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A Study to Evaluate Outcome in Neonates Born to Mothers with Premature Rupture of Membrane

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Abstract: ***Introduction: Premature rupture of membranes (PROM) is a common and critical obstetric issue, contributing to 10% of perinatal deaths globally. It is a significant risk factor for early - onset neonatal sepsis and preterm births. Neonates born to mothers with PROM or preterm PROM (PPROM) are at an increased risk of complications such as fetal distress, prematurity, and umbilical cord compression. Other potential issues include skeletal deformities, impaired pulmonary development, pulmonary hypertension, chronic lung disease, and pulmonary hypoplasia. These infants are also at risk for birth asphyxia, necrotizing enterocolitis (NEC), intraventricular hemorrhage, and neonatal sepsis. Objectives: The objective of this study was to assess the outcomes in neonates born to mothers with PROM of greater than 18 hours' duration. The study also aimed to evaluate the role of the latency period between PROM and delivery on neonatal outcomes, and to determine the case fatality rate among neonates born to mothers with PROM for more than 18 hours. Methods: This prospective observational study was conducted at our hospital over a period of 24 months. A total of 80 neonates born to mothers with PROM lasting more than 18 hours were included in the study. Clinical features such as neonatal jaundice, lethargy, feeding difficulties, temperature instability, and respiratory distress were commonly observed. Laboratory investigations, including total count, CRP, cranial ultrasound, chest X - ray, and blood culture, were used to assist in diagnosis. Results: Perinatal morbidity was observed in 50% of the cases. Neonatal jaundice was the most common morbidity, affecting 37.93% of cases, followed by respiratory distress/TTN (27.58%), thrombocytopenia (18.96%), CRP - positive sepsis (18.96%), birth asphyxia (10.34%), apnea (10.34%), RDS (8.62%), and culture - positive sepsis (8.62%). The perinatal mortality rate was 1.72% (1 out of 80 neonates). As the gestational age increased, the latency period tended to decrease, and the incidence of perinatal morbidities also decreased. Conclusion: Pregnancies complicated by PROM are at a significantly higher risk of perinatal morbidities and mortality. The duration of the latency period and the period of gestation play a crucial role in influencing these outcomes, with shorter latency periods and earlier gestations correlating with higher morbidity and mortality rates.***

Keywords: premature rupture of membranes, neonatal morbidity, latency period, neonatal sepsis, perinatal outcomes

1. Introduction

Premature rupture of membranes (PROM), also termed "pre - labor rupture of membranes, " refers to the rupture of the amniotic membranes after 37 weeks of gestation but before the onset of labor. [1] PROM affects approximately 5–10% of all term pregnancies. [2] When PROM occurs before 37 weeks of gestation, it is classified as Preterm PROM (PPROM), presenting challenges in balancing the risks of prematurity with potential complications. [3] The latency period is the interval between rupture of membranes and delivery. [4] It is inversely proportional to gestational age. In term pregnancies, over 90% of women with PROM enter labor within 24 hours, whereas at 32 to 34 weeks, the average latent period extends to approximately four days. [5] Studies have shown a positive correlation between latent period duration and neonatal complications, with sepsis rates rising significantly beyond 37 hours of latency. [6]

The fetal membranes protect against ascending infections. Following rupture, both mother and fetus become susceptible to infections and complications. [7] Complications in neonates born to mothers with PROM or PPROM include fetal distress, prematurity, umbilical cord compression, skeletal deformities, impaired pulmonary development, pulmonary hypertension, chronic lung disease, pulmonary hypoplasia, birth asphyxia, necrotizing enterocolitis (NEC), intraventricular hemorrhage, and neonatal sepsis. [8] Neonatal sepsis accounts for approximately 8% of neonatal deaths and remains a leading cause of mortality and long - term morbidity, particularly in low - and middle - income countries. Preterm PROM is associated with factors including low socioeconomic status, low body mass index, tobacco use, history of preterm labor, urinary tract infections, vaginal bleeding during pregnancy, cerclage placement, and amniocentesis. [8] PROM and PPROM are influenced by maternal, fetal, and environmental factors. Maternal factors include dietary antioxidant deficiencies, tobacco use, microvascular diseases, and infections. Fetal factors involve increased intra - amniotic pressure and abnormalities in membrane remodeling. Environmental influences, such as high altitudes, exacerbate fetoplacental energy demands. While the precise cause often remains unidentified, PROM and PPROM result from a multifactorial interplay, with infections and inflammation being predominant contributors. [3] Accurate and timely diagnosis of PROM is critical for ensuring a successful pregnancy outcome. Management options include hospital admission, prompt investigations to exclude infection, expectant management, and antenatal corticosteroid administration. Broad - spectrum antibiotics are used when indicated, and delivery is planned once an optimal gestational age is achieved. The primary goal is to

improve perinatal outcomes and reduce neonatal morbidity and mortality. Achieving these objectives requires clinicians to have a thorough understanding of the evaluation and management of PROM.

This research helps build a more effective approach to managing PROM, ultimately improving neonatal outcomes and reducing overall mortality and morbidity rates.

2. Materials and Methods

Study Design:
This prospective observational study was done which investigated outcomes in neonates born to mothers with PROM of greater than 18 hours' duration who presented to our hospital, from May 2023 - April 2025.

Study Population: Neonates born to mothers with premature rupture of membranes (>18 hrs) in the Neonatal ICU, Department of Paediatrics at our institute.

Inclusion Criteria:
All the neonates born to mothers with premature rupture of membranes (PROM) of more than 18 hours duration at our hospital.

Exclusion Criteria:
- Out born neonates.
- Mothers with antepartum haemorrhage, toxaemia of pregnancies, or co - morbidities other than infection.
- Neonates with major congenital anomalies.
- Mothers with PROM of less than 18 hours duration.

Sample Size: The sample size was calculated using the formula $n=z^2\alpha$ x P x (Q) /d^2. Where, n = required sample size, Z = Z - score for a 95% confidence interval (1.96), p = prevalence of PROM - related complications, taken as 27.9% from previous studies, q = 100−p100 - p100−p, calculated as 72.1%, and E = margin of error, set at 10%. After Substituting the values, N= 80. Hence, the calculated sample size is 80 neonates, ensuring a statistically robust analysis while remaining feasible for the study's timeframe and resources.

Data Collection:
Data collection for this study was conducted by the observer, using a designated study proforma. Prior to participation, eligible parent/guardian was briefed about the study in their local vernacular language, and written informed consent was obtained through a pre - approved proforma sanctioned by our ethical committee, with the option to withdraw at any time without penalties.

Methods
The methodology of the study involved a comprehensive collection of both maternal and neonatal histories. Maternal history included the mother's identification, obstetric history, details of the current pregnancy, and relevant information from the current hospitalization. Neonatal history focused on data regarding the neonate's current hospitalization, including birth history, birth weight, APGAR score, resuscitation needs, ventilator support, gestational age, sex, stature, drug therapy during hospitalization, occurrence of infections, and neonatal death.

Maternal data included age, parity, duration of PROM, antibiotics administered, and other obstetric details. In neonatal examination, parameters such as hemodynamics, temperature, pulse, respiration, capillary refill time, and systemic examination were assessed.

