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Mini Review

Preterm Prelabor Rupture of Membranes: Prevalence, Risk Factors, and Perinatal Outcomes at John F. Kennedy Medical Center Liberia

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Abstract

Objectives: The objectives of this study are to determine the prevalence of pre term pre labor rupture of membranes, identify associated risk factors, as well as describe its impact on perinatal outcomes.

Methods: A retrospective study was conducted from June 2024 - June 2025 of patients admitted for pre term pre labor rupture of membranes. Variables such as age, parity, gravidity, history of genito-urinary tract infection, comorbidity on presentation and fetal outcome were gathered onto excel spread sheet and analyzed.

Results: One hundred seventy-four (174) cases of PPROM were identified. The mean maternal age and gestational were 25.5 years and 34.4 weeks respectively. The prevalence of preterm prelabor rupture of membrane was found to be 5.7%. About 113 (65%) of the patients had history of genital-urinary tract infections while 121 (70%) had at least one comorbidity or complication at presentation. The perinatal mortality rate was 16.7%. Lower gestational age and having at least one comorbidity or complication adversely significantly affected perinatal outcomes.

Conclusion: The prevalence of PPROM at the JFK Maternity center was similar to other findings in the subregion. Most patients had history of genito-urinary tract infection. Gestational age at presentation and having at least one comorbidity or complication at presentation are major contributors to PPROM associated perinatal mortality.

Keywords: *Preterm; Rupture of Membranes; Genitourinary Tract Infections; Prevalence; Perinatal*

Abbreviations

PROM: Pre Labor Rupture of Membranes; PPROM: Preterm Prelabor Rupture of Membrane; GUTI: Genitourinary Tract Infection; Hx: History

Introduction

Preterm pre-labour rupture of membranes (PPROM) is defined as rupture of the fetal membranes before the onset of labour in pregnancies less than 37 weeks of gestation. It accounts for approximately 2 to 7% of pregnancies globally and contributes significantly to preterm birth, neonatal morbidity, and perinatal mortality [1,2]. In low- and middle-income countries, PPROM presents a greater challenge due to limited screening and management resources, delayed presentation, and high rates of untreated genito-urinary infections (GUTIs) [3,4]. Evidences from sub-Saharan Africa indicate a rising burden of PPROM, however, published data from Liberia remains limited. This

study aimed to determine the prevalence, associated risk factors, and perinatal outcomes of PPROM at the John F. Kennedy Medical Center Maternity Hospital in Monrovia, Liberia.

Methods

This was a retrospective study conducted from June 2024 to June 2025 among patients admitted with the diagnosis of PPROM at the J.F. Kennedy Medical Center Maternity Hospital. We used the emergency room admission log book to identified all patients admitted for PPROM together with their hospital numbers. Using the hospital numbers, the patients' files were extracted from the department of medical records. Those files were opened and thoroughly reviewed and relevant variables including maternal age, gestational age, parity, history of genito-urinary tract infections, comorbidity, and perinatal outcomes were extracted and entered into excel spread sheet. Data were analyzed using Microsoft Excel. The study endeavor to fine associations between clinical characteristics or variable and perinatal outcomes with statistical significance set at a p value < 0.05.

Results

During the period under review, three thousand and fifty (3050) admissions were done. PPROM accounted for 189 patients, of which 174 files (92%) were retrieved. The age of the patients ranged from 14 to 42 yrs with the mean age of 25.5yrs. The gestational age of the pregnancies ranged for 29 weeks to 42 weeks with mean of 34.4 weeks. A total of 174 confirmed PPROM cases were identified hence the prevalence of PPROM during the period under review was found to be 5.7%.

A history of genital urinary infections was documented in 113 (65%) of the patients as shown in table 1. Majority (28%) of patients with genital urinary tract infections were from ages 14 to 19 years followed by another 25% between ages 25 to 29 years. One hundred and twenty-one (121) accounting for 70% presented with at least one comorbidity or complication as seen in table 2. About 16 of the patients accounting for 9% had history of smoking and 50% of them where between ages 20 to 24 years as seen in table 3. Table 4 compares gestational age at delivery versus perinatal outcomes in terms of good apgar, depressed fetus (asphyxiated) or poor (perinatal death). Sixty-six of the neonates accounting for 38% had gestation age less than 34 weeks, 28 had good outcomes, 27 were delivered asphyxiated and 18 had poor perinatal outcomes. Sixty-nine of the neonates accounting for 40% were deliver between 34 to 36 weeks of which 53 had good perinatal outcome, 11 were born depressed and 10 had poor perinatal outcomes. Thirty-nine neonates making up 22% were delivered at or greater than 37 weeks of which 30 had good outcomes, 10 were deliver depressed and 4 had poor perinatal outcome. Hence the perinatal mortality rate was 16.7%. Table 5 is a regression analysis looking at variables that significantly adversely affected perinatal outcome. Gestational age at rupture ($p = 0.0026$) and presence of commodities ($p = 0.031$) were significantly associated with adverse perinatal outcomes. The comorbidities include chorioamnionitis, diabetes mellitus, hypertensive disorders in pregnancy, malaria and HIV infection in pregnancy.

