Original Article

Prevalence of bacterial vaginosis among antenatal attendees with abnormal vaginal discharge in a secondary health facility in Delta State, Nigeria

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ABSTRACT

Introduction: Bacterial vaginosis (BV) is the most common lower genital tract syndrome among women of reproductive age with significant adverse outcome in pregnancy. Routine screening of antenatal patients for BV is not recommended, however, it is important to determine its prevalence especially in pregnant women who complain of abnormal vaginal discharge.

Methods: This was a cross-sectional study of 340 antenatal attendees who complained of an abnormal vaginal discharge. The high vaginal swab was collected from each woman and subjected to wet film and Gram reaction. The diagnosis of BV was made using the Amsel's clinical criteria. Data were analyzed using the EPI-INFO statistical package and the results were presented as percentages and proportions.

Results: BV was detected in 105 pregnant women with abnormal vaginal discharge, therefore, giving a prevalence rate of 30.4%. Positive correlates of BV included multiple sexual partners (P = 0.0001) and cigarette smoking (P = 0.008).

Conclusion: BV is a prevalent disorder in pregnant women with abnormal vaginal discharge.

Key words: Bacterial vaginosis; Delta state; pregnancy; vaginal discharge.

Introduction

Bacterial vaginosis (BV) is one of the most common causes of abnormal vaginal discharge in women.[1] Current studies have found the prevalence of BV among non-pregnant women to range from 15–30% and 10–23% among pregnant women.[2] BV is characterized by an imbalance in the vaginal flora with a decrease in the number of Lactobacilli morphotypes, whereas the number of anaerobic bacteria morphotypes are increased. The vaginal flora changes from normally predominant lactobacillus to one dominated by sialidase enzyme-producing organisms including *Gardnerella vaginalis*, *Mobiluncus* spp., *Prevotella bivia*, *Bacteroides* spp., *Peptostreptococcus* spp., *Ureaplasma urealyticum* and *Mycoplasma hominis*, *Fusobacterium* spp., *Veillonella*, *Streptococcus viridans,* and now *atopobium vaginae*.[2] BV is usually associated with history of homogenous milky grayish discharge having fishy odor due to amines produced by anaerobes and *Gardnerella vaginalis*.[3] However, 50% of women with BV are asymptomatic.[3]

In pregnancy, there is a rise in the overall numbers of vaginal flora compared to the non-pregnant state due mainly to

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an increase in lactobacilli by approximately 10-fold.[1] Therefore, with increasing gestation and in the absence of BV, the flora tends to become more benign such that at term, the vaginal flora is dominated by organisms of low virulence (mainly lactobacilli), which poses no threat to the fetus. Any alteration in this balance such as occurs in BV result in adverse sequelae. BV has been related to some complications of pregnancy such as spontaneous miscarriage, premature rupture of membranes, preterm labor, preterm delivery, chorioamnionitis, and post-cesarean section endometritis, and wound infection.[3] BV has also been implicated in the causation of post hysterectomy cuff cellulitis, pelvic inflammatory disease, and increased susceptibility to sexually transmitted infections including the human immunodeficiency virus.

The significant impact of BV on pregnancy outcomes dictates that there should be local studies of the burden of the condition. This would provide evidence for decisions such as the place of routine screening or treatment for BV in all pregnant women or pregnant women who present with abnormal vaginal discharge. This study was aimed at determining the prevalence of BV in pregnant women who had abnormal vaginal discharge. It also sought to document the associated risk factors for BV in such women.

Methods

This was a cross-sectional study of antenatal attendees who complained of an abnormal vaginal discharge at the Central Hospital Warri, Delta State, Nigeria. Pregnant women who complained of abnormal vaginal discharge were invited to participate in the study and recruited into the study after they gave informed consent. The exclusion criteria included women who had taken antibiotics in the previous 14 days and women with intrauterine fetal death. A high vaginal swab was collected from each woman and sample of the vaginal discharge subjected to wet film and Gram reaction. The wet slide was made by adding a drop of saline and immediately examined for the presence of clue cells. The measurement of pH was done using a colorimetric indicator strip placed in contact with secretion on speculum for 1 min. A change in color of a blue pH strip to red indicating acidic fluid (pH <4.5) was noted. The diagnosis of BV was made using three out of the four Amsel's criteria.