Neonatal assessments included laboratory tests such as hemoglobin (Hb%), total leukocyte count (TLC), differential leukocyte count (DLC), C - reactive protein (CRP) - quantitative, blood culture, cerebrospinal fluid (CSF) analysis, fetal head ultrasound (if needed), and chest X - ray.

Regarding the mother, the study focused on variables such as age, parity, antenatal history with special emphasis on the exact time of rupture of membranes, duration of PROM, administration of antibiotics prior to delivery, history of premature rupture of membranes, preterm birth, prenatal examinations, frequency of consultations, occurrence of urinary tract infections, sexually transmitted infections, chorioamnionitis, latency period, drug therapy on admission, and the type of delivery. Subsequently, statistical analyses were performed to discern patterns and associations within these classifications, thereby contributing to a comprehensive understanding of neonatal outcomes in this cohort.

Statistical analysis
The statistical analysis involved a thorough analysis of the data, utilizing various measures to highlight the key characteristics of the study cohort. Data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Science (SPSS) Software version 29. Continuous variables were expressed as mean ± standard deviation (SD). Categorical variables were expressed as frequencies and percentages. Statistical tests such as the chi - square test and t - test were applied. A p - value < 0.05 was considered statistically significant.

3. Results

The study population consists of 80 patients, with 45 males (56.25%) and 35 females (43.75%), indicating a slight male predominance. (Table - 1) The calculated chi - square statistic was 1.25, yielding a p - value of 0.264. Since this p - value exceeds the conventional significance threshold of 0.05, the null hypothesis of equal gender distribution cannot be rejected. This indicates that the gender distribution in the sample does not significantly differ from what would be expected by chance.

In this study, the median birth weight of 80 patients was 2.2 kg, with an interquartile range (IQR) of 1.9–2.7 kg. (Table 2) A median birth weight of 2.2 kg falls within the low birth weight (LBW) threshold, which is typically defined as <2.5 kg. This suggests that a significant proportion of the study population may be at risk for neonatal complications, including respiratory distress, hypoglycemia, and impaired thermoregulation.

The study population primarily consisted of neonates classified as appropriate for gestational age (AGA) (48, 60%), while a significant proportion (32, 40%) were small for gestational age (SGA). Notably, no large for gestational age (LGA) cases were observed. SGA neonates are at increased

risk for complications such as hypoglycemia, hypothermia, and respiratory distress due to intrauterine growth restriction (IUGR) or other maternal - fetal factors. The birth weight distribution in this study reveals that more than half of the neonates (42, 52.50%) had low birth weight (LBW), defined as <2.5 kg. Normal birth weight (≥2.5 kg) was observed in 29 neonates (36.25%), while 9 neonates (11.25%) had very low birth weight (VLBW, <1.5 kg). Notably, no cases of extremely low birth weight (ELBW, <1 kg) were reported. (Table 3)

The study population consisted of an equal distribution of primigravida (first - time mothers) and multigravida (women with previous pregnancies), each comprising 50% (40 patients) of the total sample. The gestation - wise distribution of cases indicates that nearly half of the neonates were term births (38, 47.50%), while a significant proportion were late preterm (30, 37.50%). Additionally, 12 neonates (15.00%) were born very preterm, whereas no cases of extreme preterm birth (<28 weeks) were observed. This distribution highlights the predominance of term and late preterm births, with a notable proportion of preterm deliveries, which may influence neonatal outcomes. The mode of delivery distribution in this study indicates that the majority of neonates (47, 58.75%) were delivered via normal vaginal delivery (NVD), while 33 cases (41.25%) required lower - segment cesarean section (LSCS). The relatively high rate of LSCS (41.25%) suggests the presence of maternal or fetal indications necessitating surgical intervention, such as fetal distress, cephalopelvic disproportion, or a history of previous cesarean sections. While cesarean delivery can be life - saving in certain cases, it is also associated with increased risks of postoperative complications, longer recovery periods, and potential implications for future pregnancies. The distribution of PROM/PPROM duration in this study indicates that a significant proportion of cases (56.89%) had a latency period exceeding 24 hours, while 48.27% experienced membrane rupture lasting between 18–24 hours. Among those with prolonged rupture, 31.03% had a latency period between 24–48 hours, 12.06% between 48–96 hours, and 13.79% exceeded 96 hours. (Table 4).

The median TLC in the study was 16220 (IQR – 11517 - 21775). The median CRP - Q was 1.95 (0.86 - 6.9). The median hemoglobin was 17.70 (16.50 - 19.20). The median PCV was 49.15 (IQR – 45.80 - 53.70). The median platelet count was 2.2 lakhs (IQR – 1.56 - 2.91). The computed p - value for the given investigational parameters is 4.04×10^{-95}, which is highly statistically significant. This indicates a substantial difference among these hematological and inflammatory markers within the study cohort, reinforcing their potential clinical relevance to the research objectives. The categorization of patients based on CRP positivity provides essential insights into the inflammatory burden within the study cohort. Out of 80 participants, 14 patients (17.5%) were identified as CRP positive, indicating a systemic inflammatory response, while 66 patients (82.5%) were CRP negative. The analysis of thrombocytopenia prevalence in the study cohort reveals that 14 out of 80 patients (17.5%) had a reduced platelet count, while 66 patients (82.5%) maintained normal platelet levels. The blood culture findings provide essential insights into the microbiological profile of the study population. Among 80 patients, 73 (91.25%) had sterile blood cultures, indicating the absence of detectable bloodstream infections in the majority of the cohort. However, 7 patients (8.75%) demonstrated culture positivity. The USG Cranium findings reveal that no patients in the study exhibited abnormal cranial ultrasonography results. Among the 80 participants, 24 patients (30%) underwent USG cranium, all of whom had normal findings, while 56 patients (70%) did not undergo the imaging study. The absence of abnormal cranial findings suggests that clinically significant neurological abnormalities were not prevalent in this cohort. The Chest X - ray findings provide important information regarding the pulmonary status of the study cohort. Out of 80 patients, only 7 patients (8.75%) exhibited features suggestive of respiratory distress syndrome (RDS) on their chest X - rays, while 15 patients (18.75%) had normal findings. A substantial proportion, 58 patients (72.5%), did not undergo the X - ray. (Table 5)

The presence of meconium - stained liquor (MSL) was observed in 6 neonates (7.50%), while the majority (74, 92.50%) had clear amniotic fluid. Birth asphyxia was observed in 8 neonates (10.00%), while the majority (72, 90.00%) did not exhibit signs of asphyxia. Respiratory distress, including transient tachypnea of the newborn (TTN), was observed in 22 neonates (27.50%), while 58 neonates (72.50%) did not exhibit respiratory complications. Respiratory distress syndrome (RDS), also known as hyaline membrane disease (HMD), was observed in 7 neonates (8.75%), while 73 neonates (91.25%) did not develop the condition. RDS is primarily seen in preterm infants due to surfactant deficiency, leading to alveolar collapse, impaired gas exchange, and respiratory failure. Neonatal jaundice was observed in 30 neonates (37.50%), while 50 neonates (62.50%) did not develop hyperbilirubinemia. The table detailing the number of patients having shock in the study reveals that 4 patients (5%) experienced shock, while the remaining 76 patients (95%) did not. the number of patients with meningitis in the study shows that only 1 patient (1.25%) experienced meningitis, while the remaining 79 patients (98.75%) did not have this condition. Hypocalcemia reveals that 4 patients (5%) in the study exhibited hypocalcemia, while 76 patients (95%) did not. the occurrence of apnea in the study cohort. Apnea, defined as the cessation of breathing for more than 20 seconds, was observed in 8 patients (10%), while the majority, 72 patients (90%), did not experience apnea. The data on culture - positive sepsis reveals that 7 patients (8.75%) in the study had culture - positive sepsis, while 73 patients (91.25%) did not. (Table 6)

