Original Article

ASSOCIATION BETWEEN BACTERIAL VAGINOSIS AND PREMATURE RUPTURE OF MEMBRANE (PROM) IN PREGNANT WOMEN PRESENTING IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Premature rupture of the membranes (PROM) is a frequent pregnancy problem. One of the most frequent causes of vaginal discharge in women is bacterial vaginosis. It has been hypothesized that PROM risks and the prevalence of bacterial vaginosis in pregnancy, as well as its connection with PROM, vary across populations. The study aimed to find out the association between premature rupture of membrane (PROM) and bacterial vaginosis in pregnant women presenting in a tertiary care hospital.

Material and Methods: This was a six-month case control study performed in the Department of Obstetrics and Gynecology, Sheikh Zayed Hospital, Lahore. Sample size was 200 females; 100 females in each case and control group. Females were assessed for presence of signs of Bacterial vaginosis (BV). SPSS version 20 was used to perform statistical analysis on the obtained data.

Results: The mean age of females in this study was 27.40 ± 4.90 years with minimum and maximum age of 20 and 35 years respectively. In cases and controls the bacterial vaginosis was seen in 24(24%) and 5(5%) of the females respectively. Significant association was observed between bacterial vaginosis in study groups (p-value < 0.001). There were 6 times more chances of PROPM in presence of bacterial vaginosis.

Conclusion: Through the findings of this study, we found significant association between bacterial vaginosis and premature rupture of membrane in pregnant women. Bacterial vaginosis is preventable and curable condition. Therefore by early intervention and proper management we can minimize the risk of PROM.

Key Words: Gynecology, Pregnancy, Infection

INTRODUCTION

In low and middle- income countries maternal mortality is said to be caused by pregnancy related infections.[1] Three percent of all the pregnancies end in premature rupture of the membranes (PROM) which result in one third of every pre-mature births.[2] Eighty five percent of neonatal morbidity and mortality is associated with prematurity.[3] PROM complicates up to 20% of all deliveries and is associated with 18% to 20% of peri-natal deaths.[4]

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Unrecognized intra-amniotic infections may play a role.[5] According to research, infectious agents have an influence on either starting preterm labor, inducing early membrane rupture, or avoiding tocolysis.[4,6] Direct placental, fetal, or neonatal infection or vaginal, cervical, intrauterine, or even non-pelvic infections may lead to adverse pregnancy outcomes. Long-term neurologic damage seems to be associated with preterm birth which in turn is result of the infections mentioned above.[7] Infections is not associated with late preterm deliveries but is seen in case where birth occurs in less than 30 weeks.[8] There is an aberration of the usual vaginal flora in bacterial vaginosis (BV), with an excess of anaerobic bacteria and an absence of the typical lacto-bacillary flora. The presence of BV during labor has been linked to a poor pregnancy outcomes, particularly premature delivery.[9] Bharathi et al, has confirmed that the frequency of BV

was 15% with PROM while 5% in females without PROM ($p<0.05$).[10] Karat et al., also found that the frequency of BV was 16% with PROM while 3% in females without PROM ($p<0.05$).[11] However, Ziaei et al. observed no meaningful correlation amongst BV and PROM ($p>0.05$). Although BV is a frequent vaginitis in full pregnancy, they unable to uncover any evidence of a link among both BV and PROM.[12]

Rational of our research study is to measure the association between premature rupture of membrane (PROM) and bacterial vaginosis in pregnant women. Pakistan is a poor country. It has high maternal mortality and morbidity. Pregnant women need special attention between the start of prenatal care and the start of labor. To decrease mortality from pregnancy-related infections, prompt diagnosis and treatment, as well as better descriptive and microbiologic data, are essential. Literature has reported that BV is significantly associated with PROM but due to controversial evidences present in literature, we are unable to find this in literature. This study will confirm that whether BV is a cause of PROM. Moreover, this study will enable to implement the results that in turn will prevent females from developing PROM due to BV by initiation of early intervention in cased of BV.

