Magnitude, Associated Factors and Outcome of Preterm Premature Rupture of Membrane at Nekemte Referral Hospital.

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Abstract

Background: The pregnancy complications are increased before term because of increased risk of infection,preterm labor &prematurity.Preterm premature rupture ofd membrane(PPROM) is a major complication of pregnancy and an important cause of perinatal morbidity &mortality.Currently,there is no effective way of preventing spontaneous rupture of membranes.However,it is important that women be well informed regarding maternal,fetal& neonatal complications & perinatal outcome.

Objective: To determine the magnitude , associated factors and outcome of mothers with Preterm Prelabor Rupture of Membrane at Nekemte Referral Hospital, East Wollega ,Ethiopia.

Methods: prospective cross-sectional study design was conducted on mothers who were admitted with a diagnosis of preterm prelabor rupture of membrane at Nekemte referral hospital from May 1 to July 30/2017.Data was collected using self-administered questionnaires. The data was checked, entered, cleaned&analyzed using SPSS version 20.Descriptive statistic was used to assess the frequency of dependent & independent variables. Bivariate and multivariate were employed to examine the association between dependent & each independent variable.

Result: The magnitude of preterm premature rupture membrane at Nekempt referral was 3.8% (31/807). ANC follow up was found independent protective predictor for PPROM after controlling other obstetrics characteristics (AOR=8.4, 95%CI 3, 23.3). Twelve (38.7%) mothers with PPROM had unfavorable outcome (seen at least one complication). The commonest maternal complication was chrioamnionitis (41.7%). No maternal death was documented. Eighteen (58%) perinatal had unfavorable outcome and perinatal death rate was 160 per 1000. The cause of perinatal death were fetal infection 1(20%) and neonatal sepsis 4(80%)

Conclusions: The magnitude of PPROM and perinatal outcome and death rate were higher compared to other study in Ethiopia. Getting ANC follow-up was found independent protective for PPROM. Strengthening management of PPROM needed to reduce the poor outcome and Women need to be informed about PPROM on maternal and perinatal complications.

Acknowledgement

I would like to thank my advisors Dr.Fanta Asefa and Yasin Negash for their assistance, constructive comments and suggestion throughout this Research work.Then, I would like to thank Jimma University, institute of health science for their technical and financial support for overall accomplishment of my research.

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ACRONYMS

ACOG American College of Obstetricians and Gynaecologists

ANC Ante Natal Care

APGAR Appearance, Pulse rate, Grimace, Activity and Respiratory rate.

APH Ante Partum Haemorrhage

GA Gestational Age

NRH Nekemte Referral Hospital

IUFD Intra Uterine Fetal Death

IUGR Intra Uterine Growth Restriction

IVH Intraventricular Hemorrhage

LBW Low Birth Weight

PMR Peri natal Mortality Rate

PPH Post PartumHaemorrhage

PPROM Preterm Premature Rupture Of the Membrane

PROM Premature Rupture Of the Membrane

RDS Respiratory Distress Syndrome

SPSS Statistical Package for Social Science

SVD Spontaneous vaginal delivery

1 Introduction

1.1Background

The developing baby is protected by a fluid filled sac called the bag of water or the amniotic fluid. Amniotic fluid is normally produced continuously, and after approximately 16 weeks' gestation is predominantly dependent on fetal urine production. It protects against infection, fetal trauma, and umbilical cord compression. It also allows for fetal movement and fetal breathing, which, in turn, permits fetal lung, chest, and skeletal development. Decreased or absent amniotic fluid can lead to compression of the umbilical cord and decreased placental blood flow. Disruption (rupture) of the fetal membranes is associated with loss of protective effects and developmental roles of amniotic fluid (1).

Premature rupture of membrane (PROM) is referred to the disruption of fetal membranes before the beginning of labor, resulting in spontaneous leakage of amniotic fluid. PROM, which occurs prior to 37 weeks of gestation, defined as preterm PROM, and PROM that occurs after 37 weeks gestation defined as term PROM(1). PROM occurs in approximately 5%–10% of all pregnancies, of which approximately 80% occur at term(2).

Preterm premature rupture of the membranes (PPROM) occurs in 3% of pregnancies and causes around 25-30% of all preterm deliveries. PPROM involves a wide range of both fetal and maternal complications. Neonatal complications are related to prematurity and infectious risks. Data show that PPROM is associated with a 4-fold increase in perinatal mortality and a 3-fold increase in neonatal morbidity. One of the most common complications in PPROM patients is intrauterine infection, which can lead to chorioamnionitis, metritis after delivery and perinatal outcome such as neonatal sepsis. Perinatal outcomes constitute prematurity, neonatal sepsis, respiratory distress syndrome (RDS), intraventricular hemorrhage (IVH), and risk of fetal and neonatal death (3).

1.2: Statement of the problem

Preterm PROM is one of the major factors that have been found to correlate with adverse pregnancy outcomes. It remains a critically important clinical and public health problem. The fetal membranes serve as a barrier to ascending infection. Once the membranes rupture, both the mother and fetus are at risk of infection and of other complications (4).

The longer the time elapsed between rupture and delivery, the greater the chance of maternal and fetal morbidity and is associated with significant maternal, fetal and fetal mortality. The incidence of PROM ranges from about 5% to 10% of all deliveries, and PPROM occurs in approximately 1% of all pregnancies. Approximately 70% of cases of PROM occur in pregnancies at term, but in referral centers, more than 50% of cases may occur in preterm pregnancies (5)

Women and children's health remains a central concern in the Sustainable Development Goals (SDGs). SDG 3.1 aims to reduce the global MMR to less than 70 per 100 000 live births by 2030, and to have no country with an MMR above 140 – significantly below the current global MMR of 216 per 100 000. About 303 000 women are expected to die in 2015 due to maternal causes. Globally, women face a 1 in 180 lifetime risk of dying due to maternal causes; In the African Region, however, the MMR is still running at 540 per 100 000 live births, which, combined with the high levels of fertility, translates into a lifetime risk of dying from maternal causes of 1 in 37; PPH and sepsis are one of causes of maternal causes of death which are causes of PPROM. (6)

Literature data show that PPROM is associated with a 4-fold increase in perinatal mortality and a 3-fold increase in neonatal morbidity. One of the most common complications in PPROM patients is intrauterine infection, which can lead to chorioamnionitis, metritis after delivery and perinatal outcome such as neonatal sepsis. Perinatal outcomes constitute prematurity, neonatal sepsis, respiratory distress syndrome (RDS), intraventricular hemorrhage (IVH), and risk of fetal and neonatal death (3).

Ethiopia is one of the countries which have the highest number of maternal mortality in the world from this half a million women die as a result of pregnancy and child birth each year. In

now days for reduction of child mortality rate, improving the health status of fetus by reducing infection, because of one of the leading cause of fetal mortality. About 40% of under -5 years old death are estimated to occur in first month of life, mostly in the first week (WHO 2009).

Even if the Ethiopian maternal and under-five child mortality rate decrease from 950 to 350 and 198 to 77 respectively from 1990 year -2011 year. 42% of under-5 child death occurs in the fetal period so to scale-up the health of the mother and fetus still it needs more attention and work up to reach the target (7)

Premature rupture of membranes has absolutely essential significance for further fate of pregnancy. Late diagnose can mean wasted opportunity of appropriate intervention. In most cases, the diagnostics does not cause bigger problems, but in some situation it may not be easy to make the right diagnosis (8).

Knowing the maternal and fetal outcome in premature rupture of membrane is very important to achieve Women and children's health remains a central concern in the Sustainable Development Goals (SDGs). Based on the review of literatures and the personal experience of the investigator, as there are very few studies dealing with premature rupture of membranes and the complications associated with them. Thus in order to decrease this situation and to address this important issue, the investigator would like to explore on the Prevalence and management outcome of Preterm premature rupture of the membrane among pregnant women who is delivering or admitted maternity or labour ward in Nekemte Referral Hospital

1.3 SIGNIFICANCE OF THE STUDY

Global progress for child survival and health cannot be achieved without addressing Preterm premature rupture of the membrane. Thus more rigorous examinations for the quality of maternal and fetal health care are needed in order to identify specific problems and develop strategies to improve and reduce maternal and fetal morbidity and mortality. Therefore, the purpose of this study is to determine magnitude, maternal and fetal outcome and associated factor for maternal and fetal outcome in preterm premature rupture of membrane in the institution and find out the possible reasons for the findings in the study area.

