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Fetomaternal outcome of term pregnancy with premature rupture of membranes

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Abstract
Background: *When rupture of membranes occur beyond 37th week but before the onset of labor it is called term pre-labor rupture of membranes (PROM) and when it occurs before 37 completed weeks, it is called preterm PROM.[1]*
Material and Method: *A prospective study to assess the fetomaternal outcome of term pregnancy with PROM carried out in the Department of Obstetrics and Gynecology, Regional Institute of Medical Sciences, Imphal from November 2014 to April 2016 among 100 pregnant women with PROM. The collected data were analyzed using SSPS software version ver. 21.0 and described using mean and percentages.*
Result: *Out of 16,968 total deliveries PROM were 950(5.6%) and term PROM 446(2.6%). They were from age group 18-24 years in 50% of cases and booked in 84% of cases. Around 3/4th of the patients were from rural areas. More than half were from low (54%) and the remaining from middle socio economic status. Most of the patients were literate. Fever was present in 3% of cases. Apgar score was low in 2% at 0 min and at 5 and 10 min was normal. Early onset sepsis and birth asphyxia was present in 2% of cases and transient tachypnoea of newborn and neonatal jaundice in 1% of cases. Post partum fever was present in 3% of cases.*
Conclusion: *Poverty, rural area, lack of proper health services, lack of awareness are the main reasons for poor foetomaternal outcome in the patients with PROM.*
Key words: *PROM, preterm PROM, PPH*

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I. Introduction

Premature rupture of membranes (PROM) also known as pre-labor rupture of membranes (PROM) is defined as spontaneous rupture of the membranes any time beyond 28th week of pregnancy but before the onset of labor. When rupture of membranes occur beyond 37th week but before the onset of labor it is called term PROM and when it occurs before 37 completed weeks, it is called preterm PROM (PPROM).[1] The "latent period" is the interval between membrane rupture and the onset of active labour.[2]

The incidence of PROM is about 10% of all pregnancies and 70% of them occur at term.[3] At term, the onset of labour occurs within 24 hours after membrane rupture in 80% to 90% of patients. Among patients with PROM prior to term, latent periods occur longer. Latent periods of more than 24 hours occur in 57% to 83%, of more than 72 hours in 15% to 26%, and of 7 days or more in 19% to 41%. There is an inverse relationship between gestational age and the proportion of patients with latent periods longer than 3 days. For pregnancies between 25 and 32 weeks, 33% had latent periods longer than 3 days, whereas for pregnancies of 33 to 34 and 35 to 36 weeks, the corresponding values were 16% and 4.5%, respectively.[4]

The pathophysiology leading to PROM at term has been shown to be different from the pathophysiology leading to PPROM. At term, weakening of the membranes may result from physiologic changes combined with shearing forces induced by contractions. PPROM may result from a focal deficit rather than a generalized weakness of the membranes.[5]

Women with an uncertain history of pre-labor rupture of the membranes should be offered a speculum examination to determine whether their membranes have ruptured. Digital vaginal examination is to be avoided because it has been shown that a threefold increase of positive amniotic cultures occurs in women who had vaginal examinations compared to those who did not.[6]

PROM can lead to the following maternal and perinatal complications:-[7,8]

- Foetal or neonatal infection.
- Maternal infection, chorioamnionitis, endometritis, placental abruption.

- Umbilical cord compression and prolapse.

Neonatal morbidities are mainly due to infection. Fetomaternal outcome is dependent on many factors, primarily on gestational age, interventions (antibiotics, steroids etc.) done, duration of labor, development of intrapartum chorioamnionitis. Maternal morbidities are found in terms of chorioamnionitis leading to endometritis, puerperal pyrexia, and wound infection.[9]

Further consequences can be increased obstetric interventions in terms of instrumental deliveries and caesarean sections due to fetal distress or in-coordinate uterine actions. Of all the reasons, bacterial infection of the membranes i.e. subclinical chorioamnionitis is most likely to result in PROM. Prolongation of pregnancy carries the risk of intraamniotic infection (clinical chorioamnionitis) leading to high incidences of neonatal sepsis, periventricular leukomalacia, cerebral palsy, broncho-pulmonary dysplasia and neonatal death. Even though most cases are idiopathic and unpreventable, close monitoring with timely intervention and good neonatal set up, can contribute significantly to reduce fetomaternal morbidities and mortalities.[9]

Premature rupture of membranes is one of the most challenging and controversial obstetric dilemma which occurs even in low risk pregnancies. So the present study is conceptualized to analyze the maternal and perinatal outcome in premature rupture of membranes at term pregnancy.

II. Material and Methods:

On approval from ethical committee our prospective Study was carried out in the Department of Obstetrics and Gynecology, Regional Institute of Medical Sciences, Imphal for a period of eighteen months i.e. from November 2014 to April 2016 and 100 pregnant women after 37 completed weeks with PROM were analyzed.

Inclusion criteria for the study:

- Gestational age of ≥37wks confirmed by dates, clinical examination and ultrasound.
- Cervical dilation of < 3cms.
- Lack of uterine contractions for at least 1hr from PROM.
- Single live pregnancy.
- PROM confirmed by direct visualization.

