Research Article

Premature Rupture Of Membranes And Associated Factors Among Pregnant Women Admitted In Maternity Ward, Amhara Regional State Referral Hospitals, North-West Ethiopia

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ABSTRACT

The aim of this study was to assess premature rupture of membranes and associated factors among pregnant women who are admitted to maternity and labor ward Amhara regional state referral hospitals, North West Ethiopia, 2017. Institutional based cross-sectional study. Among the admitted pregnant women, 54 (8.7%) developed premature rupture of the membranes. Mothers with previous history of this problem, (AOR=12.3; 95% CI 5.5, 27.2), mothers who did not have antenatal follow up (AOR=4.5, 95% CI 1.3, 15.5), mothers with polyhydramios (AOR=5.5; 95% CI 1.1, 26.5), and with offensive vaginal discharges (AOR=4.5; 95% CI 1.43, 13.9) were significantly positively associated variables with premature rupture of membranes. We recommend pregnant mothers to have adequate ante-natal care follow up which is the best opportunity for being provided protective provisions.

Keywords: Premature Rupture of the Membranes (PROM); Admitted pregnant mothers; Ethiopia; Programmed cell death; Urinary tract infection

INTRODUCTION

Premature rupture of the fetal membranes is spontaneous rupture of the membranes any time above 28th week of pregnancy but before the onset of labor. Its occurring before 37 weeks of gestation is usually referred to as preterm premature rupture of the membranes [1]. Previous findings show that 8 to 10% of pregnant women present with this problem at term as well as from 2 to 4% and 7 to 20% of pregnant women developed premature rupture of membranes at preterm for all singleton and twin pregnancies respectively [2]. But these studies are reporting little about associated factors of premature rupture of the membranes. Therefore, this study was conducted to identify risk factors of premature rupture of membranes among pregnant women admitted in Amhara regional state Hospitals, North West Ethiopia.

Even though not adequate, here are some of the previous articles findings about the risks for Premature Rupture of the Membranes (PROM). At term, programmed cell death and activation of catabolic enzymes, such as collagenase and mechanical forces, result in ruptured membranes. Preterm PROM occurs probably due to the same mechanisms and premature activation of these pathways. However, early PROM also appears to be linked to underlying pathologic processes, most likely due to inflammation and/or infection of the membranes. Clinical factors associated with preterm PROM include low body mass index, tobacco use and urinary tract infection [3]. Patients at higher risk include those who have lower socioeconomic status, are smokers, have a history of Sexually Transmitted Infections (STI), have had a previous preterm delivery, have vaginal bleeding, or have uterine distension (example- polyhydramnios, multiple gestations). Procedures that may result in preterm PROM include cerclage and amniocentesis [4].

MATERIALS AND METHODS

An Institutional based cross-sectional study was conducted among pregnant mothers admitted in a selected Amhara regional state referral Hospitals from September 1 to October 30, 2017. In this region there are 3336 health posts, 839 health centers, 67 primary and general hospitals and 5 referral Hospitals. Those referral hospitals are University of Gondar teaching and Referral Hospital, Felegehiwot referral hospital, Dessie referral hospital, Debremarkos referral hospital and Debrebrhan referral hospital. Source population

All third trimester pregnant mothers who were admitted in maternity ward, Amhara region referral hospitals for obstetric

care service, 2017.

Study population

The third trimester pregnant mothers who were admitted in maternity ward were seeking obstetric care services during the study period and available in the data collection time (sample size, determination and sampling technique). According to a research done at Harare east Ethiopia, the commonest risk factor for PROM was previous history of PROM which is 38.2% (p=0.382) (we used the second objective to calculate the sample size because the first objective has a smaller sample size); and the sample size was determined using the single population proportion formula assuming confidence interval of 95%, and margin of error 4% (d=0.04), then the total sample calculated as follow:

$(Za/2)2p$ $(1-p)/d2=(1.96)2$ (0.382) $(0.618)/(0.4)2=566.8$, we added a 10% non-response rate and total sample size became;

567+57=624

Systematic random sampling procedure was employed for each hospital after the total sample size was divided in to each referral hospitals proportional to their case flow based on the number of deliveries conducted in the previous one year. The interval (K) was three and we selected every third mothers in each Hospital for 624 sample size accomplishing.

Operational definition

Premature Rupture of The Membranes (PROM): It was defined as rupture of membranes at any time after 28th and 37th weeks of gestation but before the onset of uterine contractions (labour).

Term premature rupture of membranes: When membranes are ruptured at 37 or above weeks of gestation before labour.

Maternity: A ward that includes labor ward, waiting room, and post-partum room.

Data collection tools and procedure

Data was collected using semi structured questionnaire that has socio demographic, obstetric and gynecologic and medical history of a pregnant mother by face to face interview and checking charts in all referral hospitals. Two data collectors and were assigned to collect data in each hospital and as well one supervisor for each hospital was assigned.

