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ASSESSING THE CORRELATION OF BACTERIAL VAGINOSIS TO LOW BIRTH-WEIGHT NEONATES AND PUERPERAL SEPSIS IN FEMALES WITH PRETERM LABOR

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ABSTRACT

Background: Bacterial vaginosis is a condition with altered vaginal flora with gross hydrogen peroxide-producing Lactobacilli strains decreasing with excessive anaerobe growth. Also, a decrease in vaginal lactic acid content is seen with increased vaginal pH to >4.5 and increased bacterial counts to 100-1000 folds.

Aim: The present study was aimed at assessing the correlation between bacterial vaginosis to low birth-weight neonates and puerperal sepsis in females with preterm labor.

Methods: The study assessed 450 females admitted to the institute with pre-term labor. In all the subjects demographic data were recorded followed by obstetric history recording including gestational age, parity, and birth weight of the infants. The subjects were then divided into two groups: bacterial vaginosis and no bacterial vaginosis. The association of birth weight to bacterial vaginosis and of bacterial vaginosis to puerperal sepsis was assessed and compared.

Results: The study results showed a significantly higher presence of bacterial vaginosis in subjects with normal baby weight group with p=0.001. A significantly higher presence of puerperal sepsis was seen in subjects with bacterial vaginosis compared to the subjects with no bacterial vaginosis with p=0.002.

Conclusions: The present study, considering its limitations, concludes that bacterial vaginosis has a high prevalence in subjects with normal baby weight compared to small or large gestational age subjects. The study also concludes that puerperal sepsis has a significantly higher prevalence in subjects with bacterial vaginosis compared to subjects without bacterial vaginosis.

Keywords: bacterial vaginosis, low birth weight, preterm labor, puerperal sepsis

INTRODUCTION

The incidence of preterm labor varies concerning various existing literature data by various authors. Based on the National Health Portal of India, it has been reported that in 184 different countries, the rate of preterm labor is in the range of 5% to 18% of newborn babies. In the Indian scenario, among 27 million babies born every year, 3.5 million babies born are premature according to the data in 2010. In developed countries including the USA (United States of America), the incidence of preterm labor is in the range of 7% to 9%.[1]

Bacterial vaginosis is the cause of vaginitis in nearly 10% to 30% of pregnant females. In pregnant females, bacterial vaginosis is been linked to the presence of fetal fibronectin. The microorganisms associated with bacterial vaginosis are also usually seen in the amniotic fluid of females having amniotic fluid infection. Bacterial vaginosis has been linked to preterm birth. It has been hypothesized that bacteria from any of the sources pose an inflammatory reaction in the fetal membranes causing the cascade of events resulting in preterm delivery.[2]

Bacterial vaginosis is a polymicrobial condition characterized by changes in the vaginal flora with gross hydrogen peroxide-producing Lactobacilli strains decrease with excessive anaerobe growth. Also, a decrease in vaginal lactic acid content is seen with increased vaginal pH to >4.5 and increased bacterial counts to 100-1000 folds. Bacterial vaginosis is not a significant disease where exact data concerning prevalence is scarce. Owing to the lack of accurate knowledge of diagnostic tests, it has been considered that the prevalence of bacterial vaginosis is reported to be different in different studies.[3]

Bacterial vaginosis is a disease affecting females from the reproductive age group. Bacterial vaginosis is more common in the users of IUCD (intrauterine contraceptive device), increased number of sexual partners, and females with increased frequency of coitus. Various factors have been linked to alterations in the vaginal flora including abnormal uterine bleeding, contraceptive methods, number of sexual partners, sexual activity, concomitant infections, and menstruation. Whether bacterial vaginosis is a sexually transmitted disease remains controversial.[4] Epidemiology of bacterial vaginosis has few characteristics of STDs (sexually transmitted diseases), is linked to the presence of Chlamydia trachomatis and N. gonorrhea, and increases in age. Existing literature presents evidence against and in favor of the sexual transmission of bacterial vaginosis.[5]

Factors that support bacterial vaginosis as a sexually transmitted disease are sexual partner number, history of previous genital infections, and age of the affected subjects. Male partner of females having bacterial vaginosis present with bacterial vaginosis shows an increase in the rate of anaerobes and G. vaginalis isolated from the urethra compared to the controls.[6] The prevalence of bacterial vaginosis is different among the obstetric population with a range of 4% to 64%. Hormones might play a vital role in the pathogenesis of bacterial vaginosis as this condition mainly affects females in the reproductive age group and is more common with non-barrier contraceptive methods such as IUCD.[7] The present study was aimed at assessing the

correlation between bacterial vaginosis to low birth-weight neonates and puerperal sepsis in females with preterm labor.