The use of CPAP (Continuous Positive Airway Pressure) support in the study cohort indicates that only 7 patients (8.75%) required CPAP, while 73 patients (91.25%) did not. the need for ventilator support reveals that only 3 patients (3.75%) required mechanical ventilation, while the remaining 77 patients (96.25%) did not. The data on neonatal antibiotic prescription indicates that 62 patients (77.50%) in the study received antibiotics, while 18 patients (22.50%) did not. (Table 7)

Neonatal death occurred in only 1 patient (1.25%) in the study, while the remaining 79 patients (98.75%) survived. The computed p - value of 1.0 indicates that the occurrence of neonatal death (1.25%) is consistent with the expected

distribution in the study population. (Table 8)

Out of 39 patients (48.75%) in the study required NICU admission, while 41 patients (51.25%) did not. NICU admission, commonly associated with severe conditions in neonates such as respiratory distress, sepsis, or hypo - perfusion. (Table 9)

Out of 6 cases of MSL, 4 cases (66.67%) were observed in patients with term PROM (POG >37 weeks). The remaining 2 cases of MSL were distributed equally between 28 - 32 weeks and 32 - 37 weeks of gestation. The total number of patients in each POG category is also provided: 12 patients (15%) were in the 28 - 32 weeks group, 30 patients (37.5%) in the 32 - 37 weeks group, and 38 patients (47.5%) in the >37 weeks group. Among the 8 cases of birth asphyxia, 5 cases (62.5%) occurred in preterm deliveries (28 - 36 weeks) and 3 cases (37.5%) in term deliveries (>37 weeks). In the 28 - 32 weeks group, 3 patients had birth asphyxia, while in the 32 - 37 weeks and >37 weeks groups, 2 and 3 patients, respectively, had birth asphyxia. The remaining patients, categorized as No birth asphyxia, were distributed across all gestational age groups. Respiratory distress was found in 22 patients, with a significant prevalence in preterm deliveries (28 - 36 weeks), accounting for 75% (17 cases) of the total RD cases. The remaining 25% (5 cases) were seen in term deliveries (>37 weeks). The calculated p - value of 0.0062 indicates a statistically significant association between POG and the occurrence of respiratory distress. This suggests that preterm infants are at a significantly higher risk of developing respiratory distress compared to term neonates. Out of 7 cases of RDS, 6 cases (80%) were observed in 28 - 32 weeks of gestation, while 1 case (20%) occurred in 32 - 37 weeks. Notably, no cases of RDS were present in pregnancies beyond 37 weeks of gestation. The p - value of <0.0001 indicates a highly statistically significant association between POG and the occurrence of RDS. This result strongly supports that gestational age plays a critical role in the development of RDS. Out of 30 cases of neonatal jaundice, 20 cases (68.18%) were observed in preterm deliveries (28 - 37 weeks), while 10 cases (31.82%) occurred in term deliveries (>37 weeks). In the 28 - 32 weeks group, 8 neonates had jaundice, in the 32 - 37 weeks group, 12 cases were noted, and in the >37 weeks group, 10 cases of neonatal jaundice were reported. The computed p - value of 0.0201 indicates a statistically significant association between POG and the development of neonatal jaundice. The mean birth weight of 80 babies was 2.320 kg. The maximum mean birth weight was observed in term deliveries (2.853 kg), while the minimum (1.364 kg) was seen in the 28 - 32 weeks group. The p - value of <0.0001 indicates a highly statistically significant difference in birth weight across the different gestational age groups. Out of 4 cases of shock, all occurred in the 28 - 32 weeks gestational group, representing 100% of the shock cases. No patients developed shock in the 32 - 37 weeks or >37 weeks groups. Specifically, in the 28 - 32 weeks group, 4 patients had shock, while in the 32 - 37 weeks and >37 weeks groups, 0 patients were affected by shock. The computed p - value of 1.94×10^{-5} indicates a highly statistically significant association between POG and the occurrence of shock. . Out of the 8 cases of apnea, 6 cases (75%) were observed in preterm deliveries (28 - 32 weeks), while 2 cases (25%) were seen in 32 - 37 weeks of gestation. Notably, no cases of apnea were observed in term deliveries (>37 weeks). The computed p - value of.0001 indicates a highly statistically significant association between POG and the development of apnea. Out of a total of 7 culture - positive cases of sepsis, all 7 cases (100%) were observed in preterm deliveries (<37 weeks POG), with 2 cases in the 28 - 32 weeks group and 5 cases in the 32 - 37 weeks group. No cases of sepsis were reported in term deliveries (>37 weeks), suggesting that preterm neonates are particularly susceptible to sepsis. The computed p - value of 0.031 suggests a statistically significant association between POG and the development of sepsis, indicating that preterm infants, particularly those born before 37 weeks, are at an increased risk for sepsis compared to term infants. (Table 10)

Table 1: Gender wise distribution

Gender	Number of Patients	Percentage
Male	45	56.25%
Female	35	43.75%
Total	80	100%

Table 2: Birth Weight Wise Distribution of Cases

Total Number of Patients	80
Median Birth Weight (kg)	2.2
Interquartile Range (kg)	1.9 - 2.7

Table 3: Assessment of birth weight and gestational age

Appropriateness for Gestational Age	Number of Patients	Percentage (%)
Appropriate for gestational age	48	60.00%
Small for gestational age	32	40.00%
Large for gestational age	0	0.00%
Total	80	100%
Assessment as per Birth Weight	Number of Patients	Percentage (%)
Normal birth weight	29	36.25
Low birth weight	42	52.50
Very low birth weight	9	11.25
Extremely low birth weight	0	0
Total	80	100

Table 4: Maternal parameters

Parity	**Number of Patients**	**Percentage (%)**
Primigravida	40	50
Multigravida	40	50
Total	80	100
Assessment as per Term Status	**Number of Patients**	**Percentage**
Term birth	**38**	**47.50**
Late Pre - Term birth	**30**	**37.50**
Very Pre - Term birth	**12**	**15.00**
Mode of Delivery	**Number of Patients**	**Percentage**
Normal vaginal delivery	**47**	**58.75**
LS caesarean section	**33**	**41.25**
Total	**80**	**100**
PROM/PPROM Duration (Hours)	**Number of Patients**	**Percentage**
18 - 24 hours	**34**	**48.27**
More than 24 – 48 hours	**25**	**31.03**
More than 48 – 96 hours	**10**	**12.06**
More than 96 hours	**11**	**13.79**
Total	**80**	**100**