Data quality control

To assure the data quality, high emphasis was given in designing data collection tools. Before starting the actual survey, the questionnaire was pre-tested on 5% of sample in Debretabor general hospital maternity ward in where the actual data was not collected. Two BSc midwives from each hospital as collectors and one supervisor for each hospital were involved throughout the course of the data collection, and meetings were held between the data collectors, supervisors and the principal investigator together in which problematic issues arising from interviews which was conducted and mistakes found during editing were discussed and decisions were reached. The collected data were reviewed and checked for completeness before data entry and then, entered.

Data processing and analysis

Data was coded and entered to Epi-info version 7 and were exported to SPSS version 20 for analysis. Data cleaning was conducted before the analysis. Crude odds ratios of maternal outcome were estimated for all independent variables in the binary logistic regression and fitted to identify factors associated with PROM. All independent variables with p value less than 0.2 at bivariant analysis were entered into multivariable logistic regression to control for all possible confounders.

In descriptive statistics: Tables, graphs mean and frequency were used to present the information. Significance was obtained at adjusted odds ratio with 95% CI and p-value<0.05.

RESULTS

Socio-demographic characteristic

A total of 624 third trimester pregnant mothers with 100% response rate completed the interview. The age of the mothers range from 15-49 with mean age of 22 years with SD+0.4. Most of the pregnant women, 534 (85.6%), 386 (61.9%), 595 (95.4%), 567 (90.9%) and 361 (57.9%) were in the age group between 20-34 years, urban inhabitants, married, Amhara in ethnicity and orthodox followers respectively (Table 1).

Table 1: Show socio-demographic characteristics of pregnant women admitted in Amhara regional referral hospitals, North West Ethiopia from September 1-October 30, 2017, (n=624).

Variables	Frequency	Percentage
Age		
15-19	27	4.3
20-34	534	85.6
35-49	63	10.1
Religion		
Orthodox	361	57.9
Catholic	9	1.4
Protestant	41	6.6
Muslim	213	34.1
Ethnicity		
Amhara	563	90.2
Oromo	35	5.6
Tigray	17	2.7
Other	9	1.4
Residence		
Urban	435	69.7
Rural	189	30.3
Marital status		
Single	6	1
Married	595	95.4
Divorce	18	2.9
Widowed	5	0.8
Monthly income		
<1000	6	1
1000-1999	96	15.4
2000-2999	232	37.2
≥ 3000	290	46.5
Occupation		
House wife	269	43.1
Merchant	136	21.8
Governmental employ	174	27.9
Student	15	2.4
Other	30	4.8
Educational level		

Unable to read and write	193	30.9
Primary and secondary level	253	40.5
Preparatory and above	178	28.5
BMI		
<18	11	1.8
18-24	346	55.5
>24	267	42.8

Obstetric and gynecological history

More than half, 356 (57.1%) of the participants were multiparous. Greater than three quarter, 547 (87.7%) of the participants presented at term pregnancy. Nearly the sample size number of the participants, 589 (94.4) reported that they had ANC follow up at-least once. Thirty five (8.1%) and 22 (5%) pregnant women had previous history of PROM and abortion respectively (Table 2).

Table 2: Shows obstetric and gynaecologic characteristics of pregnant women admitted in Amhara regional referral hospitals, North West Ethiopia from September 1-October 30, 2017,(n=624).

Variables	Frequency	Percentage
Gestational age		
Preterm	71	11.4
Term	547	87.7
Post term	6	1
Gravidity		
Primigravida	199	31.9
Multigravida	425	68.1
ANC follow up		
Yes	601	96.3
No	23	3.7
Number of visit		
1-4	458	76
>4	145	24
Amniocentesis		
Yes	24	3.9
No	600	96.1
Fetal lie		
Longitudinal	620	99.4
Oblique or transverse	4	0.6
Confirmed CPD		
Yes	3	0.5
No	621	99.5
Pelvic examination		
Yes	10	98.4
No	614	1.6
Cause listed		
Infection	5	71.4
Workload	2	28.6
Sexual intercourse		
Yes	35	5.6
No	589	94.4
History of chronic cough		
Yes	20	3.2
No	604	96.8

Other cause		
Yes	6	1
No	618	99

Medical history

Most of the participants, 598 (95.8%), 579 (92.8%), 589 (94.4%) and 604 (96.8%) reported that, they were not experienced: Offensive vaginal discharge, urinary tract infection, fever and chronic cough respectively. These selected medical disorders are usually considered as the risk factors for pre-mature rupture of the membranes and 26 (4.2%), 45 (7.2%), 35 (5.6%) and 20 (3.2%) of the participants were with offensive vaginal discharge, urinary tract infection, fever and chronic cough respectively.