Guide the development of policies and programs for improving quality in the outcome of preterm premature rupture of membrane at national level in general and the study area in particular. In addition, the paper may be useful to other researchers as reference material while conducting further studies on similar problems. The results will also form baseline data for improving quality of maternal and fetal health in the study area specifically and subsequently contributing to reduction of maternal & fetal mortality in the country. Also this will have further advantage to minimize maternal morbidities and child mortality and also to achieve the Sustainable Development Goals (SDGs).

2. LITRATURE REVIEW

2.1. Magnitude of PPROM

Each year, about 15 million babies in the world, more than one in 10 births, are born too prematurely. More than one million of those babies die shortly after birth; countless others suffer from lifelong physical, neurological, or educational disabilities, often at great cost to families and societies. Complications of preterm birth are the leading direct causes of neonatal mortality and account for an estimated 27% of neonatal deaths. PPROM is a leading cause of preterm delivery with a third of all preterm births resulting from preterm PROM. This comes to almost four million neonatal deaths every year (9).

According to Society of Obstetricians and Gynecologists of Canada (SOGC), preterm premature rupture of the membranes occurs in 2.0% to 3.5% of pregnancies and is the most common cause of preterm birth, present in 30% to 40% of cases in Canada. PPROM occurs in 7% to 8% of births. Unfortunately, these rates have not changed significantly over the past 40 years (10).

A study report by Department of Obstetrics and Gynecology, University of California, San Francisco, 2008; showed PPROM complicates 2% to 4% of all singleton and 7% to 20% of twin pregnancies. The risk of recurrence of preterm PROM is 16% to 32%, as compared with approximately 4% in women with a prior uncomplicated term delivery. This percentage may be increased if there is evidence of cervical shortening or uterine contractions in the second trimester. However, most cases of preterm PROM occur in otherwise healthy women without identifiable risk factors (3).

A retrospective cross sectional study done at Ayub Medical College, Abbottabad, 2006 showed there were 85 cases of PPROM from a total of 889 deliveries occurred from September 2005 to March 2006, leading to prevalence of 9.6%(11). On the other hand a cross sectional hospital based research done in Pakistan, 2007 on incidence and outcome of Preterm premature rupture of membranes showed 72cases (7%) of PPROM from 1024 total deliveries and resulted in premature delivery(12)

A 10year retrospective study at the University of Nigeria Teaching Hospital at Enugu, Nigeria, 2008; showed from total 2798 deliveries during the study period, there were 11cases of premature rupture of fetal membranes, from which 94 cases were PPROM. This showed an incidence of 4.2% for PROM in general and 3.3% for PPROM from all deliveries. Majority of patients presented at the time when they were a febrile (47 cases, 55.2%), while 38 patients (44.7%) presented with fever of 380C or more. Pelvic examination had been performed by some midlevel health professionals or midwife in 20 patients (23.5%) before reporting to the hospital while in 65 (76.4%) patients no previous pelvic examination had been performed (13).

A hospital based retrospective cross sectional descriptive study done from June, 2010 G.C. to June,2013 G.C. at TikurAnbessa Hospital (TAH), a specialized central referral Hospital; Addis Ababa,Ethiopia showed the overall prevalence of Preterm PROM was 1.4% (111 / 8,283) (14)

2.2. Management Outcome and Associated Factors of PPROM

PPROM is the leading identifiable cause of premature birth and accounts for approximately 18% to 20% of perinatal deaths in the United States (3). According to study done at Ayub Medical College, Abbottabad, 2010, the most likely outcome of PPROM is preterm delivery within one week with its associated morbidity and mortality risk such as respiratory distress, necrotizing enterocolitis, intraventricularhaemorrhage and sepsis. The incidence of neonatal infection for infant born to women with PPROM range from 1-2.6% It is found that the risk of neonatalinfection was increased among mother colonized with group B streptococci, premature rupture of membranes >18 hours with maternal fever during labour and prematurity. Majority of patients with PPROM had vaginal deliveries, and only 12 patients underwent caesarean section for obstetrical indications. Caesarean section rate among cases with PPROM was 14% for this study. At early PPROM there are more chances of malpresentation hence delivery most of the time in this situation is by Caesarean section to decrease the chances of traumatic delivery (11).

A study done in Pakistan, 2005; on Neonatal outcome and Prenatal Antibiotics Treatment in Premature Rupture of membranes showed perinatal mortality rate was 13% of total births. A total of 153 (62.3%) babies born to mothers with PPROM were low birth weight which includes 10 (11.76%) babies of extremely low birth and 30 (35.29%) babies of very low birth weight. Twenty-six (30.5%) babies were born with low APGAR score and required neonatal intensive

care. APGAR score tells about the physical indicators of the new born. It is definitely affected by prematurity and low birth weight. It is significant in this study (p=0.01) Five (5.88%) babies had intrapartum death while 11 (12.9%) babies had neonatal death, resulting in perinatal mortality of 129.9/1000 births. In this study, 30.6% cases had previous preterm deliveries (15).

From 85 pregnant women with PPROM at Abbottabad from September 2005 to March 2006 Normal vaginal delivery occurred in (65.86%), while instrumental delivery rate in PPROM was 20% and caesarean section rate was 14%. Postnatally16.47% patients developed infection while 24 (28.2%) babies developed infection and required antibiotics. Majority of babies born to patients with PPROM were low birth weight (62.3%), and 30.5% babies required neonatal intensive care. PPROM is responsible for one third of all preterm births and is associated with significant maternal, foetal and neonatal risks. Infection and perinatal mortality was significantly associated with PPROM. In recent years, substantial progresses have been made in understanding the relation between maternal infection and preterm birth. This high prevalence of PPROM can be explained by the cultural influences of early marriages, poverty, gender discrimination resulting in low maternal weight gain and lack of birth spacing (11).

Similar study done at southern Nigeria, 2007; on PPROM and its management showed all thebabies delivered before gestational age (GA) of 34 weeks weighed < 2.5kg.While 23(31.4%)babies delivered after 35-36 weeks weighed > 2.5kg and 19 babies (62.6%) delivered after 35 36weeks still weighed < 2.5kg. 8 perinatal deaths occurred in those with gestational age between 26-30weeks and 5 perinatal deaths occurred in those with gestational age between 31-34 weeks. Only one perinatal death was recorded in those with gestational age between 35 weeks and above. A total of 19 cases (24%) had complications which led to prolongedhospital stay. 14 women out of the 19 patients were febrile (16).

A cross sectional study done in Northern Gahana, 2006; on PPROM and effect of chorioamnionitis on overall neonatal outcome showed perinatal mortality was 13%. In this study 29.6% of babies and 14.8% of mothers developed infection despite the administration of antibiotics. Neonatal sepsis is documented in less than 12% and amnionitis (based always on clinical criteria) occurs in approximately 3.6% to 33%. Subclinical infection based on positive amniotic fluid culture or histologic inflammation of the cord or membranes is seen much more often, in up to 80% at very early gestational ages with PPROM. Endometritis develops in up to 31%. Abruption after PROM is reported in 5.0% to 7.2% of cases, severalfold higher than the rate of 0.5% to 1.4% in the general population (17).

Another study done by University of Benin Teaching Hospital, December 2010; showed 15with PPROM with prophylactic antibiotic uses were associated with reduced perinatal morbidity, neonatal sepsis, endometritis and chorioamnionitis. According to this study a total of 16 cases (20%) had complications which led to prolonged hospital stay. 11 women out of the 16 patients were febrile and 7 women out of the 11 women that had febrile illness had secondary postpartum haemorrhage (PPH) and one out of this patients had total abdominal hysterectomy (TAH) because of uncontrollable secondary post partumhaemorrhage (PPH). One patient had offensive lochia, one patient had puerperal psychosis as a result of neonatal death while one patient had puerperal depression (18).

