Asymptomatic Bacterial Vaginosis and Associated Risk Factors among Undergraduate in a Tertiary Institution in Ogun State, Nigeria

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Abstract

Background: Bacterial vaginosis (BV) is a disease condition in women with adverse health outcomes. Proper clinical diagnosis of BV is difficult because a larger percentage of women are asymptomatic until they come down with its sequaele. Therefore, this study was aimed to determine the prevalence of asymptomatic BV among undergraduate female students of Babcock University in Ogun State Nigeria and to detect the risk factors associated with it. **Materials and Methods:** A descriptive cross-sectional study involving 200 asymptomatic undergraduate female student of Babcock University from September 2018 to November 2019. Information was obtained, using structured questionnaire, on sociodemographic and behavioral characteristics considered risk factors of the respondents. High vaginal swabs were collected from each of the participants, made into thin smears and were Gram stained. Modified Nugent criteria were used to analyze the specimen and make a diagnosis of BV. The data were analyzed by IBM Statistical Package for the Social Sciences software version 20 (SPSS Chicago, IL, USA). **Results:** The prevalence of asymptomatic BV among the study participants was 35/200 (17.5%). Vaginal douching (Odd's ratio [OR] = 3.3, 95% confidence interval [CI]: 1.49–7.33), smoking (OR = 3.2, 95% CI: 1.16–8.80), previous history of reproductive tract infection (OR = 16, 95% CI 3.99–64.11), and wearing of nylon underwears (OR = 5.21, 95% CI: 1.23–21.88) were the factors with increased likelihood of BV on multivariate analysis. **Conclusion:** The prevalence of BV among the asymptomatic population in this study is high. The risk factors found suggest that there should be preventive program strategies such as education on risky behaviors.

Keywords: Asymptomatic, bacterial vaginosis, prevalence

Introduction

Bacterial vaginosis (BV) is a clinical condition caused by vaginal microbiota that is lactobacilli-deficient and dominated by BV-associated organisms such as Ureaplasma urealyticum, Gardnerella vaginalis, Peptostreptococcus, Bacteroides, Mobiluncus, Prevotella, Fusobacterium, Eubacterium, and Veillonella.[1] The decrease in lactobacillus predominantly those producing hydrogen peroxide leads to decreased lactic acid production in the vagina.[2,3] This will result in increased alkalinity of the vagina, thereby favoring the increase in growth of the other species of bacteria.[2] BV is characterized by foul smelling vaginal discharge and is the most common cause of vaginal discharge in women of child-bearing age.[3] BV varies from 15% to 30% among nonpregnant women in developed countries.[4-7] A study in India reported 32.8% while 21%–29% was reported from Kenya.[2,8,9] In Nigeria, the prevalence

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reported from various studies in different parts of the country varies from 17% to 51%.[1,2,10-13] BV is associated with many sequaele such as endometritis, pelvic inflammatory disease, cervicitis, HIV, postoperative infection, and adverse pregnancy outcomes.[1,2] BV has also been associated with the risk of sexually transmitted infection (STI). Proper determination of BV is difficult because a larger percentage of women are asymptomatic.[14] The pathogenesis of asymptomatic BV is not well understood, but it was reported that treatment of asymptomatic BV has led to reduction in Chlamydia infection.[15] Considering the risk associated with BV and improved health outcome reported in treatment of people with asymptomatic BV, then the knowledge of the prevalence of asymptomatic BV is important in reducing the disease burden. Therefore, the aim of this article was to determine the prevalence of asymptomatic BV among undergraduate female students of Babcock University in Ogun State Nigeria and to detect the risk factors associated with it.

MATERIALS AND METHODS

This is a cross-sectional study in which 200 asymptomatic undergraduate female students of Babcock University were enrolled between September 2018 and November 2019. Ethical approval was obtained from Babcock University Health Research ethics committee Ilishan-Remo, Ogun State, Nigeria. The minimum sample size was calculated by Leslie Fischer's formula.[16] The prevalence of 14.6% from a previous study was used and confidence limit was set at 5%.[17] Participants were recruited by simple random technique. The inclusion criteria were women of child-bearing age 15–35 years while exclusion criteria were vaginal discharge, itching, pain during intercourse and use of antibiotics in the last 6 weeks. Participants filled written informed consent while Semi-structured interviewer-administered questionnaire was used to obtain sociodemographic and associated predisposing factors to BV. High vaginal swabs were collected from each of the participants and made into thin smears on glass slides. A Gram stain was done on smears made from specimens and then viewed under the light microscope at ×40 and ×100 respectively. Nugent scoring criteria was used to analyze specimen.[18] scores of 7–10 were indicative of BV, scores of 4–6 were intermediate and scores of 0–3 were negative. Using the modification to the Nugent criteria, scores of 4–6 with the presence of clue cells were considered positive while scores of 4–6 with the absence of clue cells were considered negative.[19] The data were analyzed by IBM Statistical Package for the Social Sciences software version 20 (SPSS Chicago, IL, USA). The categorical variables were presented in proportions while test of significance was further analyzed using Chi-square.