MATERIALS AND METHODS

The present hospital-based cross-sectional clinical study was aimed at assessing the correlation between bacterial vaginosis to low birth-weight neonates and puerperal sepsis in females with preterm labor. The subjects were from the Department of Obstetrics and Gynecology of the Institute. Verbal and written informed consent were taken from all the subjects before participation.

The present study assessed 450 female subjects who reported to the institute with preterm labor during the study period. The inclusion criteria for the study were subjects with gestational age less than 37 weeks, threatened pre-term labor, intact fetal membranes, cervical dilatation equal to or more than 1cm but less than 4 cm and effacement equal to or >80%, and regular uterine contractions of four or more in 20 minutes or eight or more in 60 minutes and each lasting for more than 40 seconds. The exclusion criteria for the study were subjects that were not willing to participate in the study, PPROM, corticosteroid use, cervical cerclage, and multiple gestation.

After final inclusion, detailed histories were recorded for all the subjects followed by a comprehensive clinical examination. In all the subjects demographic data were recorded followed by obstetric history recording including gestational age, parity, and birth weight of the infants. The subjects were then divided into two groups: bacterial vaginosis and no bacterial vaginosis. The association of birth weight to bacterial vaginosis and of bacterial vaginosis to puerperal sepsis was assessed and compared.

The data gathered were analyzed statistically using SPSS (Statistical Package for the Social Sciences) software version 21.0 (IBM Corp., Armonk. NY, USA) for assessment of descriptive measures, independent t-test, Mann Whitney U test, and chi-square test. The results were expressed as mean and standard deviation and frequency and percentages. The p-value of <0.05 was considered statistically significant.

RESULTS

The present hospital-based cross-sectional clinical study was aimed at assessing the correlation between bacterial vaginosis to low birth-weight neonates and puerperal sepsis in females with preterm labor. The present study assessed 450 female subjects who reported to the institute with preterm labor during the study period. The mean age of the study subjects was 26.2±4.8 years. The majority of study subjects were from 20-34 years of age with 93.8% (n=422) subjects followed by 4.9% (n=22) subjects from 35 years and above and 1.3% (n=6) subjects from <20 years respectively. The majority of subjects were from urban residences with 83.1% (n=374) subjects and 16.9% (n=76) subjects from rural residences. The majority of subjects were above the poverty line with 82.2% (n=370) subjects and 17.8% (n=80) subjects below the poverty line as shown in Table 1.

Concerning the obstetrics characteristics of study subjects, the majority of subjects were multigravida with 80.9% (n=364) subjects and 19.1% (n=86) subjects being primigravida. The gestational age of study subjects was <33 weeks in 63.6% (n=284) subjects and 33-37 weeks in 36.4% (n=164) study subjects respectively as depicted in Table 2. For birth weight of neonates, small for gestational age was seen in 18% (n-36) neonates, normal weight was seen in 85.3% (n=384) neonates, and large for gestational age was seen in 6.7% (n=30) neonates (Table 3).

It was seen that for the association of birth weight of neonates to bacterial vaginosis, in neonates with small gestational age, bacterial vaginosis was present in 50% (n=18) of study subjects. In neonates that were large for gestational age, bacterial vaginosis was present in 26.75 (n=8) study subjects. In neonates that were normal for gestational age, bacterial vaginosis was reported in 7.3% (n=28) of study subjects respectively. This difference was statistically significant with p=0.001 as summarized in Table 4.

The study results showed that concerning the association of puerperal sepsis to bacterial vaginosis in study subjects, puerperal sepsis was seen in 66.7% (n=8) subjects with bacterial vaginosis and 33.3% (n=4) subjects without bacterial vaginosis. Puerperal sepsis was absent in 10.5% (n=46) subjects with bacterial vaginosis present and was absent in 89.5% (n=292) subjects with bacterial vaginosis absent which was statistically significant with p=0.002 (Table 5).

DISCUSSION

The present study assessed 450 female subjects who reported to the institute with preterm labor during the study period. The mean age of the study subjects was 26.2±4.8 years. The majority of study subjects were from 20-34 years of age with 93.8% (n=422) subjects followed by 4.9% (n=22) subjects from 35 years and above and 1.3% (n=6) subjects from <20 years respectively. The majority of subjects were from urban residences with 83.1% (n=374) subjects and 16.9% (n=76) subjects from rural residences. The majority of subjects were above the poverty line with 82.2% (n=370) subjects and 17.8% (n=80) subjects below the poverty line. These data were similar to the studies of Nakubulwa S et al[8] in 2015 and Guise J-M et al[9] in 2001 where authors assessed pregnant females with bacterial vaginosis and demographics comparable to the present study.