Another study done by University of Benin Teaching Hospital, December 2010; showed 15with PPROM with prophylactic antibiotic uses were associated with reduced perinatal morbidity, neonatal sepsis, endometritis and chorioamnionitis. According to this study a total of 16 cases (20%) had complications which led to prolonged hospital stay. 11 women out of the 16 patients were febrile and 7 women out of the 11 women that had febrile illness had secondary postpartum haemorrhage (PPH) and one out of this patients had total abdominal hysterectomy (TAH) because of uncontrollable secondary post partumhaemorrhage (PPH). One patient had offensive lochia, one patient had puerperal psychosis as a result of neonatal death while one patient had puerperal depression (18).

The study done at Nigeria Tertiary Hospital, Enugu, 2014; also show the relationship of the gestational age at which PROM occurred, the latency period with birth weight and perinatal deaths. The most common clinically evident complications among pregnancies with PROM before 37 weeks were APGAR score < 7 which, in general, is found in 10% to 40% of neonates and a total of 55 (58.5%) babies born to mothers with PPROM were low birth weight. Number of babies with low APGAR score who required advanced resuscitation were also high (30.5%). All the babies delivered before gestational age (GA) of 34 weeks weighed < 2.5kg while 20 babies delivered after 35-36 weeks weighed > 2.5kg while 17 babies delivered after 35-36weeks still

Weighed < 2.5kg. Four perinatal deaths occurred in those with gestational age between 26-30weeks and 3 perinatal deaths occurred in those with gestational age between 31-34 weeks. No perinatal death was recorded in those with gestational age between 35 weeks and above. 59.5% had preterm PROM in those with gestational age between 35-36weeks +6days while 32.9% had preterm PROM in those with gestational age between 31-34 weeks and less number of cases occurred in those remote from term(13).

A Retrospective cross-sectional descriptive study done at TikurAnbessa Hospital (TAH) Addis Ababa, Ethiopia,2014, the age of the study subjects ranged from 15-to-39 years while the mean age was 26.31 years. Majority were married, housewives, and from outside of Addis Ababa with proportions of 96.4% (107/111), 67% (75/111) and 82% (91/111) respectively. Fifty three percent (59/111) were nulliparous. All except one (110/111) had ANC follow up. The PPROM occurred at less than 34 weeks in 41.4% (46/111), and between 34 and 37 weeks in 58.6% (65/111) of the mothers. Fetal presentation at the time of admission was cephalic, breech and shoulder in 80.4% (90/112), 14.3% (16/112) and 5.4% (6/112) of the fetuses respectively. Prophylactic antibiotics were administered to 84 % (93/111) of the mothers. In addition, dexamethasone was administered in 87 % (40/46) of the mothers with ROM at less than 34 weeks. There was no documented use of tocolysis in the study group. The mean gestational age at delivery was 34.57 weeks. Majority, 61.3% (68/111), gave birth at gestational age of ≥34 weeks but <37 weeks. Twenty four percent (27/112) of the neonates were born within the first day while 46.4% (52/112) were born with in the first week of rupture of membrane. One case of

PPROM was admitted at GA of 29 weeks with GA at ROM of 27 weeks. Labor started spontaneously in 58.5% (65/111) of the mothers. Pregnancy was terminated by induction in 30.6% (34/111) and cesarean section before onset of labor in 10.8% (12/111). Indications for termination of pregnancy were chorioamnionitis, anticipated fetal lung maturity because of GA considered to be near term, confirmed lung maturity by amniocentesis and NRBPP in 54.3% (25/46), 21.7% (10/46), 17.4% (8/46) and 6.5% (3/46) respectively.

The cesarean section delivery rate in the study group was 23.2%. Failed induction, chorioamnionitis with breech presentation and chorioamnionitis with previous caesarian scar were the main indications for C/S. The other indications include; shoulder presentation, footling breech, non reassuring biophysical profile (NRBPP), non reassuring fetal heart rate pattern (NRFHRP) and prolonged latent stage of labor with breech presentation. Clinical chorioamnionitis, seen in 31.5% (35/111) of the mothers, was the commonest maternal complication. Twenty five (22.5%) mothers presented with clinical chorioamnionitis, while additional 10 (9%) developed chorioamnionitis after admission. Puerperal endomyometritis,superficial abdominal wound infection and sepsis occurred in 13.5% (15/111), 4.5% (5/111) and 2.7% (3/111) of cases. There were no reported cases of maternal mortality or long term morbidity. Prematurity was the commonest stated reason for the perinatal mortality accounting for 66.7% (8/12) of perinatal deaths. Other stated causes include congenital anomaly, birth asphyxia and intra uterine growth restriction (IUGR) accounting for 16.7% (2/12), 8.3% (1/12) and 8.3% (1/12) respectively (14)

2.3Conceptual frame work

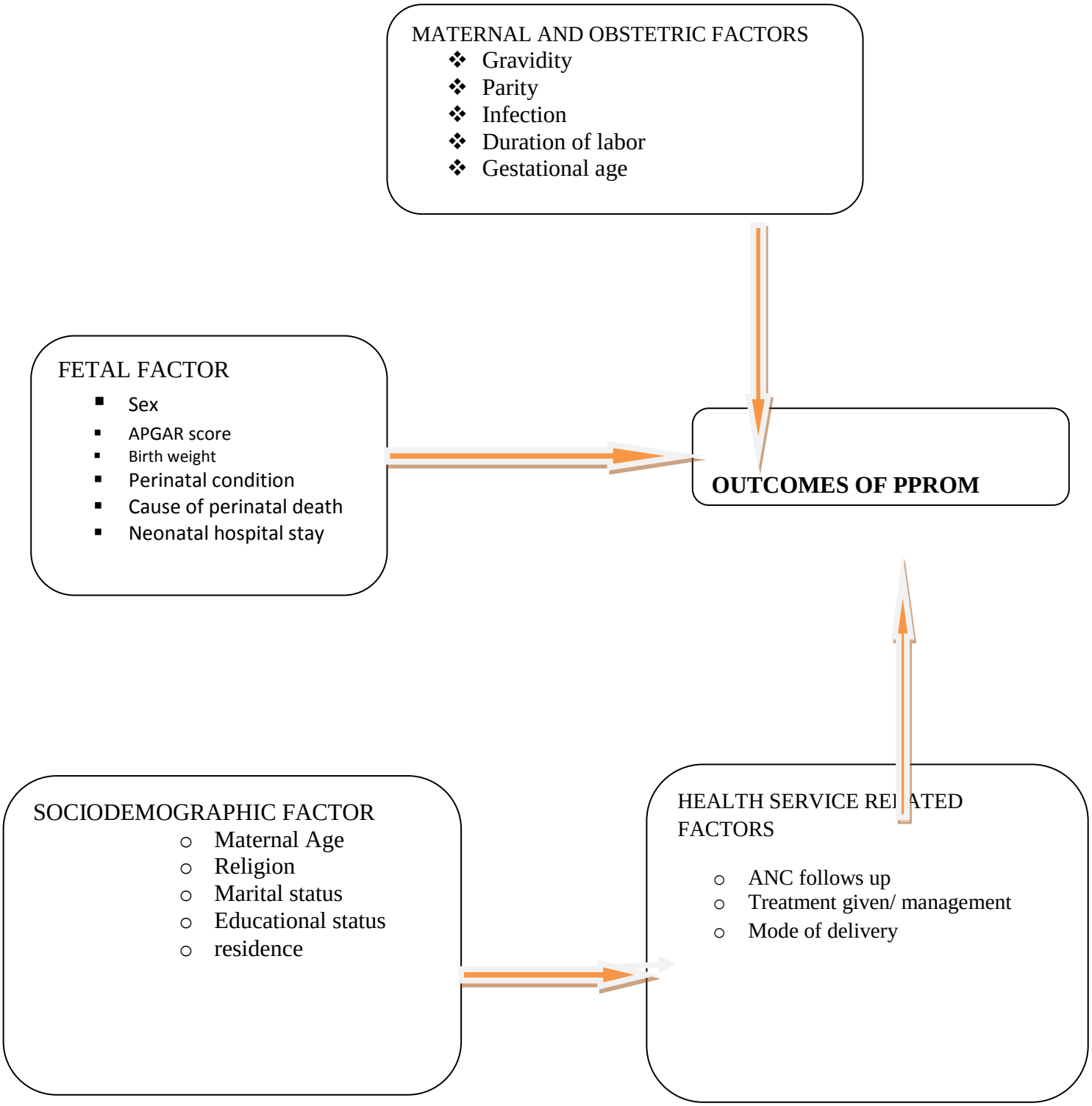

Figure 1: Conceptual frame work for associated factors and management outcome of preterm premature rupture of membrane.