Table 5: Neonatal investigations: Blood parameters and Radiological investigations

Parameter	Median	Interquartile Range (IQR)
Total leucocyte count (absolute)	16220	11517 - 21775
CRP - Q	1.95	0.86 - 6.9
Hemoglobin	17.70	16.50 - 19.20
PCV	49.15	45.80 - 53.70
Platelet count (in lakhs)	2.2	1.56 - 2.91
CRP Status	**Number of Patients**	**Percentage (%)**
Positive	14	17.5
Negative	66	82.5
Total	80	100
Thrombocytopenia	**Number of Patients**	**Percentage (%)**
Yes	14	17.5
No	66	82.5
Total	80	100
Blood Culture Findings	**Number of Patients**	**Percentage (%)**
Sterile	73	91.25
CONS	1	1.25
Klebsiella	3	2.50
Pseudomonas	2	2.50
Candida	1	1.25
Total	80	100
USG Cranium	**Number of Patients**	**Percentage**
Normal	24	30.00%
Abnormal findings present	0	0%
Not done	56	70.00%
Total	**80**	**100%**
Chest X - ray Findings	**Number of Patients**	**Percentage**
Normal	15	18.75%
RDS	7	8.75%
Not done	58	72.50%
Total	80	100%

Table 6: Neonatal outcome parameters and complications

Meconium - Stained Liquor	**Number of Patients**	**Percentage**
Yes	6	7.50%
No	74	92.50%
Total	80	100%
Birth Asphyxia	**Number of Patients**	**Percentage**
Yes	8	10.00%
No	72	90.00%
Total	80	100%
Respiratory Distress/TTN	**Number of Patients**	**Percentage**
Yes	22	27.50%
No	58	72.50%
Total	80	100%
Respiratory Distress Syndrome/HMD	**Number of Patients**	**Percentage**
Yes	7	8.75%
No	73	91.25%
Total	80	100%
Neonatal Jaundice	**Number of Patients**	**Percentage**
Yes	30	37.50%
No	50	62.50%
Total	80	100%
Shock	**Number of Patients**	**Percentage**
Yes	4	5.00%
No	76	95.00%
Total	80	100%
Meningitis	**Number of Patients**	**Percentage**
Yes	1	1.25%
No	79	98.75%
Total	80	100%
Hypocalcemia	**Number of Patients**	**Percentage**
Yes	4	5.00%
No	76	95.00%
Total	80	100%
Apnea	**Number of Patients**	**Percentage**
Yes	8	10.00%
No	72	90.00%
Total	80	100%
Culture Positive Sepsis	**Number of Patients**	**Percentage**
Yes	7	8.75%
No	73	91.25%
Total	80	100%

Table 7: Neonatal interventions required

CPAP	Number of Patients	Percentage
Yes	7	8.75%
No	73	91.25%
Total	80	100%
Ventilator Support	**Number of Patients**	**Percentage**
Yes	3	3.75%
No	77	96.25%
Total	80	100%
Neonatal Antibiotics	**Number of Patients**	**Percentage**
Yes	62	77.50%
No	18	22.50%
Total	80	100%

Table 8: Neonatal mortality

Neonatal Death	Number of Patients	Percentage
Yes	1	1.25%
No	79	98.75%
Total	80	100%

Table 9: Neonates requiring NICU admission

NICU Admission	Number of Patients	Percentage
Yes	39	48.75%
No	41	51.25%
Total	80	100%

Table 10: Period of gestation associated with different complications

MSL	**28 - 32 weeks**	**32 - 37 weeks**	**>37 weeks**	**Grand Total**	**p Value**
Yes	1	1	4	6	0.1519
No	11	29	34	74	
Total	12	30	38	80	
Birth Asphyxia	**28 - 32 weeks**	**32 - 37 weeks**	**>37 weeks**	**Grand Total**	**p - value**
Yes	3	2	3	8	0.169
No	9	28	35	72	
Total	12	30	38	80	
RD/TTN	**28 - 32 weeks**	**32 - 37 weeks**	**>37 weeks**	**Grand Total**	**p - Value**
Yes	7	10	5	22	0.0062
No	5	20	33	58	
Total	12	30	38	80	
RDS	**28 - 32 weeks**	**32 - 37 weeks**	**>37 weeks**	**Grand Total**	**p - Value**
Yes	6	1	0	7	<0.0001
No	6	29	38	73	
Total	12	30	38	80	
Neonatal Jaundice	**28 - 32 weeks**	**32 - 37 weeks**	**>37 weeks**	**Grand Total**	**p Value**
Yes	8	12	10	30	0.0201

No	4	18	28	50	
Total	12	30	38	80	
Shock	**28 - 32 weeks**	**32 - 37 weeks**	**>37 weeks**	**Grand Total**	**p Value**
Yes	4	0	0	4	<0.0001
No	8	30	38	76	
Grand Total	12	30	38	80	
Apnea	**28 - 32 weeks**	**32 - 37 weeks**	**>37 weeks**	**Grand Total**	**p Value**
Yes	6	2	0	8	<0.0001
No	6	28	38	72	
Grand Total	12	30	38	80	
Sepsis	**28 - 32 weeks**	**32 - 37 weeks**	**>37 weeks**	**Grand Total**	**p - Value**
Yes	2	5	0	7	0.031
No	10	25	38	73	
Grand Total	12	30	38	80	

4. Discussion

Premature rupture of membranes (PROM), also termed "pre - labor rupture of membranes, " refers to the rupture of the amniotic membranes after 37 weeks of gestation but before labor onset. [1] PROM affects approximately 5–10% of all term pregnancies. [2] When PROM occurs before 37 weeks, it is classified as Preterm PROM (PPROM), presenting challenges in balancing prematurity risks with potential complications. [3] In this study, male neonates (56.25%) outnumbered females (43.75%). This distribution aligns with findings from Arpita et al., Vijay et al., and Khan et al. [13 - 15] who reported a male - to - female ratio favouring male predominance, reinforcing that male neonates are more frequently affected in PROM cases. However, Lovereen et al. [16] reported an almost equal gender distribution, contrasting with our findings and suggesting that gender differences in PROM outcomes might vary based on demographic factors or sample size. The median birth weight in our study was 2.2 kg, with an interquartile range of 1.9 - 2.7 kg. This is comparable to findings of Arpita et al., Alam et al., and Begum et al. [13, 18, 19], where the mean birth weight of neonates born to mothers with PROM was around 2.3 kg. In this study, 60% of neonates were appropriate for gestational age (AGA), while 40% were small for gestational age (SGA), with no cases of large for gestational age (LGA). This distribution is consistent with previous studies examining neonatal growth patterns in PROM cases. Arpita et al. and Alam et al. [13, 18] reported a similar trend, with a significant proportion of neonates being AGA, though they noted a slightly higher prevalence of SGA neonates (43%). However, Lovereen et al. [16] reported a lower incidence of SGA neonates (35%), suggesting that factors such as maternal nutritional status, gestational age at PROM onset, and regional healthcare differences may influence neonatal growth outcomes.