Age group	# of clients	Hx of GUTI	% GUTI among peers	% of GUTI
14 - 19	42	32	76%	28%
20-24	41	23	56%	20%
25 - 29	40	28	70%	25%
30-34	31	16	52%	14%
35-39	15	11	73%	10%
40-44	5	3	60%	3%
45-49	-	-		0%
Total	174	113	65%	100%
		65%		

Table 1: *Number of women with history of GUTI by age group.*

Age group	Frequency	Frequency of co-morbidity	% of co-morbidity in peers	% co morbidity in all
14 - 19	42	25	60%	21%
20-24	41	27	66%	22%
25 - 29	40	27	68%	22%
30-34	31	25	81%	21%
35-39	15	14	93%	12%
40-44	5	3	60%	2%
45-49				0%
Total	174	121	70%	100%
		70%		

Table 2: *Number of women associate with at least one co-morbidity pr age group.*

Age group	# of clients	Hx of smok	% of Smok in peers	% in all
14 - 19	42	4	10%	25%
20-24	41	8	20%	50%
25 - 29	40	2	5%	13%
30-34	31	-	0%	0%
35-39	15	2	13%	13%
40-44	5	-	0%	0%
45-49	-	-		0%
Total	174	16	9%	100%
		9%		

Table 3: *Number of women with history of smoking by age group.*

GESTATIONAL AGE VERSUS FETAL OUTCOME								
GESTATIONAL AGE	FREQUENCY	PERCENT (%)	FETAL OUTCOMES (N = 191)					
			GOOD		DEPRESSED		POOR (Perinatal death)	
			FREQ	PER (%)	FREQ	PER (%)	FREQ	PER (%)
< 34 WEEKS	66	38	28	38	27	37	18	25
34 TO 36 WEEKS	69	40	53	71.6	11	14.8	10	13.5
≥ 37 WEEKS	39	22	30	68.1	10	22.7	4	9
TOTAL	174	100%	111	58.1%	48	25.1%	32	16.7%

Table 4: *Gestational age versus prenatal outcome.*

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-0.02435922	0.341272808	-0.07138	0.943184	-0.6981838	0.64946539	-0.698183821	0.649
AGE	-0.00107348	0.006958373	-0.15427	0.877584	-0.0148124	0.01266545	-0.014812409	0.012
GRAVIDITY	0.020397112	0.041772268	0.488293	0.625991	-0.06208	0.10287418	-0.062079961	0.102
PARITY	-0.02354153	0.046508764	-0.50617	0.61341	-0.1153706	0.0682875	-0.115370553	0.068
GA	0.02928311	0.009612007	3.046514	0.002696	0.01030472	0.0482615	0.010304724	0.048
HX OF GUTI	-0.03180095	0.054275277	-0.58592	0.55873	-0.1389645	0.07536264	-0.13896453	0.075
HX OF SMOKING	-0.16471534	0.09112713	-1.80753	0.072501	-0.3446409	0.01521022	-0.344640907	0.015
CORMORBIDITY/COMPLICATION ON PRESENTATION	-0.12446545	0.057475262	-2.16555	0.031782	-0.2379472	-0.0109837	-0.237947228	-0.010

Table 5: *Variables significantly affecting perinatal outcomes.*

A simple regression analysis showed that gestational age at delivery and mother having at least one comorbidity or complication at presentation were variables that significantly statically affected perinatal outcomes.

Discussion

The prevalence of PPROM in this study (5.7%) aligns with global estimates and findings from similar resource-limited settings [1,3,4]. The mean maternal age of 25.5 years corresponds with demographics commonly seen in sub-Saharan Africa. Younger maternal age has been associated with higher PPROM risk in previous studies, though evidence remains mixed [6,7].

Infection emerged as a major associated factor, with 65% of cases reporting GUTIs. This finding reinforces existing literature describing infection as a key contributor to membrane weakening and rupture through inflammatory mediators, matrix metalloproteinases, and microbial invasion [8-10]. High prevalence of untreated or recurrent lower genital tract infections has been reported in comparable African PPROM cohorts [11,12].

Comorbidities were highly prevalent (70%) and significantly associated with poor perinatal outcomes. Prior studies confirm that complications and or comorbidities such as hypertensive disorders, anemia, or intrauterine infection worsen maternal and neonatal prognosis [13-15]. The perinatal mortality rate of 16.7% is consistent with data from other low-resource settings, where limited neonatal intensive care capacity exacerbates the risks associated with prematurity [16-20].

Lower gestational age at rupture was a strong predictor of mortality, consistent with evidences showing improved neonatal survival after 32-34 weeks due to increased lung maturity and physiological resilience [1,18]. In resource-limited contexts, lack of antenatal corticosteroids, respiratory support, and infection control significantly heightens mortality risks.

These findings emphasize the need to improve antenatal infection screening, timely management of maternal complications, and neonatal care capacity. Strengthening health systems with regard to early detection, antibiotics, corticosteroid use, and neonatal stabilization could substantially reduce the burden of PPROM-related mortality in Liberia.

Conclusion

PPROM remains a significant contributor to adverse perinatal outcomes in Liberia. High prevalence of GUTIs, comorbidities, and low gestational age at rupture were key determinants of poor outcomes. Strengthening antenatal care, infection screening, and neonatal care improvement are essential to reducing PPROM-related perinatal morbidity and mortality.

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Conflict of Interest

There is no conflict of interest to be declared.

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