3: Objectives

3.1 General Objective

To assess the magnitude, associatedfactors andMaternal and Perinatal outcomes of Preterm Premature Rupture of Membrane in Nekemte Referral Hospital, East Wollega, Ethiopia from May 1to July 30/2017

3.2 Specific Objectives

1)To assess the magnitude of Preterm Premature Rupture of Membrane among pregnant women admitted for birth and pregnancy related problems from May 1to July 30/2017.

2)To identify factors associated With Preterm Premature Rupture of Membrane among pregnant women admitted for birth and pregnancy related problems from May 1to July 30/2017.

3)To assess maternal and perinatal outcome of Preterm Premature Rupture of Membrane from May 1to July 30/2017.

4: Methods and Materials

4.1. Study area and period

The study was conducted from May1 -July 30/ 2017 at Nekemte Referral Hospital, which is found in East Wollega Zone, at 331km distance from the capital city of Addis Ababa to the west. The Hospital is serving for a total population of about 2.1 million peoples of Nekemte town, East Wollega zone, part of West Wollega, Horoguduru zone & West show zone.

The Hospital is the only referral hospital for the Zone. It was established in 1923 E.C. It has 204 beds. The total number of staff in the hospital is 408.Out of these 120 of them are health professionals including specialists, General practitioners, Health officers, Nurses, Lab technicians and pharmacists.

The study was conducted at labor and delivery room among pregnant mothersadmitted for birth and pregnancy related problems.

4.2. Study Design

A prospective cross-sectional study design was conducted to show the magnitude of Preterm Premature Rupture of Membrane (PPROM) by using Hospital based cross sectional study design and to describe maternal and perinatal outcome of PPROM .

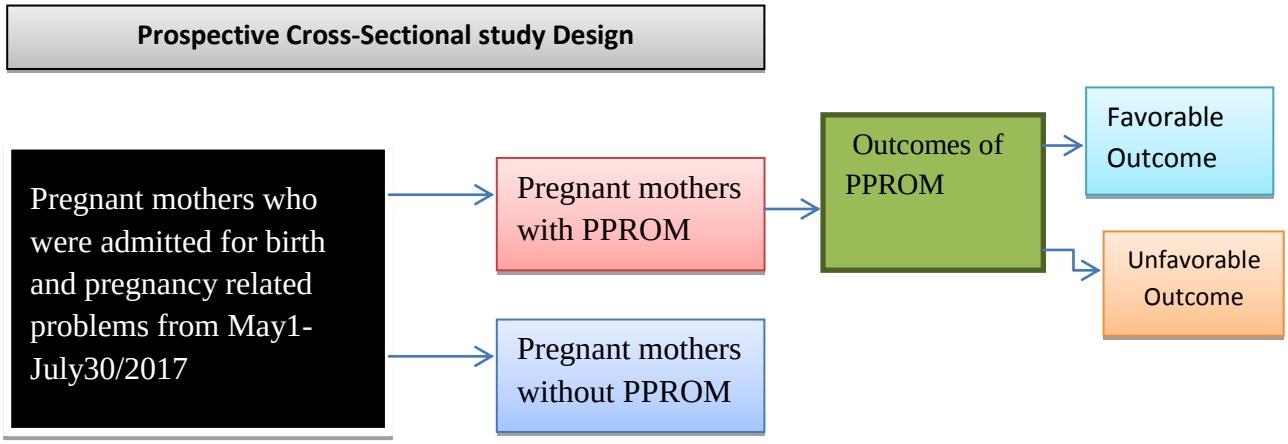

Figure 2 **Prospective Cross-Sectional study Design**

4.3. Population

4.3.1. Source population

Pregnant women in the catchment area of the hospital and those in the surrounding areas who are likely to visit the hospital for obstetric care were considered as source population.

4.3.2. Study population:

All mothers who were admitted for birth and pregnancy and all pregnant mothers who had PPROM at Nekemte Referral Hospital during the study period (may1-July30/2017) were considered as study population.

4.4. Inclusion and exclusion criteria

4.4.1 Inclusion criteria:

All mothers who were admitted for birth and pregnancy related problems during the study period for cross-sectional study and all pregnant mothers who had PPROM for prospective cross-sectional study. .

4.4.2. Exclusion criteria

Mothers who were admitted for birth and pregnancy related problems were excluded from cross-sectional studyif the

- ✓ IUFD
- ✓ Congenital anomalies

4.5Variables

4.5.1 Dependent variables

- Magnitude of Preterm Premature Rupture of Membrane
- Perinatal Outcome
- Maternal outcome

4.5.2 Independent variables

- Socio-Demographic characteristics
- Gravidity
- Parity
- ANC follow up
- Duration of labor
- Gestational age
- Latency period
- Mode of delivery

4.6. Data Collection Instrument

A structured questionnaire adopted from similar studies (3, 8,). The questionnaire has four major sections; socio-demographic characteristics, Obstetric characteristics, and Outcome of PPROM.

4.7. Data collection Method

4.7.1 Data collection procedures

Four midwives data collectors and one 2nd year IESO student and principal investigator were collect and supervise the data collection. Before the actual data collection one day training was given to data collectors and supervisors. The data were collected by using self administered questioners when pregnant mothers admitted and the necessary service received and document review was made to obtain the clinical assessment report and outcome of PPROM. Each day of data collection the supervisors were checked for the completeness and accuracy of the information.

4.7.2 Pre- test

Before the actual data collection, the questionnaire was tested on 5% at Ambo Hospital to check the questionnaire consistency and error. Accordingly the questionnaire was modified.

4.8 Data Quality Assurance

To keep the quality of data, training was given for data collectors and supervisor. The questionnaire was adopted from different research studies and pretested before the actual data collection and necessary correction was made. The data were checked for completeness and accuracy at each day. The data were edited, coded, entered to SPSS version 20 and explored to check the accuracy of data and correction was made as necessary.

4.9. Data Analysis and Interpretation

The data were checked for completeness, consistency, coded, entered, & analyzed using SPSS software program version 20. Descriptive statistics such as frequency, percentage, mean, and median was employed and presented in tables, graphs and Pie charts. Binary logistic regression was performed to analysis Bivariate and Multivariate to identify factors associated with of PPROM with 95% CI and P – Value of < 0.05 to considered statistically significant association.

4.10. Ethical consideration

Ethical clearance letter was obtained from Research Ethical Committee of Jimma University post graduated faculty. Letter of formal permission to conduct the study was obtained from Nekemte Referral hospital administration office to obstetrics and gynecology department ward. Participants were informed the objective of the study and freely decide to participate in the study. Furthermore, to keep privacy name of the participants wasnot included in the report and confidentiality was ensured for any response obtained from the participants

4.11. Dissemination of the findings

The finding of the research will be presented to Jimma University. The findings of the report will be given to Nekempt referral Hospital. Effort will be made to publish the research findings on peer viewed journals and to present the findings at different conference

4.12. Operational definitions

Favorable outcome of PPROM: - Cases of PPROM with no obstetric complications outcome.

Unfavorable outcome of PPROM: - Cases of PPROM outcome with presence of at least one obstetric complication (maternal and neonatal sepsis, respiratory distress, APH, perinatal death,

preterm labor, low birth weight, low Apgar score, neonatal death, PPH, wound infection, prolonged hospital stay) and/or maternal death.

