

Nugent Scores Of Female Students From Babcock University, Southwestern Nigeria

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Abstract:Background: Bacterial vaginosis is a condition of the vagina caused by an imbalance of naturally occurring bacterial flora, which allows more harmful bacteria to gain a foothold and multiply. The study was carried out to determine the prevalence of bacterial vaginosis and the effect of hygiene practices on the vagina flora. **Methodology:** One hundred and fifty self-collected vagina swabs were obtained from female students of the University, smeared, Gram stained and scored by the Nugent method. Questionnaire was also administered to each respondent to assess the possible risk factors responsible for the imbalance of the vagina flora. **Result:** The overall prevalence of BV was 22.5%, 37.3% had intermediate and 40.2% had negative Nugent scores. Among the factors analyzed, douching ($p=0.01$), multiple sex partners ($p=0.0$), change of sex partner ($p=0.00$) and at least three times a week coital frequency ($p=0.00$) had a significance correlation to the presence of BV. Age and menstrual hygiene and had no significant correlation with the prevalence of BV. **Conclusion:** There is a need to create awareness to reduce the complication that might occur in future during pregnancy and childbirth by conducting scheduled programs on health education because the study established that certain hygienic practices can be a predisposing factor to bacterial vaginosis and imbalanced vagina flora.

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Introduction

A healthy vagina normally contains many microorganisms; some of the common ones are *Lactobacillus crispatus* and *Lactobacillus jensenii*. *Lactobacilli*, particularly hydrogen peroxide-producing species, appear to help prevent other vaginal microorganisms from multiplying to a level where they cause symptoms. Bacterial vaginosis is a condition of the vagina caused by an imbalance of naturally occurring bacteria flora, which allows more harmful bacteria to gain a foothold and multiply.

Bacterial vaginosis (BV) is the most common cause of vaginal discharge in women of childbearing age, accounting for 40 to 50% of cases (Morris *et al.*, 2001). It can also be referred to as a condition whereby there is a microbial imbalance, in which a decrease in resident vaginal *Lactobacilli*, associated with the growth of anaerobic polymicrobial flora. Most women affected with bacterial vaginosis harbor *Gardnerella vaginalis*, other associated microbial population include *Bacteriodes*, *Mycoplasma hominis* and *Mobiluncus* (Hill, 1993). The mechanism by which the floral imbalance occurs and the roles of sexual activity in the pathogenesis of BV are not clear but formation of an epithelial biofilm containing *G. vaginalis* appears to play an important role (Swidsinski *et al.*, 2005). Hydrogen-peroxide producing *Lactobacilli* appear to be important in preventing overgrowth of the anaerobes normally present in the vaginal flora. With the decrease in the population of *Lactobacilli*, pH rises and massive

growth of vaginal anaerobes occurs. These anaerobes produce large amounts of proteolytic carboxylase enzymes, which break down vaginal peptides into a variety of amines that are volatile, malodorous, and associated with increased vaginal transudation and squamous epithelial cell exfoliation, resulting in the typical clinical features observed in patients with BV. The rise in pH also facilitates adherence of *G. vaginalis* to the exfoliating epithelial cells.

Prevalence of BV varies between 8% and 75%. In the general population of women, prevalence is found to be 10% in Hispanics, 6% in Asians, 23% in African-American, 30% in Indonesia, 25% in Canada, 15% in rural Brasil and 14.2% amongst a population of Nigerian women, 13% among adolescent girls, 16% in pregnant white women, 9% in non-pregnant white, 64.3% in pregnant Nigerian women (Ajani *et al.*, 2012). Bacterial vaginosis is not considered a STD, but has been associated with increase susceptibility to some other STD as a sexually related disease (Oyewole *et al.*, 2010) in which the frequency of intercourse plays a critical role. Other risk factors include low socioeconomic status, douching, antibiotic treatment for another condition, young age of coitarche, acquisition of a new sex partner and a recent history of multiple sex partners (Verstraelen *et al.*, 2010). Approximately 50-75% of women with BV show no symptoms (Schwebke, 2000). Those with symptoms often note an unpleasant "fishy" vaginal odour and a yellow or off-white vaginal discharge that is more noticeable

after sexual intercourse (Hedges *et al.*, 2006).). Bacterial vaginosis usually does not cause significant irritation of the vulva.