MATERIAL AND METHODS

This study conducted at the Department of Obstetrics & Gynecology, Sheikh Zayed Hospital, Lahore was a case control study. The study duration was six month from Feb 3, 2017 till August 3, 2017. The sample size was 200 females; 100 females in each group. The sampling used in our research work was non-probability, consecutive sampling. The criteria for inclusion in our study was females of age 20-35 years of parity <5 presenting at gestational age 28-40 weeks (on LMP). The cases were **f**emales with PROM (as per operational definition) while control were females without PROM (no leakage). The criteria for exclusion in our study was women in active labor (cervical length>3cm on clinical examination), mal-presentations, multiple gestation, polyhydramnios, congenital fetus (on scan), history of cervical circlage, ante-partum hemorrhage (on clinical examination), eclampsia, gestational diabetes (BSR> 186mg/dl) PIH, preeclampsia, and females who already received antibiotics for PROM. After approval from 200 females who fulfilled the selection criteria were included in the study. Consent in written form was obtained from all the participants. Demographic information (name, age, parity, gestational age) were noted. Females were assessed for presence of signs of BV. Information was documented on predesigned proforma. SPSS version 20 was used to do statistical analysis on the obtained data. Quantitative data such as age and gestational age were given as a mean and standard deviation. The frequency and proportion of qualitative factors such as BV were reported. The Chi-square test was used. The relationship between BV and PROM was measured using the odds ratio. OR>1 and probability value of less than 0.05 was considered significant. For parity, the frequency and percent were determined. To account for effect modifiers, data was stratified by age, gestational age, and parity.

RESULTS

Females in this study had a mean age of 27.40± 4.90 years, with a min and max age of 20 and 35 years, correspondingly. While in cases and controls the mean age was 26.57±4.54 years and 28.24 ± 5.12 years respectively**.** (Table-1) Overall 93(46.5%) cases were 20-26 years old and 107(53.50%) were 27-35 years of age. (Fig-1) A total of 130(65%) cases had < 37 weeks of gestation and 70(35%) cases had ≥ 37 weeks of gestation. (Fig-2) The mean gestational age in this study was 34.26 ± 3.92 weeks while in cases and controls the mean gestational age was 34.56 ± 4.29 weeks and 33.97 ± 3.51 weeks respectively. (Table-2) 100(50%) females had 1-2 and while 100(50%) had 3-4 parity. (Fig-3) The mean parity was 2.54 ± 1.08 with minimum and maximum as 1 and 4. (Table-3) The overall frequency of bacterial vaginosis was seen in 29(14.50%)

females. (Fig-4) In cases and controls the bacterial vaginosis was seen in 24(24%) and 5(5%) of the females respectively. On applying Chi-square test significant association was found between bacterial vaginosis and study groups (p-value < 0.001). There were 6 times more chances of PROPM in presence of bacterial vaginosis. (Table-4) When data was stratified for age, gestational age and parity we found significant association between PROM and bacterial vaginosis (p-value < 0.05) and there were higher chances of PROM in presence of bacterial vaginosis (OR > 1). (Table-5,6,7)

Table -1: Descriptive statistics of age (years)

	Study groups	Mean	S.D	Minimum	Maximum
Age (years)	Case (n=100)	26.57	4.54	20.00	35.00
	Control (n=100)	28.24	5.12	20.00	35.00
	Total (n=200)	27.40	4.90	20.00	35.00

Table -2: Descriptive statistics of gestational age (weeks)

	Study groups	Mean	S.D	Minimum	Maximum
Gestational Age (weeks)	Case (n=100)	34.56	4.29	28.00	40.00
	Control (n=100)	33.97	3.51	28.00	40.00
	Total (n=200)	34.26	3.92	28.00	40.00

