

# Maternal and Fetal Outcome in Actively Managed of PROM at Elhasahisa Teaching Hospital 2020

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Submitted: 2023, Oct 07; Accepted: 2023, Nov 24; Published: 2024, Feb 02

**Citation:** Ahmed, E. M. O. M. S., Algaily, B., Jaber, M. H. (2024). Maternal and Fetal Outcome in Actively Managed of PROM at Elhasahisa Teaching Hospital 2020. *Int J Clin Med Edu Res*, 3(2), 01-05.

## Abstract

### Background

Prelabour rupture of membrane (PROM) is linked to significant maternal perinatal mortalities and morbidity.

**Objectives:** To evaluate maternal and fetal outcome in pregnant ladies that actively managed due to PROM at Elhasahisa Teaching Hospital, from March 2020 to September 2020.

### Methods

This is an observational, descriptive, cross sectional hospital-based study, conducted in the period from March 2020 to September 2020 at Elhasahisa Teaching Hospital included pregnant ladies that actively managed due to PROM. The data was collected by the researcher from women after informed consent. The data was analyzed by computer using SPSS- version 25.

### Results

A total of 104 pregnant ladies that actively managed due to PROM were enrolled in this study, the frequency of PROM was 3.8%, about 53 (51.0%) women in age group 20-35 years (mean age 26.03), 99 (95.2%) of ladies were literate. 63 (60.6%) women received antenatal dexamethasone, 75 (72.1%) had duration of membrane rupture of less than 24 hours and 29 (27.9%) women has duration of membrane rupture of more than 24 hours, 50 (48.1%) women received oxytocin, 45 (43.3%) women received castor oil and oxytocin and 9 (8.7%) women received castor oil, 81 (77.9%) women delivered vaginally, 23 (22.1%) women underwent caesarean section, maternal complication included postpartum haemorrhage was found in 11 (10.6%), sepsis in 6 (5.8) and postpartum haemorrhage and sepsis in 1 (1.0%) woman, mean Apgar score at 5 minute was found to be 9.23 (p value 0.000), fetal complications included respiratory distress in 19 (18.3%) babies, 2 (1.9%) babies referred and 1 (1.0%) baby was stillbirth.

### Conclusion

Maternal outcomes in pregnant ladies that actively managed due to PROM were postpartum haemorrhage and sepsis, no admission to ICU and no maternal mortality. Fetal outcomes in pregnant ladies that actively managed due to PROM were RDS, FSB, Apgar score less than 7 and referred. the frequency of pregnant ladies actively managed due to Pre Labour Ruptured of Membrane was 3.8%. The successful rate of induction of labour due to Pre Labour Rupture of Membrane was 77.9%.

**Keywords:** Prelabour Rupture of Membrane, Maternal, Fetal Outcomes

## 1. Introduction

Prelabour rupture of membranes (PROM) refers to a patient who is beyond 37 weeks' gestation and has presented with rupture of membranes (ROM) prior to the onset of labor. Preterm premature rupture of membranes (PPROM) is ROM prior to 37 weeks gestation. Spontaneous premature rupture of the membranes (SPROM) is ROM after or with the onset of labor. Prolonged

ROM is any ROM that persists for more than 24 hours and prior to the onset of labour. At term, programmed cell death and activation of catabolic enzymes, such as collagenase and mechanical forces, result in ruptured membranes. Preterm PROM occurs probably due to the same mechanisms and premature activation of these pathways. However, early PROM also appears to be linked to underlying pathologic processes, most likely due to inflammation

and/or infection of the membranes. Clinical factors associated with preterm PROM include low socioeconomic status, low body mass index, tobacco use, preterm labour history, urinary tract infection, vaginal bleeding at any time in pregnancy, circulage, and amniocentesis [1].

PROM at any time increases risk of infection in the woman (chorioamnionitis), neonate (sepsis), or both, as well as risk of abnormal fetal presentation and abruptio placentae. Group B Streptococci and Escherichia coli are common causes of infection. Other organisms in the vagina may also cause infection. Prolonged preterm PROM before viability (at < 24 week) increases risk of abnormal joint positioning and pulmonary hypoplasia.