APGAR score: is the score given to a fetus at or immediately after birth to assess the status of oxygenation. In this study the final score will be assessed.

Birth weight: is taken from the record in delivery note & it is rounded to the nearest two decimals in kg & categorized according to the standard classification.

Booked: Those cases of PPROM with at least one ANC visit

Cesarean delivery: Is the delivery of the fetus, placenta and membranes through an incision on the abdominal wall after 28 weeks of gestation.

Chorioamnionitis: Inflammation of the fetal membranes usually a manifestation of intrauterine infection. It frequently is associated with prolonged membrane rupture and long labor. There also may be a foul odor, and associated lower abdominal tenderness depending on bacterial species and concentration.

Duration of labor: Total time from initiation of labor to delivery.

Fetal distress: is term used to express intrauterine fetal jeopardy, as a result of intrauterine fetal hypoxia.

Gestational age: is calculated from the last normal menstrual period (LNMP) or fundal height that was documented on the card, if not from the duration of amenorrhea documented from mothers recall & is rounded to the nearest weeks. Amenorrhea of 9 months was taken as 37-42 weeks gestation for all mothers.

Gravidity: the total number of pregnancies includes abortion, ectopic pregnancy and any other pregnancies but twin pregnancies considered as one pregnancy.

Latency period: the time between rupture of membrane and onset of labor.

Low birth weight: is defined as a birth weight below 2500 grams (5.5 pounds).

Maternal mortality: Death of a woman while pregnant or within 42 days of termination of the pregnancy regardless of the site or duration of the pregnancy, from any cause related to pregnancy or aggravated by its management but not from accidental or incidental causes.

Parity: - total number of delivery; including still birth after 28 weeks of gestation.

Perinatal mortality: It is defined as fetal death after 28 weeks of gestation & death of a newborn with in the first seven days of life.

Preterm: - baby born before 37 completed weeks of gestation but after 28 weeks of gestation.

Pregnancy related problems: All admission due to pregnancy related problems like hypertensive disorders of pregnancy, Ante partum haemorrhage, PROM, PPROM and other medical illnesses related to pregnancy.

Still birth: is the birth of an infant that has died in the womb or during intra partum after 28 weeks of gestation.

5: Results

5.1. Socio Demographic Characteristics

A total of 807 pregnant mothers were admitted for birth and pregnancy related problem in the period between May1 to July30/ 2017 at Nekemt Referral hospital. The majority of the participants were aged between 21-25 (38%) and 26-30 (32%). Near to eighty percent of the

participants were Oromo Ethnic group and 521(64.65) were following protestant religion. The majority of pregnant mothers 764(94.7%) were married and 566(70.1%) of pregnant mothers were occupationally housewife. The higherproportion (35.1%) of the pregnant mothers were unable to read and write.

The higher proportion (45.2%) of PPROM was among mothers' aged between26-30 and followed by mothers' aged between 21-25 in which 7 (22.6%) of mothers had PPROM. Ethically 25 (80.6%) of mothers were Oromo and the remaining were Amhara. Most of mothers (90.3%) with PPROM were married and more than half of mothers were occupationally housewife 16(51.6%) (Table1).

Table 1: Socio demographic characteristics pregnant mothers admitted at Nekempt Referral Hospital from May1-July30, 2017

Variable	All Pregnant mothers	Pregnant mothers who had PPROM
	Frequency (%) N=807	Frequency (%) N=31
Age		
15-20	137(17)	5(16.1)
21-25	308(38.2)	7(22.6)
26-30	258(32)	14(45.2)
31-35	89(11)	4(12.9)
36-40	15(1.9)	1(3.2)
Ethnicity		
Oromo	647(80.2)	25(80.6)
Amhara	118(14.6)	6(19.4)
Gurage	30(3.7)	0
Others	12(1.5)	--
Religion		
Protestant	521(64.6)	13(41.9)
Orthodox	176(21.8)	10(32.3)
Muslim	94(11.6)	8(25.8)

Others	**16(2)**	**--**
Marital Status		
Married	**764(94.7)**	**28(90.3)**
Divorced	**19(2.4)**	**1(3.2)**
Widowed	**6(0.7)**	**0**
Single	**18(2.2)**	**2(6.5)**
Educational Status		
Unable to read and write	**283(35.1)**	**7(22.6)**
Read and Write	**83(10.3)**	**7(22.6)**
Grade 1-8	**249(30.9)**	**9(29)**
Grade 9-12	**64(7.9)**	**6(19.4)**
Grade above 12	**128(15.9)**	**2(6.5)**
Occupational Status		
Housewife	**566(70.1)**	**16(51.6)**
Government Employee	**114(14.1)**	**8(25.8)**
Merchant	**64(7.9)**	**6(19.4)**
Farmer	**12(1.5)**	**0**
Student	**31(3.8)**	**1(3.2)**
Other	**20(2.5)**	**--**

5.2. Obstetric characteristic

Higher proportion of (57.1%) admitted pregnant mothers at referral hospital were a multigravida followed by primiagravidamothers which were 261 (32.3%). However, 269 (33.3%) and 257(31.8%) of the pregnant mothers were a nulliparous and primiparous respectively. Most (95.3%) of the admitted pregnant mothers had follow ANC; among these 2.7%were followed first visit and 71.4% were followed three and above ANC visit (Table 2).

Table 2: Obstetric characteristic pregnant mothers admitted at Nekempt Referral Hospital from May-July 2017

Variables	Frequency (N=807)	Percent
Gravida		
Primiagravida	**261**	**32.3%**
Multigravida	**461**	**57.1%**
Grand multigravida	**85**	**10.5%**
Para		
Nulliparous	**269**	**33.3%**
Primiparous	**257**	**31.8%**
Multiparous	**235**	**29.1%**
Grand multipara	**46**	**5.7%**
ANC follow-up		
Yes	**769**	**95.3%**
No	**38**	**4.7%**
Number of ANC Visit		
One	**21**	**2.7%**
Two	**203**	**26.4%**
Three	**344**	**44.7%**
Four	**201**	**26.7%**

5.3. Magnitude of Preterm Premature Rupture of Membrane

From the total of 807 pregnant mothers who were admitted for birth and pregnancy related problems in the period between May1 to July30/2017 at Nekempt referral Hospital 31(3.8%) of pregnant mothers had Preterm Premature rapture membrane (PPROM) (Figure 3). Of mothers who had PPROM 14(45.2%) of them had also history of previous PPROM (Figure 4). The median duration of rupture membrane was 16 hour with the minimum and maximum duration of rupture membrane was of 2 and 72 hours respectively. The majority 25 (80.6%) mothers were not in labor at a time of admission

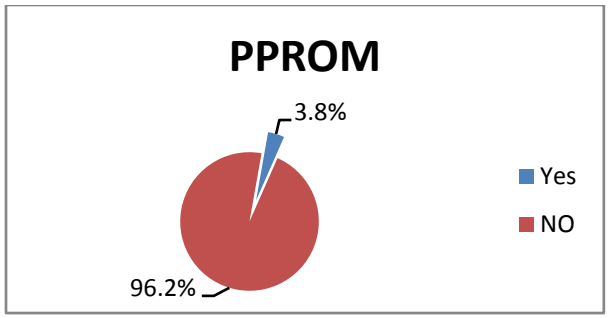

Figure 3: Magnitude of PPROM among mothers Admitted at Nekemte Refferal Hosptal May1-

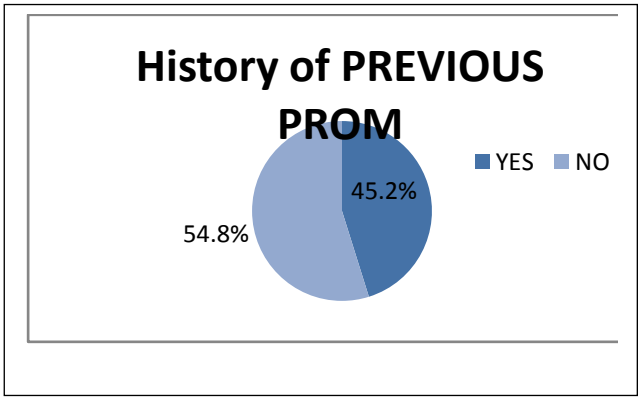

Figure 4:History ofprevious PROM among mothers Admitted at Nekemte Referral Hopital

Of 31 mothers who had PPROM the majority 19(61.3%) of mothers were multigravida (pregnant 2-4). Higher proportion (35.5%) mothers were multiparous and followed by primiparous which was 9 (29%). Near to three fourth of mothers with PPROM had followed ANC and 14 (45.2%) of mothers had history of previou PPROM. Near to half (48.4%) of PPROM was occurred at gestational age between 31-34 weeks (Table 3).