Exclusion criteria:

- Gestational age <37wks.
- Cervical dilation of >3cms.
- Women in labor or uterine contractions in 1hr of rupture of membranes.
- Multiple gestations.

The study variables were age, booked/unbooked status, address, occupation, socio-economic status, literacy, ABO/Rh, serology, mode of delivery, indication of LSCS, weight of baby, Apgar score, NICU admission, sex of baby, neonatal morbidity, neonatal mortality, congenital abnormalities, presence of fever, PPH, maternal mortality etc. Data was collected after obtaining consent from the patient. All the cases in the study group were subjected to a complete obstetrical work-up including history, general physical examination and systemic examination and relevant laboratory investigations. The observation of the study was recorded in Microsoft excel 2007 and the data were analyzed using SSPS software version ver. 21.0 and described using mean and percentages.

III. Result

Total number of deliveries during the study period was 16,968 and total women with PROM were 950(5.6%). Total number of term PROM was 446(2.6%).

Table 1: Age distribution of respondents

Age in years	Frequency	Percentage
18-24	50	50.0
25-29	25	25.0
30-34	18	18.0
≥35	7	7.0
Total	**100**	**100.0**
Mean ± SD	**25.8 ± 5.6**	

Majority of the respondents were from the age group 18-24 years in 50% of cases.

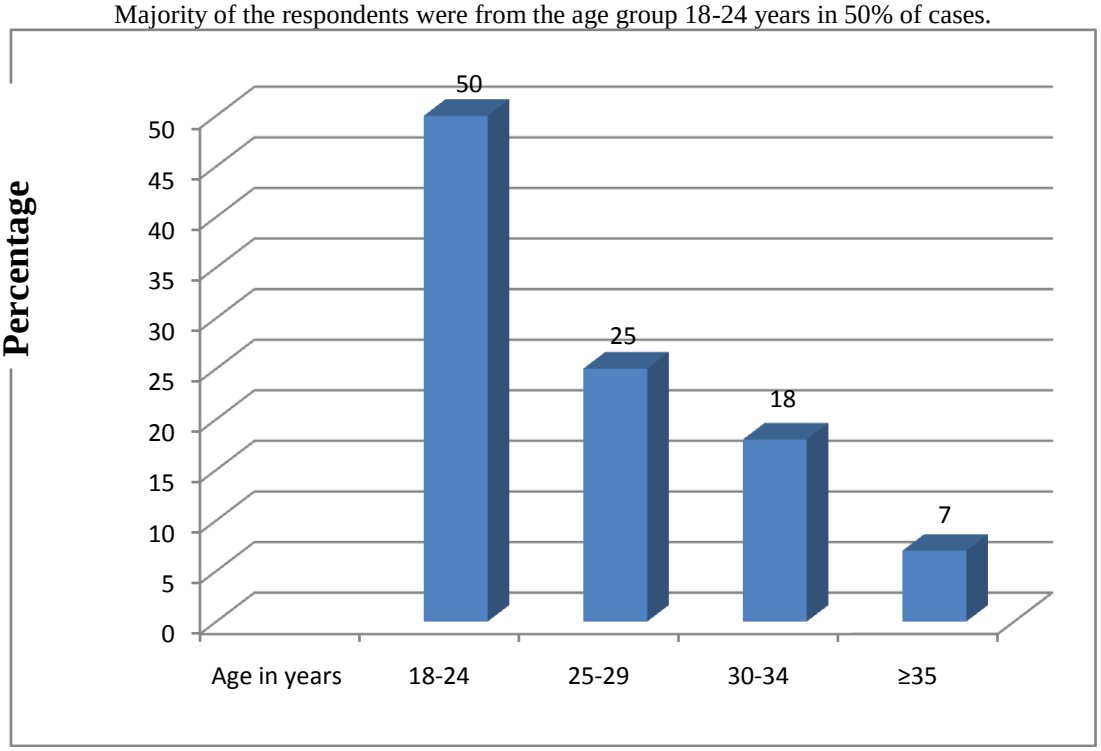

Figure 1: Bar diagram showing age distribution of respondents

Table 2: Distribution of respondents by booked status

Booked status	Frequency	Percentage
Booked	84	84.0
Unbooked	16	16.0
Total	**100**	**100.0**

Most of the patients were booked in 84% of cases as shown in table 2.