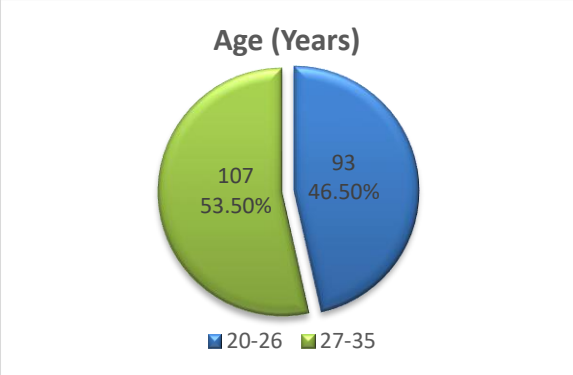

Fig-1: Age distribution of females

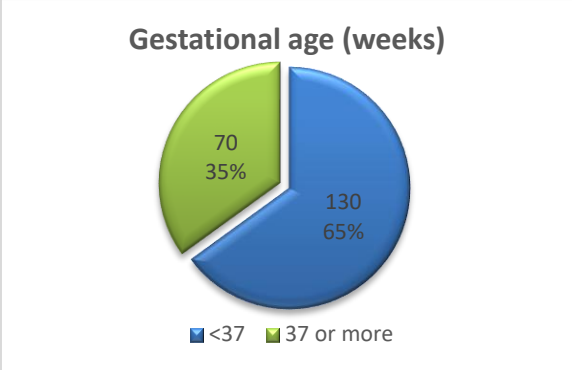

Fig-2: Distribution of gestational age (weeks)

Fig-3: Distribution of Parity

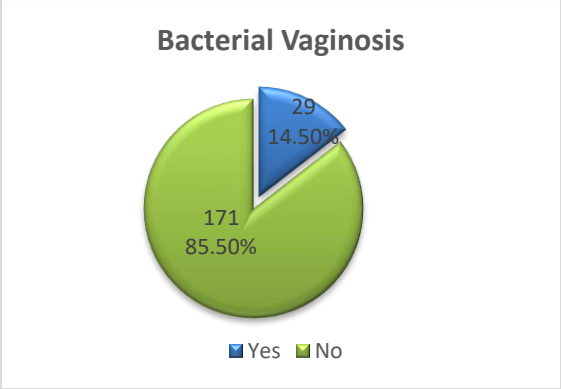

Fig-4: Frequency of bacterial vaginosis

Table -3: Descriptive statistics of Parity

	Study groups	Mean	S.D	Minimum	Maximum
Parity	Case (n=100)	2.49	1.09	1.00	4.00
	Control (n=100)	2.60	1.07	1.00	4.00
	Total (n=200)	2.54	1.08	1.00	4.00

Table -4: Comparison of bacterial vaginosis in cases and controls

		Study groups		Total	Chi-square (p-value)	Odds ratio
		Case	Control			
Bacterial vaginosis	Yes	24	5	29	14.56 (<0.001)	6.00
		24.0%	5.0%	14.5%		
	No	76	95	171		
		76.0%	95.0%	85.5%		
Total		100	100	200		
		100.0 %	100.0 %	100.0 %		

p-value<0.05 significant

Table -5: Comparison of BV in cases and controls with respect to age groups (years)

Age (years)	Bacterial vaginosis	Study groups		Chi-square (p-value)	Odds ratio
		Case	Control		
20-26	Yes	10	1	5.86 (0.014)	9.07
		18.9%	2.5%		
	No	43	39		
		81.1%	97.5%		
27-35	Yes	14	4	10.07 (0.003)	5.94
		29.8%	6.7%		
	No	33	56		
		70.2%	93.3%		

Table -6: Comparison of BVin cases and controls with respect to gestational age (weeks)