1. Homogeneous thin grayish white vaginal discharge
2. Whiff test -Amine (fishy) odor when potassium hydroxide solution is added to vaginal secretions
3. Presence of clue cells (greater than 20%) on microscopy
4. Vaginal pH greater than 4.5.

Socio-demographic variables of the pregnant women were obtained and inputted for analysis of associations and risk factors.

A total of 365 pregnant women complained of vaginal discharge within the four months study period however only 340 of them participated in the study.

Ethical approval for this study was obtained from the research ethics committee of the Central Hospital, Warri.

Results

The age range of the subjects was between 16 and 42 years with a mean of 32.8 ± 5.3 years and median 32.5 years. Gravidity was from 1-11 with a median of 4.2, whereas parity was 0-8 with a median of 2.9 [Table 1]. BV was detected in 105 pregnant women with abnormal vaginal discharge, therefore, giving a prevalence rate of 30.4%.

Table 2 shows the number of subjects that were positive for the individual Amsel criterion. BV on the basis of three out of four Amsel's criteria was present in 105 (30.4%) subjects. Out of these 105 subjects, 100 (95.2%) had a positive Whiff test, whereas 85 (80.9%) had clue cells in the wet mount, which was further confirmed by a Gram's test.

Table 1: Socio-demographic characteristics of study participants

Characteristics	Total participants (n=340)	BV positive (n=105)	BV negative (n=235)	Test of statistical significance
Mean Age	32.8±5.3 years	31.7±2.6 years	33.8±4.8 years	χ^2=0.84, P 0.47, Not significant
Parity				
0	42 (100%)	13 (31.0%)	29 (69.0%)	χ^2=4.67, P 0.38, Not significant
1	62 (100%)	20 (32.3%)	42 (67.7%)	
2-4	175 (100%)	60 (34.3%)	115 (65.7%)	
≥5	61 (100%)	12 (19.7%)	40 (80.3%)	
Education				
No formal Education	34 (100%)	10 (29.4%)	24 (70.6%)	χ^2=0.426, P 0.623, Not significant
Primary	75 (100%)	23 (30.7%)	52 (69.3%)	
Secondary	144 (100%)	47 (32.6%)	97 (67.4%)	
Tertiary	87 (100%)	25 (28.7%)	62 (71.3%)	

The sensitivities of the individual Amsel criterion for the diagnosis of BV were 90.5%, 95.2%, 80.9%, and 85.0% for homogenous milky vaginal discharge, positive amine test, the presence of clue cells, and vaginal pH >4.5, respectively.

The univariate analysis showed that multiple sexual partners ($P < 0.0001$) and cigarette smoking ($P < 0.008$) significantly associated with BV prevalence, whereas hormonal contraceptive use ($P = 0.077$) did not [Table 3]. On further multivariate analysis, multiple sexual partners and cigarette smoking remained significantly associated with BV; AOR 0.01, 95% CI 0.002-0.041, $P = 0.0001$ and AOR 0.169, CI 0.046-0.623, $P = 0.008$, respectively.

BV had no significant association with the occurrence of premature birth ($P = 0.713$), low birth weight ($P = 0.7661$), low A/S at 1 min ($P = 0.152$), stillbirth ($P = 0.809$), and neonatal intensive care admission ($P = 0.328$) [Table 4].

Discussion

This was a cross-sectional laboratory-based study that provided information on the prevalence, predictors, and pregnancy outcome of BV in symptomatic women complaining of vaginal discharge. In this study, the overall prevalence of BV of 30.4% is in agreement with some of the local and international studies that showed different rates ranging from 10–37%.[4,5] This is, however, lower than the Lagos[6] and Ife[7] studies that found a prevalence of 64.3% and 60%, respectively using Nugent's criteria. These variations in the rate could be related to different methods of diagnosing BV employed by different studies. The evaluation of tests for BV has shown that the gram stain scoring (Nugent's) is better than most techniques, but unfortunately, only a few clinicians ever have time to use this method, whereas the microbiology staff strength is inadequate in resource-poor countries like ours to use it effectively.[7]

The Amsel's criteria is a standard method that provided a rapid and accurate diagnosis in most studies evaluating BV and demonstrated sensitivity and specificity of 96%.[2] Studies evaluating the sensitivity, specificity, positive, and negative predictive values of the various Amsel's criteria revealed variable results. In this study, the whiff test had the highest sensitivity value of 95.2%. The sensitivities of vaginal discharge, clue cells, and vaginal pH were 90.5%, 80.9%, and 85.0%, respectively. This finding is at variance with that of Farnaz Mohammadzadeh *et al*.,[8] which reported sensitivities of vaginal pH, amine test, clue cells, and gray-white discharge of 83.3%, 54%, 97.6%, and 86.7%, respectively. The study also reported that although whiff test had the greatest specificity, it had the lowest sensitivity compared to other Amsel's criteria.

