

# Outcomes of Premature Rupture of Membrane Among Women Admitted in Teaching Hospital, Chitwan, Nepal

Sabita Sharma<sup>1</sup>, Jayalaxmi Shakya<sup>2</sup>, Basanta Thapa<sup>3</sup>, Saraswati Baral<sup>4</sup>,  
Kamala Upadhaya<sup>5</sup>

<sup>1</sup>School of Nursing, Chitwan Medical College,

<sup>2</sup>School of Nursing, Chitwan Medical College,

<sup>3</sup>School of Nursing, Chitwan Medical College,

<sup>4</sup>Department of Nursing, Parbat Hospital,

<sup>5</sup>Department of Nursing, Shree Medical and Technical College,

Corresponding Author: Sabita Sharma

DOI: <https://doi.org/10.52403/ijshr.20240135>

## ABSTRACT

**Background:** Premature rupture of membranes is defined as rupture of membranes after 28<sup>th</sup> weeks of gestation before the onset of labor is called preterm PROM when it occurs after 37 completed weeks of gestation and before onset of labor, then it is term PROM. Spontaneous rupture of the membrane any time beyond 28<sup>th</sup> weeks of pregnancy but before the onset of labor is called Premature Rupture of Membrane (PROM). The management of maternal and fetal outcome in PROM is very important to decrease maternal as well as neonatal mortality and for better management and prevention of complications which has essential significance for the further fate pregnancy. Thus, the study aims to find out the factors and outcomes of PROM among the women who will be admitted in maternity ward at Chitwan Medical College.

**Methods:** A descriptive cross-sectional study was conducted in a teaching hospital of Chitwan, Nepal during the study period of six months from 13<sup>th</sup> Feb 2023 to 14<sup>th</sup> August 2023 after getting ethical approval from Chitwan Medical College- institutional Review Committee (Reference number-

CMC-IRC/079/080). Women were selected via convenience sampling technique. Face to face interview was conducted to gather socio-demographic and obstetric data by structured interview schedule whereas, data related to the feto-maternal outcomes were obtained from patient charts and delivery record books. Statistical Package for Social Sciences version 20 was used for data analysis. Point estimate at 95% confidence interval was calculated along with frequency and proportion for binary data.

**Result:** The prevalence of premature rupture of membrane was found to be 15.3% out of 503 delivered mothers during six-month period. More than half (67.5%) of postnatal mother were between age of 35-45 years. More than half (57.1%) of mother were at 33-35 weeks of gestation. Only 3.9 % of mother has Postpartum hemorrhage as maternal outcome. Only 2.6% of fetus have meconium aspiration syndrome as fetus outcome.

**Conclusion:** The burden of premature rupture of membrane was found quite higher as compared to other similar studies done in Nepal. Hence, awareness, early screening, and treatment are necessary for the hospital attended pregnant women to minimize the risk of premature rupture of membrane.

**Keywords:** Outcomes, premature and Rupture of membrane

## INTRODUCTION

Premature rupture of membrane (PROM) is the spontaneous rupture of membrane before the onset of labour. It is relatively common obstetric event that is estimated from 3 % to 4.5 % of all deliveries. The diagnosis of Premature rupture of membrane is made by obtaining a history of leaking of amniotic fluid, clinical assessment, including by speculum examination and laboratory tests such as nitrazine and fern tests and by ultrasound evaluation of vaginal P.H<sup>1</sup>

Rupture of membrane is found to be related with cervico-vaginal infection, hypertensive disease, recent coitus, malpresentation, Polyhydramnios, multiple pregnancies antepartum hemorrhage, changes in pH, inadequate prenatal care and inadequate nutrition status and iatrogenic factors.<sup>2-4</sup>

