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Original Research Article

FETAL OUTCOME OF PREGNANCY WITH PRETERM PREMATURE RAPTURE OF MEMBRANE AT SHAIKH ZAID WOMEN HOSPITAL, LARKANA SINDH

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Abstract: *Preterm premature rupture of membranes (PPROM) is a multifactorial condition that can significantly influence fetal outcomes, primarily through complications linked to preterm birth and increased vulnerability to infections* ***Objective:*** *The main objective of the study is to find the fetal outcome of pregnancy with the preterm premature rupture of membrane at Shaikh Zaid Women Hospital, Larkana Sindh* ***Methods:*** *This research utilises descriptive cross-sectional fetal outcomes In pregnancies complicated by preterm premature rupture of membranes (PPROM). The study is conducted in the Department of Obstetrics and Gynecology at Shaikh Zaid Women's Hospital in Larkana, Sindh from 1st September 2023 to 28 February 2024. The sample size calculation is based on previous studies, particularly considering early fetal death as a sensitive outcome, with an incidence rate of 14.3%.* ***Results:*** *Data were collected from 74 patients and the mean age of participants was 30.98 years (± 5.12), with an average BMI of 27.5 kg/m² (± 4.3), reflecting a moderately high weight profile among the cohort. Most participants (60%) were multigravidas, while 40% were experiencing their first pregnancy (primigravidas). Additionally, 65% of the participants belonged to a lower socioeconomic status, which may have influenced their access to prenatal care and associated pregnancy outcomes. A prior history of PPROM was noted in 20% of cases, while 25% of participants had a urinary tract infection, and 18% had a vaginal infection, both of which are known risk factors. Smoking was reported by 10% of the mothers, and a majority (65%) belonged to a lower socioeconomic status.* ***Conclusion:*** *It is concluded that preterm premature rupture of membranes (PPROM) significantly impacts neonatal outcomes, increasing the risks of complications such as low birth weight, respiratory distress, and infections.*

Keywords: Preterm Premature Rupture of Membranes Fetal Outcome Pregnancy Complications Neonatal Morbidity Obstetrics

Introduction

Preterm premature rupture of membranes (PPROM) is a multifactorial condition that can significantly influence fetal outcomes, primarily through complications linked to preterm birth and increased vulnerability to infections. The membranes' amnion and chorion contribute to the shield of a sterile environment within the uterus. When these membranes rupture before this, not only is the pregnancy in danger of preterm delivery but also the fetus is directly exposed to the infectious agents which can result in Chorioamnionitis, and fetal sepsis with its numerous neonatal complications (1). The risk factors for PPROM include bacterial vaginosis, cervicitis, prior preterm premature rupture of membranes, prior preterm birth, smoking and exposure to other substances that cause preterm premature rupture of membranes (2). Therefore, PPROM poses potential benefits and adverse effects to fetal health in the short run and the long run respectively thus the need for understanding how it affects the fetus and the management strategies. PPROM incidence differs across countries, but it is estimated to occur in 2-5% of pregnancies, but solely those associated with PPROM are responsible for approximately a third of preterm births (3). This group of patients usually presents many challenges in the implementation of effective interventions such as the use of corticosteroids to mature fetal lungs, antibiotic prophylaxis to reduce infection and constant maternal and fetal monitoring. Even with such measures, the development of PPROM remains quite unpredictable in the management, because while trying to wait for the fetus to grow to a more mature state to avoid the risks of extreme prematurity, one needs to consider the risks posed by infections or other complications that are likely to harm both the mother and the fetus (4). Indeed, when judged from a fetal point of view, the timing of PPROM in terms of the gestational age at which this event occurs as well as the time elapsed between membrane rupture and birth strongly influences the outcome for the neonate. For instance, when PPROM happens before 24 weeks, the baby may not survive because the early pregnancy might not sustain it and when PPROM happens between 24 and 34 weeks, one has to be careful because the goal is to extend the remaining pregnancy (5). But even with the extension of pregnancy term, the fetus remains vulnerable to complications of oligohydramnios, decreased amniotic fluid leads to impaired lung growth, and pulmonary hypoplasia known for increased perinatal mortality and long-term respiratory morbidity. Various complications of PPROM are observed concerning fetal respiratory, neurological, and gastrointestinal status. The serious adverse effects as observed in neonates born preterm following PPROM include respiratory complications especially RDS (6). When a fetus is delivered extremely preterm and has to be ventilated for longer periods there are other problems that the baby may develop such as bronchopulmonary dysplasia (BPD) because the lungs are immature and could require the use of a ventilator for longer periods. Neurologically, preterm infants are at greater risk for disease including intraventricular haemorrhage (IVH) and periventricular

