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Incidence, Maternal and Perinatal Outcome of Premature Rupture of Fetal Membrane Cases in Jimma University Teaching Hospital, South West Ethiopia

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Abstract

Background: Premature rupture of the fetal membranes (PROM) is the rupture of the amniotic membranes with release of the amniotic fluid more than 1 hour prior to the onset of labor confronts both clinicians and patients with a difficult dilemma it can cause serious maternal and perinatal morbidity and mortality.

Objective: Prospective dichotomous cohort study was carried out to study incidence, maternal and perinatal outcome of patients with PROM cases managed in Jimma university teaching hospital (JUTH).

Methods: Institution based study, 422 had premature rupture of membrane admitted to Jimma university medical center over eight months. Dichotomous cohort study was done between 172 those delivered within twelve hours of rupture of fetal membrane and 250 patients those delivered more than twelve hours after rupture of fetal membrane.

Results: Incidence of premature rupture of membrane was 14.6%. Gestation age less than 37 weeks account 42 (1.5%). Mother who admitted to maternity word for conservative management stayed as minimum 4 days and maximum 33 days. Contributing factor for neonatal admission to intensive care unit by multivariate analysis show that delivery before 34 weeks more contribute for NICU admission RR 4 (p-0.000) when compare to that of duration of rupture of membrane. Contributing factors for increasing poor post-partum maternal outcome by univariate analysis were PROM > 12 hours RR 1.8, P-0.011 and those monthly income ≤ $1.9, RR, 0.69, (p, 0.108). By multivariate analysis PROM > 12hours RR 1.9, P-0.015 was significantly increase poor maternal outcome those compare to monthly income ≤ $1.9, RR, 0.69, (p,0.108). Most patients with gestational age ≤ 34 weeks delivered after 12 hours PROM for the reason of conservative inpatient management. The maternal hospital stays were significantly related with duration of rupture of membrane with R = 4.9 (p-0.028).

Conclusion and Recommendation: The overall hospital incidence was considered to be high as compared to the universal incidence. Early delivery will decrease antepartum morbidity than conservative management for those indicated. Depend upon this study conservative management of those gestation ages less than 34 weeks will decrease neonatal intensive care admission. Early delivery will decrease operative delivery than conservative management. Shorting of duration of premature rupture of membrane will decrease maternal infection, and also will decrease hospital stay.

Keywords: *Maternal; Perinatal; PROM; JUTH*

Introduction

Premature rupture of the fetal membranes (PROM) is the rupture of the amniotic membranes with release of the amniotic fluid more than 1 hour prior to the onset of labor. PROM may be subdivided into term PROM (TPROM, i.e. PROM after 37 weeks of gestation) and preterm PROM (PPROM, i.e. PROM prior to 37 weeks of gestation. PROM is any ROM that last longer, for more than 18 hours before start of labor is induced in [1,2]. The epidemiology of PROM varies considerably based on geographic location. In Africa the prevalence is higher than developed countries. PROM complicates approximately 3 percent of preterm pregnancies,10% of term pregnancy a, 11% of preterm delivery and causes 40 - 75% neonatal deaths in USA [1-3].

Term or preterm uterine contractions can also lead to membrane rupture resulting from increased bursting pressure due to increased intra-amniotic pressure and from "strain hardening "with repeated uterine contractions. There are a number of pathways that ultimately result in accelerated membrane weakening. Bacterial collagenases and proteases can directly cause fetal membrane tissue weakening. Amniotic fluid cultures after PROM are frequently positive (25% to 3 5%), and histological evaluation in the setting of preterm birth frequently has demonstrated acute inflammation and bacterial contamination along the choriodecidual interface [4-6]. Mostly patients belonged to the poor class in 72% cases followed by middle class in 21% and upper class 7%. Analysis shows that out of 100 mothers 26% had PROM of < 24 hours duration and 74% had > 24 hours of duration. Maternal outcome in 16 cases of Preterm Premature Rupture of Membrane findings revealed septicemia in 12% cases and Chorioamnionitis in 12% cases. Fetal outcome in 27 cases of preterm premature rupture of membrane revealed prematurity in 5% cases, fetal distress in 4% cases, cord compression in 5% cases, necrotizing enterocolitis in 2% cases, hypoxia in 9% cases and pulmonary hypoplasia in 2% cases [1,2,5]. Preterm PROM is associated with brief latency from membrane rupture to delivery; delivery within 1 week is the most common outcome after preterm PROM at any gestational age. On average, latency increases with decreasing gestational age at membrane rupture. When PROM occurs before 34 weeks' gestation, 93% of women will deliver within 1 week, and 50% to 60% of those who are managed conservatively will deliver within 1 week. With PROM near the limit of viability, 60% to 70% deliver within 1 week, but 1 in 5 will have a latency of 4 or more weeks if they are managed conservatively [6-8].