If undiagnosed or untreated, it might interfere with the woman reproductive health, being commonly associated with infertility, obstetric conditions such as pelvic inflammatory disease (PID), and premature rupture of membranes (PROM) (Syed *et al.*, 2004). Treatment of BV may also reduce the risk of acquiring sexually transmitted diseases (STDs), including human immunodeficiency virus (HIV) (Schwebke and Desmond, 2007). There are two prescription medications used for the treatment of BV: metronidazole which can be in oral form (500mg twice daily for seven days) or as gel that is applied to the vagina at bedtime for five days (CDC, 2006); Clindamycin is applied to the vagina at bedtime for seven day and can be taken orally (300mg twice daily for seven days). *Lactobacillus* preparations are commonly used in the treatment of bacterial vaginosis. This study was carried out to determine the prevalence of bacterial vaginosis among female students of Babcock University and the effect of some hygiene practices on the vagina flora.

Materials and Methods

The study was conducted between January and March 2014 at Babcock University, Ilishan-Remo, Ogun State, Nigeria. 150 female students aged between 16 and 27 years were randomly selected. Pregnant students were excluded from the study because their vaginal flora might differ substantially from non-pregnant students. The respondents were given a brief explanation on the procedures, and after giving informed consent, vagina hygiene practice and demographic data were collected with a simple structured questionnaire which was approved by the Babcock University Health Research and Ethic Committee (BUHREC). Self-collected high vagina swabs were collected and transported to the Microbiology laboratory immediately for diagnosis.

Diagnosis of BV

The diagnostic criterion developed by Nugent *et al.*, (1991) was employed. Swabs of vagina secretions were rolled on a clean, labelled glass slide, air-dried

and Gram stained. The slides were evaluated for the following morphotypes under the microscope using oil immersion: large Gram-positive rods (*Lactobacillus* morphotypes), small Gram-variable rods (*Gardnerella vaginalis* morphotypes), small Gram-negative rods (*Bacteroides* morphotypes), curved Gram-variable rods (*Mobiluncus* morphotypes) and Gram-positive cocci. *Gardnerella vaginalis* and *Bacteroides* were grouped together because of their similar appearance on Gram stain. Five oil immersion fields were examined in order to gain a better sense of the vaginal micro flora as well as the field-to field variability that is typically encountered. A score of zero to three is considered to be normal, four to six is considered intermediate, while seven to ten is defined as BV.

Statistical Analysis

Data were entered and analyzed using the Epi Info version 3.5.1 software. Chi-square test was used to determine the significance of associations between categorical variables. The prevalence was calculated with a confidence interval of 95% ($p < 0.05$).

Results

Out of the 150 samples collected, 142 had complete data and were available for statistical analysis. The mean age of the women involved was 20 years with a standard deviation (SD) of 2.5. The prevalence of BV in this study was 22.5% (32 of 142), 40.1% (57 of 142) were negative while 37.3% (53 of 142) were intermediate.

BV rates were relatively high across all age groups, ethnicity (table1) but with no statistical significant difference ($p = 0.69, 0.97$ respectively). It was also observed that prevalence was higher in Muslim 25% (1 in every 3 women) than in Christian women 5.6% (1 out of 17) though this was also not significant statistically ($p = 0.07$).

BV rates were higher in women who practice douching 36.2% (Table 2: 17 of 30) than those who do not 15.8% (15 of 80). The prevalence of BV is 70.4% in students who had more than one sexual partner, 76.4% among students who changed their sex partner recently (Table 4). The use of tampons (62.5%) also showed a higher prevalence to having BV than using sanitary towel (Table 3).