RESULTS

A total of 200 respondents participated in the study. Table 1 describes the sociodemographic and bivariate analyses of the characteristics of the 200 participants. The mean age was 21 ± 2.74, with range of 17–25 years. The prevalence

Table 1: Sociodemographic and behavioural characteristics of the participants

Variables	Bacterial vaginosis (%)		χ^2	df	P
	Yes	No			
Age					
10-20	11 (13.1)	73 (86.9)	1.95	1	0.16
21-30	24 (20.7)	92 (79.3)			
Vaginal douching					
Yes	25 (26)	71 (74)	9.33	1	0.002
No	10 (9.6)	94 (90.4)			
IUCD					
Yes	0	165 (100)	0	0	0
No	0	165 (100)			
Smoking					
Yes	7 (36.8)	12 (63.2)	5.4	1	0.02
No	28 (15.5)	153 (84.5)			
Previous RTI					
Yes	8 (72.7)	3 (27.3)	24.59	1	0.00
No	27 (14.3)	162 (85.7)			
Nylon underwear					
Yes	4 (50.0)	4 (50.0)	6.09	1	0.014
No	31 (16.1)	161 (83.9)			
Use of condom					
Yes	5 (14.7)	29 (85.3)	0.22	1	0.62
No	30 (18.1)	136 (81.9)			
Age at first sex					
No sex	30 (18.4)	133 (81.6)	0.62	2	0.73
≤18	2 (16.7)	10 (83.3)			
>18	3 (12.0)	22 (88.0)			
Present sex partner					
None	30 (18.4)	133 (81.6)	11.45	2	0.003
1	3 (8.6)	32 (91.4)			
2	0	0			
>2	2 (100.0)	0			

IUCD: Intra-uterine contraceptive device, RTI: Reproductive tract infection

of asymptomatic BV among the study participants was 35/200 (17.5%).

Participants practicing vaginal douching, smoking, with previous history of STI and wearing nylon underwears had increased likelihood of having BV on logistic regression [Table 2].

DISCUSSION

The prevalence of BV in this index study is similar to previous reports in Nigeria by Ibrahim *et al.*, Adinma *et al.*, and Aduloju *et al.*, respectively.[1,12,20] However, the prevalence rate documented by Awoniyi *et al.*, Olowe *et al.*, and Odunuga *et al.*, respectively, were higher than the prevalence of this study.[21-23] In sub-Saharan Africa, higher prevalent rates such as (32.5%) in Zimbabwe, (37%) in Kenya, and (38%) in Botswana were reported.[24-26] The variations in prevalence rate might be attributed to a lot of factors such as study population,

Table 2: Logistic regression of the participants

Variables	P	95% CI	OR
Vaginal douching			
Yes	0.074	1.49-7.33	3.3
No*			
Smoking			
Yes	0.025	1.16-8.80	3.2
No*			
Previous RTI			
Yes	0.00	3.99-64.11	16
No*			
Nylon underwear			
Yes	0.025	1.23-21.88	5.21
No*			

*Reference category. OR: Odds ratio, CI: Confidence interval, RTI: Reproductive tract infection

genital hygiene, sexual activities, and sociodemographic characteristics of individuals.[24,27,28] The prevalence derived from this study is quite high for asymptomatic population. Previous studies have also reported high prevalence rates among asymptomatic individuals.[1,29] Although there are a lot of arguments about whether to screen or treat asymptomatic BV or not.[15] Considering the high prevalence observed among the asymptomatic in this and other studies, the adverse outcome of this condition individuals in women of childbearing age, screening, and treatment of asymptomatic BV will go a long way to reduce its burden.

Majority of the participants (15%) with BV in this study had never had sex before. This finding is consistent with previous studies that had reported BV among women that had never had sex before.[24,27,30] These findings suggest that sex might not be a necessity for BV. However, the actual relationship of sexual activity or sex behaviors with BV are not very clear because, as much as, BV has been found in people who had no sex before, so also factors such as multiple sex partners and new present sex partners have been reported to be associated with BV.[24,30] In this study, present number of sex partners lost its statistical significant with BV on multivariate analysis. This finding is consistent with that of Bitew *et al.*[24]

Participants with a history of reproductive tract infections (RTI) had 16 times increased likelihood to have BV in our study. This finding is similar to previous reports from Kenya and Rwanda.[31] The explanation for this might be the alteration in vaginal PH from acidity to alkalinity by the metabolism of the pathogens responsible for RTIs.

Participants who douched were 3.3 times more likely to have BV in this present study. Our findings are in congruent with previous studies that have reported strong statistical relationship between douching and BV.[32-35] However, some other literatures did not find any association between douching and BV.[1,36] The explanation given by these researchers is that issue of douching and BV maybe more related to the agents or substances used for douching.[1] Smoking was also

found to be associated with BV in this study and this finding is similar to that of Manandhar *et al*,[34,37] although another study in Sweden did not find a significant association.[34,38] However it has been reported that smoking reduces hydrogen peroxide–producing lactobacilli and this might be a good explanation for the association of smoking and BV.[34] Our study did not find any association between condom use and BV and this report is similar to that of Mascarenhas *et al*.[39] Our study is not without limitation as we did not asses treatment outcomes in participants with asymptomatic BV.

Conclusion

In conclusion, the prevalence of BV among the asymptomatic population in this study was high. Vaginal douching, previous RTI, smoking, and use of nylon underwear were associated risk factors. Therefore, screening of asymptomatic population is advocated as early diagnosis and treatment might help to reduce the adverse outcomes of BV among females.

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Conflicts of interest

There are no conflicts of interest.

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