The antepartum risks to the fetus are primarily those related to intrauterine infection, umbilical cord compression, and placental abruption. Fetal heart rate patterns consistent with umbilical cord compression due to oligohydramnios are commonly seen after PROM. Umbilical cord prolapse can occur after membrane rupture, particularly with fetal malpresentation, which is more common with preterm gestations.

In more than 90% of cases, the diagnosis of PROM can be confirmed by clinical assessment including the combination of history, clinical examination, and laboratory evaluation. Other potentially confounding findings such as urine leakage, increased vaginal discharge with cervical dilatation or membrane prolapse, cervical infection, passage of the mucous plug, and the presence of semen or vaginal douching should be considered. A sterile speculum examination should be performed to provide confirmatory evidence of membrane rupture and to inspect for cervicitis and for umbilical cord or fetal prolapse, to assess cervical dilatation and effacement, and to obtain cultures.

Digital cervical examination should be avoided unless imminent delivery is anticipated. If the diagnosis is not confirmed on initial inspection, the pH of the vaginal side walls or pooled vaginal fluid can be evaluated using Nitrazine paper, which turns blue at a pH above 6.0 to 6.5. If further clarification is needed, microscopic inspection can be performed for the presence of arborized crystals (i.e., ferning) in an air-dried sample collected from the vaginal side walls or pooled vaginal fluid [6-8].

Some research indicates that women with PROM at term who are not in labor on arrival at the Hospital should have labor induced, usually with an oxytocin infusion, to reduce the risk of maternal and neonatal complications. Caregivers should allow an adequate time for the latent phase of labor and minimize digital vaginal examinations until the active phase of labor.

In the setting of PPROM 34 weeks, in order to achieve 48 hours of corticosteroid administration, tocolytics, antibiotics may be used in the absence of clinically apparent or subclinical amniotic fluid infection, placental abruption, non-reassuring fetal status or other maternal/fetal contraindications to labor inhibition. The literature currently does not support the use of maintenance or prophylactic labor inhibiting agents beyond the initial 48-hour steroid window [5,9,10].

The PPROMT trial was a multicenter randomized controlled trial done show that neonatal sepsis neonatal morbidity and mortality increased in expectant management but in immediate delivery group had increased rates of respiratory distress and any mechanical ventilation. The expectant management group had higher risks of antepartum or intrapartum hemorrhage, intrapartum fever, and use of postpartum antibiotics, and longer hospital stay [11].

Methodology

This study was conducted from June 1, 2015 - January 30, 2016 G.C in JUTH located in Jimma town 350 km South west of Addis Ababa. It is a teaching and referral hospital, providing services for approximately 15,000 inpatient, 160,000 outpatient attendants, 11,000 emergency cases and 4500 deliveries in a year coming to the hospital from the catchment population of about 15 million people. These research include all pregnant mother diagnosed to have rupture of membrane admitted to maternity ward for conservative managements and to labor ward for immediate delivery were included. For premature rupture of membrane admitted to maternity ward are managed according JUSH obstetric protocol with 2g of ampicillin IV every 6 hours for 48 hours then amoxicillin 500 mg po TID for 5 days, erythromycin 500 mg PO TID for 7 days, dexamethasone for lung maturity, tocolytics accordingly for arrest of labor, if delivery was imminent, ampicillin 2 gm iv Four times per day was given until delivery, for PROM more than eight hours before onset of labor [11].

Gestational age was estimated using from 1st trimester or 2nd trimester U/S, last normal menstrual period, Ballard score, and for IUFD femoral length were taken. Pelvic examination using a sterile speculum was performed Digital examination was avoided unless the patient was committed to delivery. Diagnosis of preterm PROM was based on history and confirmed by the presence of pooled amniotic fluid on a sterile speculum examination.