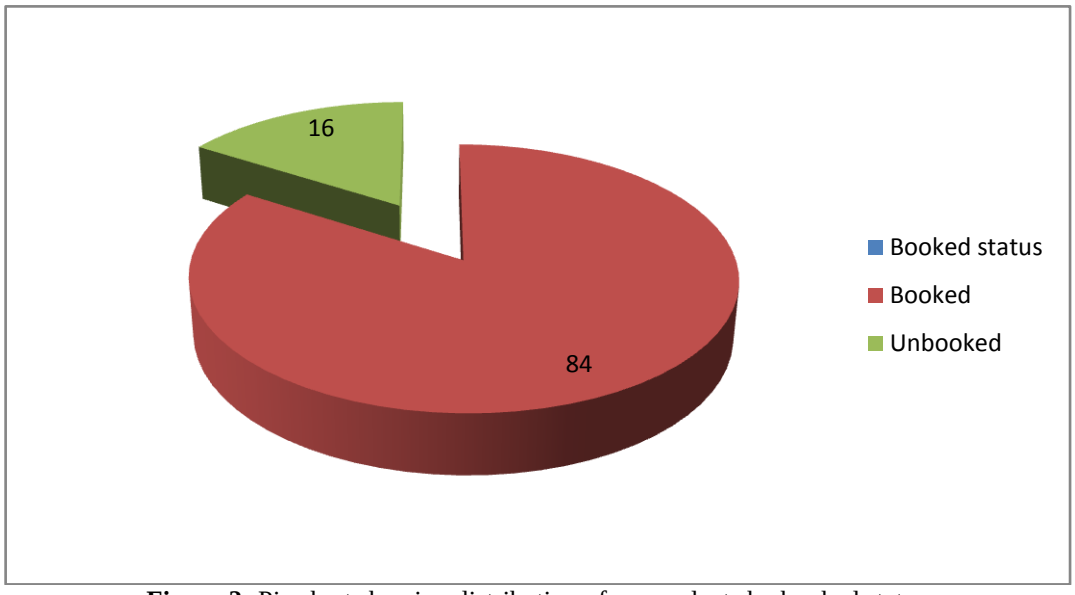

Figure 2: Pie chart showing distribution of respondents by booked status

Table 3: Distribution of respondents by address

Address	Frequency	Percentage
Urban	26	26.0
Rural	74	74.0
Total	**100**	**100.0**

Around 3/4th of the patients were from rural areas as shown in table 3.

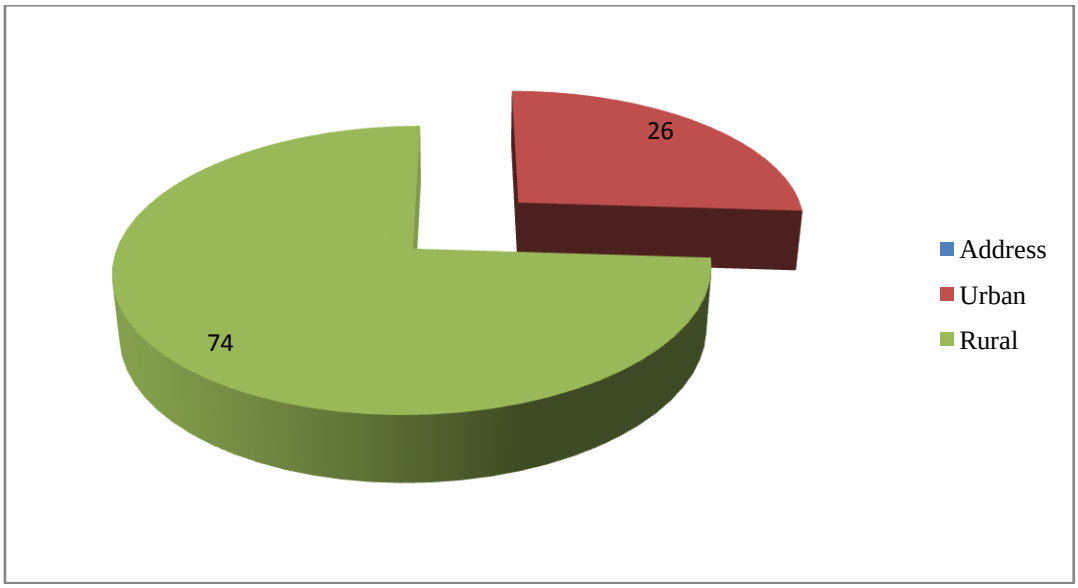

Figure 3: Pie chart showing distribution of respondents by address

Table 4: Distribution of respondents by occupation

Occupation	Frequency	Percentage
Housewife	94	94.0
Business	4	4.0
Embroidery	1	1.0
Nurse	1	1.0
Total	**100**	**100.0**

Majority of the respondents were housewives in 94% of cases, doing business in 4% of cases and 1% each of nurse and embroidery.