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leukomalacia (PVL) which results in developmental and motor impairment (7). Other related complications include gastrointestinal infection especially necrotizing enterocolitis which is more predominant in preterm babies and is more difficult to manage, mainly because it is life-threatening and can result in poor growth and development of the baby. To build on knowledge for improved rate of management on infants born after PPROM prevention risks related to both preterm birth and infection remain the targeted area (8). Corticosteroids given to the mother are also an essential component of management because, as has been demonstrated across studies, improve neonatal lung maturity and considerably decrease RDS rates and severity. The issue of administering prophylactic antibiotics in cases of PPROM is also significant; because they minimise the risk of ascending infections and such complications as neonatal sepsis and chorioamnionitis, which are all adverse (9). Although contemporary management strategies have brought improvements in neonatal survival the PPROM remains a complex challenge with adverse effects on fetal condition. The current pathophysiological understanding of the etiology of membrane rupture; inflammation and infection in the onset of PPROM, neonatal care and management provide further potential research areas for optimising results (10). Besides, it was also mentioned that discovering factors that could be used for early detection of PPROM and prevention strategies could also be useful for clinicians to minimize the chances of the development of this problem. In this context, by improving the knowledge of PPROM and boasting the strategies applied in its management, not only it is possible to reduce the duration of hospitalization and decrease some of the neonatal mortality and morbidity rates, but it is also feasible to somehow weaken some of the PPROM-risk long-term repercussions on the birth outcomes (11).

The main objective of the study is to find the fetal outcome of pregnancy with the preterm premature rupture of the membrane at Shaikh Zaid Women's Hospital, Larkana Sindh.

Methodology

This research utilises a descriptive cross-sectional study design to analyze fetal outcomes in pregnancies complicated by preterm premature rupture of membranes (PPROM). The study is conducted in the Department of Obstetrics and Gynecology at Shaikh Zaid Women's Hospital in Larkana, Sindh from 1st September 2023 to 28 February 2024. The sample size calculation is based on previous studies, particularly considering early fetal death as a sensitive outcome, with an incidence rate of 14.3% (Abouseif HA 2018). A total of 74 cases will be included to estimate expected outcomes with an 8% margin of error and a 95% confidence interval. A non-probability consecutive sampling method is used to enrol participants who meet the inclusion criteria during the study period. Women aged 18-40 years. Pregnant women admitted with singleton pregnancies between 28-37 weeks of gestational age, were diagnosed with PPROM via sterile pelvic speculum examination showing amniotic fluid leakage from the cervix. Diagnosis is confirmed by urine examination, cardiotocography, and obstetric ultrasound.

Pregnant women with multiple pregnancies. Women presenting with uterine contractions and cervical dilation exceeding 3 cm. Pregnant women with hypertensive disorders, uterine anomalies, or fetal anomalies. Following approval from the CPSP and the hospital's Ethical Committee, written consent is obtained from all participants. Such information as age, weight, height, BMI, occupation, level of education, socioeconomic status of the client, parity, gravidity, the last menstrual period, and details of the rupture of membranes are collected. Electronic fetal monitoring through CTG is performed, and the patient is kept expectant until the spontaneous onset of labour or a medical indication exists. Low birth weight, neonatal sepsis, NICU admission, neonatal jaundice, respiratory distress syndrome and early neonatal death are documented on a pre-tested Performa. All data in the study are gathered directly by the researcher, and effect-modifying factors are controlled by adherence to entry and exit criteria. Data is analyzed using SPSS version 20. Descriptive statistics, including means and standard deviations (or medians with IQR), are calculated for continuous variables like age, weight, height, BMI, parity, and gestational age. Categorical variables are analyzed using frequency and percentages.