Mother with obstructed labor, congenital malformation, multiple pregnancy, uterine rupture were excluded, maternal and fetal outcome affected by different factor other than premature rupture of membrane. Modes of delivery were spontaneous vaginal delivery, c/s, assisted breech deliver, destructive deliver, and spontaneous breech vaginal delivery.

The 12 hours was used for classification because failed induction was declared after 12 hours of induction [18]. Indications for delivery included gestational age greater than or equal to 34 week clinical chorioamnionitis, non-reassuring assessment for fetal well-being, fetal death, advanced labor, or failed tocolysis. 1£ infection was identified, delivery was expedited and the use of broad-spectrum antibiotics was initiated. Clinical chorioamnionitis was diagnosed by the attending physician if two or more of the following symptoms were present: maternal fever (>38°C [>100.4°F]) in conjunction with uterine tenderness, purulent vaginal discharge, maternal or fetal tachycardia.

Diagnoses of respiratory distress syndrome, perinatal asphyxia, necrotizing enterocolitis, sepsis, meconium aspiration syndrome were based on clinical, physical signs and radiographic characteristics.

Neonatal death (NND) is death of neonate within the first 28 days of delivery.

Perinatal mortality rate is fetal death started from 28 weeks of gestation to 28 days after delivery.

Wound infection is purulent discharge from wound site, the surgeon's diagnosis of infection or surgical site that requires reopening.

Wound dehiscence is complete or partial fascia separation. postpartum febrile morbidity as an oral temperature of ≥ 38.0 degrees Celsius (100.4 degrees Fahrenheit) on any 2 of the first 10 days postpartum, exclusive of the first 24 hours.

Post-partum morbidity were who had at least one of the following: PPH, endometritis, wound dehiscence, anemia, wound infection. Operative deliveries were including cesarean delivery, forceps deliver, vacuum deliver and destructive delivery. Income is classified according to WHO poverty line per day income $1.9.

A single population proportion formula, [$n = (Z\ \alpha/2)^2\ p\ (1-p)/d^2$], was used to estimate the sample size. The following assumptions of p-0.5, 95% confidence interval, 1% margin of error (d = 0.01), and 10% expected non-response rate.

$n = (Z\alpha/2)^2 p(1-p)/d^2$

$= (1.96)^2\ 0.5(1-0.5)/(0.05)^2$

=384 and 10% expected non-response rate =422

Where, n = sample size

P = incidence of premature rupture of membrane

α = type I error (probability of rejecting true null hypothesis)

d = margin of error.

Data was collected by three trained mid-wifers and four year one resident using structured questionnaire. The questionnaire has the following five components. socio-demographic information, ante partum factor associated with PROM/PPROM, Labor and deliver and maternal and fetal outcome. Data was entered, cleaned and analyzed using Epi info software version 3.1 and SPSS (software package for statistical sciences) version 20. patients' socio-demographic characteristics and premature rupture of membrane specific variables was summarized using frequency distribution tables.

Mean, relative risk and standard deviation were calculated for continues data. Association between variables was tested by use of the of chi square and pearson exact tests. Univariate, multi-variate analysis were performed to determine factors independently association with maternal and fetal outcome of premature rupture of membrane. A p value of less than or equal to 0.05 was considered statistically significant.

Result

There were total of 2896 deliveries conducted during the study period, out of these 422 had premature rupture of membrane. Dichotomous cohort study was done between 172 those delivered within twelve hours of rupture of fetal membrane and 250 patients those delivered more than twelve hours after rupture of fetal membrane. Incidence of premature rupture of membrane was 14.6%. Gestation age less than 37 weeks account 42 (1.5%). The common age groups of patients with PROM were between age 21 - 30 years account 72.7% (306) (Table 1).