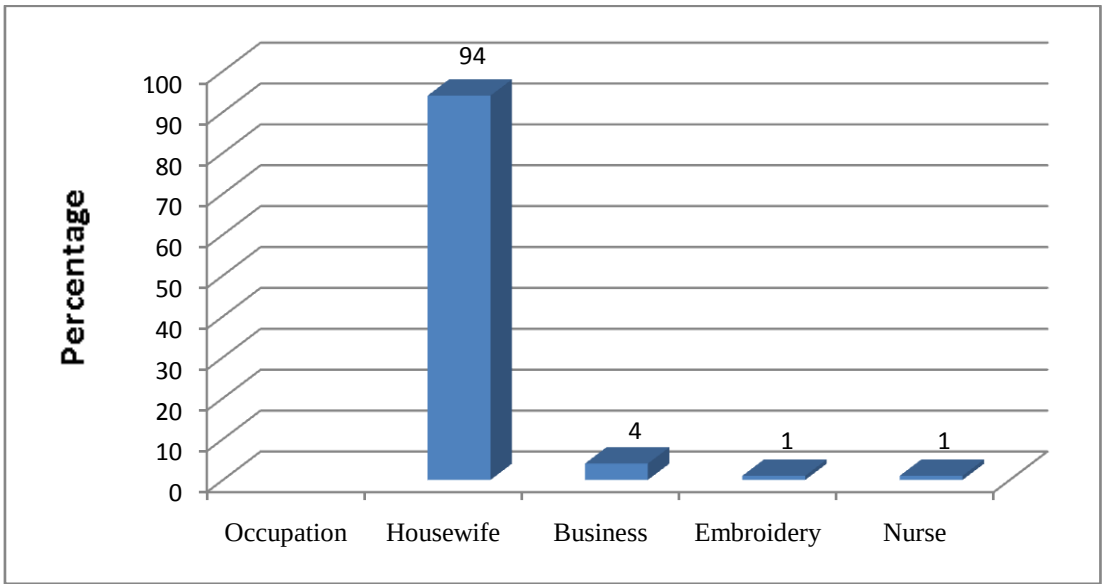

Figure 4: Bar diagram showing distribution of respondents by occupation

Table 5: Distribution of respondents by SES

SES	Frequency	Percentage
Low	54	54.0
Middle	46	46.0
High	0	0.0
Total	**100**	**100.0**

More than half of the respondents were from low socio economic status (54%) and the remaining from middle socio economic status.

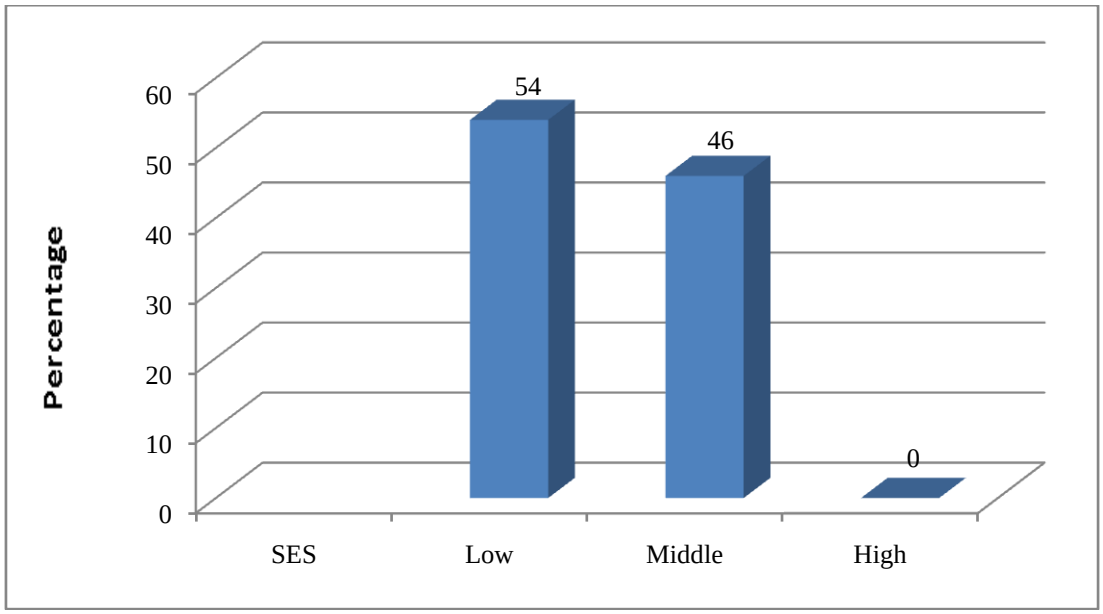

Figure 5: Bar diagram showing distribution of respondents by SES

Table 6: Distribution of respondents by literacy status

Literacy status	Frequency	Percentage
Illiterate	2	2.0
Literate	98	98.0
Total	**100**	**100.0**

Two pregnant ladies were illiterate as shown in table 6.