Table 3: Obstetric characteristics of pregnant mothers admitted at Nekempt Referral Hospital from May1-July30, 2017

Variables	Frequency (N=31)	Percent
Gravida		
Primiagravida	**7**	**22.6%**
Multigravida	**19**	**61.3%**
Grand multigravida	**5**	**16.1%**
Para		
Nulliparous	**7**	**22.6%**
Primiparous	**9**	**29.0%**
Multiparous	**11**	**35.5%**
Grand multipara	**4**	**12.9%**
ANC follow-up		
Yes	**23**	**74.2%**

No	**8**	**25.8%**
Number of ANC Visit		
One	**1**	**3.2%**
Two	**7**	**22.6%**
Three	**12**	**38.7%**
Four	**3**	**9.7%**
History of PPROM		
Yes	**14**	**45.2%**
No	**17**	**54.8%**
Gestational age at Rupture		
28-30 weeks	**6**	**19.4%**
31-34 weeks	**15**	**48.4%**
35-37 weeks	**10**	**32.3%**
Latency Period		
1-8 hours	**3**	**9.7%**
8-24 hours	**13**	**41.9%**
24-72 hours	**7**	**22.6%**
>72 hours	**8**	**25.8%**
Mode of delivery		
Spontaneous Vaginal Delivery (SVD)	**17**	**54.8%**
Assisted Breech Delivery	**5**	**16.1%**
Instrumental Delivery	**1**	**3.2%**
Caesarean Section (CS)	**7**	**22.6%**
Gestational age at Delivery		
28-30 weeks	**1**	**3.2%**
31-34 weeks	**20**	**64.5%**
35-37 weeks	**10**	**32.3%**

5.5. Factor Associated With PPROM

To identify obstetrics factors associated with PPROM Bivariate and multivariate analysis were employed. Accordingly, only ANC follow up was found as predictor of PPROM. After

controlling other obstetrics factors, the likelihood of developing PPROM 8.4 times higher among pregnant mothers who were not follow any ANC visit compared to mothers who got ANC (AOR 8.4, 95CI 3, 23.3). In Bivariate analysis nulliparous and ANC four visit were found as protective and risk factor for PPROM as compared to multiparous mothers and ANC three visit respectively. However,this was not statistical significant association factors (Table 4).

Table 4: Obstetrics factors associated with PPROM among pregnant mothers admitted at Nekempt Referral Hospital from May-July 2017

Variables	PPROM (N=807)		COR	AOR
	Yes	No	(95% CI)	(95% CI)
Gravida				
Primiagravida	**7(22.6%)**	**254(32.7%)**	**1.5 (0.6,3.7)**	
Multigravida*	**19(61.3%)**	**442(57%)**	**1**	**1**
Grand multigravida	**5(16.1%)**	**80(10.3%)**	**0.7 (0.25,1.9)**	**2.4(0.3,20.4)**
Para				
Nulliparous	**7(22.6%)**	**262(33.8%)**	**0.3 (0.8, 1)****	
Primiparous	**9(29.0%)**	**248(32%)**	**0.4(0.1, 1.3)**	**5(0.4,60)**
Multiparous*	**11(35.5%)**	**224(28.9%)**	**1**	**1**
Grand multipara	**4(12.9%)**	**42(5.4%)**	**0.5(0.2, 1.6)**	**3.3(0.3,33.6)**
ANC follow-up				
Yes*	**23(74.2%)**	**746(96.1%)**	**1**	**1**
No	**8(25.8%)**	**30(3.9%)**	**8.6(3.6,20.9)****	**8.4(3, 23.4)****
Number of ANC Visit				
One	**1(3.2%)**	**20(2.7%)**	**1.1(0.1,8.6)**	**0.7(0.08,6)**
Two	**7(22.6%)**	**196(26.3%)**	**1.5(0.6,3.7)**	**1(0.4,2.7)**
Three*	**12(38.7%)**	**332(44.5%)**	**1**	**1**
Four	**3(9.7%)**	**198(26.5%)**	**3.6(1,12.4)****	**2.3(0.6,8.4)**

*Reference group
**Statistical significant (P value<0.05)

5.7. Maternal and perinatal outcome of PPROM

5.7.1. Maternal Outcome of PPROM

Of 31 pregnant mothers who had Preterm Premature Rupture of Membrane 12(38.7%) of mother had unfavorable outcomes (Figure 5). Among mothers who had unfavorable outcome the complications they developed were chrioamnionitis 5(41.7%), Post-Partum Haemorrhage3(25%), Puerperal sepsis 2(16.7%) and Abruption 2(16.2%)(Figure 6).No Maternal death was doucmented.

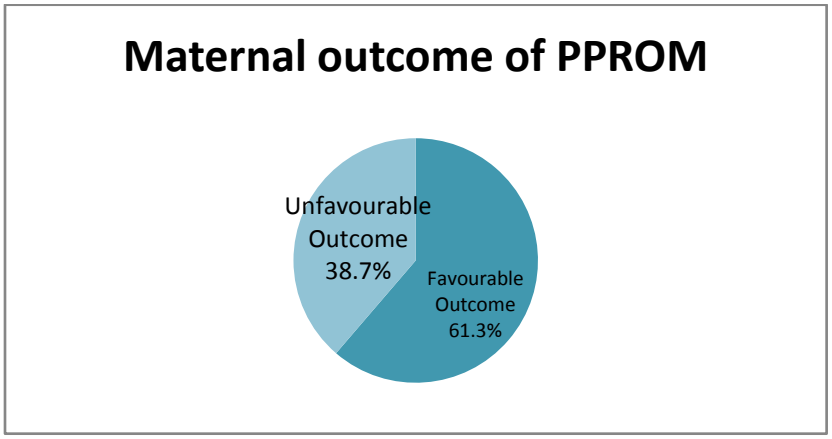

Figure 5: Maternal outcome of PPROM among mothers admitted at Nekempt Referral Hospital from May1-July30, 2017

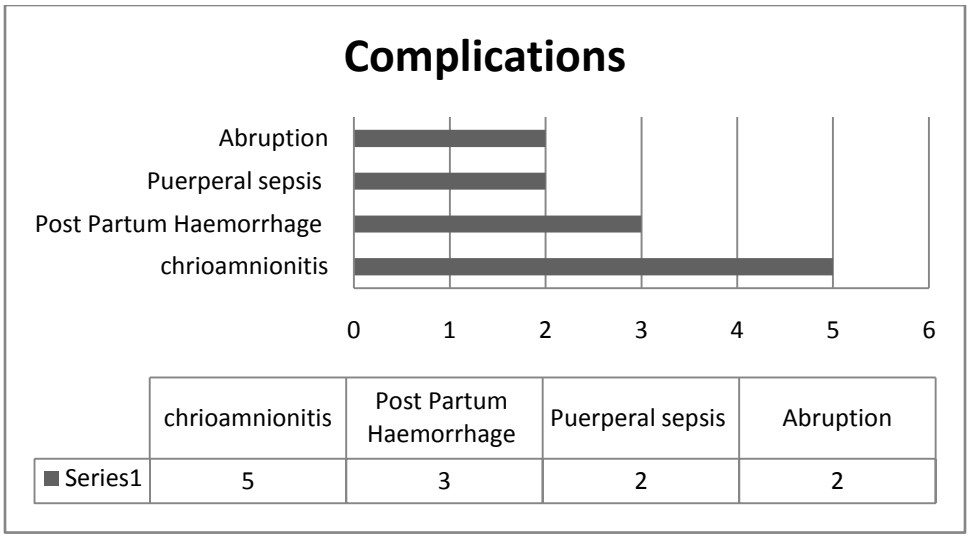

Figure 6: Number of Complications developed by mothers admitted at Nekempt Referral Hospital from May1-July30/ 2017

5.7.2.

