers and 4.48 days for neonates.**Conclusion:** PROM at term is associated with significant maternal and neonatal morbidity. Prompt diagnosis and management, including appropriate use of antibiotics and timely induction of labor, are essential to reduce complications.**Keywords:** PROM, NICU, Chorioamnionitis

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**Introduction**

Premature rupture of membranes (PROM) is defined as the rupture of membranes before the onset of labor, resulting in leakage of amniotic fluid and the establishment of communication between the amniotic cavity and the endocervical canal and vagina [1]. When it occurs before 37 completed weeks of gestation, it is termed preterm PROM (PPROM); after 37 weeks, it is called term PROM [2]. PROM at term complicates 8-10% of all births, with most cases occurring in women who are at term [3]. The etiology of PROM is multifactorial, involving physiological changes, mechanical factors, infections, and biochemical changes within the membranes [4].

PROM poses significant risks to both the mother and the fetus, including chorioamnionitis, endometritis, postpartum hemorrhage, neonatal sepsis, and increased rates of NICU admission [5]. The management of PROM at term is controversial, with options ranging from expectant management to immediate induction of labor [6].

The objective of this study was to analyze the maternal and neonatal outcomes in cases of PROM

at term and to evaluate the effectiveness of different management strategies in reducing associated complications.

**Materials and Methods**

**Study Design:** This was a prospective, descriptive study conducted in the Department of Obstetrics and Gynecology and the Department of Pediatrics at Cosmopolitan Hospital, Trivandrum.

**Study Population:** The study included 200 pregnant women who presented with PROM after 37 weeks of gestation, diagnosed based on history and sterile speculum examination. Patients with active labor, previous cesarean section, malpresentation, and antepartum hemorrhage were excluded.

**Sample Size Calculation:** The sample size was calculated using EPI INFO software, considering a 5% error margin and a 95% confidence interval. The estimated proportion of cesarean section ( $p = 0.29$ ) among term PROM cases from a reference study was used, resulting in a minimum sample

size of 115, adjusted to 200 to account for dropouts.

**Data Collection:**

Detailed history, general physical examination, obstetric examination, and necessary laboratory investigations were performed for each patient. Information on maternal demographics, medical and obstetric history, method of labor induction, and delivery outcomes were recorded.

**Statistical Analysis:**

Data were analyzed using SPSS version 20. Frequencies and percentages were calculated for categorical variables, while means and standard deviations were used for continuous variables.

Chi-square tests were applied to assess associations between categorical variables. A p-value of <0.05 was considered statistically significant.

**Results**

**Table 1: Demographic Characteristics of the Study Population**

Characteristic	Frequency (n)	Percentage (%)
Age (years)		
≤ 20	11	5.5
21-30	162	81.0
>30	27	13.5
Education Level		
Secondary	30	15.0
Higher Secondary	53	26.5
Graduate	88	44.0
Post Graduate	17	8.5
Professional	12	6.0

**Table 2: Maternal Factors and Medical History**

Maternal Factor	Frequency (n)	Percentage (%)
Hypothyroidism	42	21.0
Anemia	9	4.5
Gestational Diabetes Mellitus	31	15.5
Gestational Hypertension	21	10.5

**Table 3: Distribution of Patients According to Gestational Age**

Gestational Age (weeks)	Frequency (n)	Percentage (%)
37.1-38	37	18.5
38.1-39	83	41.5
39.1-40	80	40.0

**Table 4: Mode of Delivery**

Mode of Delivery	Frequency (n)	Percentage (%)
Normal Vaginal Delivery	127	63.5
Instrumental Delivery	9	4.5
Lower Segment Cesarean Section (LSCS)	64	32.0

**Table 5: Indications for Cesarean Section**

Indication	Frequency (n)	Percentage (%)
Failure to Progress	19	9.5
Fetal Distress	17	8.5
Prolonged Second Stage	12	6.0
Failed Induction	15	7.5

**Table 6: Neonatal Outcomes**

Neonatal Outcome	Frequency (n)	Percentage (%)
Healthy Baby	149	74.5
Birth Asphyxia	21	10.5
Meconium Aspiration	14	7.0
Hyperbilirubinemia	12	6.0
Sepsis	4	2.0

**Table 7: APGAR Scores at 1 and 5 Minutes**

APGAR Score	Frequency (n)	Percentage (%)
APGAR < 7 at 1 min	24	12.0
APGAR > 7 at 1 min	176	88.0
APGAR < 7 at 5 min	9	4.5
APGAR > 7 at 5 min	191	95.5