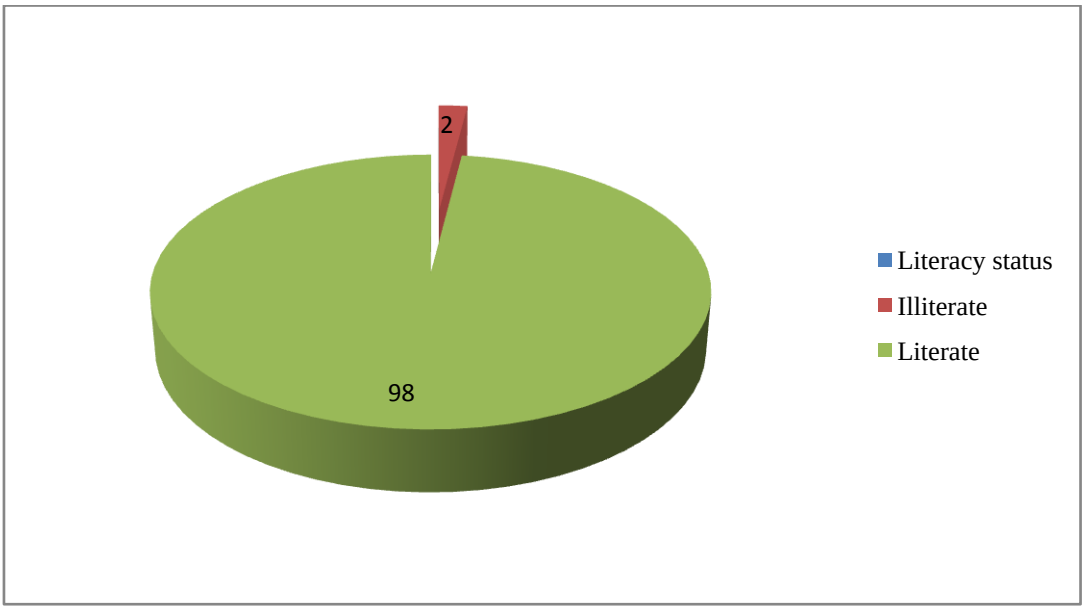

Figure 6: Pie chart showing distribution of respondents by literacy status

Table 7: Distribution of respondents by presence of fever

Fever	Frequency	Percentage
Present	3	3.0
Absent	97	97.0
Total	**100**	**100.0**

Fever was present in 3% of cases as shown in table 7.

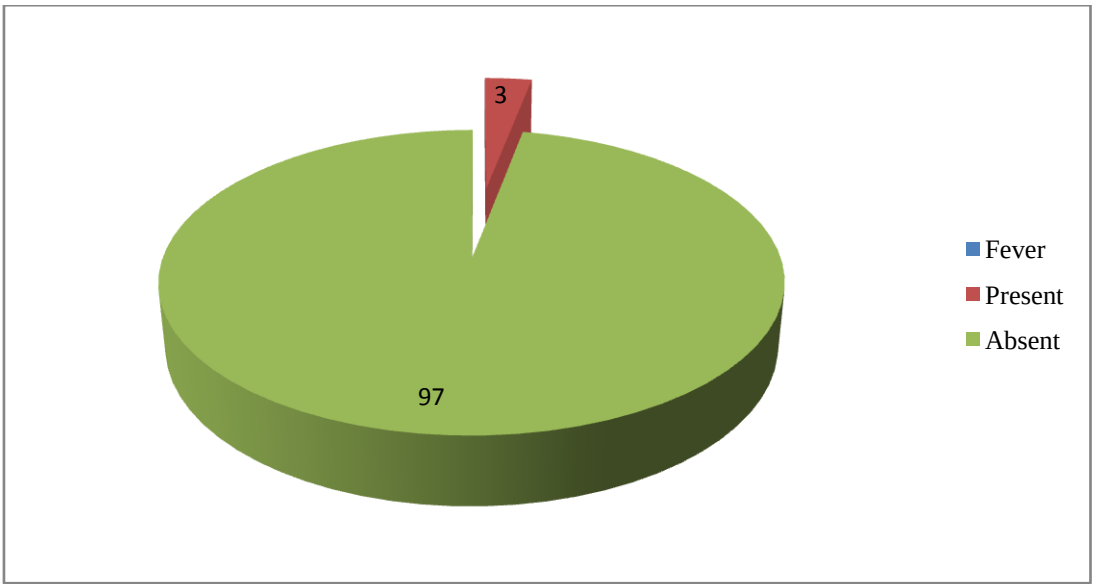

Figure 7: Pie chart showing distribution of respondents by presence of fever

Table 8: Distribution of respondents by ABO/Rh status

Blood group	Frequency	Percentage
A positive	37	37.0
A negative	1	1.0
B positive	21	21.0
B negative	1	1.0
O positive	32	32.0
O negative	0	0.0
AB positive	8	8.0
AB negative	0	0.0
Total	**100**	**100.0**

A positive was the most common blood group (37%) followed by O positive blood group (34%).