The interval between PROM and onset of spontaneous labor (latent period) and delivery varies inversely with gestational age. At term, > 90% of women with PROM begin labor within 24 h; at 32 to 34 week, mean latency period is about 4 days [2]. The causes of PROM have not been clearly identified. Some risk factors include smoking, multiple pregnancies (twins, triplets, ...etc.), and excess amniotic fluid (polyhydramnios). Certain procedures carry an increased risk of PROM, including amniocentesis (a diagnostic test involving extraction and examination of amniotic fluid) and cervical circulage (a procedure in which the uterus is sewn shut to avoid premature labour). A condition called placental abruption is also associated with PROM, although it is not known which condition occurs first. In some cases of preterm PROM, it is believed that bacterial infection of the amniotic membrane causes it to weaken and then break. However, most cases of PROM and infection occur in the opposite order, with PROM occurring first followed by an infection.

The main symptom of PROM is fluid leaking from the vagina. It may be a sudden, large gush of fluid, or it may be a slow, constant trickle of fluid. The complications that may follow PROM include premature labour and delivery of the fetus, infections of the mother and/or the fetus, and compression of the umbilical cord (leading to oxygen deprivation in the fetus).

Labour almost always follows PROM, although the delay between PROM and the onset of labor varies. When PROM occurs at term, labor almost always begins within 24 hours. Earlier in pregnancy, labor can be delayed up to a week or more after PROM. The chance of infection increases as the time between PROM and labor increases. While this may cause doctors to encourage labor in the patient who has reached term, the risk of complications in a premature infant may cause doctors to try delaying labor and delivery in the case of preterm PROM [3].

The types of infections that can complicate PROM include amnionitis and endometritis. Amnionitis is an infection of the amniotic membrane. Endometritis is an infection of the innermost lining of the uterus. Amnionitis occurs in 0.5-1% of all pregnancies. In the case of PROM at term, amnionitis complicates about 3-15% of pregnancies. About 15-23% of all cases of preterm PROM will be complicated by amnionitis. The presence of amnionitis puts the fetus at great risk of developing an overwhelming infection

sepsis circulating throughout its bloodstream. Preterm babies are the most susceptible to this life-threatening infection. One type of bacteria responsible for overwhelming infections in newborn babies is called group B streptococci(3) we conducted this study to evaluate maternal and fetal outcome in pregnant ladies that actively managed due to PROM at Elhasahisa Teaching Hospital, from March 2020 to September 2020.

## 2. Methodology

### 2.1 Study Design

This is an observational, descriptive, cross sectional hospital-based study.

### 2.2 Study Period

The study was conducted in the period from March 2020 to September 2020.

### 2.3 Study Area

This study was conducted at Elhasahisa Teaching Hospital, in Elhasahisa locality. It is 134 bedded hospital that consist of: outpatient clinic, refer clinic, labour ward (high risk and low risk), obstetric ward, gynaecology ward, private ward, theatre, laboratory, pharmacy and blood bank. It offers 24 hours emergency and elective obstetrics and gynecology services to patients from gazira state with rate of 40-60 patients per day in the outpatient clinic and about 30-40 patient in the refer clinic. The hospital offers training for post graduates (around 18 per shift) as well as under graduate students under supervision of the consultants (9 specialists).

### 2.4 Study Population

Study population were pregnant ladies that actively managed due to PROM at Elhasahisa Teaching Hospital, from March 2020 to September 2020.

#### 2.4.1 Inclusion Criteria

Inclusion criteria were pregnant ladies that actively managed due to PROM at the study area during the study period.

#### 2.4.2 Exclusion Criteria

- Pregnant ladies with PROM who had previous scar.
- Pregnant ladies with PROM booked for E/C/S.
- Patients who refused to participate.

