

*Research Article*

## Prevalence, Fetal and Maternal Outcomes of Premature Rupture of Membranes Among Pregnant Women Attending Minia Maternity University Hospital: a prospective study

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### Abstract

**Introduction:** Premature rupture of membrane (PROM) is defined as a rupture of the amniotic membranes before 37 weeks' gestation and before the onset of labour, while extreme PPRM occurs before 26 weeks' gestation. PROM is a serious condition leading to approximately one-third of preterm births and it complicates about 3% of pregnancies. (Idrisa et al., 2019). **Aim of the study:** To evaluate prevalence, fetal and maternal outcome of premature rupture of membranes among pregnant women attending Minia Maternity University hospital. **Patients and Method: Study Settings and Design** This prospective study was conducted at the department of obstetrics and gynecology at Minia Maternity University Hospital during the period from 1<sup>st</sup> october 2019 to 31<sup>st</sup> march 2020. **Demographic data:** The study included 456 patients with Premature Rupture Of Membranes at Minia maternity university hospital . Age of patients range from 18 to 48 years old; Gestational age was recorded once the patient is admitted between 24 up to 37 weeks; Gravidity of patients were between G1 – G 10; Parity of patients were between P0 up to P9 with previous history of abortion ranged between (0-7). **Summary and Conclusion:** Premature rupture of membranes (PROM) also called pre-labor rupture of membranes, is a condition that can occur in pregnancy. It is defined as rupture of membranes (breakage of amniotic sac).

**Keywords:** Premature, Fetal and Maternal, labour

### Introduction

Premature rupture of membrane (PROM) is defined as a rupture of the amniotic membranes before 37 weeks' gestation and before the onset of labour, while extreme PPRM occurs before 26 weeks' gestation. PROM is a serious condition leading to approximately one-third of preterm births and it complicates about 3% of pregnancies.<sup>(1)</sup>

It is associated with many perinatal complications including neonatal sepsis, respiratory distress syndrome (RDS), placental abruption, and eventually fetal death, and carries a 1 to 2% risk of fetal death.<sup>(2)</sup>

In addition, PROM puts the mother at risk for infection (chorioamnionitis) and premature delivery, and increases the risk of Caesarean section delivery. Risk factors for PROM are abdominal trauma, smoking, bacterial infection, or inflammation. Women with darker skin tone are at higher risk compared to women with lighter skin.<sup>(3)</sup>

Other higher risk groups are those with a previous history of preterm delivery, those who are experiencing vaginal bleeding, or those with uterine distension. In addition, low socioeconomic status, a history of sexually transmitted infections, genetic and/or enzymatic abnormalities, nutritional deficiencies, an incompetent cervix, and placental abruption are known predisposing factors.<sup>(4)</sup>

Procedures like amniocentesis and cerclage may result in PROM. PROM has been suggested to be due to loss of the collagen content of the amniotic membranes and is more likely a multifactorial phenomenon.<sup>(4)</sup>

Proper evaluation and management are necessary in order to improve neonatal outcomes. Corticosteroids are effective in reducing many neonatal complications, especially RDS and intraventricular haemorrhage. Antibiotics can be used effectively to increase the latency period. However, management of

PROM varies according to the gestational age of the fetus. In the United States, approximately 1% of pregnancies are complicated by PPRM between 16 and 26 weeks' gestation, resulting in a potential risk of neonatal complications and death.

### **Aim of the study**

To evaluate prevalence, fetal and maternal outcome of premature rupture of membranes among pregnant women attending Minia Maternity University hospital.

### **Patients and Method**

#### **Study Settings and Design**

This prospective study was conducted at the department of obstetrics and gynecology at Minia Maternity University Hospital during the period from 1<sup>st</sup> october 2019 to 31<sup>st</sup> march 2020

This study was conducted on 456 pregnant female at gestational age between 24 up to 37 weeks attending outpatient clinics, emergency room or admitted at inpatient departments in Minia Maternity university Hospital with premature rupture of membrane (PROM) during the study period . Patients were followed up from onset of PROM till one week after delivery.