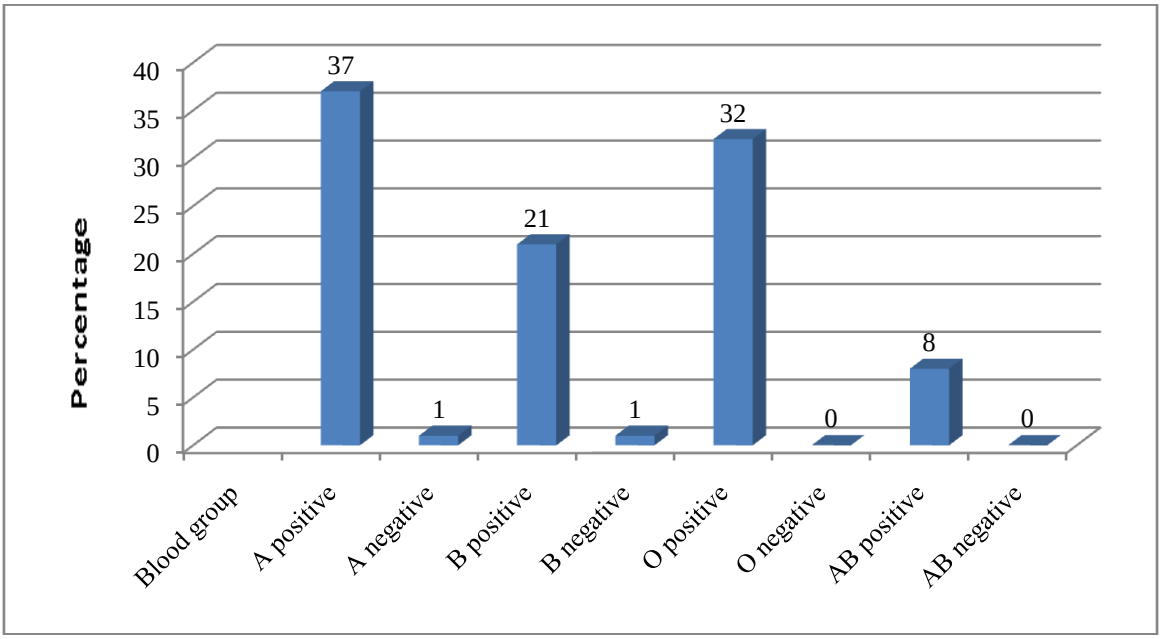

Figure 8: Bar diagram showing distribution of respondents by blood group

Table 9: Distribution of respondents by serology

Serology	Frequency	Percentage
VDRL		
Yes	0	0.0
No	100	100.0

HIV		
Yes	0	0.0
No	100	100.0
Total	**100**	**100.0**

VDRL, HIV was negative in all the cases.

Table 10: Distribution of respondents by mode of delivery

Mode of delivery	Frequency	Percentage
Normal	55	55.0
LSCS	36	36.0
Ventouse	8	8.0
Forceps	1	1.0
Total	**100**	**100.0**

Majority of the patients were delivered normally (55%), LSCS in 36% of cases, ventouse in 8% of cases and forceps in 1% of cases.

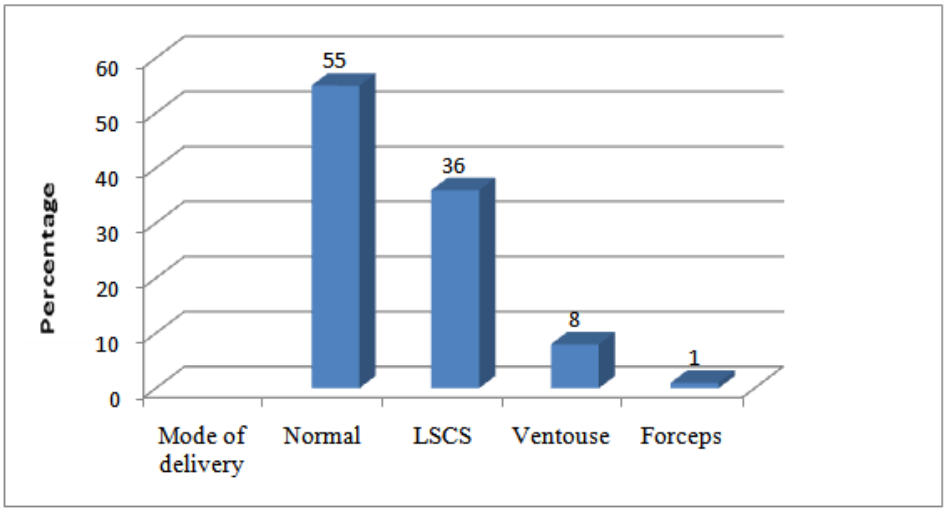

Figure 9: Bar diagram showing distribution of respondents by mode of delivery

Table 11: Distribution of respondents by indication of LSCS

Indication of LSCS (n=36)	Frequency	Percentage
Failed induction with fetal distress	5	13.8
Failed induction without Fetal distress	11	30.5
Malpresentation	12	33.3
Post CS	3	8.3
Fetal distress	5	13.8
Total	**100**	**100.0**

Most common reason for LSCS in PROM was malpresentation (33.3%) followed by failed induction without fetal distress (30.5%).

Table 12: Distribution of respondents by sex of the baby

Sex	Frequency	Percentage
Female	56	56.0
Male	44	44.0
Total	**100**	**100.0**

More than half of the babies were females in 56% of cases.

Table 13: Distribution of respondents by weight in kg

Weight in kg	Frequency	Percentage
<2.5	4	4.0
2.5-3	67	67.0
>3	29	29.0
Total	**100**	**100.0**
Mean ± SD	**2.9 ± 0.3**	

Underweight was present in 4% of cases as shown in table 13.

Table 14: Distribution of respondents by apgar score at 0 minute

Apgar score at 0 min	Frequency	Percentage
9/9	86	86.0
8/9	8	8.0
7/9	4	4.0
3/9	2	2.0
Total	**100**	**100.0**

Majority had apgar score of 9/9 in 86% of cases at 0 minute and few (2%) had apgar score of 3/9.