Of 31 neonates born from mothers with PPROM 18 (58%) had unfavorable outcome, out of them5(27.8%) of newborn were died, 4(22.2%) ENND, and 1(5.6%) INNFD. Twenty six newborns were admitted to NICU.(figur7 &Table5) .

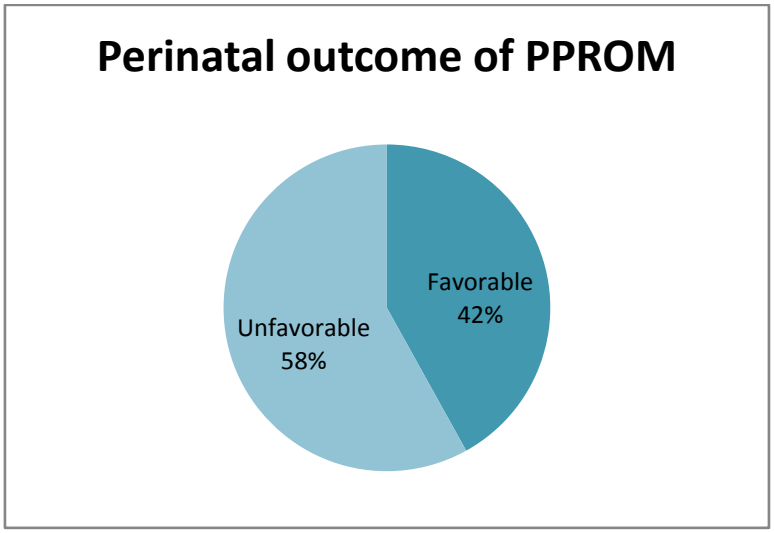

Figure 7: Perintal outcome of PPROM born from mothers admitted at Nekempt Referral Hospital from May1-July30/ 2017

Table 5 : **Perintal outcome of PPROM born from mothers admitted at Nekempt Referral Hospital from May-July 2017**

General Perinatal condition	Perinatal Outcome of PPROM				
		Favorable		Un Favorable	Total
		No	%	NO	%	
	INFD	0		1	5.6%	1
	ENND	0		4	22.2%	4
	Alive at discharge	13	100%	13	72.2	26
Total	Total	13	100%	18	100%	31

Table6: Obstetric profile with maternal and perinatal outcome of PPROM among mothers admitted at Nekempt Referral Hospital from May1-July30, 2017 (N=31)

Variables	Maternal Outcome of PPROM		Perinatal Outcome of PPROM	
	Favorable	Unfavorable	Favorable	Unfavorable
Gravida				
Primiagravida	**3(15.8%)**	**4(33.3%)**	**0**	**7(38. 9%)**
Multigravida	**11(57.9%)**	**8(66.7%)**	**10(76.9%)**	**9(50%)**
Grand multigravida	**5(26.3%)**	**0**	**3(23.1%)**	**2(11.1%)**
Para				
Nulliparous	**3(15.8%)**	**4(33.3%)**	**0**	**7(38.9%)**
Primiparous	**5(26.3%)**	**4(33.3%)**	**3(23.1%)**	**6(33.3%)**
Multiparous	**7(36.8%)**	**4(33.3%)**	**7(53.8%)**	**4(22.2%)**
Grand multipara	**4(21.1%)**	**0**	**3(23.1%)**	**1(5.6%)**
ANC follow-up				

Yes	**16(84.2%)**	**7(58.3%)**	**12(92.3%)**	**11(61.1%)**
No	**3(15.8%)**	**5(41.7%)**	**1(7.7%)**	**7(38.9%)**
Number of ANC Visit				
One	**1(6.2%)**	**0**	**1(8.3)**	**0**
Two	**2(12.5%)**	**5(71.4%)**	**2(16.7%)**	**5(45.5%)**
Three	**11(68.8%)**	**1(14.3%)**	**8(66.7%)**	**4(36.4%)**
Four	**2(12.5%)**	**1(14.3%)**	**1(8.3%)**	**2(18.2%)**
History of PreviousPROM				
Yes	**11(57.9%)**	**3(25%)**	**5(38.5%)**	**9(50%)**
No	**8(42.1%)**	**9(75%)**	**8(61.5%)**	**9(50%)**
Gestational age at Rupture				
28-30 weeks	**2(10.5%)**	**4(33.3%)**	**2(15.4%)**	**4(22.2%)**
31-34 weeks	**7(36.8%)**	**8(66.7%)**	**3(23.1%)**	**12(66.7%)**
35-37 weeks	**10(52.6%)**	**0**	**8(61.5%)**	**2(11.1%)**
Latency Period				
1-8 hours	**3(15.8%)**	**0**	**3(23.1%)**	**0**
8-24 hours	**10(52.6%)**	**3(25%)**	**6(46.2%)**	**7(38.9%)**
24-72 hours	**2(10.5%)**	**5(41.7%)**	**0**	**7(38.9%)**
>72 hours	**4(21.1%)**	**4(33.3%)**	**4(30.8%)**	**4(22.2%)**
Mode of delivery				
Spontaneous Vaginal Delivery	**10(52.6%)**	**8(66.7%)**	**10(76.9%)**	**8(44.4%)**
Assisted Breech Delivery	**1(5.3%)**	**4(33.3%)**	**0**	**5(27.8%)**
Instrumental Delivery	**1(5.3%)**	**0**	**0**	**1(5.6%)**
Caesarean Section (CS)	**7(36.8%)**	**0**	**3(23.1%)**	**4(22.2%)**
Gestational age at Delivery				
28-30 weeks	**1**	**3.2%**	**1(7.7%)**	**0**
31-34 weeks	**20**	**64.5%**	**4(30.8%)**	**16(89.9%)**
35-37 weeks	**10**	**32.3%**	**8(61.5%)**	**2(11.1%)**

6: Discussion

This study generates information on the magnitude of Preterm Premature Rupture of Membrane, associated factors and its outcome. Overall obstetric characteristics of all study participants indicated that higher proportion (57.1%) of mothers was multigravida and followed by primiagravida mothers (32.3%). Regardingparous 33.3% and 31.8% of participants were a nulliparous and primiparous respectively. Most of participants (95.3%0 had attend ANC at least for first visit.

In this study the magnitude of Preterm Premature Rupture membrane was 3.8% (31/807) among pregnant mothers admitted for birth and pregnancy related problems at Nekempt referral Hospital in three months periods. This is almost similar to an estimated PPROM occur 2% to 3.5% of pregnancy according to Society of Obstetricians and Gynecologists of Canada (SOGC)(9).But ,higher magnitude was seen in this study compared to Nigeria study (3.3%) (13) and lower from Pakistan studies Ayub Medical College, Abbottabad which were 7% and 9%)(12, 15). The Prevalence of PPROM in this study higher compared to TikurAnbessa referral hospital study of Addis Ababa, Ethiopia which were 1.4% of PPROM were documented (14).

Of mothers withPPROM 45.2% of them was history of PPROM. This is supported by study conducted USA previous preterm birth caused by premature rupture of membranes in multiparous women was independent risk factor for PPROM (AOR=2.5)(18). The median duration of rupture membrane was 16 hours with the range of (2,72hrs). The higher proportion (41%) of latency period was between 8-24 hours. Of mothers with PPROM 61.3% were multigravida, and 35.5% were multiparous and 29% were primiparous. Near to three fourth of mothers with PPROM visit ANC at least for one visit and near to half (48.4%) of PPROM was occurred at gestational age between 31 to 34 weeks.