		Delivery ≤ 12hrs (172)	Delivery > 12hrs (250)	RR	95%CI	P value
Age in yrs	≤ 20	13 (7.6)	15 (8.3)	0,6	0.9,1.1	0.980
	21 - 25	76 (41.4)	81 (33.5)	0.8	0.6,1	0.071
	26 - 30	53 (30)	96 (33.5)	1.0	0.9,1.3	0.534
	31 - 35	22 (13.8)	41 (17.9)	1.2	0.9,2	0.218
	≥ 36	8 (5)	16 (6.8)	1.1	0.9,1.5	0.126
Religion	Muslim	93 (56.6)	152 (62.3)	1	0.9,1.3	0.200
	Orthodox	68 (36.5)	68 (26.2)	0.8	0.7,0.9	0.013
	Protestant	11 (6.9)	28 (10.9)	1.2	1.0.1.4	0.130
	Others	0	2 (0.6)	1.6	1.5,1.7	0.254
Ethnicity	Oromo	107 (62.2)	194 (77.6)	1.3	0.8,1.5	0.003
	Amhara	45 (26.2)	28 (11.2)	0.7	0.5,0.8	0.001
	Gurage	10 (5.8)	18 (7.2)	1	0.7,1.4	0.941
	Dawuro	8 (1.7)	9 (3.6)	0.9	0.9,1.3	0.508
	Others	2 (1.1)	5 (0.4)	1.2	0.7,1.9	0.557
Marital	Married	169 (95.3)	242 (96.8)	0.88	0.5,1.7	0.71
	Unmarried	3 (1.7)	8 (3.2)	0.9	0.4,2.4	0.86
Education status	Can't read	48 (27.9)	86 (41.6)	1.2	1.2,1.7	0.159
	Grade 1 - 8	60 (34.9)	78 (26.8)	0.9	0.8,1.1	0.165
	Grade 9 - 12	53 (30.8)	46 (18.8)	0.7	0.6,0.9	0.000
	Grade >12	11 (6.4)	40 (12.8)	1.2	1,1.9	0.053
Occupation	Housewife	132 (76.7)	184 (73.6)	1	0.9,1.2	0.789
	Civil servant	23 (13.4)	51 (20.4)	1.1	0.9,1.3	0.400
	Merchant	17 (9.9)	15 (6.0)	0.8	0.6,1.1	0.129
Income (EB) per month	< 1200	86 (50)	188 (75.2)	1.5	1.3,1.8	0.000
	≥ 1200	86 (50)	62 (24.8)	0.5	0.4,0.6	
Address	Jimma	75 (43.6)	94 (37.6)	1.16	0.9,1.6	
	Out Jimma	97 (38.8)	156 (62.4)	1.1	0.9,1.3	0.216

Table 1: *Sociodemographic factor of PROM cases in JUTH, Ethiopia from June 1, 2015 – January 30, 2016 G.C.*

Primigravid were account more than 50%. Mean duration of PROM during admission was 15 hours ± 25.52 standard deviation. Mean duration of premature of membrane those delivered after 12 hours of PROM were 21.9 ± 3 1.1 standard deviation. Most the cases of PROM were in the gestational age group of ≥ 37 weeks account 90% and those gestational age ≤ 34 weeks account 7.6%. There were delaying deliveries of prom cases more than 12 hours with gestational age of 34 weeks (p-10.3, 95%CI 2.5, 42.6) the reason was patients admitted for conservative treatment (Table 2).

		Delivery ≤ 12hrs (172) (%)	Delivery > 12hrs (250) (%)	RR	95%CI	P value
Primigravid		93(54)	145(58)	1.1	0.9,1.2	0.502
Multigravid		79(46)	105(42.8)	0.9	0.8,1.2	
Abortion		5(2.9)	6(2.4)	0.8	0.26,2.6	0.159
GA in wks	≤ 34	2(1.2)	30(12)	10.3	2.5,42.6	0.000
	34 - 36	5(2.9)	5(2.0)	1.1	0.8,1.6	0.501
	≥ 37	165(95.9)	215(86.0)	0.8	0.7,0.9	0.015
Mean PROm on arrival (hrs)	in	3.9 ± 2.8 standard deviation	21.9 ± 31.1 standard deviation	8.2	13,22.5,	0.000

Table 2: *Obstetric factor of PROM cases in JUTH, Ethiopia from June 1, 2015 - January 30, 2016 G.C.*

There were 32 cases of preterm premature rupture of membrane admitted to maternity ward with ≤ 34weeks of gestational age. Mother who admitted to maternity word for conservative management stayed as minimum 4 days and maximum 33 days. Longer mean duration of gestational ages at delivery were 35.5 weeks ± 0.8 standard deviation (Table 3).

