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Association between Human Immunodeficiency Virus and premature rupture of membranes

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ABSTRACT

Background: Pregnant women who have PROM and their unborn children are at risk of infections. Furthermore, unborn children are at risk of cord prolapse and compression, preterm delivery, fetal deformities, fetal demise, pulmonary hypoplasia and low birth weights. The findings of association between Human immunodeficiency virus (HIV) and PROM have been inconsistent. The objective of the study was to determine the relationship between HIV infection and PROM in our setting. **Methods:** A retrospective case control study was conducted at Ndola Teaching Hospital, Zambia. Cases were women who were admitted with PROM and controls were pregnant women who were admitted for other illnesses other than PROM. Sample sizes of 148 cases and 148 controls were determined using the following information: HIV prevalence of 27% among cases, 14% among controls, 95% confidence level and a power of 80%. The Chi-square test was used to compare proportions. The level of significance was set at 5%. **Results:** The study enrolled 167 cases and 170 controls. The rate of women with PROM was lower in women of Gravidity 1 (40.7%) than in women of gravidity 2+ (54.0%). The proportion of women with PROM was highest in women of gestational age 32-35 weeks (66.7%). HIV infection was not significantly associated with PROM (p=0.729). HIV was not significantly associated with PROM (p=0.729). **Conclusions:** The lack of association between HIV and PROM may partly be due to none staging of the HIV disease.

Keywords: HIV, premature rupture of membrane

Introduction

Premature rupture of membranes (PROM) is defined as rupture of the fetal membranes before the onset of labor [1]. PROM can occur at 37 weeks or more of gestation (term PROM) or before 37 weeks of gestation (pre-PROM) [2]. In this study only term PROM was considered. Pregnant women who have PROM are at risk of infections such as chorioamnionitis, while their unborn children are at risk of fetal infection, cord prolapse and compression, preterm delivery, fetal deformities, fetal demise, pulmonary hypoplasia, and low birth weights [2]. The prevalence of PROM worldwide ranges between 2 and 10 % [3]. The findings of association between Human immunodeficiency virus (HIV) and PROM have been inconsistent.

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The study by Nakubulwa *et al* found no significant association between HIV infection and PROM [4]. However Musana *et al* found an association between HIV serostatus and PROM [5]. The relationship between HIV and PROM has been postulated to be due to increased inflammatory poly morphonuclear cells in the cervical fluid of HIV positive women [6]. To the best of our knowledge no study has been done to ascertain the relationship between HIV infection and PROM in our setting, hence, this study.

Methods

A retrospective case control study was conducted among women who were admitted in maternity B ward at Ndola Teaching hospital, Zambia between 2nd January 2016 and 27th February 2017. The cases were pregnant women who were admitted with PROM and the controls were pregnant women who were admitted for other illnesses other than PROM. In order to determine the sample size, a pilot study was conducted comprising 30 cases and 30 controls. Data obtained

from the pilot study on the proportion of HIV positive women among cases and controls was used to compute the sample size. With 27% of the cases and 14% of the controls having HIV, and considering 95% confidence level with a power of 80%, the minimum sample size was found to be 148 for the cases and 148 for the controls. The study was approved by Tropical Disease and Research Center (TDRC) ethical committee and permission to conduct the study was granted by the hospital administration. No personal identifiers were collected.A checklist was designed to collect the following data from the registers: age of the patient, parity, gravidity, gestational age, HIV status and diagnosis. The data was entered in MS Excel and analyzed using SPSS version 16.0. The Chi-square test was used to compare proportions. The level of significance was set at 5%. Logistic regression was used to determine magnitude of association. Odds ratios and their 95% confidence intervals are reported.

Results

During the period of study, there were a total of 200 cases of PROM. There were 2,883 admissions into the Maternity B ward during the same period. Thus, premature rupture of membranes constituted 6.9% of all the maternity B admissions in Ndola teaching Hospital over the study period. The study included a total number of 337 women of whom 167 had PROM and 170 had no PROM.

Figure 1 shows the distribution of PROM according to age groups. The age group 15-19 years had the lowest proportion of pregnant women with PROM (29.8%), while the highest proportion was in the 30-34 years age group (60.6%).

Table 1 shows factors associated with PROM. Gravidity (p=0.021) and gestational age (p=0.003) were significantly associated with PROM. PROM rate was lower in women of Gravidity 1 (40.7%) than in women of gravidity 2+ (54.0%). The proportion of women with PROM was highest in women of gestational age 32-35 weeks (66.7%). HIV infection was not significantly associated with PROM (p=0.729). No further analyses considering gravidity and gestational age as possible confounding factors were conducted to determine whether HIV was independently associated with PROM.