Gesta-tional age	Bacterial vaginosis	Study groups		Chi-square (p-value)	Odds ratio
		Case	Control		
<37 (weeks)	Yes	16	4	11.43 (0.001)	6.23
		27.1%	5.6%		
	No	43	67		
		72.9%	94.4%		
37 or more (weeks)	Yes	8	1	3.92 (0.048)	6.79
		19.5%	3.4%		
	No	33	28		
		80.5%	96.6%		

Table -7: Comparison of bacterial vaginosis in cases and controls with respect to parity

Parity	Bacterial vaginosis	Study groups		Chi-square (p-value)	Odds ratio
		Case	Control		
1-2	Yes	10	1	7.82 (0.005)	11.71
		19.6%	2.0%		
	No	41	48		
		80.4%	98.0%		
3-4	Yes	14	4	7.27 (0.007)	4.7
		28.6%	7.8%		
	No	35	47		
		71.4%	92.2%		

DISCUSSION

Preterm PROM is linked to a number of risk factors. When compared to white patients, black individuals had a higher incidence of preterm PROM.[13] Patients with a lower socioeconomic level, who smoke, who have a history of sexually transmitted diseases, who have had a prior preterm birth, who have vaginal hemorrhage, or who have uterine distension are also at greater risk.[14]

Bacterial vaginosis in pregnant women is a significant factor in the development of PROM due to intrauterine infections at any point in pregnancy. Intrauterine infection frequency exists to estimate pregnancies of 1 to 10 percent. Clinical chorioamnionitis complicates 1-5% of term pregnancies, but over 25% of premature births, and thereby increasing neonatal illness and death and is also a cause of maternal morbidity. A state of identification, intrauterine infection determination is the risk of infection and development of newborn clinical signs.[15]

In current study we found that in cases and controls the bacterial vaginosis was seen in 24(24%) and 5(5%) of the females. On applying Chi-square test we found significant association between bacterial vaginosis and study groups, p-value < 0.001. There were 6 times more chances of PROPM in presence of bacterial vaginosis.

A previous study found a strong association between BV and PROM.[16] Bharathi et al, has confirmed that the frequency of BV was 15% with PROM while 5% in females without PROM (p<0.05).[10] Significant association of PROM and BV was observed in our study. Karat et al., also found that the frequency of

BV was 16% with PROM while 3% in females without PROM ($p<0.05$).[11]
Another research observed the association between BV and premature birth.They observed substantial associations amongst premature births and BV diagnosed, but not amongst preterm birth and BV.[17] PROM / preterm birth rates were nearly doubled in women who had BV in early pregnancy (20.5 percent) compared to those who had BV exclusively in late pregnancy (11.5%). (10.7 percent). Bacterial vaginosis is one of the most common illnesses in women who are pregnant, with 50% of women presenting with no symptoms. The fact that infection is associated with "abortion, preterm births, prematurity, premature rupture of membranes, amniotic fluid infection, and postpartum sepsis" amplifies its clinical significance.[18] Premature rupture of membranes was shown in a previous study to be more common in pregnant women with BV.[19] The prevalence of BV was 30.5 percent in this group. There was no evidence of a link between BV and premature membrane rupture.[12] A link between bacterial vaginosis and PROM was observed in one research. Bacterial vaginosis was found in 29% of individuals with PROM and 11% of patients without PROM.[20]
Although BV is a frequent vaginitis in full pregnancy, we were unable to uncover any correlation between BV and PROM.[12] But Ziaei et al., found no considerable relationship between BV and PROM ($p>0.05$). These findings are not consistent with our study.

CONCLUSION

Through the findings of this study we found significant association between bacterial vaginosis and premature rupture of membrane in pregnant women. Bacterial vaginosis is preventable and curable condition so by early intervention and proper management we can minimize the risk of PROM. By preventing PROM we can reduce burden of poor feto-maternal related morbidities.

AUTHOR'S CONTRIBUTION

LA: Conception of idea
AA: Article writing
SA: Data collection
SA: Critically review
SN: Data analysis
ASAN: Editing

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