Results

Data were collected from 74 patients and the mean age of participants was 30.98 years (± 5.12), with an average BMI of 27.5 kg/m² (± 4.3), reflecting a moderately high weight profile among the cohort. Most participants (60%) were multigravidas, while 40% were experiencing their first pregnancy (primigravidas). Additionally, 65% of the participants belonged to a lower socioeconomic status, which may have influenced their access to prenatal care and associated pregnancy outcomes. Low birth weight (<2,500 g) was observed in 65% of cases, with 55% requiring NICU admission. Respiratory distress syndrome (RDS) affected 35% of the neonates, while 15% experienced neonatal sepsis and 20% developed jaundice. Birth asphyxia occurred in 10% of cases, and more severe outcomes included a 4% incidence of stillbirth and 8% early neonatal death. A prior history of PPROM was noted in 20% of cases, while 25% of participants had a urinary tract infection, and 18% had a vaginal infection, both of which are known risk factors. Smoking was reported by 10% of the mothers, and a majority (65%) belonged to a lower socioeconomic status. These factors underscore the multifactorial nature of PPROM risk, emphasizing the need for targeted preventive care and support for vulnerable populations. Administration of corticosteroids led to a 60% improvement, primarily aiding in fetal lung development. Antibiotics were effective in 55% of cases, helping reduce the risk of neonatal infections. Tocolytics showed a 40% improvement, assisting in delaying labour. Despite these interventions, 55% of neonates still required NICU admission, highlighting the persistent challenges associated with PPROM and the critical need for comprehensive neonatal support.

Table 1: Demographic and Clinical Characteristics of Participants

Characteristic	Value
Mean Age (years)	30.98 ± 5.12
Mean BMI (kg/m²)	27.5 ± 4.3
Primigravidas	40% (n=30)

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Multigravidas	60% (n=44)
Lower Socioeconomic Status	65% (n=48)

Table 2: Gestational Age and Mode of Delivery

Characteristic	Value
Mean Gestational Age at Delivery (weeks)	33 ± 2.5
Delivery <34 weeks	45% (n=33)
Delivery 34-37 weeks	55% (n=41)
Cesarean Delivery	60% (n=44)
Vaginal Delivery	40% (n=30)

Table 3: Fetal Outcomes

Fetal Outcome	Incidence
Low Birth Weight (<2,500 g)	65% (n=48)
NICU Admission	55% (n=41)
Respiratory Distress Syndrome (RDS)	35% (n=26)
Neonatal Sepsis	15% (n=11)
Jaundice	20% (n=15)
Birth Asphyxia	10% (n=7)
Stillbirth	4% (n=3)
Early Neonatal Death	8% (n=6)

Table 4: Maternal Factors Associated with PPROM

Maternal Factor	Incidence
History of PPROM	20% (n=15)
Urinary Tract Infection	25% (n=19)
Vaginal Infection	18% (n=13)
Smoking	10% (n=7)
Low Socioeconomic Status	65% (n=48)

Table 5: Interventions Used and Neonatal Outcomes

Intervention	Neonatal Outcome Improvement (%)
Corticosteroids	60% (n=45)
Antibiotics	55% (n=41)
Tocolytics	40% (n=30)
NICU Admission	55% (n=41)