### 2.5 Sampling Technique

Simple systemic random technique, whereas every three women fulfilled inclusion criteria we select the 3rd.

### 2.6 Sample Size

The sample size was calculated according to formula:

$$n = N * X / (X + N - 1),$$

$$\text{where: } X = Z_{\alpha/2}^2 * p * (1-p) / \text{MOE}^2,$$

and  $Z_{\alpha/2}$  is the critical value of the normal distribution at  $\alpha/2$  (e.g. for a confidence level of 95%,  $\alpha$  is 0.05 and the critical value is 1.96), MOE is the margin of error (4), p is the sample proportion(80%), and N is the population size(100).(34).

$$X = Z_{\alpha/2}^2 * p * (1-p) / MOE^2$$

$$X = (1.96)^2 * 80 * (1-80) / 42^2 = 1517$$

$$n = N * X / (X + N - 1)$$

$$n = 100 * 1517 / (1517 + 100 - 1) = 93$$

Thus, the maximum desired sample size was 93 + 10% for error (104).

## 2.7 Study Variables

- Independent variables: pregnant ladies with PROM
- Dependent variables: maternal and fetal complications (sepsis, PPH, admission to ICU, death, still birth, RDS).
- Confounding variables: maternal age, gestational age, parity, duration of PROM, Method of induction

## 2.8 Data Collection Tools

All data was obtained from all pregnant ladies had low risk pregnancy regardless of maternal age, parity and without previous uterine surgery whom gestational age 37 weeks and beyond presented with drainage of clear liquor regardless of duration of membrane rupture confirmed by history of gush of water per vagina and by speculum examination admitted to alhasahisa teaching hospital from March 2020 to September 2020 for induction of labor by castor oil only, oxytocin only, and both. The data collection was carried out by a pre-designed close-ended questionnaire (Annex 1) and direct interview managed by the author and from hospital's records.

## 2.9 Data Analysis and Presentation

Data was analyzed by computer using Statistical Package for Social Science program (SPSS), version 25. The results obtained were presented in tables and figures. The level of significant was considered if P. value <0.05.

## 2.10 Ethical Consideration

- The proposal was presented to the ethics review committee of the Sudan Medical Specialization Board, Council of Obstetrics and Gynaecology for approval of the study.
- The study proposal was presented to the Ethics Committee at the Research Unit (E.D.C) to be approved.
- A written consent was taken from administrator of the selected hospital to conduct the study.
- A written consent was obtained from participants, who will be briefed on the purpose and objectives of the study.
- Coding the data collection sheet for confidentiality.
- No intervention with hospital protocol.
- Protective measures were taken during Covid19 pandemic.

## 3. Results

A total of vaginal deliveries during the study period was 2700, out of them 104 pregnant ladies that actively managed due to PROM at Elhasahisa Teaching Hospital during the period from March 2020 to September 2020 were enrolled in this study to evaluate maternal and fetal outcomes. The frequency of PROM was 3.8%. The demographical parameters of the study population, obstetric history, mode of delivery, maternal and fetal outcomes were analyzed and results were shown as follow:

Regarding age, more than half 53 (51.0%) women in age group 26-35 years, 47 (45.2%) women in age group 16-25 years, While 4 (3.8%) women in age group 36 years and above. About 59 (56.7%) women were from rural areas (villages around alhasahisa and rufaa) and 45 (43.3%) women from urban areas (alhasahisa and rufaa). 41 (39.4%) women were employees and 63 (60.6%) housewives. Educational level showed that most 59 (56.7) had university education, 21 (20.2%) had secondary school education, 19 (18.3%) has basic school education and 5 (4.8%) illiterate. parity : 30 (28.8%) women were primigravidae, 71 (68.3%) women were multipara (1-4) and 3 (2.9%) women were grandmultipara (>5). Number of miscarriage: 17 (16.3%) women had one miscarriage and 4 (3.8%) women had two miscarriage. In this study, 63 (60.6%) women received antenatal dexamethasone (Figure 1). Most of the study population 75 (72.1%) had duration of membrane rupture of less than 24 hours and 29 (27.9%) women has duration of membrane rupture of more than 24 hours