On assessing the obstetrics characteristics in study subjects, the majority of subjects were multigravida with 80.9% (n=364) subjects and 19.1% (n=86) subjects being primigravida. The gestational age of study subjects was <33 weeks in 63.6% (n=284) subjects and was 33-37 weeks in 36.4% (n=164) study subjects respectively. For birth weight of neonates, small for gestational age was seen in 18% (n-36) neonates, normal weight was seen in 85.3% (n=384) neonates, and large for gestational age was seen in 6.7% (n=30) neonates. These findings were consistent with the results of Leitich H et al[10] in 2007 and Laxmi U et al[11] in 2012 where obstetric characteristics similar to the present study were reported by the authors in their respective studies.

The study results showed that for the association of birth weight of neonates to bacterial vaginosis, in neonates with small gestational age, bacterial vaginosis was present in 50% (n=18)

of study subjects. In neonates that were large for gestational age, bacterial vaginosis was present in 26.75 (n=8) study subjects. In neonates that were normal for gestational age, bacterial vaginosis was reported in 7.3% (n=28) of study subjects respectively. This difference was statistically significant with p=0.001. These results were in agreement with the findings of Manns-James L[12] in 2011 and Nelson DB[13] in 2002 where authors suggested a significant association of birth weight of neonates to bacterial vaginosis as seen in the present study.

It was seen that concerning the association of puerperal sepsis to bacterial vaginosis in study subjects, puerperal sepsis was seen in 66.7% (n=8) subjects with bacterial vaginosis and 33.3% (n=4) subjects without bacterial vaginosis. Puerperal sepsis was absent in 10.5% (n=46) subjects with bacterial vaginosis present and was absent in 89.5% (n=292) subjects with bacterial vaginosis absent which was statistically significant with p=0.002. These results were in line with Svare JA et al[14] in 2006 and Thorsen P et al[15] in 2006 where authors suggested a similar association of puerperal sepsis to bacterial vaginosis as seen in the present study in their respective studies.

CONCLUSIONS

The present study, considering its limitations, concludes that bacterial vaginosis has a high prevalence in subjects with normal baby weight compared to small or large gestational age subjects. The study also concludes that puerperal sepsis has a significantly higher prevalence in subjects with bacterial vaginosis compared to subjects without bacterial vaginosis. However, future longitudinal studies with larger sample sizes and follow-up during the whole pregnancy are required and needed.

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TABLES

S. No	Characteristics	Number (n=450)	Percentage (%)
1.	**Mean age (years)**	26.2±4.8	
2.	**Age range (years)**		
a)	<20	6	1.3
b)	20-34	422	93.8
c)	35 and above	22	4.9
3.	**Residence**		
a)	Urban	374	83.1
b)	Rural	76	16.9
4.	**Socioeconomic status**		
a)	Above poverty line	370	82.2
b)	Below poverty line	80	17.8

Table 1: Demographic data of study participants

S. No	Obstetric characteristics	Number (n=450)	Percentage (%)
1.	**Parity**		
a)	Primigravida	86	19.1
b)	Multigravida	364	80.9
2.	**Gestational age (weeks)**		
a)	<33	286	63.6
b)	33-37	164	36.4

Table 2: Obstetric characteristics of the study subjects

S. No	Birth weight of neonates	Number (n=450)	Percentage (%)
1.	**Small for gestational age (SGA)**	36	18
2.	**Normal**	384	85.3
3.	**Large for gestational age (LGA)**	30	6.7

Table 3: Birth weight in neonates of study subjects

S. No	Birth weight of neonates	Bacterial vaginosis present		Bacterial vaginosis absent		p-value
		n	%	n	%	
1.	**SGA**	18	50	18	50	**0.001**
2.	**Normal**	28	7.3	256	92.7	
3.	**LGA**	8	26.7	22	73.3	

Table 4: Association of birth weight of neonates to bacterial vaginosis

S. No	Puerperal sepsis	Bacterial vaginosis present		Bacterial vaginosis absent		p-value
		n	%	n	%	
1.	**Present**	8	66.7	4	33.3	**0.002**
2.	**Absent**	46	10.5	292	89.5	

Table 5: Association of puerperal sepsis to bacterial vaginosis in study subjects