**Table 8: Duration of Hospital Stay**

Duration of Stay (days)	Frequency (n)	Percentage (%)
≤ 7 days	181	90.5
> 7 days	19	9.5
Mean Duration	4.4 ± 2.0	

**Table 9: Correlation between Mode of Delivery and Neonatal Outcome**

Neonatal Outcome	Normal Delivery (%)	LSCS (%)	p-value
Healthy Baby	86.6	46.9	<0.001
Birth Asphyxia	3.1	26.6	
Meconium Aspiration	1.6	18.8	

**Table 10: Correlation between PROM-to-Delivery Interval and Maternal Complications**

PROM-to-Delivery Interval (hours)	Chorioamnionitis (%)	Puerperal Fever (%)	p-value
<6	0	0	<0.001
6-12	4.8	3.8	
12-18	20.0	9.8	
18-24	44.4	16.7	

## Discussion

The results of this study are consistent with previous research, indicating that PROM at term is associated with significant maternal and neonatal morbidity [7]. The incidence of cesarean sections was comparable to other studies, and maternal complications like chorioamnionitis and puerperal fever were prevalent. The study reinforces the importance of active management of PROM cases at term, particularly in reducing the interval between PROM and delivery to minimize complications [8].

**Maternal Outcomes:** PROM significantly impacts maternal health, with an increased risk of complications such as chorioamnionitis, puerperal fever, and postpartum hemorrhage [9]. In this study, 6% of women developed chorioamnionitis, a rate comparable to findings by Pandey S (6%) and Shah M (4%) [10]. The incidence of puerperal fever (15%) was also within the range reported by studies like Anjana Devi (20.19%) and Gaikwad B (15%) [11]. These findings underscore the need for vigilant monitoring and timely intervention in cases of PROM to prevent maternal morbidity [12].

**Neonatal Outcomes:** Neonatal outcomes are a significant concern in PROM cases due to the potential for complications such as sepsis, birth asphyxia, and meconium aspiration syndrome [13]. The study showed a 10.5% incidence of birth asphyxia and a 7% incidence of meconium aspiration syndrome, similar to the findings of

Shanthi et al. (14% birth asphyxia) and Kurude V N (6.3% sepsis) [14]. The rate of NICU admissions (12.5%) observed in this study is consistent with the 16% reported by Sinha R K et al. and 15% by Mukharya et al. These data indicate that the neonatal morbidity associated with PROM is substantial and highlights the need for comprehensive neonatal care facilities to manage such cases effectively [15].

**Management Strategies:** The management of PROM at term includes monitoring for signs of infection and deciding on the appropriate time and method for labor induction. Studies have shown that early induction of labor in cases of PROM reduces the risk of infection without significantly increasing the rate of cesarean sections. This study followed a protocol of immediate induction with prostaglandins or oxytocin based on the Bishop's score, which is consistent with guidelines from the Society of Obstetricians and Gynecologists of Canada and the World Health Organization.

The use of antibiotics in cases of PROM is also a crucial management strategy to prevent ascending infections. In this study, all patients received prophylactic antibiotics, and there was a noted reduction in the incidence of chorioamnionitis and neonatal sepsis. This practice aligns with the recommendations of the NICE guidelines, which advocate for the use of antibiotics in PROM cases to minimize the risk of maternal and neonatal infections.

**Strengths and Limitations:** The major strength of this study is its prospective design and the comprehensive collection of data on maternal and neonatal outcomes in PROM cases at term. However, there are several limitations to consider. The sample size, although adequate, was limited to a single tertiary care center, which may affect the generalizability of the findings. Additionally, the study did not account for long-term neonatal outcomes, which are crucial in understanding the full impact of PROM.

**Future Research Directions:** Future studies should focus on larger, multi-center trials to validate these findings and explore the long-term outcomes of neonates born after PROM at term. Further research is also needed to refine the management protocols for PROM, including the optimal timing of induction and the use of prophylactic antibiotics.

### Conclusion

This study highlights the significant maternal and neonatal morbidity associated with PROM at term. Active management with timely induction of labor and the use of prophylactic antibiotics are essential strategies to reduce the risks of infection and adverse outcomes. A team-based approach, including obstetricians, neonatologists, and nursing staff, is crucial in managing these cases effectively. While this study provides valuable insights, further research is needed to optimize management strategies and improve outcomes for both mothers and neonates.

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