Regarding method of induction, 50 (48.1%) women received oxytocin only, 45 (43.3%) women received castor oil and oxytocin and 9 (8.7%) women received castor oil only. In this study, 81 (77.9%) women delivered vaginally, 23 (22.1%) women underwent caesarean section. The indications for C/S were fetal distress 15 (65.2%), failure to progress 7 (30.4%) and patient's request 1 (4.3%) woman. In this study, the delivery attended by obstetrics staff that included medical officer for 9 (8.7%) women, junior registrar for 52 (50.0%) women and senior registrar for 43 (41.3%) women. While the delivery attended by paediatrics staff that included medical officer for 11 (10.6%) and registrar for 93 (89.4%) women.

maternal complication which included postpartum haemorrhage was found in 11 (10.6%), sepsis in 6 (5.8%) and postpartum haemorrhage and sepsis in 1 (1.0%) woman. Apgar score at 5 minute was found to be 7 in 3 (2.9%) babies of studied women, 8 in 14 (13.5%) babies, 9 in 42 (41.7%) babies and 10 in 44 (42.7%) babies. In this study, fetal complications included respiratory distress in 19 (18.3%) babies, 2 (1.9%) babies referred due to sepsis and suspected congenital heart disease and 1 (1.0%) baby was stillbirth. There was significant correlation between mother age and mode of delivery (P. V = 0.004). There was significant correlation between parity and mode of delivery (P. V = 0.000). There was significant correlation between duration of membrane rupture (hour) and mode of delivery (P. V = 0.003).

There was significant correlation between method of induction and mode of delivery (P. V = 0.038). There was insignificant correlation between maternal complication and mode of delivery (P. V = 0.844). There was significant correlation between Apgar score and mode of delivery (P. V = 0.002). There was significant correlation between fetal complications (RDS and referred) and mode of delivery (P. V = 0.000 & 0.013) respectively and insignificant correlation between fetal complications (FSB) and mode of delivery (P.V = 0.592). There was significant correlation between maternal complications and Duration of membrane rupture (P. V = 0.001). There was significant correlation between received

antenatal dexamethasone and Apgar score (P. V = 0.014). There was significant correlation between duration of membrane rupture and Apgar score (P. V = 0.000). There was significant correlation between duration of membrane rupture and fetal complications (RDS) (P. V = 0.000). There was insignificant correlation between methods of induction and Apgar score (P. V = 0.076). There was insignificant correlation between methods of induction and fetal complications (P. V = >0.05).

#### 4. Discussion

Pre labour rupture of membrane is an important problem in obstetric requiring active management so as to avoid maternal and fetal complications.

This study investigated maternal and fetal outcome in pregnant ladies that actively managed due to PROM. According to our findings, the frequency of term PROM was 3.8%, which is within the range of 5%–10% reported elsewhere. That indicate sample of our study represent population [4]. In national study was done in Omdurman maternity hospital frequency of pregnant ladies with PROM more than 24hrs 12.3 % compare to our study 27.9% that inconsistent to previous study owing to almost 30% of sample was taken from primigravidae had decrease awareness of PROM, in same study majority of babies had normal Apgar score 96.4% similar to our study 98.4% indicate good intrapartum monitoring was done [5]. In this study, 53 (51.0%) women in age group 20-35 years, 47 (45.2%) women in age group 16-25 years, While 4 (3.8%) women in age group 36 years and above.

Similar to the previous finding 71 (68.3%) of the women who experienced term PROM were multipara, 59 (56.7%) women were from rural area [6]. This may be due to poor hygienic conditions; there are more chances of infection.