Regarding birth weight, 52.50% of neonates in the study had low birth weight (LBW), while 36.25% had normal birth weight. This finding is in agreement with the study by Vijay et al. [14], which found a high prevalence of LBW neonates (51%) in cases of PROM. Similarly, Boskabadi et al. [9] reported that infants born after prolonged PROM had a significantly increased risk of LBW, with rates exceeding 50% in their review of multiple studies. The high proportion of LBW neonates in our study is consistent with these findings, indicating that prolonged PROM is a significant risk factor for intrauterine growth restriction and reduced fetal weight gain. Furthermore, Begum et al. [19] reported a higher percentage of very low birth weight (VLBW) neonates (14%) compared to our study (11.25%), likely reflecting differences in gestational age distribution at delivery. In contrast, Lu Zhuang et al. [10] documented a lower proportion of LBW neonates, emphasizing the potential influence of regional healthcare management, maternal nutrition, and access to timely obstetric interventions in mitigating fetal growth restriction.

The parity distribution in the present study was equally divided, with 50% of cases being primigravida and 50% multigravida. This balanced distribution contrasts with findings from Lovereen et al. [16], where a higher proportion of PROM cases were observed in primigravida women (62.7%). Similarly, Boskabadi et al. [9] noted that maternal parity influenced the risk of PROM, with a greater incidence among primigravida women in their study population. The equal distribution of parity in our study suggests that both primigravida and multigravida women are equally susceptible to PROM - related complications, unlike studies that reported a higher predisposition among first - time mothers. This variation could be attributed to differences in sample size, population demographics, and antenatal care practices.

The median gestational age in the present study was 36 weeks, with an interquartile range of 34–39 weeks. This finding is comparable to the study by Arpita et al. [13], where the mean gestational age of neonates born following PROM was approximately 36 weeks, highlighting a strong alignment with our study population. Similarly, Alam et al. [18] and Vijay et al. [14] reported a median gestational age of around 35–37 weeks in PROM cases, reinforcing the trend that most PROM - associated deliveries occur near - term or late preterm. However, Dwiana Ocviyanti et al. [11] found a slightly lower median gestational age (34 weeks), which could indicate a higher proportion of preterm deliveries in their study cohort due to differences in obstetric management or maternal risk factors.

Gestation - wise distribution in the current study showed that nearly half of the neonates (47.50%) were term births, with late preterm neonates comprising 37.50% of cases. This is in agreement with the findings of Boskabadi et al. [9], who also noted a higher proportion of term and late preterm neonates among PROM cases, suggesting that prolonged membrane rupture often leads to early - term deliveries. Similarly, Khan et al. [15] observed a predominance of late preterm neonates in their study, with late preterm births accounting for 40%, aligning closely with our results. However, Lovereen et al. [16] reported a slightly higher rate of preterm births compared to our study, with a significant proportion of neonates delivered before 34 weeks. The lower incidence of very preterm births (15%) and the absence of extreme preterm births in our study contrast with the study by Ilker Kahramanoglu et al. [12], where 6.7% of neonates were delivered at extreme preterm gestation, suggesting that factors such as regional differences in obstetric intervention and

latency management strategies may influence gestational age at birth in PROM cases.

The mode of delivery - wise distribution in our study revealed that 58.75% of neonates were delivered via normal vaginal delivery (NVD), while 41.25% were born via lower segment caesarean section (LSCS). These findings are consistent with the results of Arpita et al. [13], where the majority of PROM cases resulted in vaginal deliveries, highlighting that prolonged membrane rupture does not always necessitate surgical intervention. Similarly, Boskabadi et al. [9] and Alam et al. [18] reported a comparable vaginal delivery rate among PROM cases, further reinforcing that spontaneous labor often occurs following PROM, reducing the need for caesarean sections. However, Lovereen et al. [16] reported a slightly lower rate of vaginal delivery (52.3%), with a higher caesarean section rate attributed to increased fetal distress and maternal complications in their study population. Contrastingly, Drassinower et al. [17] found a much higher caesarean section rate (66%) in cases of prolonged latency PROM, possibly due to stricter criteria for fetal distress and maternal indications for surgical intervention in their cohort. The higher vaginal delivery rate in our study suggests that close monitoring and timely intervention can allow safe vaginal deliveries in a majority of PROM cases while reserving caesarean sections for specific obstetric indications.

Regarding investigational parameters, the median total leukocyte count (TLC) in our study was 16, 220 (IQR: 11, 517–21, 775), indicating a trend toward elevated inflammatory markers in PROM cases. This is consistent with the findings of Alam et al. [18], who observed significantly elevated leukocyte counts in neonates born following prolonged PROM, particularly in cases associated with clinical signs of infection, reinforcing the importance of monitoring hematological parameters for early detection of neonatal sepsis. The median CRP - Q level in our study was 1.95 (IQR: 0.86–6.9), which aligns with the findings of Khan et al. [15], who reported that neonates born following prolonged PROM exhibited elevated CRP levels, often correlating with an increased risk of early - onset neonatal sepsis.

The median hemoglobin level in our study was 17.70 g/dL (IQR: 16.50–19.20), while the median packed cell volume (PCV) was 49.15% (IQR: 45.80–53.70), both of which indicate relatively stable hematological status in the majority of neonates. These findings are similar to those of Lu Zhuang et al. [10], who reported comparable hemoglobin and PCV values in neonates following PROM, suggesting that while infection risk is heightened, anemia is not a predominant concern in such cases. The median platelet count was 2.2 lakhs (IQR: 1.56–2.91), consistent with previous studies by Boskabadi et al. and Vijay et al. [9, 14], where neonatal platelet counts remained within normal limits despite prolonged membrane rupture.

In the present study, CRP positivity was observed in 17.5% of neonates born to mothers with PROM. This finding is consistent with the results of Khan et al. [15], who reported elevated CRP levels in 18–22% of neonates following prolonged PROM, correlating with an increased risk of neonatal sepsis.

Thrombocytopenia was observed in 17.5% of neonates in the present study, which aligns closely with the findings of Boskabadi et al. [9], where thrombocytopenia was noted in 16–18% of neonates following PROM. Vijay et al. [14] similarly documented thrombocytopenia in approximately 17% of cases, particularly in neonates with confirmed neonatal infections, supporting the association between prolonged PROM, inflammatory responses, and platelet depletion.

Regarding blood culture findings, 8.75% of neonates in the study had positive blood cultures, with *Klebsiella pneumoniae* (2.5%) and *Pseudomonas aeruginosa* (2.5%) being the most frequently isolated pathogens. These findings align with those of Alam et al. [18], who reported that *Klebsiella pneumoniae* (29%) and *Pseudomonas aeruginosa* (24%) were among the most common organisms isolated in cases of neonatal sepsis following prolonged PROM. Similarly, Begum et al. [19] found that *Klebsiella* and *Pseudomonas* were predominant pathogens in their study, further confirming their association with PROM - related neonatal infections. The overall blood culture positivity rate of 8.75% in our study is comparable to that reported by Khan et al. [15], where 9% of neonates with prolonged PROM exhibited bacteremia. However, contrasting findings were noted in the study by Drassinower et al. [17], where a lower blood culture positivity rate (around 5%) was observed, possibly due to differences in latency duration, intrapartum antibiotic use, and neonatal immune response. The predominance of sterile blood cultures (91.25%) in our study is consistent with findings from Boskabadi et al. [9] and Lu Zhuang et al. [10], suggesting that while PROM increases infection risk, a majority of neonates do not develop culture - confirmed sepsis, highlighting the importance of clinical and laboratory monitoring beyond culture - based diagnostics.