GA in wks (22)	Mean GA at admission (wks) (range)	Mean GA at deliver in weeks (range)	Mean Latency period in days
28 - 30wks (6)	29.7 ± 0.866 (28.3 - 30.6)	30.8 ± 0.83 (29.7 - 31.71)	10.18 ± 1.59 (8 - 13)
30 - 32wks (9)	32.1 ± 0.59 (32.2 - 33.7)	33 ± 0.29 (32.7 - 33.28)	18.5 ± 1.51 (17 - 20)
32 - 34wks (17)	34.7 ± 0.000 (34.7)	35.5 ± 0.82 (34.14 - 36.28)	16.62 ± 10.47 (4 - 33)

Table 3: *Latency period of PROM cases in JUTH, Ethiopia from June 1, 2015 - January 30, 2016 G.C.*

The ante partum morbidity for both mother and fetus of cases PROM were chorioamnionitis 12.6%, cord prolapsed 3.6%, placenta abruption 5.2%. As the duration of delivery longer than 12 hours after rupture membrane, significantly increase antepartum complication, chorioamnionitis 18.8% versus 3.5% (RR, 1.85, p˛0.00, 95%CI 1.7,2), ante partum haemorrhage 7.6% versus 1.7%, RR, 2.74 (p < 0.000), cord prolapsed 4.0% versus 2.9%, RR, 1.04 (P-0.52) (Table 4).

Antepartum	Delivered ≤ 12hrs (172)	Delivered > 12hrs (250)	RR	95%CI	P value
Chorioamnionitis	6 (3.5%)	47 (18.8%)	1.85	1.68,2.0	0.00
Cord prolapse	5 (2.9%)	10 (4.0%)	1.04	0.99,1.17	0.52
Placental abruption	3 (1.7%)	19 (7.6%)	2.74	1.12,6.67	0.000

Table 4: *Ante partum morbidity of PROM cases in JUTH ,Ethiopia from June 1,2015 - January 30,2016 G.C.*

More than half of the deliver were undergo operative delivery including cesarean, forceps, vacuum and destructive deliveries. 27.3% of them had NRFPH during labor. Compared to those delivered after 12 hours and within 12 hours, NRFHP 34.4% versus 16.9% (p-0.000), operative vaginal deliver 14% versus 7% (p-0.0.024), cesarean deliveries 46% versus 37.2% (p-0.0.073) show that operative deliveries, and NRFHP were significantly increased with duration of rupture of membrane (Table 5).

Delivery	Delivered ≤ 12hrs (172)	Delivered > 12hrs (250)	RR	95%CI	P value
NRFHP	29 (16.9%)	86 (34.4%)	1.6	1.4,1.8	0.000
Failed Induction	8 (6.95%)	18 (7.2%)	.90	0.6,3.4	0.720
Cesarean delivery	64 (37.2%)	115 (46.0%)	1.14	1.0,1.7	0.073
Operative vaginal	12 (7.0%)	35 (14.0%)	1.86	1.0,1.7	0.024

Table 5: *Labor and delivery of PROM cases in JUTH, Ethiopia from June 1, 2015 - January 30, 2016 G.C.*

Contributing factor for neonatal admission to intensive care unit by multivariate analysis show that delivery before 34 weeks more contribute for NICU admission RR 4 (p-0.000) when compare to that of duration of rupture of membrane (Table 6).

Variable	Admitted To N ICU		Univariate		Multivariate analysis		
	Yes (102)	No (320)	P value	95%CI	RR	95%CI	P value
GA ≤ 34wks	28 (87.5%)	4 (12.5%)	3.5	1.4,2.4	4	1.2,2.2	0.000
Delivered > 12hrs	83 (33.2%)	167 (66.2%)	4.0	2.3,6.9	4	2.3,6.9	0.191

Table 6: *Neonatal admission to NICU of prom cases in JUTH, Ethiopia from June 1, 2016 - January 30, 2016 G.C.*

Contributing factors for increasing poor post-partum maternal outcome by univariate analysis were PROM > 12 hours RR 1.8, P-0.011 and those their monthly income ≤ 1200birr RR, 0.69, (p,0.108). By multivariate analysis PROMε12 hours RR 1.9, P-0.015 was significantly increase poor maternal outcome those compare to monthly income ≤ 1200birr RR, 0.69, (p,0.108). Most patients with gestational age ≤34 weeks delivered after 12 hours PROM for the reason of conservative inpatient management (Table 7).