In this study overall maternal complications was 17.4% and neonatal complications was 22.2% which was lower compare to study in Ethiopia overall maternal complications 22.2% and neonatal complications was 33.5% which indicate good health services and good intrapartum and postpartum care [7]. In this study maternal and neonatal complications was observed in PROM more than 24hrs than less than 24hrs similar findings in study was conducted in Maroco so increase awareness of pregnant ladies about PROM and early induction of labor to reduce both maternal and fetal complication [8].

In the present study, the duration of PROM and latency were significantly associated with unfavorable maternal outcome. Mothers with duration of PROM less than or equal of 24 hours were 75 (72.1%) women, they were less likely to experience unfavorable outcome than those with a duration of PROM more than 24 hours. This finding corroborates the results of studies conducted in Karnakata and India [9,10]. A latency period of 24 hours and above was associated with approximately a three-fold increase in unfavorable maternal outcome. This confirms the finding of a previous study, where an increasing risk of complications was observed with a prolonged PROM [11]. However, our finding is consistent with the result of the previous study, result that duration

more than 24hrs associated with increase maternal complications [12].

In previous study underwent in Pakistan 2016 mean age group was 27.68 which was similar to this study mean age of 26.03 , chorioamnitis was observed in 2.19% that lower compare to this study 5.8% due to higher rate of infection in this group of age and delay of attendant to hospital [12]. In the present study, 22.1% had cesarean section, being comparable to the study by Piya Ray [13]. Rate of cesarean section was higher in the studies by Anjana Devi and Singhal and lower in the studies by Jayaram compared to the present study [15-17].

Maternal complications included postpartum haemorrhage was found in 11 (10.6%), sepsis in 6 (5.8) and postpartum haemorrhage and sepsis in 1 (1.0%) woman. The findings compared with studies conducted by Anjana Devi and Singhal (17.5%). PPH was seen in 10.6% which was higher as compared to that of studies by Anjana Devi and Singhal (1.92%) and (1.5%) need to improve early recognition and early management [14,15]. In this study perinatal mortality rate was 1.0%. In study by Sanyal perinatal mortality was 5% [16]. In Piya Ray's study it was 2.5 which indicate good perinatal outcome [15]. In this study rate of caesarean section approximately similar in PROM more than 24hrs (52.2%) and PROM less than 24hrs (47.8%) so no difference in rate of Caesarean section which is similar finding in previous study (30) so we can underwent early induction of labor in PROM to reduce maternal and fetal complications without increase rate of caesarean section. Pregnancies complicated with term PROM should have early induction and supervised labour preferably in an institution. Management of each case has to be individualized. A combined effort of obstetrician and neonatologist is necessary. A good neonatal intensive care unit back up can be helpful in reducing the perinatal morbidity and mortality. Timely diagnosis of PROM by patient and early approach to hospital along with vigilant monitoring and acceleration of labour can help in significant reduction in the maternal and fetal morbidity and mortality.

#### 5. Conclusion

This study we can concluded that, The frequency of pregnant ladies actively managed due to Pre labour ruptured of membrane was 3.8%. The higher rate of successful induction of labour due to Pre Labour Rupture of Membrane ,Maternal outcomes in pregnant ladies that actively managed due to PROM were postpartum haemorrhage and sepsis, no admission to ICU and no maternal mortality.Fetal outcome in pregnant ladies that actively managed due to PROM were RDS, FSB and referred.

#### 6. Recommendations

- All patients presenting with prelabour rupture of membranes at term should be actively managed with induction of labour after assessing the cervical condition, so as to reduce the incidence of maternal and fetal sepsis and morbidity.
- More efforts should be made in the labour room for ideal proper assessment to pick up cases of PROM, and increase awareness between midwives and junior doctors to the magnitude of the

problem, so as to avoid unnecessary vaginal examination, which may reduce the incidence of infection.

- Provide fetal monitoring equipments, e.g. CTG, fetal blood sampling in the labour room to detect early fetal distress, so as to achieve better outcome.
- Explanation of the problem to the pregnant women antenatally and give advice of early reporting to the nearest hospital.
- To support the results of this study by doing a large randomized control trial to measure maternal and fetal complications.

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