In the present study, no abnormal cranial ultrasound (USG) findings were observed among the neonates who underwent imaging, with 30% of cases showing normal scans, while the remaining 70% did not undergo the investigation. This aligns with the findings of Arpita et al. [13], who reported that the majority of neonates born following PROM did not exhibit significant cranial abnormalities on imaging, suggesting that prolonged rupture of membranes does not inherently predispose neonates to major structural brain abnormalities. Similarly, Vijay et al. [14] and Khan et al. [15] found no significant differences in cranial USG abnormalities in neonates following PROM, reinforcing that intracranial complications in these cases are uncommon unless associated with severe infections or extreme prematurity. However, contrasting findings were noted by Boskabadi et al. [9], who reported a higher incidence of abnormal cranial ultrasound findings, including intraventricular hemorrhage (IVH) and periventricular leukomalacia (PVL), particularly in neonates with very low birth weight and severe sepsis. The absence of abnormal USG findings in our study may be attributed to the relatively lower incidence of extreme prematurity and severe neonatal infections in our cohort.

Chest X - ray findings in the study revealed that 8.75% of neonates exhibited features suggestive of respiratory distress syndrome (RDS), while 18.75% had normal chest radiographs. This finding is comparable to the study by Ilker

Kahramanoglu et al. [12], who reported that RDS was present in approximately 9% of neonates following PROM, indicating that prolonged membrane rupture is an established risk factor for neonatal lung immaturity and respiratory compromise. Similarly, Alam et al. [18] found RDS in 10–12% of neonates with prolonged PROM, supporting the notion that despite the increased risk, the majority of neonates do not develop significant respiratory complications. However, Lovereen et al. [16] reported a higher incidence of RDS (15%) in neonates born following PROM, likely due to a greater proportion of preterm births in their cohort. The lower RDS rate in our study suggests that while PROM is a known risk factor for neonatal respiratory complications, timely obstetric intervention and neonatal respiratory support may mitigate its impact.

The requirement for continuous positive airway pressure (CPAP) support was observed in 8.75% of neonates in the study. This aligns with findings from Boskabadi et al. [9], who noted that CPAP was required in approximately 8–10% of neonates following prolonged PROM, particularly those with mild - to - moderate respiratory distress. Similarly, Arpita et al. [13] reported CPAP use in 9% of neonates with PROM - related respiratory compromise, reinforcing the idea that non - invasive respiratory support is effective in managing neonatal respiratory distress in these cases. However, Ilker Kahramanoglu et al. [12] documented a higher rate of CPAP use (14%) in their cohort, which included a greater proportion of preterm neonates requiring respiratory assistance. The relatively lower CPAP requirement in our study suggests that the overall respiratory status of the neonates remained stable, with only a small proportion requiring non - invasive ventilation, further highlighting the role of timely delivery and postnatal monitoring in minimizing respiratory morbidity associated with PROM.

In the present study, ventilator support was required in only 3.75% of neonates, indicating that severe respiratory distress or other critical conditions necessitating invasive mechanical ventilation were relatively rare among PROM cases. This finding is consistent with the study by Boskabadi et al. [9], where ventilator support was needed in approximately 4–6% of neonates with prolonged PROM, particularly those presenting with sepsis or respiratory failure. Similarly, Ilker Kahramanoglu et al. [12] reported ventilator use in about 5% of neonates following PROM, reinforcing the observation that while respiratory distress is a recognized complication, only a minority progress to the severity requiring invasive support. However, Lovereen et al. [16] reported a higher incidence of ventilator support (12%), likely due to a greater proportion of preterm neonates and those with severe sepsis in their study population. The lower ventilator requirement in our study suggests that most neonates remained hemodynamically stable, with only a few requiring invasive respiratory assistance.

Antibiotic administration was observed in 77.50% of neonates in the current study, highlighting the widespread use of prophylactic or therapeutic antibiotics in cases of prolonged PROM. This finding aligns closely with the results of Alam et al. [18], who reported antibiotic use in approximately 75–80% of neonates born after prolonged PROM, primarily as a preventive measure against early - onset sepsis. Similarly, Begum et al. [19] and Khan et al. [15] documented high antibiotic usage rates (ranging from 70% to 82%) in PROM - related neonatal admissions, reinforcing the standard clinical practice of initiating empirical antibiotic therapy in these cases. However, Drassinower et al. [17] noted a lower antibiotic administration rate (60%), likely due to differences in sepsis risk stratification and antibiotic stewardship protocols. The high percentage of antibiotic use in our study underscores the cautious approach taken in managing neonates at risk of infection, ensuring prompt intervention to mitigate the potential consequences of neonatal sepsis.

Culture - positive sepsis was confirmed in 8.75% of neonates in the study, closely matching the findings of Khan et al. [15], who reported sepsis in approximately 9% of neonates following prolonged PROM. Similarly, Boskabadi et al. [9] and Alam et al. [18] documented neonatal sepsis rates ranging between 8–12%, reinforcing the well - established association between PROM and increased sepsis risk. The predominant organisms isolated in our study (*Klebsiella pneumoniae* and *Pseudomonas aeruginosa*) are consistent with findings from Alam et al. [18], where *Klebsiella* (29%) and *Pseudomonas* (24%) were among the most commonly isolated pathogens in neonatal sepsis cases. However, Lu Zhuang et al. [10] reported a slightly lower incidence of culture - positive sepsis (6%), suggesting potential variations in neonatal immune response, intrapartum antibiotic use, and infection control measures across different settings. The overall sepsis rate in our study highlights the critical need for close monitoring and timely antibiotic administration in neonates born following prolonged PROM to reduce morbidity and improve neonatal outcomes.

In the present study, meconium - stained liquor (MSL) was observed in 7.50% of cases, indicating that the majority of neonates (92.50%) were delivered without evidence of meconium passage in utero. This finding aligns with the study by Arpita et al. and Alam et al. [13, 18], who reported an MSL incidence of approximately 8–10% in neonates born following prolonged PROM, suggesting that PROM alone does not significantly increase the likelihood of meconium passage. The relatively lower incidence of MSL in our study suggests that fetal compromise leading to meconium passage was not a significant issue, likely due to timely obstetric intervention and close fetal monitoring.

Birth asphyxia was observed in 10% of neonates, a finding consistent with the results of Khan et al. [15], who reported that birth asphyxia occurred in 9–11% of neonates born after PROM, particularly in cases with prolonged latency periods. Similarly, Begum et al. [19] found that birth asphyxia was a leading cause of perinatal morbidity in PROM cases, affecting approximately 10% of neonates, reinforcing the risk of hypoxic complications in these infants. In contrast, Ilker Kahramanoglu et al. [12] reported a slightly higher incidence of birth asphyxia (13–15%), likely due to a greater proportion of very preterm and growth - restricted neonates in their study population. The asphyxia rate in our study suggests that while the risk of neonatal hypoxia exists, it remains within expected limits for PROM cases, emphasizing the importance of timely delivery and neonatal resuscitation.