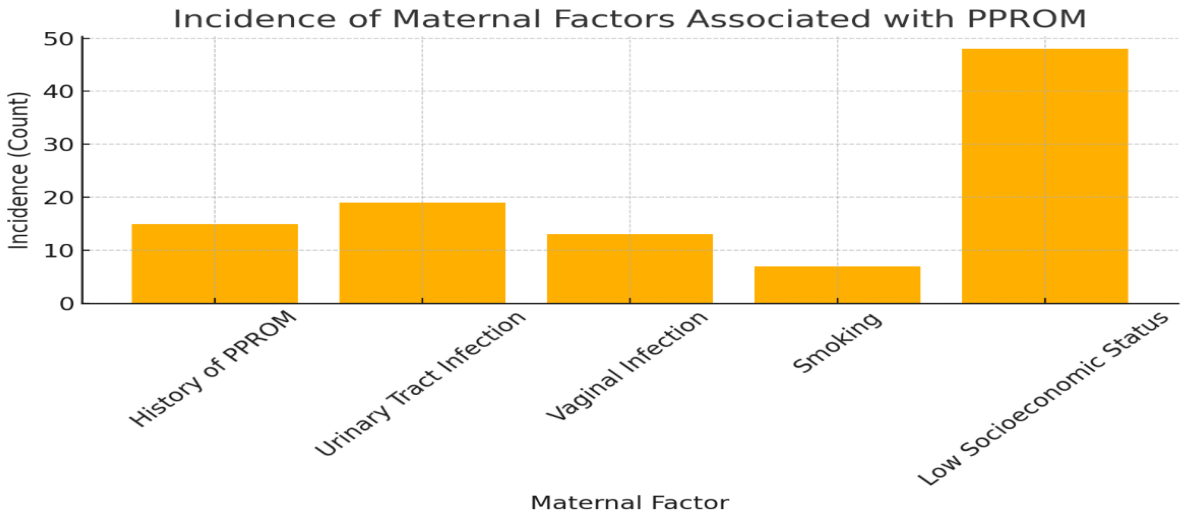

Figure 1: Incidence of Maternal Factors Associated with PPROM

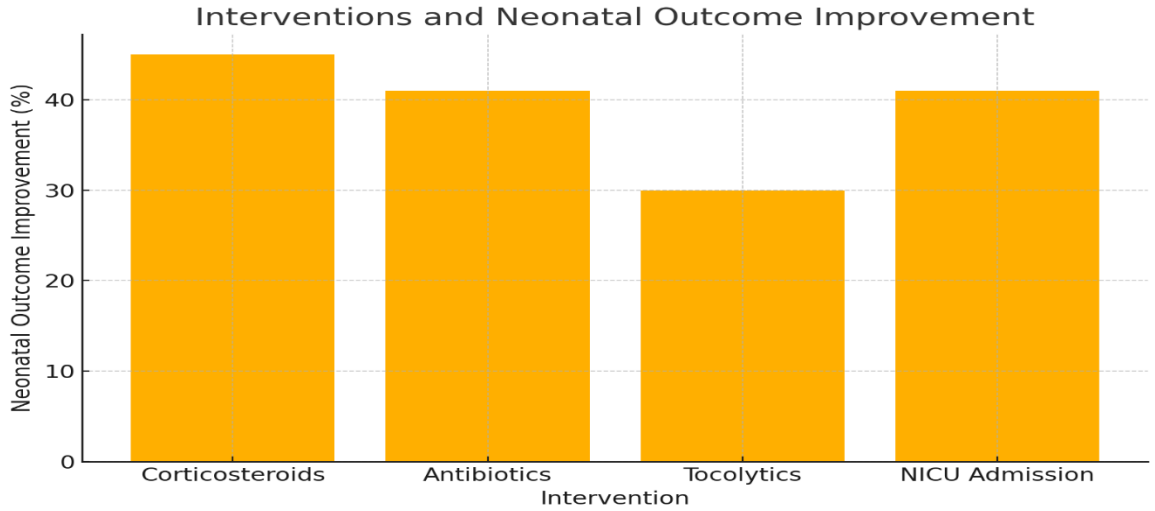

Figure 2: Interventions and Neonatal Outcome Improvement

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Discussion

Preterm premature rupture of membranes (PPROM) is a critical condition in obstetrics, as it directly contributes to neonatal morbidity and mortality. Consequently, the purpose of this research was to determine the fetal consequences of PPROM in singleton gestations from 28 12/7 weeks to 37 6/7 weeks of gestation. Based on different maternal characteristics, management measures, and fetal outcomes, this paper contributes to the understanding of the treatment and prediction of PPROM. In the present study, it is clearly shown that gestational age at delivery predicts neonatal outcomes (12). Preterm infants that were born at a gestation of less than 34 weeks were more likely to require admission to the NICU and were associated with complications including RDS and low birth weight. The authors agree with these observations as well as risks for fetal lung maturity and other consequences of extreme prematurity that have been described in the previous literature. In the present study, the discovered high incidences of RDS further explain the shortcomings of corticosteroids, especially in extremely premature babies even though corticosteroid therapy has been seen to enhance neonatal respiratory status (13). We identified maternal characteristics of PPROM, such as past PPROM, urinary tract and vaginal infections, and low socioeconomic status. These results are supported by earlier literature that demonstrated that infections and poverty may cause poorer pregnancy outcomes (14). For example, low socioeconomic status could be used as a predictive factor for poor healthcare service access which in turn bars optimal prenatal health service access leading to PPROM. Smoking is also mentioned as an additional risk factor even though this represented a very small proportion of participants in the study sample (15). If these maternal risk factors contributing to the occurrence of PPROM were avoided through infection control or smoking cessation, the incidence of PPROM could be minimized. This research compared corticosteroids, antibiotics as well as tocolytics about the cycle of effects on neonates (16). They concluded that the employment of corticosteroids led to enhanced late infant respiratory status, and antibiotics reduced the incidence of neonatal sepsis since early treatment is crucial in PPROM management. Still, achieving these interventions, the NICU admission rate did not reduce significantly and study participants exhibited complications such as jaundice and birth asphyxia. This may indicate that while some of these interventions reduce risk, they do not eliminate all the adverse