The study was approved by the ethical committee of the department of obstetrics and gynecology on 21 Sept 2019 (Reference NO: MUEOB00053). According to the hospital protocol, all patients consented for data retrieval for research purpose at time of admission after ensuring the confidentiality . So the study poses no harm regarding the safety issues to the mother or the fetus . the potential benefits and inconveniences of all aspects of the study were clearly stated to the participants. Informed consent was obtained from all patients.

#### **Study Population.**

**Patients in this study had the following inclusion criteria:**

- 1- Any pregnant patient whose diagnosed as PROM at gestational age between 24 up to 37 weeks

**Exclusion criteria:** Demonstrated patients of premature rupture of membranes (at gestational age < 24 up or > 37 weeks ).

**All the patients was subjected to the following:**

#### **1. Complete history taking :**

- History taking : Personal, Obstetric history. 1<sup>st</sup> day of LMP, EDD, any medical or surgical history, history of previous deliveries or abortion , and past history of previous PROM or preterm birth . previous history of preterm delivery, those who are experiencing vaginal bleeding, or those with uterine distension. In addition, low socioeconomic status, a history of sexually transmitted infections, genetic and/or enzymatic abnormalities, nutritional deficiencies, an incompetent cervix, and placental abruption are known predisposing factors. Procedures like amniocentesis and cerclage may result in PROM.
- History of present complaint: symptoms suggestive of preterm labor pain and symptoms suggestive of vaginitis if present (itching, offensive vaginal discharge or dysparunia)
- History of urinary complaint: as frequency or dysuria.
- Diagnostic criteria of cases: Diagnosis of cases with PROM was confirmed by presence of history of fluid drainage through the vagina, direct visualization of fluid from cervical os.

#### **2. Examination:**

- General examination: Blood pressure, pulse rate and temperature....etc: To detect: Signs of complication as chorioamnionitis.
- Abdominal examination: ultrasonography to assess the amniotic fluid index level.
- Local vaginal examination: with sterile vaginal speculum to confirm the diagnosis of ROM .

**3. Routine investigations:** CBC, urine analysis, CRP.

**4. follow up:** fetal wellbeing by abdominal ultrasound and CTG .

#### **5. Outcome measures:**

- Maternal outcome:**
  - PTL, infection (chorioamnionitis)
  - Antepartum haemorrhage (Placental abruption).
- Fetal outcome:**
  - Prenatal morbidity
  - Respiratory distress syndrome (RDS)
  - Admission to the newborn intensive care unit (NICU)

- Intracranial hemorrhage .
- Low AS (Apgar score)
- neonatal sepsis .

➤ Perinatal mortality

To achieve the study objective (prevalence of PROM) total number of deliveries and total number of pregnant women who suffered from PROM in study period from (october 2019 to march 2020) were identified and included in calculating the prevalence in this period using the following equation: Prevalence of PROM= Total number of women presenting with PPRM/ Total number of deliveries in the same period and place.

## Results

### Demographic data:

**Table (1) : Prevalence of PROM among women delivered at Minia maternity university hospital from from 1<sup>st</sup> october 2019 to 31<sup>st</sup> march 2020.**

Duration	Number of deliveries	Number of pregnant Women presenting with PROM	Prevalence of PPRM
From October 2019 to March 2020.	6165	456	7.4%

Prevalence of PROM among women delivered at Minia maternity university hospital during the study period was 7.4% .

## Discussion

Premature rupture of membranes (PROM) is the rupture of the fetal membranes before the onset of labor, if occurred before 37 weeks, it's called; the preterm premature rupture of fetal membranes (PPROM).<sup>(5)</sup>

There is variation in the prevalence of PROM and this is due to the difference in the studied populations. Premature rupture of membranes occurs between 5 and 15% of all pregnancies.<sup>(6)</sup>

PROM was defined as rupture of membranes prior to the establishment of regular uterine contractions. PROM was diagnosed only when a specified latent period has elapsed following Amniorrhaxis occurring at any time prior to the onset of labour; regardless of the length of gestation. ROM was defined as rupture of membranes occurring at least one hour before onset of labour. PROM was defined as rupture

The study included 456 patients with Premature Rupture Of Membranes at Minia maternity university hospital. Age of patients range from 18 to 48 years old; Gestational age was recorded once the patient is admitted between 24 up to 37 weeks; Gravidity of patients were between G1 – G 10; Parity of patients were between P0 up to P9 with previous history of abortion ranged between (0-7).