Respiratory distress, including transient tachypnea of the newborn (TTN), was observed in 27.50% of neonates in our study. This finding is in agreement with the results of Vijay et al. and Alam et al. [14, 18], who reported that respiratory distress was present in approximately 25–30% of neonates following PROM, highlighting the increased risk of lung immaturity and compromised pulmonary transition in these cases. The relatively high rate of respiratory distress in our study underscores the need for vigilant neonatal monitoring and respiratory support strategies in neonates born after PROM to ensure optimal respiratory adaptation and minimize complications.

In the present study, respiratory distress syndrome (RDS) /hyaline membrane disease (HMD) was observed in 8.75% of neonates, which aligns closely with the findings of Ilker Kahramanoglu et al. [12], who reported an RDS incidence of 9% in neonates born after PROM, particularly among preterm neonates. The relatively lower incidence of RDS in our study suggests that while PROM increases the risk of respiratory complications, timely obstetric intervention and neonatal respiratory support can reduce the severity of pulmonary distress.

Neonatal jaundice was present in 37.50% of neonates in our study, a finding that is consistent with Begum et al. [19], who reported a neonatal jaundice incidence of approximately 38–40% in cases of prolonged PROM. However, Drassinower et al. [17] reported a slightly lower incidence of jaundice (30%), possibly due to differences in gestational age distribution and postnatal feeding practices. The high incidence of neonatal jaundice in our study highlights the need for regular bilirubin monitoring and phototherapy support in neonates born after PROM.

Shock was observed in 5% of neonates in our study, a finding that aligns with the results of Vijay et al. [14], who reported neonatal shock in approximately 4–6% of PROM cases, primarily in those with severe sepsis or hemodynamic instability. The relatively low incidence of neonatal shock in our study suggests that while PROM increases the risk of circulatory instability, timely neonatal resuscitation and supportive care can mitigate the severity of hemodynamic complications.

Meningitis was observed in only 1.25% of neonates in the present study, indicating that while prolonged PROM is a recognized risk factor for neonatal infections, the incidence of confirmed central nervous system involvement remained low. This finding is consistent with the study by Khan et al. and Singh Daljit et al. [15, 20], who reported an overall incidence of neonatal meningitis of approximately 3.4% and 2% respectively in cases of PROM, reinforcing that while neonatal sepsis is a concern, meningitis remains a relatively infrequent but serious complication. The lower incidence of meningitis in our study suggests that early antibiotic administration and close neonatal monitoring may have played a role in preventing the progression of systemic infections to central nervous system involvement.

Feed intolerance was observed in only 1.25% of neonates in our study, which aligns with the findings of Vijay et al. [14], who reported a similarly low incidence of feeding difficulties in neonates born following PROM. Similarly, Boskabadi et al. [9] documented that while feeding intolerance was a concern in some neonates with sepsis and prematurity, its overall incidence remained low in their study population. This suggests that while prolonged PROM increases the risk of infections and other morbidities, most neonates do not experience significant gastrointestinal complications requiring intervention. The low incidence of feed intolerance in our study suggests that gastrointestinal adaptation remained largely intact in the majority of neonates despite PROM - related complications.

Hypocalcemia was noted in 5% of neonates, a finding that is consistent with the results of Khan et al. [15], who reported an incidence of hypocalcemia ranging from 4% to 6% in neonates born after PROM. Similarly, Alam et al. [18] documented hypocalcemia in approximately 5% of neonates with prolonged membrane rupture, reinforcing that metabolic disturbances can occur in a subset of these neonates. The presence of hypocalcemia in our study highlights the importance of biochemical monitoring and early intervention in neonates born after PROM to prevent complications associated with metabolic imbalances.

Apnoea was observed in 10% of neonates in the present study, a finding that aligns with the results of Boskabadi et al. [9], who reported an incidence of 9–11% in neonates born following prolonged PROM, particularly among those with prematurity and suspected sepsis. However, Ilker Kahramanoglu et al. [12] documented a slightly higher apnoea incidence (13–15%), likely due to a greater proportion of very preterm neonates in their cohort. The incidence of apnoea in our study highlights the need for continuous respiratory monitoring in neonates born following PROM to detect and manage apnoeic episodes effectively.

NICU admission was required in 48.75% of neonates in our study, which is consistent with the findings of Vijay et al. [14], who reported NICU admission rates of approximately 45–50% in neonates with prolonged PROM, primarily due to concerns about infection, respiratory distress, and prematurity - related complications. Similarly, Boskabadi et al. [9] documented that nearly 50% of neonates born after PROM required NICU admission, reinforcing the increased risk of morbidity in this population. The high rate of NICU admissions in our study underscores the importance of close neonatal surveillance in PROM cases to ensure early detection and management of potential complications.

Neonatal death was observed in only 1.25% of cases in the study, indicating a relatively low mortality rate among neonates born following prolonged PROM. This finding is comparable to the results of Arpita et al. [13], who reported a neonatal mortality rate of 1.43% in their study on PROM outcomes, reinforcing that while PROM increases the risk of neonatal morbidity, timely obstetric and neonatal interventions can significantly reduce mortality. The low neonatal mortality rate in our study highlights the effectiveness of prompt medical intervention in reducing fatal outcomes in neonates born after prolonged PROM.

Respiratory distress syndrome (RDS) was significantly associated with gestational age, with 80% of cases occurring

in the 28–32 weeks group and the remaining 20% in the 32–37 weeks group. No cases were observed beyond 37 weeks, and the result was statistically significant (P<0.0001). These findings align with the study by Ilker Kahramanoglu et al. [12], who reported that RDS was predominantly seen in neonates born before 32 weeks following PROM, highlighting the role of prematurity and lung immaturity in respiratory distress outcomes. However, Lovereen et al. [16] observed a small proportion of RDS cases in term neonates, suggesting that additional factors such as intrauterine infections or perinatal asphyxia may contribute to respiratory distress in select full - term neonates. The statistically significant association in our study highlights the need for antenatal steroid administration and surfactant therapy in preterm PROM cases to improve neonatal respiratory outcomes.

Mean APGAR scores at 1 minute and 5 minutes decreased as latency period increased, but the association was not statistically significant (P=0.3391 for APGAR at 1 minute and P=0.9045 for APGAR at 5 minutes). These findings are in agreement with the study by Begum et al. [19], who reported that while prolonged PROM was associated with a slight reduction in APGAR scores, the difference was not statistically significant, indicating that other factors such as gestational age and birth complications may have a stronger influence on immediate neonatal well - being. Similarly, Lovereen et al. [16] found that increasing latency duration was linked to lower APGAR scores, but the trend did not reach statistical significance in their study cohort. Additionally, Boskabadi et al. [9] observed that prolonged PROM led to lower APGAR scores in some neonates, but this was more pronounced in cases with confirmed neonatal infections or respiratory distress. However, Alam et al. [18] reported a statistically significant decline in APGAR scores with increasing latency, suggesting that variations in delivery practices and neonatal resuscitation efforts may influence these outcomes. The lack of statistical significance in our study suggests that while prolonged latency may have an impact on neonatal adaptation, other perinatal factors may play a more decisive role in determining immediate postnatal well - being.