Table 1: Prevalence of BV among the student by sociodemographic characteristic

	Positive n(%)	Negative/Intermediate n(%)	p
All Student	22.5	77.5	
<u>Age</u>			
16 – 19	12 (23.5)	39 (76.4)	
20 – 23	16 (20.5)	62 (79.5)	
24 – 27	4 (30.8)	9 (69.2)	0.69
<u>Ethnicity</u>			
Hausa	2 (25)	6 (75)	
Yoruba	19 (22.1)	67 (77.9)	
Igbo	11 (22.9)	37 (77.1)	0.97
<u>Religion</u>			
Islam	31 (25)	93 (75)	
Christian	1 (5.6)	17 (94.4)	0.07

Table 2: Prevalence of BV in relation to douching

Douching	No of Student Positive for BV (%)	No of Student Negative/Intermediate (%)	Total no of women studied (%)
Yes	17 (36.2)	30 (63.8)	47
No	15 (15.8)	80 (84.2)	95
	32 (22.5)	110 (77.5)	142(100)

$X^2 = 6.36$, $df = 1$, p value = 0.01, Odds ratio = 3.02, Relative risk = 2.29

Table 3: Prevalence of BV in relation to sanitary protection practiced

SPP	No of Student Positive for BV (%)	No of Student Negative/Intermediate (%)	Total no of women studied (%)
Sanitary Pads	34 (25.3)	100 (74.7)	134
Tampons	5 (62.5)	3 (37.5)	8
	39 (27.4)	110 (72.6)	142 (100)

$X^2 = 3.53$, $df = 1$, p value = 0.06, Odds ratio = 0.20. Relative risk = 0.41, SPP – Sanitary Protection Practiced

Table 4: Prevalence of BV in relation to Coital Practice

	No of Student Positive for BV (%)	No of Student Negative/Intermediate (%)	p
NSP			
None	9 (8.2)	101 (91.8)	
1 - 2	19 (70.4)	8 (29.6)	
3 - 5	4 (80)	1 (20)	0.00
CSPR			
Yes	13 (76.4)	4 (23.6)	
No	19 (15.2)	106 (84.8)	0.00
NCFW			
None	20 (16)	105 (84)	
1 - 2	11 (68.8)	5 (31.2)	
3 - 5	1 (100)	0	0.00

NSP – number of Sexual Partners, *CSPR* – change of sex partner recently, *NCFW* – Number of Coital Frequency per Week

Discussion

Using Nugent's score as the gold standard, a prevalence of 22.5% was found in the population studied, which is considered to be relatively high and consistent with the study Yen *et al.*, (2003) which found BV in non pregnant women to be 28%. While in a study conducted in Gambia on African women (Edward *et al.*, 2005), the prevalence of BV was higher (47.6%). This may be as a result of the age range of women involved in the study (range 18-50) as compared to (range 16-27) in this study. Also non-statistical significant between age and BV may be as a result of the dis-proportionately higher percentage of younger women in the sample population (Ajani *et al.*, 2012); but other studies showed a directly proportional relationship exist between the prevalence of BV and age (Allsworth and Peipert, 2007).

A significant correlation occurred between BV and douching which further reveals that hygiene practices of such can be associated with imbalanced vaginal flora. Douching is dangerous, as it interferes with both the vagina's normal self-cleaning and with the naturally occurring bacteria of the vagina, which might encourage the spread or introduce infections.

The method of sanitary protection practiced such as the use of tampons can also be a predisposing factor for BV as this is being inserted into the vagina and if left for a longer period before changing it may encourage the formation of biofilms.

The presence of bacterial vaginosis was associated with women with multiple sexual partners ($p = 0.00$), women who had sex at least three times a week ($p = 0.00$) and those who changed their sex

partners recently ($p = 0.00$). Research have also unveils association between BV and sexual activity, in spite of the fact that bacterial vaginosis is not considered an STD; a greater risk for being diagnosed with this condition has been identified in patient with multiple sexual partners (Bradshaw *et al.*, 2006), which is consistent with this study.

Furthermore, male sexual partners may serve as carriers of anaerobic bacteria that cause bacterial vaginosis; one possible explanation is that the semen is alkaline and may create an imbalance in the vaginal microflora necessary for the development of BV (Ajani *et al.*, 2012; Fethers *et al.*, 2008). The vagina is mildly acidic ($pH < 4.5$) but contact with semen makes it neutral ($pH 7$) which results in the imbalance of the flora. In women who have more than one sexual partner, have sex more frequently and change their sex partner recently, it is advisable to use condom consistently because it may be useful both in preventing BV and also in reducing the likelihood of recurrences in women prone to infection.

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