Discussion

Premature rupture of membranes from this study accounted for 6.9% of maternity admissions. This finding is similar to a finding reported in Nigeria [7].In this study HIV infection was not significantly associated with PROM. A similar finding was obtained in a study by Nakubulwa et al that showed no significant association between HIV and PROM [4]. Similar to the study by Nakubulwa et al, the HIV infected subjects used in this study were not staged according to WHO clinical staging and thus could not be assessed whether or not they had advanced HIV disease. In bivariate analyses, gravidity and gestational age were significantly associated with PROM. Women with gravidity 1 were less likely to have PROM compared to women of gravidity 2 or higher. This finding is similar to what Emechebe et al found that PROM was commoner among multiparous women than nulliparous women. This may be due to cervical incompetence as a result of trauma to the cervix from previous deliveries [7].Although age was significantly associated with PROM in bivariate analysis, it was not independently associated with PROM. The reason for this finding is unclear. This is similar to what Dars et al found [8].It was difficult to read some entries of patient's information in the registers as well as some entries were missing some key information which resulted in 33 cases of PROM being excluded from the study. Thus the missing information might have biased findings. However we were unable to determine the direction of bias. In addition, the gestational age was based on last menstrual period which is subjective.In conclusion, no association was established between HIV and PROM partly due to none staging of the HIV disease. Another study considering staging the HIV disease is recommended.

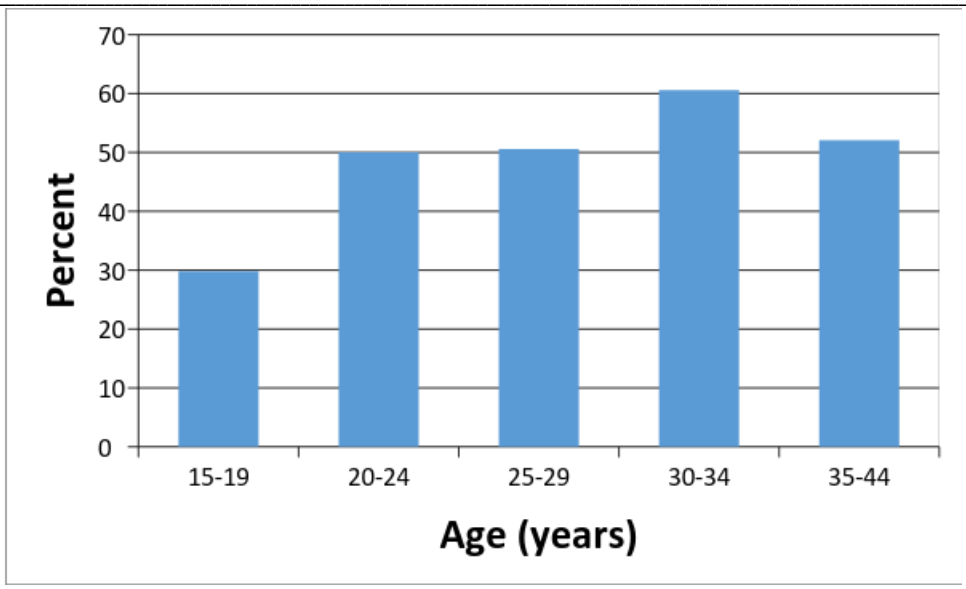

Fig 1: Distribution of PROM by age

Table 1: Factor specific rates for premature rupture of membranes

	TOTAL	PROM	No PROM	
Factor	n (%)	n (%)	n(%)	p value
Parity				
0	123 (100)	53 (43.1)	70 (56.9)	0.313
1	214 (100)	114 (53.3)	100 (46.7)	
2	45 (100)	22 (48.9)	23 (51.1)	
3	44 (100)	28 (63.6)	16 (36.4)	
4	27 (100)	13 (48.1)	14 (51.9)	
5+	35 (100)	19(54.3)	16 (45.7)	
Gravidity				
1	113 (100)	46(40.7)	67(59.3)	0.021
2+	224 (100)	121(54.0)	103(46.0)	
HIV status				
Positive	82 (100)	42(51.2)	40(48.8)	0.729
Negative	255 (100)	125(49.0)	130(51.0)	
Gestational age				
<32	47 (100)	18(38.3)	29(61.7)	0.003
32-35	78 (100)	52(66.7)	26(33.3)	
36-39	120 (100)	51(42.5)	69(57.5)	
40+	76 (100)	35(46.1)	41(53.9)	

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