In Bivariate analysis Nulliparous, and ANC four visits were found statistically significant as protective and risk factor for PPROM as compared to multiparous, and ANC three visit respectively. However, in Multivariate analysis only ANC follow up was found as independent predictor of PPROM after adjusting other obstetrics factors (AOR=8.4, 95CI 3, 23.3). The likelihood of developing PPROM 8.4 times higher among pregnant mothers who was not visit ANC follow up compared to mothers who received ANC follow up. In USA study found that

multiparous women with all three risk factors had a 31.3-fold increased risk of preterm birthcaused by premature rupture of membranes at <35 weeks' gestation(18).

In the maternal outcome assessment of PPROM indicated that 38.7% (12/31) of mothers with PPROM had unfavorable outcomes (seen at least one complication). The most common of maternal complications were chrioamnionitis 5(41.7%), Post-Partum Haemorrhage 3(25%), Puerperal sepsis 2(16.7%) and Abruption 2(16.2%).In TikerAnbessa study also documented that Clinical chorioamnionitis was seen in 31.5% of the mothers. Additionally, Puerperal endomyometritis, superficial abdominal wound infection and sepsis were documented (14). Seventeen (54.8%) of mothers with PPROM delivered spontaneously and followed by Caesarean Section (CS) 7(22.6%). This consistent with TikurAnbessa study in which 23.2% of mothers were delivered Caesarean Section(14).

Regarding the outcome of perinatal outcome 58% (18/31) had unfavorable outcome and 16% (5/31) of perinatal death were occurred. These deaths were 4 ENND and 1 INNFD. The causes of perinatal death recorded 20% (1/5) were due to fetal infection and 80% (4/5) were due to neonatal sepsis. This is different from TikurAnbessa study in which 66.7% of perinatal death were due to prematurity. The perinatal death rate (160 per 1000) was higher compared to study conducted at TikurAnbessa(107 per 1000) (14). 26 newborns were admitted to NICU. Twenty one 67.7% newborns were born with birth weight less than 2500g. This is higher compared to TikurAnbessa study in which 60.7% of neonate birth weight less than 2500g(14).

This study was observed limited number of women (31) with PPROM to document the outcome. Hence, statistical association between independent variables and Outcome of PPROM was analyzed.

7: Conclusion and Recommendation

7.1. Conclusion

The magnitude of Preterm Premature Rupture Membrane at Nekempt Referral Hospital in three months period was 3.8%. Magnitude of PPROM was higher compared to other setting study in Ethiopia. Mothers who had ANC follow-up was found independent protective predictor for Preterm Premature rapture membrane.

Near to two fifth of women with Preterm Premature Rupture Membrane had unfavorable outcome (seen at least one complication). The most common complications were chrioamnionitis, Post-Partum Haemorrhage, Puerperal sepsis and Abruption.More than half and one fourth of women with PPROM were delivered by spontaneous and Caesarean Section respectively. No maternal mortality was documented in this study.

Near to three fifth of perinatal had unfavorable outcome (seen at least one complication or death). The perinatal death rate was 160 per 1000.These deaths were 4 ENND and 1 INNFD. The causes of perinatal death were 20% fetal infection and 80% were neonatal sepsis. Two third of perinatal was born with birth weight less than 2500g.

7.2. Recommendation

Mothers should be informed early about maternal and perinatal complications of preterm premature Rupture Membrane. Strengthening ANC follow up may help for early identification PPROM mothers. Further prospective study should be to identify with large number of PPROM to identify risk factors, complications and outcome of PPROM.

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ANNEX- 1 Questioner

This questionnaire will be designed to assess magnitude, Associated Factors and Outcome of pre term premature rupture of membrane conducted at Nekemte referral Hospital, a prospective three month study from May1/ 2017 G.C – July31/ 2017G.C

Socio-demographic characteristics		
001	Card No	……
002	Age in year	……
003	Ethnicity	1. Oromo 2. Amhara 3. Gurage 4. Others
004	Religion	1. Protestant 2. Orthodox 3. Muslim 4. Others
005	Marital Status	1. Married 2. Single 3. Divorced 4. Widowed 5. Separated
006	Educational Status	1. Illiterate 2. Reads and writes 3. 1-8 4. 9-12

		5 12 and above
007	Occupation	1. Government employee 2. Merchant 3. Farmer 4. Student 5. House wife 6. others
008	Place of Residence	1. Nekemte town 2. Outside of the town
II. **Obstetric Profiles**		
009	1. Gravida 2. Para	---------- ----------
010	Number of live birth	----------
011	Number of still birth	----------
012	ANC follow Up	1. Yes **2.** No
013	If above is yes Q12 where?	1. At Health center 2. At NRH 3. At Private facilities 4 At Other Governmental Hospital 5. Non government Health Facility
014	If Yes for Q12 how many times	1) one 2) two 3) three 4) four

		5) above four visits
III.	**Obstetric Profiles only for mothers Diagnosed preterm PROM**	
015	Duration of premature rupture of membrane in hour	----------
016	History of previous PROM	1) Yes 2) No
017	Time between rupture of membrane and onset of labour	1) 1- 8 hours 2) 8- 24 hours 3) 24 – 72 hours 4) > 72 hours
018	Is she on labour during admission?	1) Yes 2) No
019	If labour starts after admission how it starts start?	1)Spontaneous 2) Induced 3) Elective C/S
020	If yes for Q018, Mode of delivery	1) SVD 2) Assisted Breech Delivery 3) Instrumental Delivery

		4) C/S 5) destructive delivery
021	At what weeks was the membrane ruptured?	1. 28-30 weeks 2. 31- 34weeks 3. 35-37weks
022	Fetal Presentation	1. Cephalic 2. Breech 3. Shoulder
023	Gestational age at delivery_____wks	1. 28-30 weeks 2. 31- 34weeks 3. 35-37weks 4. Compound Presentation
024	Latency period_____days	1. < 01 day 2. 2 - 7 days 3. 8 -14days **4.** > 14 days
III. **Management options taken**		
025	Management plan at admission	1. Immediate delivery 2. Expectant management
026	Prophylactic antibiotics were administered	1. Yes **2.** No
027	Dexamethasone was administered	1. Yes **2.** No
028	Observed &/or investigated for chorioamnionitis periodic obstetric ultrasound monitoring,	1. Yes 2. No
029	Tocolysis given	1. Yes **2.** No
IV. **Maternal Outcome**		

031	Does the mother develop complications?	1) Yes 2) No
032	If yes for Q34 which complication (s)	1. Chorioamnionitis 2. Puerperal sepsis 3. PPH 4. Abruption 5. Wound infection **6.** Others specify
033	Maternal mortality	1. Yes **2.** No
034	If mother died, cause of death?	1. Chorioamnionitis 2. Puerperal sepsis 3. PPH **4.** Others
035	Maternal Hospital stay_____days	1. < 3 days 2. 3-7 days **3.** > 7 days
036	General outcome of the mother	1) Favorable outcome 2) Unfavorable outcome
V. Fetal / perinatal Condition		
037	Sex	1. Male **2.** Female
038	APGAR score	1. 1 st minute _____/10 **2.** 5th minute _____/10
039	Birth weight _____grams	1. 1000- 1499 2. 1500 – 2499 **3.** > = 2500
040	Neonate admitted to NICU	1)Yes 2)No
041	Reason for admission to NICU	1. Respiratory distress

		2. Observation for prematurity 3. Neonatal sepsis **4.** Others specify
042	General Perinatal condition	1. IUFD 2. INFD 3. ENND **4.** Alive at discharge
043	Cause of perinatal death	1. Fetal infection 2. Complications of prematurity 3. Neonatal sepsis 4.Others specify
044	Neonatal hospital stay	1. 0 day 2. 1-3 days 3. 4 - 7days **4.** > 7 days
046	General Perinatal outcome	1) Favorable 2) Unfavorable

DECLARATION

I, the undersigned, declare that this thesis is my original work, has not been presented for a degree in this or any other university and that all sources of materials used for the thesis have been fully acknowledged.

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This thesis has been submitted for examination with my approval as University advisor

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