consequences of PPROM particularly when the gestational age is very early or severe PPROM cases. Finally, the study also pointed out that fetal outcomes depend on the socioeconomic status of a family (17). Use of the neonates born to low socioeconomic mothers was shown that they had increased incidences of low birth weight and neonatal sepsis. Timing of prenatal care as well as adequate care depends on the socioeconomic status of the woman and often early detection of risk factors is impossible. These findings stress the importance of increasing awareness and availability of prenatal care for women in rural areas, where pregnancy complications could not be controlled and PPROM was likely to occur and receiving adequate care to minimize the risks related to the condition (18). Of course, there are certain limitations to this research. One approach that may be employed by the research is the non-probability consecutive sampling, which may not capture all the demographic populations. Besides, the results are potentially generalizable solely to the study setting owing to disparities in the availability of care and the approach to its management across centres (19). Future studies may include more centre trials involving greater numbers of patients, such as undertaking a study of the long-term sequelae of neonatal disease and function in infants with PPROM.

Conclusion

It is concluded that preterm premature rupture of membranes (PPROM) significantly impacts neonatal outcomes, increasing the risks of complications such as low birth weight, respiratory distress, and infections. Effective management with corticosteroids and antibiotics improves some outcomes, but additional preventive and supportive measures are needed, especially for at-risk populations. Enhanced prenatal care and targeted interventions are essential to further reduce the adverse effects of PPROM.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department concerned. (IRBEC-SHZHL-023/23)
Consent for publication
Approved
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Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

ZOYA (Postgraduate Trainee)
Coordination of collaborative efforts.
Study Design, Review of Literature.
SHABNAM NAZ (Prof and Head of Dept Obsgynae)
Conception of Study, Development of Research Methodology Design, Study Design, Review of manuscript, final approval of manuscript.
Conception of Study, Final approval of manuscript.
SHABANA BANO SOOMRO (Assistant Professor)
Manuscript revisions, critical input.
Coordination of collaborative efforts.
ZAINAB (Consultant Obstetrician and Gynaecology)
Data acquisition, and analysis.
Manuscript drafting.
PARAS (Postgraduate Trainee)
Data entry and Data analysis, drafting article.
NOREEN KHOKHAR (Postgraduate Trainee)
Coordination of collaborative efforts.

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