The findings of this study underscore the significant impact of prolonged premature rupture of membranes (PROM) on neonatal outcomes, particularly in relation to preterm birth, respiratory distress, sepsis, and birth asphyxia. A clear correlation was observed between increasing latency periods and adverse neonatal conditions, with a notable rise in the incidence of low birth weight, respiratory complications, and NICU admissions among preterm neonates. Although culture - positive sepsis was exclusively detected in preterm neonates, the association between latency duration and infection risk did not reach statistical significance, indicating that other factors such as maternal antibiotic use and gestational maturity may influence sepsis development. Similarly, neonatal jaundice was frequently observed, though its relationship with latency was not statistically confirmed, suggesting that additional perinatal variables contribute to hyperbilirubinemia. The statistically significant association between latency period and gestational age at birth reaffirms the hypothesis that extended latency following PROM predisposes neonates to preterm delivery, further amplifying the risk of neonatal morbidities.

5. Conclusion

The present study systematically evaluated neonatal outcomes in cases of premature rupture of membranes (PROM) beyond 18 hours, with a particular focus on birth weight, respiratory complications, infection risk, and overall neonatal morbidity. A significant proportion of neonates were born preterm, reinforcing the well - established association between prolonged PROM and early delivery. Additionally, neonatal complications such as respiratory distress, transient tachypnea of the newborn (TTN), and sepsis were observed more frequently in preterm neonates and those with extended latency periods. Although the study did not establish a statistically significant correlation between latency duration and some neonatal morbidities, the overall trend indicated that prolonged PROM increases the risk of adverse perinatal outcomes, necessitating prompt obstetric and neonatal management.

Through rigorous statistical analysis, this study provides insight into the clinical implications of PROM, contributing to a better understanding of its role in neonatal morbidity and mortality. Findings suggest that while timely medical intervention can mitigate severe complications, preterm neonates remain vulnerable to respiratory distress, infections, and metabolic disturbances. These results emphasize the importance of close neonatal monitoring and strategic intervention in managing PROM - related complications.

References

[1] Garg A, Jaiswal A. Evaluation and Management of Premature Rupture of Membranes: A Review Article. Cureus.2023 Mar 24; 15 (3): e36615. doi: 10.7759/cureus.36615. PMID: 37155446; PMCID: PMC10122752.

[2] Dr. Priti Vasava, Dr. Bipin R Shah, DR. Bhavesh Airao. A study of risk factors and its impact on fetomaternal outcome in prelabour rupture of membranes. Int J Clin Obstet Gynaecol 2021; 5 (5): 211 - 214. DOI: 10.33545/gynae.2021. v5. i5d.1041

[3] Dayal S, Jenkins SM, Hong PL. Preterm and Term Prelabor Rupture of Membranes (PPROM and PROM) [Updated 2024 Oct 31]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan - . Available from: https: //www.ncbi. nlm. nih. gov/books/NBK532888/

[4] Singhal S, Puri M, Gami N. An Analysis of Factors Affecting the Duration of Latency Period and Its Impact on Neonatal Outcome in Patients with PPROM. Int J Infertility Fetal Med 2012; 3 (3): 87 - 91

[5] MSD Manual Professional Version. [Internet] Prelabor Rupture of Membranes Author - Antonette Dulay. Revised March 2024. Available at https: //www.msdmanuals. com/professional/gynecology - and - obstetrics/antenatal - complications/prelabor - rupture - of - membranes - prom

[6] Gupta S, Malik S, Gupta S. Neonatal complications in women with premature rupture of membranes (PROM) at term and near term and its correlation with time

lapsed since PROM to delivery. Tropical Doctor.2020; 50 (1): 8 - 11. doi: 10.1177/0049475519886447

[7] MOTTAGHI, MOGHADAM SHAHRI HASSAN, et al. "Diagnostic utility of chest X - rays in neonatal respiratory distress: determining the sensitivity and specificity. " (2014): 65 - 72.

[8] Nili F. Neonatal Complications of Premature Rupture of Membranes. Acta Med Iran 2003; 41: 175–179.

[9] Boskabadi H, Zakerihamidi M. Evaluation of Maternal Risk Factors, Delivery, and Neonatal Outcomes of Premature Rupture of Membrane: A Systematic Review Study. J. Pediatr. Rev 2019; 7 (2): 77 - 88 URL: http: //jpr. mazums. ac. ir/article - 1 - 170 - en. html

[10] Zhuang, L, Li, ZK, Zhu, YF. Et. al. Latency period of PROM at term and the risk of neonatal infectious disease. Published July 2022. https: //doi. org/10.1038/s41598 - 022 - 16593 - 6

[11] Ocviyanti D, Wahono WT. Risk Factors for Neonatal Sepsis in Pregnant Women with Premature Rupture of the Membrane. J Pregnancy 2018; 2018: 1–6.

[12] Kahramanoglu I, Ilhan O, Kahramanoglu O, et al. Preterm Premature Rupture of Membranes and Neonatal and Maternal Outcomes OPEN ACCESS.2018; 1: 9– 11 (19)

[13] Jaiswal AA, Hariharan C, Dewani DKC. Study of maternal and fetal outcomes in premature rupture of membrane in central rural India. Int J Reprod Contraception, Obstet Gynecol 2017; 6: 1409.

[14] Vijay M, Nandan T, Ranjan B. A study of neonatal morbidity in preterm premature rupture of membrane mother. Int J Contemp Pediatr 2016; 3: 1272–1274

[15] Khan S, Khan A. Study on preterm pre mature rupture of membrane with special reference to maternal and its fetal outcome. Int J Reprod Contraception, Obstet Gynecol 2016; 5: 2768– 2774

[16] Lovereen, Salma, Mst Afroza Khanum, Nazlima Nargis, Begum, Shahanawaj, Afroze, Rumana. Maternal and Neonatal outcome in premature rupture of membranes Bangladesh Journal of Medical Science. Dhaka Vol.17, Iss.3, (2018): 479 - 483. DOI: 10.3329/bjms. v17i3.37004

[17] Drassinower D, Friedman AM, Običan SG, et al. Prolonged latency of preterm premature rupture of membranes and risk of neonatal sepsis theabstract was presented at the 35th annual meeting of the Society for Maternal - Fetal Medicine, San Diego, CA, Feb.2 - 7, 2015. Am J Obstet Gynecol 2016; 214: 743. e1 - - 743. e6.

[18] Alam MM, Saleem AF, Shaikh AS, et al. Neonatal sepsis following prolonged rupture of membranes in a tertiary care hospital in Karachi, PAKIstan. J Infect Dev Ctries 2014; 8: 67–73 (11)

[19] Begum H, Roy M, Shapla NR. Perinatal Outcome of Premature Rupture Membrane in Pregnancy. J Dhaka Med Coll 2018; 26: 135–139.

[20] D. Singh, M. Verma, H. Singh, B. Abraham JC. Neonatal infection following premature rupture of amniotic membranes. J Obs Gynecol 1989; 232–235