Variable	Post-partum outcome		Univariate	P value	Multivariate		P value
	Poor (114)	Good (308)	RR		RR	95%CI	
Income ≤ 1200	67 (56%)	207 (34.3%)	0.69	0.108	0.6	0.4,0.9	0.028
PROM > 12hrs	79 (73.7%)	171 (51.3%)	1.8	0.011	1.9	1.1,1.3	0.015
Gestational Age ≤ 34wk	17 (53.1)	15 (46.9%)	3.4	0.001	2.8	1.3,5.6	0.008

Table 7: *Poor maternal outcome of PROM cases in JUTH, Ethiopia from June 1, 2015 - January 30, 2016 G.C.*

From all delivery neonatal morbidity were RDS (7.1%), NEC (2.2%), PNA (6.6%), MAS (14.4%), 5th minute APGAR score less than 7 (16.4%), neonatal death 4.3% and perinatal mortality rate were 93 in 1000 delivers As the duration of rupture membrane longer than 12 hours hypoglycemia 27.2% versus 7%, RR 1.2 (p-0.000), RDS 8.8% versus 4.7%, RR 1.9 (p < 0.109), neonatal sepsis 21.2% versus 9.3% RR 2.6 (p-0.002), NEC 4.4% versus 0.6% RR 13 (p < 0.023), and MAS 18.8% versus 8.1% RR 1.6 (p < 0.033), were increased (Table 8).

Perinatal morbidity	PROM duration		RR	95%CI	P value
	Deliver < 12 hrs (172)	Deliver > 12hrs (250)			
5th APGAR < 7	13 (7.6%)	56 (22.4%)	1.2	1.1,1.18	0.000
Hypoglycaemia	12 (7.0%)	68 (27.2%)	3.6	1.7,7.6	0.000
Me conium aspiration syndrome	14 (8.1%)	47 (18.8%)	1.6	1.1,3.1	0.033
Neonatal sepsis	16 (9.3%)	53 (21.2%)	2.6	2.7,5	0.002
Respiratory distress syndrome	8 (4.7%)	22 (8.8%)	1.9	.85,4.5	0.109
Perinatal asphyxia	9 (5.2%)	19 (6.83%)	3.5	1.2,10.5	0.024
Necrotizing enterocolitis	1 (0.6%)	11 (4.4%)	13	1.7,95.9	0.023
Neonatal death		18 (7.2%)			
stillborn	1 (3.4%)	13 (2.24%)	1	0.85,1.8	0.635

Table 8: *Perinatal morbidity versus latency of PROM cases in JUTH, Ethiopia from June 1, 2015 - January 30, 2016 G.C.*

Maternal anemia was 51.5% among 268 deliveries who post deliver HCT were determined. Other maternal morbidity after deliver were endometritis (26.16%), wound infection (22.7%), complete wound dehiscence (1.2%). As the duration of delivery longer than 12 hours after rupture of membrane maternal morbidity were also increased: Endometritis 14.8% versus 3.5% RR 3.3, (p-0.00), wound infection 22% versus 9.3% RR 4.2 (p-0.00),wound dehiscence 1.2%, anemia 31.94% versus 18.72% RR 1.8 (p < 0.020). The maternal hospital stays were significantly related with duration of rupture of membrane with R = 4.9 (p-0.028) (Table 9).

Post-partum morbidity	Deliver ≤12 hrs (172)	Deliver > 12hrs (250)	RR	95% CI	P value
Post-partum anemia	32 (18.72%)	80 (31.94%)	1.8	1.14,2.9	0.020
Endometritis	6 (3.5%)	37 (14.8%)	3.3	1.8,9.8	0.000
Wound infection	16 (9.3%)	55 (22%)	4.2	1.4,4.0	0.000
Wound dehiscence	0	3 (1.2%)			
Mean maternal hospital stay in days	2.3 ± 2.1	4.8 ± 3.2	4.9	1,9.9	0.028

Table 9: *Maternal morbidity versus duration of PROM cases in JUTH, Ethiopia from June 1, 2015 to January 30, 2016 G.C.*

Discussion

The incidence of premature rupture of membrane in JUTH is 17.6% of all pregnant women presenting to the hospital in third trimester after 28 weeks of gestational age. The incidence of preterm premature rupture of membrane in JUTH 1.75% of all PROM in JUTH. This finding is higher than to previous studies. Prospective research done in Pakistan shows that pre labor rupture of the fetal membranes occurs in 2% of all births and 40% of all preterm births [12]. Similarly, retrospective research was done in tertiary hospital of Nigeria showing an incidence of 4.2% for premature rupture of fetal membranes in general and 3.3% for preterm premature rupture of fetal membranes of all deliveries [13].