Variables associated with pre-mature rupture of membranes

In this study, both bivariable and multivariable logistic regression analysis were computed. Variables crudely associated with PROM were: Having history of PROM, ANC follow up, vaginal offensive discharge, poly hydramnios, urinary tract infection, pelvic examination and fever. From the seven variables crudely associated with PROM, history of PROM, ANC follow up, offensive vaginal discharge and polyhydramnios were significantly associated with premature rupture of membrane in multivariable logistic regressionas shown in Table 3.

Table 3: Bivariable and multivariable analysis of variables associated with pre-mature rupture of membranes among pregnant women, admitted in Amhara regional referral Hospitals, North West Ethiopia, September 1-October 30, 2017, (n=624).

Variables	PROM No	PROM Yes	Crude odds ratio (95%CI)	Adjusted odds ratio (95%CI)
Previous history of PROM	No 368	23	1	1
	Yes 23	18	11.4 (5.35,24.01)	12.2 (5.52,27.118)
ANC follow up	No 18	5	3.2 (1.11,8.79)	1
	Yes 552	49	1	4.5 (1.299,15.46)
Offensive vaginal discharge	No 548	46	1	1
	Yes 22	8	4.4 (1.83,10.27)	4.5 (1.43,13.99)
Polyhydramnios	No 561	50	1	1
	Yes 9	4	5.0 (1.48,17.77)	5.5 (1.14,26.53)
UTI	No 533	46	1	1
	Yes 37	8	2.3 (1.1,5.7)	-
Pelvic examination	No 564	50	-	-
	Yes 6	4	7.6 (2.1,27.5)	-
Fever	No 542	47	-	-
	Yes 28	7	2.9 (1.2,6.9)	-

DISCUSSION

This study was on premature rupture of membranes and associated factors from all third trimester pregnant mothers who were admitted in maternity and labour wards of referral hospitals in Amhara region, North West Ethiopia, 2017. The study result shows that the prevalence of premature rupture of membranes was 8.7% (95% CI=6.6, 10.9). From this result, term premature rupture of membranes was 6.41% and preterm premature rupture of membranes was 2.24% which is lower than previous study findings done in Mahaveer Medical College & Hospital which was 14.2% with term PROM and 4% had preterm PROM [5]. This difference might be due to the study time. It was higher than the study done in the same developing country Nigeria showed that the prevalence of PROM was 1.94% [6]. The possible explanation for the difference could be health care system

difference. The result of term PROM was in line with the study done on term PROM at Mizan-Aman which was 6% [7]. But this study`s preterm PROM was higher than the study done at Tikur-Anbesa generalized Hospital, which was 1.4% [8]. The possible reason for the difference could be due to the study populations risk difference: the ones in Addis Ababa might have a reduced risk as they could get better health care access for the prevention ways. This study showed that premature rupture of membrane was associated with previous history of PROM. Those mothers who had previous history of PROM were more likely to have a pre-mature rupture of the membranes when compared to those who have no previous history (AOR=12.1; 95% CI 5.5, 27.2). This is in agreement with the study done at Government General Hospital, Kurnool and Harare Ethiopia on preterm premature rupture of membranes [9,10]. This may be due to the fact that majority of obstetrical complications have a reoccurrences chance. So, mothers, with especially PROM history, are recommended to disclose their history to the health care providers as to be scheduled and early starting ANC follow up that can be the best opportunity for being provided protective provisions.

CONCLUSION

Another variable associated with pre-mature rupture of membranes was ANC follow up. Women who had no ANC history were 5 times likely to develop PROM when compared with the counterparts (AOR=4.5, 95% CI=1.3, 15.46). This is in agreement with the study done at Harare Ethiopia. This may be due to antenatal care is a key entry point for pregnant women to receive a broad range of health promotion and preventive health services. We recommend here, pregnant mothers to have adequate ANC follow up and also, having offensive vaginal discharge was one of the factors associated with pre-mature rupture of the membranes. Mothers who had offensive vaginal discharge were 5 times likely to develop PROM when compared with those who did not have (AOR=4.5, 95% CI=1.43, 13.99). This is in agreement with the study done at Mulago hospital, Uganda, which showed that there was an association between PROM and abnormal vaginal discharge. The possible explanation could be: offensive vaginal discharge is an indicative of maternal genital infection and is most likely via inflammatory mediators. It might be due to the fact that ascending abnormal genital tract colonization and urogenital tract infection are integral to the pathogenesis of PROM. This factor obligates health care providers to early screen every pregnant mothers for infection and prevent complications including PROM. The other positive predictor variable for pre-mature rupture of the membranes was ployhydramnios. Those pregnant women with polyhydramnios were six times more likely to have PROM compared to those who do not have polyhydramnios (AOR=5.5, 95% CI=1.1, 26.53). Unfortunately, there was no study which revealed that

association of polyhydramnios with PROM. This may be due to increased intrauterine pressure because as the gravid uterus is pressurized, it is likely for the membranes to be ruptured. We recommend pregnant mothers to have obstetrical ultrasound as per needed to early detection and prevention of the complications of polyhydramnios including PROM.

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