Table 15: Distribution of respondents by Apgar score at 5 minute

Apgar score at 5 min	Frequency	Percentage
9/9	86	86.0
8/9	9	9.0
7/9	5	5.0
Total	**100**	**100.0**

Apgar score at 5 minute increased upto 86%.

Table 16: Distribution of respondents by apgar score at 10 minute

Apgar score at 10 min	Frequency	Percentage
9/9	95	95.0
8/9	3	3.0
7/9	2	2.0
Total	**100**	**100.0**

Apgar score at 10 minute increased upto 95%.

Table 17: Distribution of respondents by NICU/PICU admission

NICU admission	Frequency	Percentage
Yes	6	6
No	94	94.0
Total	**100**	**100.0**

Six patients were admitted in NICU as shown in table 17.

Table 18: Distribution of respondents by neonatal morbidity

Neonatal morbidity	Frequency	Percentage
Early onset sepsis	2	2.0
Transient Tachypnoea of newborn	1	1.0
Neonatal Jaundice	1	1.0
Birth Asphyxia	2	2.0
Total	6	6.0

Percentage calculated out of total birth in PROM cases.
Early onset sepsis and birth asphyxia was present in 2% of cases and transient tachypnoea of newborn and neonatal jaundice in 1% of cases.

Table 19: Distribution of respondents by neonatal mortality

Mortality	Frequency	Percentage
Yes	0	0.0
No	100	100.0
Total	**100**	**100.0**

There was no neonatal mortality.

Table 20: Distribution of respondents by congenital abnormalities

Congenital abnormalities	Frequency	Percentage
Yes	0	0.0
No	100	100.0
Total	**100**	**100.0**

There were no congenital abnormalities.

Table 21: Distribution of respondents by presence of PPH

PPH	Frequency	Percentage
Yes	0	0.0
No	100	100.0
Total	**100**	**100.0**

There was no PPH as shown in table 20.

Table 22: Distribution of respondents by presence of fever postpartum

Fever	Frequency	Percentage
Yes	3	3.0
No	97	97.0
Total	**100**	**100.0**

Postpartum fever was present in 3% of cases.

Table 23: Distribution of respondents by presence of maternal mortality

Maternal mortality	Frequency	Percentage
Yes	0	0.0
No	100	100.0
Total	**100**	**100.0**

No maternal mortality was found during the study period among PROM ladies.

IV. Discussion:

Total number of deliveries during the study period was 16,968 and total women with PROM were 950(5.6%). Total number of term PROM was 446(2.6%). Several studies have been performed evaluating incidence and fetomaternal outcome of PROM. But most studies include both preterm and term PROM as a whole, and studies on term PROM alone is less commonly performed. According to previous literatures incidence of PROM was 4.01% in the study by Kodkany BS et al,[17] 6.91% by Nili F et al,[20] 6.06% by Shrestha et al,[28] 5.2% in the study by Gandhi M et a,l[26] 14.2% in the study by Lalwani A et al[9] with term PROM 10.2% and PPROM 4%.

The incidence of PROM in our study was 5.6% which was comparable to the others except Lalwani A et al[9] 14.2%. In the study by Gandhi M et al[26] incidence of term PROM was 4.6%, Vaishnav et al,[25] study on PROM after 37 completed weeks showed that incidence of PROM was 8.09%. These were higher than our study (2.6%). In our study, missed diagnosis could be a factor contributing to lower incidence of term PROM. In majority of time patient might already have been in established labor following PROM and as such, could lead to non documentation of such cases at term. Almost similar finding was observed in Eleja GU et al[35] where term PROM was 2.4%.

In our study, majority of the respondents were from the age group 18-24 years in 50% cases with mean age 25.8 ± 5.6. The mean age of the patients with PROM was 23.3 (Koh KS et al[14]), 22.8 ± 5.7 (Lindsay SA et al[16]). In study by Eleje GU et al[35] mean age of the patients was 26.9 ± 3.9 years coinciding with our study and the mean gestational age at occurrence of the PROM was 38.8 ± 2.7 weeks.

Gandhi M et al[26] had maximum incidence of 77.6% in age group 21-30 years with 59.4% in 21-25 years. Lalwani A et al[9] had 81% in 20-30 years, Gahwagi MMM et al[33] had 61% in 21-30 years. Kiranmaie S[27] had 43% incidence in 21-25 years age group which is comparable to our study.

Patients who attend the antenatal clinics of RIMS Hospital, Imphal for at least three antenatal visits in three trimesters are considered to be booked patients. Most of the patients were booked in 84% cases. In the study of Eleje GU et al[35] forty-nine (66.2%) patients were booked while 25(33.8%) were unbooked. In the study of Revathi V et al[31] incidence was 78% in unbooked and 22% in booked cases.