PROM complicates approximately 3 percent of preterm pregnancies,10% of term pregnancy in USA [1,2]. The reason for higher incidence is all PROM cases referred to JUTH for induction and inpatient management from different nearby health institution.

This study showed that majority of women (72.7%) were in the age group 21 - 30 years old. which is similar to Study was done on PPROM in Pakistan show that there was wide variation of age ranging from a minimum of 20 - 40 years. The mean age was 30 + 3.1 years [12]. Retrospective study done in Nigeria also show that incidence at the mid-reproductive age group of 26 - 30 years (43%) almost comparable to this study [13].

In this study 75.2% of those delivered after 12 hours of premature rupture of membrane had income of bellow $1.9 (1200birr) RR 1.5, P-0.000 this may be due to delay transportation to hospital lack of payment, similar study done in :mostly patients belonged to the poor class in 72% cases followed by middle class in 21% and upper class 7% [11-13].

This study revealed that about 56.4% of women were primigravida which is differ from other studies and about 58% of those delivered after 12 hours of premature rupture of membrane were primigravida RR 1.1, P-0.502. Retrospective study done in Nigeria show that 67.1% was recorded in multigravida while 29.1% was recorded in primigravida [13]. The reason may be primigravid is prone to different pelvic infection.

Most the cases of PROM were in the gestational age group of ≥ 37 weeks account 90% and those gestational age ≤ 34 weeks preterm premature rupture of membrane account 7.6% from PROM cases. There were delaying deliveries of prom cases more than 12 hours with gestational age of 34 weeks (p-10.3, 95%CI 2.5, 42.6) the reason was patients admitted into word for conservative treatment.

In this study there were 32 cases of preterm premature rupture of membrane admitted to maternity ward with ≤ 34 weeks of gestational age. Mother who admitted to maternity word for conservative management stayed as minimum 4 days and maximum 33 days. Longer mean duration of gestational ages at delivery were 35.5 weeks ±0.8 standard deviation this consistent with most of the study: study in patients with PPROM, who were managed expectantly, 5 1.66% delivered within 48 hours and 14.16% remained undelivered after a week from presentation [6,12,13].

In this study ante partum morbidity for both mother and fetus of cases PROM were Chorioamnionitis 12.6%, cord prolapsed 3.6%, placenta abruption 5.2% which is consistent with study done in Pakistan, 16 cases of Preterm Premature Rupture of Membrane findings revealed septicemia in 12% cases and chorioamnionitis in 12% cases [12].

As the duration of delivery longer than 12 hours after rupture membrane, significantly increase antepartum complication, Chorioamnionitis 18.8% versus 3.5% (RR, 1.85, p_0.00), ante partum hemorrhage 7.6% versus 1.7%, RR, 2.74 (p < 0.000), cord prolapsed 4.0% versus 2.9%, RR, 1.04 (P-0.52) higher than similar study University of Mississippi Medical Center, were randomized to receive oxytocin induction (n = 57) or observation chorioamnionitis occurred more often (16% vs 2%, p-0.007 [14,15]. The PPROMT trial the expectant management group had higher risks of antepartum or intrapartum hemorrhage, (RR 0.6, 95% CI 0.4 - 0.9), intrapartum fever (0.4, 0.2 - 0.9) [11]. The reason for higher antepartum morbidity may be delay delivery of PROM cases at home or at hospital depend on local protocol as induction start after premature membrane of eight hours in JUTH.

In this study more than half of the deliveries were undergo operative delivery including cesarean, forceps, vacuum and destructive deliveries. 27.3% of them had NRFPH during labor. This is consistent with research done in India REWA show that most common indication for caesarean section was fetal distress due to hyper stimulation or oligohydramnios (25.6%) and 37.2% of them delivered by cesarean section [11] and Research done in Oman Patients with AFI < 5 cm demonstrated greater frequency of C/S delivery for non-reassuring fetal tests (23% vs 2.8%) (p = 0.001) [14,15].

In this show that compared to those delivered after 12 hours and within 12 hours, NRFHP 34.4% versus 16.9% (p-0.000), operative vaginal deliver 14% versus 7% (p-0.0.024), cesarean deliveries 46% versus 37.2% (p-0.0.073) show that operative deliveries, and NRFHP were significantly increased with duration of rupture of membrane.