Maternal complications include intra-amniotic infection, which occurs in 13% - 60% of women with PROM, placenta abruption and postpartum endometritis.<sup>5</sup> The complication risk of PROM is increased with decreasing gestational age and with if the mother has previous PROM, low body mass index, concomitant infection of gestational tissues and longer the time elapsed between the rupture and delivery.<sup>6-8</sup> PROM also leads to significant maternal complications such as puerperal infections, disseminated intravascular coagulopathy, placental abruption, operative delivery and psychological lactation problems and recurrence of PROM may occur in 20% cases.<sup>9</sup> It was seen to be common among patients who were young (15-25 years) 58.8%, with low socioeconomic status (68.2%), and with an educational status of primary to middle (71.7%). Risk of PPRM was seen to be highest among patients giving birth to their first child (42.2%), with gestational age between 30-35 weeks (43.5% cases) and 35-37 weeks (35.2%). In 69.4% cases there was no previous history of preterm deliveries while in 30.6% cases,

there were one, two, or more previous preterm deliveries. Normal spontaneous vaginal delivery occurred in (65.86%), while instrumental delivery rate in PPRM was 20% and caesarean section rate was 14%. Postnatally 16.47% patients developed infection while 24 (28.2%) babies developed infection and required antibiotics. PROM can lead to serious complications such as uterine cavity infection, umbilical cord compression, oligohydramnios, fetal malpresentation, umbilical cord prolapse, preterm delivery, fetal asphyxia and death. Majority of babies born to patients with PPRM were low birth weight (62.3%), and 30.5% babies required neonatal intensive care. Perinatal mortality rate was 129.9/1000 (13%) of total births. PPRM is an important cause of preterm birth, resulting in large number of babies with low birth weight, requiring neonatal intensive care. It is associated with increased fetal morbidity and mortality.<sup>10</sup>

The magnitude of PPRM varies in different countries and populations. It affects 3-4.5% of pregnancies globally, Evidences also discovered that PPRM accounts 2.2 % in Manipur, India.<sup>11</sup>

Clinical early onset neonatal infection was the commonest cause for perinatal morbidity noticed in 23.8% (50 out of 210) of cases. Neonatal morbidities were birth asphyxia (6.19%), hyper-bilirubinemia (2.86%), late onset sepsis (0.95%), congenital malformations (0.48%), congenital pneumonia (0.48%), and perinatal mortality was 1.43% (3 out of 210). Two of the three neonatal deaths were due to birth asphyxia and one was due to multiple congenital malformations.<sup>12</sup>

There is an enhanced risk of cord compression/prolapse and infectious morbidity, particularly so if cesarean section becomes eventually necessary. Approximately two-thirds of the patients with PROM are delivered within the next 4 days and the rest within 1 week. The time between the rupture of membranes and onset of labor (latent period) may extend

from hours to days, generally shorter the gestation period longer the latent period.<sup>13</sup> The management of maternal and fetal outcome in PROM is very important to decrease maternal as well as neonatal mortality and for better management and prevention of complications which has essential significance for the further fate pregnancy. There are very few studies on outcome of premature rupture of membrane in Nepal. Thus, the study aims to find out the outcomes of PROM among the women who were admitted in maternity ward at Chitwan Medical College.

## MATERIALS AND METHODS

### Study design, period and setting

A cross-sectional, descriptive study was conducted among the postnatal mother who were diagnosed with Premature Rupture Of Membrane (PROM) admitted in maternity ward of Chitwan Medical College, Chitwan, Nepal for six months period from 13<sup>th</sup> Feb 2023 to 14<sup>th</sup> August 2023. Chitwan Medical College is considered as one of the referral centre for maternity and newborn cases of province 3 providing free delivery services in co-ordination with the safe motherhood program under the Government of Nepal (GoN).

Ethical approval was obtained from Chitwan Medical College Institutional Review Committee with reference no-CMC-IRC/079/080 and permission from the hospital side as well as the concerned department was taken prior to the study. Before data collection, verbal informed consent was taken from all those post-natal mothers who are diagnosed with premature rupture of membrane after 28<sup>th</sup> weeks of gestation and before onset of labor, attending at maternity ward of Chitwan Medical College, within the duration of 6 months

### Study population and eligibility criteria

All the postnatal mother who were diagnosed with PROM after 28<sup>th</sup> weeks of gestation before the onset of labor within

data collection period and willing to participate in the study were included in the study whereas those postnatal mother diagnosed with premature rupture of membrane after 28 weeks of gestation with established labour and who cannot communicate were excluded from the study were excluded from the study.