Table 2: Number of subjects that were positive for the individual Amsel criterion

Criterion	Number (%)
Homogenous milky-grey vaginal discharge	95 (90.5%)
Amine test (Whiff test)	100 (95.2%)
Clue cells	85 (80.9%)
Vaginal pH >4.5	89 (85%)
≥3 Amsel's criteria	105

Table 3: Univariate analysis of risk factors of BV

Variables	BV present ($n=105$)	BV absent ($n=235$)	Chi Square
Multiple sexual partners			
Yes	79	85	$\chi^2=44.363$, df=1, $P<0.0001$
No	26	150	
Hormonal contraceptiveuse			
Yes	49	134	$\chi^2=3.131$, df=1, $P=0.077$
No	56	101	
Smoking			
Yes	6	5	$\chi^2=22.982$, df=1, $P=0.008$
No	99	230	

Table 4: Analysis of pregnancy outcomes

Variables	BV present ($n=105$)	BV absent ($n=235$)	Chi Square
Premature birth			
Yes	14	28	$\chi^2=0.135$, df=1, $P=0.713$
No	91	207	
Low Birth Weight			
Yes	10	19	$\chi^2=0.193$, df=1, $P=0.7661$
No	95	216	
Low APGAR score in 1 min			
Yes	12	16	$\chi^2=2.050$, df=1, $P=0.152$
No	93	219	
Low APGAR score in 5 min			
Yes	7	21	$\chi^2=0.495$, df=1, $P=0.482$
No	98	214	
NICU admission			
Yes	13	21	$\chi^2=0.957$, df=1, $P=0.328$
No	92	214	

Although the cause of BV is not known, there are several proposed risk factors, some of which are still disputed. These factors trigger the change from Lactobacillus-dominated flora to BV-associated flora. The positive correlates of BV that persisted at multivariate analysis after initial univariate analysis in this study were multiple sexual partners ($P = 0.0001$) and cigarette smoking ($P = 0.008$), whether previous or current. This agrees with other studies,[6,7,9] and there are several explanations. Women who smoke may have a risk behavior that would predispose them to BV and these women may not notice the malodor caused by BV. Furthermore, as one study[10] demonstrated, BV in

early pregnancy is more common among women who have stopped smoking compared to women who had never smoked. Therefore, there might be a causal relation between BV and smoking. Nicotine in the vagina/cervix could have a negative impact on vaginal flora.[10] These same studies showed that BV is more common among women who are former smokers than among those who have never smoked. There was no correlation between BV and previous use of hormone contraceptive in this study (AOR 1.38, CI 1.11-1.71, $P = 0.301$). In fact a number of studies, including a systematic review and meta-analysis have shown that hormonal contraception was associated with a reduced risk of BV.[11]

This study did not demonstrate significant impact of BV on pregnancy outcome (preterm birth $P = 0.713$, low birth weight; $P = 0.7661$, low A/S at 1 min; $P = 0.152$, stillbirth; $P = 0.809$, and neonatal intensive care admission; $P = 0.328$). This agrees with a similar study in southwest Nigeria[12] and a large study in Sweden[10] but contrasted other smaller studies, which demonstrated adverse impact of BV on pregnancy outcome. The reason for these discordant findings is not clear, but it is important to note that in selecting the sample for this study, pregnant women with obstetric complications or those with medical conditions that could affect pregnancy outcome were strictly excluded. Furthermore, following the diagnosis of BV, the women were treated, and this may have removed any possible adverse effect. It is pertinent to note that some researchers have, however, cautioned that a causal effect between BV and adverse pregnancy outcome is yet to be demonstrated conclusively.

Conclusion

BV is common among pregnant women with vaginal discharge attending the antenatal clinic in Central Hospital, Warri. The prevalence of 30.4% compared favorably with a lot of studies from developing countries. The correlation of BV prevalence with cigarette smoking and multiple sexual partners implies that public health measures and safer sex practices may contribute in controlling this disorder.

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Conflicts of interest

There are no conflicts of interest.

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