Contributing factor for neonatal admission to intensive care unit by multivariate analysis show that delivery before 34 weeks more contribute for NICU admission RR 4 (p-0.000) when compare to that of duration of rupture of membrane.

Contributing factors for increasing poor post-partum maternal outcome by univariate analysis were PROM > 12 hours RR 1.8, P-0.011 and those their monthly income ≤ 1200birr RR, 0.69, (p,0.108). By multivariate analysis PROM > 12 hours RR 1.9, P-0.015 was significantly increase poor maternal outcome those compare to monthly income ≤ 1200birr RR, 0.69, (p,0.108). Most patients with gestational age ≤ 34 weeks delivered after 12 hours PROM for the reason of conservative inpatient management.

In this study from all delivery neonatal morbidity were RDS (7.1%), NEC (2.2%), PNA (6.6%), MAS (14.4%), 5th minute APGAR score less than 7 (16.4%) are comparable with different similar study: study done in Pakistan, fetal distress in 4% cases, cases, necrotizing enter colitis in 2% cases, hypoxia in 9% cases [7,8,12].

In this study neonatal death 4.3% and perinatal mortality rate were 93 in 1000 deliveries which is higher than similar study fetal death occurs in 1% to 2% of cases [7,9,13]. The reason may be this study include all gestational age of PROM cases and delay deliveries may also contribute for the morbidity.

As the duration of rupture membrane longer than 12 hours hypoglycemia 27.2% versus 7%, RR 1.2 (p-0.000), RDS 8.8% versus 4.7%, RR 1.9 (p < 0.109), neonatal sepsis 21.2% versus 9.3% RR 2.6 (p-0.002), NEC 4.4% versus 0.6% RR 13 (p < 0.023), and MAS 18.8% versus 8.1%RR 1.6 (p < 0.033), were increased in this study. when compare to similar studies most of the patients of this study were from rural area, delay initiation of antibiotic prophylaxis and delivery may contribute for the morbidity [7,9,11,13].

Maternal anemia was 51.5% among 268 deliveries who post deliver hematocrit were determined. Most the patients did not have antepartum hematocrit, difficult to conclude all of anemia cases was due to sepsis. Other maternal morbidity after deliver were endometritis (26.16%), wound infection (22.7%), complete wound dehiscence (1.2%) Research done in Jimma university on maternal post operation

the overall surgical site infection rate was 11.4% among the total 770 women studied which twice than in this study finding the reason may be PROM is one of the risk factor for wound infection, the previous include all cesarean deliveries [17].

As the duration of delivery longer than 12 hours after rupture of membrane maternal morbidity were also increased: Endometritis 14.8% versus 3.5% RR 3.3, (p-0.00), wound infection 22% versus 9.3% RR 4.2 (p-0.00), wound dehiscence 1.2%, anemia 31.94% versus 18.72% RR 1.8 ($p < 0.020$). This findings are higher than similar study [11,12,16]. The reason may be delay arrival of hospital, delay initiation of antibiotics and deliver. The maternal hospital stays were 4.8 ± 3.2 verses 2.3 days ± 2.1 significantly correlated with duration of rupture of membrane with $F(1,9.9) = 4.9$ (p-0.028) and correlation coefficient of 0.47 which is consistent with similar research [6,11,13].

Conclusion

The overall hospital incidence was 14.6% which was considered to be high as compared to the universal incidence.. Early delivery will decrease antepartum morbidity than conservative management for those indicated.

Depend upon this study conservative management of those gestation ages less than 34 weeks will decrease neonatal intensive care admission.

Early delivery will decrease operative delivery than conservative management.

Shorting of duration of premature rupture of membrane will decrease maternal infection, will decrease hospital stay.

Recommendations

A larger study is needed to establish the difference in incidence, management protocol of premature rupture of fetal membrane in delivery and maternity health care settings. In addition, prematurity outweigh the duration of premature rupture of fetal membrane vise verse for the mother, so how long hospitalization require further exploration. Depend on finding leads to recommendation that physicians and nurses should pay more attention to these women and neonate who were diagnosed with the problem.

Limitation of the Study

Patients were followed until discharged from hospital; recall bias and temporal bias were the major limitations.

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