Sample size determination and sampling technique

The sample size was calculated by using the formula

$$\begin{aligned} n &= Z^2 \times p \times q / e^2 \\ &= 1.96^2 \times 0.3 \times (1-0.3) / (0.05)^2 \text{ (Tavassoli et.al. 2010)}^{14} \\ &= 322.5 \\ &= 323 \end{aligned}$$

Where,

n= required sample size

Z= 1.96 at 95% of Confidence Interval (CI)

p= prevalence taken as 50% for maximum sample size

q= 1-p

e= margin of error,

Adding 10 % for the non-response rate we get the sample of 355. A sample size of 355 postnatal mother.

A sample size of study were 77 women meeting the selection criteria for the study was included during our six months period.

Non- probability convenience sampling technique was used to select the desired study sample. Mother who met the inclusion criteria were taken as study sample till the study period.

### Data collection tools and measurement

Data were collected by the researcher using structured interview schedule, first women were identified from the record in patient chart. The purpose of the study was explained to the them. Then face to face interview was conducted in separate corner of postnatal ward with postnatal mother after delivery to collect the data regarding socio-demographic and obstetric factors using structure interview schedule . Further, data related to the maternal and fetal

outcomes were obtained from patient charts and delivery record book.

### Data quality control

Nepali version questionnaires were used for the data collection

### Data management and analysis

Statistical Package for Social Sciences version 20 and Microsoft Excel were used for data analysis. Point estimate at 95% Confidence Interval was calculated along with frequency and proportion for binary data were used.

## RESULT

Out of 77 mother the median age Median age was 27 , Regarding occupation half of mother 50 (65 %) were unemployed and only 27 (35 %) were employed. Concerning on residence half of them 39 (50.7% were from rural municipality , 52(67.5% ) of respondents' hemoglobin level falls 7-10 g/dl , 53 (68.8 %) of mother had complain of UTI during pregnancy, Regarding white discharge above half of mother 61 (79.2%) had present complain . Only 13 (16.9 %) of respondent had gestational diabetes. About 58 (75.3%) have lifted heavy objects during pregnancy and 9 (11.7 %) of them have history of falling during pregnancy ( **Table 1** ) .

Table. 1. Sociodemographic characteristics of respondent ( n = 77 )

Variables	Number	Percent
<b>Age</b>		
>21	6	7.8
21-30	52	67.5
31-40	19	24.7
<i>Median age - 27 , mini-19, Maxi - 40</i>		
<b>Occupation</b>		
Employment	27	35.0
Unemployment	50	65.0
<b>Place of residence</b>		
Metropolitan	38	49.3
Rural municipality	39	50.7
<b>Hemoglobin level</b>		
<7 g/dl	8	10.4
7- 10 g/dl	52	67.5
> 10 g/dl	17	22.1
<b>Complain of UTI</b>		
Yes	53	68.8
No	24	31.2
<b>Complain of white discharge</b>		
Yes	61	79.2
No	16	20.8
<b>Gestational Diabetes</b>		
Yes	13	16.9
No	64	83.1
<b>Lifting heavy of objects during pregnancy</b>		
Yes	19	24.7
No	58	75.3
<b>History of falling during pregnancy</b>		
Yes	9	11.7
No	68	88.3

Out of the mother with PROM, nearly half 38 (49.4 %) were nulliparous. Regarding week of gestation more than half 44 (57.1%) were between 33-36 weeks. All most all 76 (98.7 %) had received antenatal care services. Nearly three quarter 59 (76.6%) of the respondents had no history of abortion and only 6 (7.8 %) of respondent

had twice aborted. About three quarter 30 (76.9%) of respondent had history of PROM in previous pregnancy and history of preterm labor respectively. About 48 (62.3%) of respondent delivered their child within less than 24 hours of PROM (**Table 2**).