PROM was frequent among patients belonging to low socioeconomic class. Residential area definitely makes difference in incidence of PROM. In rural areas, because of unhygienic conditions, there are more chances of infection, which is an independent risk factor for PROM. Around 3/4th (74%) of the patients were from rural areas. Gandhi M et al's[26] study of PROM showed incidence of PROM much higher in rural area, 61.7% patients came from rural area and 38.3% came from urban area.

In our study, majority of the respondents were housewives in 94% of cases, doing business in 4% of cases and 1% each of nurse and embroidery. This is due to the fact that majority of pregnant women admitted in our institute are housewives.

In the study by Gahwagi MMM[33] et al[34] 75% were housewives, 22% employed, 3% students. More than half of the respondents were from low socio economic status (54%) and the remaining from middle socio economic status. Most of the patients were literate (98%).

Blood group A positive was the most common among term PROM women. Majority of the patients were delivered normally (55%), LSCS in 36% of cases, ventouse in 8% of cases and forceps in 1% of cases. Most common indication for LSCS in PROM was malpresentation(33.3%) followed by failed induction without fetal distress (30.5%).

Mode of delivery in the study by Gahwagi MMM et al[33] were full term normal vaginal delivery 62%, post term vaginal delivery 10%, LSCS 28%. Indications for LSCS were failed induction 50%, fetal distress 28.6%, big baby 3.6%, previous caesarean section 7.2%, drained liquor 3.6%, breech 7.2%.

In the study by Shrestha et al[28] normal vaginal delivery 70%, instrumental 3.5%, caesarean section 27%. In Gandhi M et al's[26] study, normal vaginal delivery was the commonest mode of delivery (338 cases, 88. %), while instrumental delivery rate was only 0.5 % (2 cases) and caesarean section rate was 11.5% (44 cases). The common indications of LSCS were fetal distress in 1st stage of labor (50.0%) and failure to progress in 1st stage of labor (31.8%).

In the study by Kadikar Gk et al[30] FTNVD (full term normal vaginal delivery) 48%, LSCS 41%, instrumental delivery 11%.

In the study by Kiranmaie S[27] 63% women delivered vaginally, 37% delivered by LSCS coinciding with our study.

In the study by Shah M et al[3] 81% had FTNVD, 3.8% had forceps delivery, 15.2% had LSCS.

Post partum fever was present in 3% of cases. In the study by Gandhi M et al[26] 2.86% had postpartum fever coinciding with our study. In the study by Lalwani A et al[9] intrapartum chorioamnionitis developed in 1 patient in term PROM, diagnosed by presence of fever, fetomaternal tachycardia, leukocytosis; postpartum fever was found in 7 patients.

More than half of the babies were females (56% of cases). Most of the babies were having normal weight and underweight was present in 4% of cases. In this study, the mean birth weight of 2.9 ± 0.3 kg and was because the pregnancies were at term.

Apgar score was low in 2% at 0 min and at 5 and 10 min all was normal. There was also no significant difference in the 1- minute or 5-minute Apgar scores between babies delivered vaginally and those delivered by caesarean section.

Six patients were admitted in NICU. Early onset sepsis and birth asphyxia was present in 2% of cases and transient tachypnoea of newborn and neonatal jaundice in 1% of cases. There was no neonatal mortality. In study by Gandhi M et al[26] 1.04% had septicemia, 1.56% respiratory distress syndrome, 0.26% transient tachypnoea of newborn, 0.52% neonatal jaundice. In the study by Shah et al[3] one baby had moderate birth asphyxia. One patient was admitted to NICU in the study by Vaishnav et al.[25] Maternal morbidity was 21%, neonatal morbidity was 58.53%, birth asphyxia was the commonest, seen in 29.5% of cases in the study by Kodkany BS et al.[14]

V. Conclusion:

A prospective study to assess the fetomaternal outcome of term pregnancy with premature rupture of membranes was carried out in the Department of Obstetrics and Gynecology, Regional Institute of Medical Sciences, Imphal from November 2014 to April 2016 among 100 pregnant women with PROM. Total number of deliveries during the study period was 16,968. During this period total women with PROM was 950 which comes to 5.6%. Total number of term PROM was 446 so the incidence of term Prom comes to 2.6%. Majority of the respondents were from the age group 18-24 years in 50% of cases. Most of the patients were booked in 84% of cases. Around 3/4th of the patients were from rural areas. Majority of the respondents were housewives in 94% of cases, doing business in 4% of cases and 1% each of nurse and embroidery. More than half of the respondents were from low socio economic status (54%) and the remaining from middle socio economic status. Most of the patients were literate. Fever was present in 3% of cases. Blood group A positive was the most common among term PROM women. More than half of the babies were females in 56% of cases. Most of the babies were having normal weight and underweight was present in 4% of cases. Apgar score was low in 2% at 0 min and at 5 and 10 min all were normal. Six patients were admitted in NICU. Early onset sepsis and birth asphyxia was present in 2% of cases and transient tachypnoea of newborn and neonatal jaundice in 1% of cases. There was no neonatal mortality. Post partum fever was present in 3% of cases. There was no maternal PPH and mortality. A bigger sample size with a better methodology will be needed to supplement our finding.

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