### Neonatal outcome was classified into 2 groups according to prognosis:

- Poor neonatal outcome (occurrence of one or more of the following (NICU admission, preterm birth, respiratory distress, neonatal infection or neonatal death)
- Good neonatal outcome (born alive and well).

of membranes with at least 2 hours latent period before active labour, latent period being the time elapsing from the time of rupture of membranes to the onset of labour. One of the main problems in diagnosing PROM is the difficulty in accurately timing the onset of labour. This problem is especially true in primigravida where regular uterine contractions may not result in cervical dilation and where cervical effacement usually precedes the onset of true labour. Spontaneous rupture of foetal membranes occurring prior to the onset of uterine contractions, which result in progressive cervical dilation.<sup>(7)</sup>

Higher rates of PROM in the current study could be explained by the fact that Minia maternity university hospital is a tertiary care level referral hospital to which complicated cases are usually referred. Also, cultural influences of early marriage, poverty resulting in low maternal weight gain and lack of birth spacing which are significantly associated with PROM and this explanation was supported by Tahir et al.,<sup>(8)</sup>

Maternal age, parity and increase maternal weight do not seem to have a correlation with PROM.<sup>(9)</sup>

In this study Maternal age, parity, gestational age of the included patients didn't seem to have direct relation with the occurrence of PROM as the age of the included cases was ranged between (18-48) years and parity of the included cases was ranged between (p0-p9) and gravidity was ranged between (G1-G10), while gestational age ranged between (24-37) weeks without increasing risk of PROM with certain gestational age at PROM or increased parity, this is in agreement with<sup>(10)</sup> who proved that Maternal parity and increase maternal weight do not seem to cause PROM.

All cases were almost of the same socio-economic status and the same race, no history of drug abuse or smoking, to exclude the effect of these variables on the risk of preterm delivery.<sup>(11)</sup>

In a retrospective study including 90 women with PROM from (24-41) weeks of gestation in two French tertiary university referral centers investigated the predictive value of maternal serum and vaginal markers for clinical and histological chorioamnionitis. they found that both WBC count and CRP had a high predictive value for histological chorioamnionitis.<sup>(12)</sup>

This is in agreement with this study. In this study Maternal infection (chorioamnionitis) due to PROM was evidenced by two important indicators of infection c-reactive protein (CRP) and total leucocytic count (TLC).

Moreover, inadequate antenatal care had a higher risk of poor maternal outcome according to a study done in Ismailia General Hospital.<sup>(13)</sup>

Although there is a high utilization rate of antenatal care in Egypt (82%) according to EDHS, 2016<sup>(14)</sup>, the visits may be ineffective or inadequate. In the present study the prevalence rate of PROM among booked cases for ANC was high in comparison to other studies.

PROM is one of the leading identifiable causes of premature birth and it accounts for approximately 30-40% of preterm deliveries in Oman and Iran. In Egypt, approximately 30% of

preterm births are related to preterm rupture of membranes.<sup>(15)</sup>

### Summary and Conclusion

Premature rupture of membranes (PROM) also called pre-labor rupture of membranes, is a condition that can occur in pregnancy. it is defined as rupture of membranes (breakage of amniotic sac).

Preterm premature rupture of the membranes (PPROM) is defined as loss of amniotic fluid before the onset of labor in pregnancies before 37 weeks of gestation, which is characterized as a painless flow of fluid that escapes out of the vagina.

PROM is a serious condition leading to approximately one-third of preterm births and it complicates about 3% of pregnancies.

The exact etiology is vague, but usually the cause is multifactorial, depending on special anatomy of the fetal membranes, protecting factors and factors that lead to weakening and destruction of the membranes.

There are many studies suggesting that maternal nutritional deficiency, certain connective tissue disorders, cervical incompetence, smoking, sexual activity and genital tract infection predispose to PROM.

The present study was done in Minia governorate, Minia Maternity university hospital which serve as tertiary care facility for whole Minia Governorate, where there are approximately 12.500 deliveries annually. During the period from 1<sup>st</sup> october 2019 to 31<sup>st</sup> march 2020. 456 patients with Premature Rupture of Membranes were included. This study was approved by the hospital's Ethical Committee.

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