**Table 2. Obstetric Characteristics of respondent (n =77)**

Variable	Number	Percent
<b>Parity</b>		
Nulliparous	38	49.4
Primiparous	31	40.3
Multiparous	8	10.3
<b>Weeks of gestation</b>		
28-32 weeks	19	24.7
33-36 weeks	44	57.1
36-before labor starts	14	18.2
<b>Antenatal care received</b>		
Yes	76	98.7
No	1	1.3
<b>History of abortion</b>		
No	59	76.6
Yes	18	15.6
Twice	6	7.8
<b>History of PROM in previous pregnancy (n=39)</b>		
Yes	30	76.9
No	9	23.1
<b>History of preterm delivery (n=39)</b>		
Yes	30	76.9
No	9	23.1
<b>Duration of PROM to delivery in hours</b>		
<24	48	62.3
>24	29	37.7

regarding maternal outcome, PPH was seen in only 3 (3.9%) where lactational insufficiency was seen in only in 7(9.1 %) puerperal sepsis, wound site infection and retained placenta was seen in only 1(1.3%) respectively, trauma to perineal muscles was

13 (16.9%) respectively. Postnatal blues were not seen in mother. More than half 46 (59.7%) of mother stayed in hospital for 4-7 days and no other were admitted in ICU (**Table 3**).

**Table 3. Maternal Outcome of PROM (n = 77 )**

Variables	Number	Percent
<b>PPH</b>		
Yes	3	3.9
No	74	96.1
<b>Lactational insufficiency</b>		
Yes	7	9.1
No	70	90.9
<b>Puerperal sepsis</b>		
Yes	1	1.3
No	76	98.7
<b>Wound site infection</b>		
Yes	1	1.3
No	76	98.7
<b>Trauma of perineal muscles</b>		
Yes	13	16.9
No	64	83.1
<b>Retained placenta</b>		
Yes	1	1.3
No	76	98.7
<b>Post natal blues</b>		
No	77	100
<b>Hospital stay</b>		
1-3 days	31	40.3
4-7 days	46	59.7
<b>Admit in ICU</b>		
NO	77	100

Regarding fetal outcome, 9 (11.7%) have tachycardia before birth, 3 (3.9%) of fetus were death in uterus before birth, 5(6.5 %) of fetus have APGAR between 0-3, and 4-6

respectively and 67 ( 87%) have between 7-10 within a minute of birth. And 3 (3.9%) of fetus have APGAR between 0-3 , 4(5.1 %) of fetus have between 4-6, and 70

(91.0%) of fetus have between 7-10 at 5 minute of birth. Regarding birth weight 15(19.5 %) of newborn have very low birth weight (<1500 gram) and 2500 gram and above respectively. Meconium Aspiration

Syndrome was seen in only in 2 (2.6%) whereas only 9 (11.7) were shifted to NICU for further management perinatal death was seen in 6 (7.8%) **Table 4.**

**Table 4. Fetal Outcome related to PROM (n = 77 )**

Variables	Number	Percent
<b>Fetal tachycardia</b>		
Yes	9	11.7
No	68	88.3
<b>Intrauterine death</b>		
Yes	3	3.9
No	74	96.1
<b>APGAR Score at 1<sup>st</sup> minute</b>		
0-3	5	6.5
4-6	5	6.5
7-10	67	87.0
<b>APGAR Score at 5<sup>th</sup> minute</b>		
0-3	3	3.9
4-6	4	5.1
7-10	70	91.0
<b>Birth Weight</b>		
Very low birth weight (<1500 gram)	15	19.5
Extremely low birth weight(<1000 gram)	11	14.3
Low birth weight (< 2500 gram)	36	46.8
2500 gram and above	15	19.5
<b>Meconium Aspiration Syndrome</b>		
Yes	2	2.6
No	75	97.4
<b>Admit in NICU</b>		
Yes	9	11.7
No	68	88.3
<b>Perinatal death</b>		
Yes	6	7.8
No	71	92.2

## DISCUSSION

The finding of the study revealed that the prevalence of premature rupture of membrane was found to be 15.3% which seems to be quite higher than the study conducted in College of Medical Science Chitwan , where it was found 8.9% <sup>1</sup> like wise similar study done in Kathmandu also shows 8%. <sup>16</sup> In this study 67.5% of mother were in between age 21 -30 years, hemoglobin level less than 7g/dl was 10.7 % and the study done in India is contradictory which showed 82 % of mother falls between the age 21- 25 years and hemoglobin level less than 7g/dl was 30 %, study by Chandra et al , 2021.<sup>18</sup>

The current study in concordance recorded 68.8 % of mother had history of UTI which might be the cause of PPRM , this finding was contradictory to the study done in , Kist Medical College, Nepal where it was only

7.14 %, the differences might be due to different setting .<sup>16</sup>

In this present study the 79.2. % of mother have complain of white discharge from vagina which might be the cause of PPRM, and also shows that that 57.1 % of mother have been diagnosed with PPRM between 33-36 weeks of gestation, history of preterm delivery was 76.9 % which is contradictory to the study done in College of Medical Sciences , Chitwan where it was only 1.2 %, of white discharge , 28.57 % were between 28-36 weeks of gestation , history of preterm delivery was 2.4 % it might be due to differences in population.<sup>15</sup>

In our present study 37.7% of mother had delivered their babies in more than 24 hours of PPRM which is contradictory to the study done in Ethiopia which was 53.7 %. This might be due to different setting.<sup>17</sup>

In present study, maternal outcomes seen in mother such as : PPH in 3.9 % , puerperal sepsis in 1.3% , wound site infection in 1.3% and this finding were consistent to the study done in India where it found PPH in 6.1 % , puerperal sepsis in 12.3 % , wound site infection in 6.1 % which might be due to similar setting <sup>18</sup>.

In this study duration of hospital stay for 4-7 days is 59.7 % , which is more than study done in Ethiopia which was 32.4. <sup>17</sup> So prompt maternal care is required to minimize the maternal complication.

This present study shows that 11.7% of fetus had tachycardia, 3.9% of fetal death occurred which was contradictory to study done by Gauthier et al. 2020 which showed that 47.4 % IUFD which might be due to longer the study. <sup>19</sup>

In present study 87 % of fetus have APGAR score between 7-10 within a minute of birth, 91 % of fetus have APGAR score between 7-10 at 5 minute of birth. Regarding weight of fetus only 19.5% of the were above 2500gram. 11.7% of new born were admitted to NICU after birth. These finding was dissimilar with the study done in Ethiopia by Endale et.al 2016 which showed that 47% of fetus have APGAR score between 7- 10 within a minute of birth, 76.2 % of fetus have APGAR score between 7-10 at 5 minute of birth . This might be due to high priority given by government towards the pregnant women. <sup>17</sup>

In present study perinatal death occurred in 7.8 % , which is similar to the study carried out by Shakya et al. 2020 which showed 1.2% perinatal death occurred in newborn due to PPROM so prompt management should be done. <sup>15</sup>

This study is limited by lack of long term follow up of newborn to mother with premature rupture of membrane for more than 12 hours. Also being a single centre study with limited number of patient, so the results should be generalized with caution.

## CONCLUSION

Our study shows that the prevalence of premature rupture of membrane is higher

than compared to that of other developing countries with significant negative outcomes both seen in mothers and newborn which remains a major concern for health workers to plan for adequate supplies and manpower to manage such cases beforehand. Majority of the mother had trauma of perineal muscles and lactational insufficiency. Intrauterine death and low birth weight requiring well equipped NICUs can be seen in PROM cases and further comparative studies are required to confirm various factors described here to be associated with PIH.

## Declaration by Authors

**Ethical Approval:** Approved

**Acknowledgement:** We thank the matron Professor Laxmi Rajbanshi and Associate professor Dipa Sigdel, staff and patient for continue support.

**Source of Funding:** None

**Conflict of Interest:** The authors declare no conflict of interest.

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How to cite this article: Sabita Sharma, Jayalaxmi Shakya, Basanta Thapa, Saraswati Baral, Kamala Upadhaya. Outcomes of premature rupture of membrane among women admitted in Teaching Hospital, Chitwan, Nepal. *International Journal of Science & Healthcare Research*. 2024; 9(1): 262-270. DOI: <https://doi.org/10.52403/ijshr.20240135>

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