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Prevalence of Bacterial Vaginosis among Antenatal Patients at Federal Teaching Hospital Abakaliki, South East Nigeria

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Abstract

Bacterial vaginosis (BV) is the most common cause of vaginal discharge in women of child bearing age. About half of these women are asymptomatic. Adverse outcomes are consistently associated with bacterial vaginosis in pregnancy and in the puerperium. This study, which was done to look at the prevalence, involved recruiting 230 participants, and screening them for BV using the Amsel's criteria. It is hoped that identification and treatment of these women will help prevent some of the sequela associated with BV. Restoration of the vaginal microflora by treating identified cases of BV will also help reduce the transmission of HIV and herpes simplex virus (HSV) as BV propagates their replication and vaginal shedding. Two hundred and thirty women in the age range 16 - 40 years were screened for BV. All the participants douched, soap and water being predominantly used. 55 women (23.9%) had BV based on Amsel's criteria. Women with only one sexual consort had the highest incidence of BV (51.9%).

Keywords

Prevalence, Bacterial Vaginosis, Women, Abakaliki, Nigeria

1. Introduction

Bacterial vaginosis is the most common cause of vaginal discharge in women of childbearing age [1] [2] [3] [4]. In some populations its prevalence is greater than 50 percent [1], and almost half of the affected women are asymptomatic [2] [4]. With normal physiological vaginal discharge increasing during pregnancy [5], distinguishing between a normal physiological discharge and that caused by

bacterial vaginosis is of significant interest and benefit to the mother, yet to be born baby and the Obstetrician. Observational studies have consistently shown that an association exists between bacterial vaginosis and adverse pregnancy outcome [2]. These include preterm delivery [2] [6] [7], preterm premature rupture of membranes, postpartum endometritis [8]. Bacterial vaginosis carries a five to seven fold increased risk for late miscarriage and preterm labour [5] and hence prematurity. Prematurity remains the leading cause of perinatal and neonatal morbidity and mortality [9]. Prematurity as a result of bacterial vaginosis infection can be prevented if pregnant women infected with bacterial vaginosis are identified and treated. Long standing or untreated bacterial vaginosis may lead to more serious sequelae, such as endometritis, and salpingitis [10].

Bacterial vaginosis have been recognised as a state of diminished resistance to colonization. It also renders women particularly vulnerable to the acquisition of *Trichomonas vaginalis, Neisseria gonorrhoeae*, *Chlamydia Trachomatis*, Herpes Simplex Virus 2 (HSV-2) and Human Immunodeficiency Virus-1 (HIV-1) [4] [11] [12] [13] [14] [15]. It has been documented that bacterial vaginosis propagates viral replication and vaginal shedding of the HIV-1 and HSV-2 viruses, thereby further enhancing the spread of these sexually transmitted diseases [4].

Bacterial vaginosis (BV) was previously called non-specific vaginitis because bacteria are the main etiologic agent, and an associated inflammatory response is lacking. Studies have shown that a diagnosis of BV based on symptoms alone is often inaccurate compared to diagnosis based on laboratory criteria [16] [17]. In addition, basing diagnosis solely on symptoms will miss those women who would have laboratory-confirmed diagnosis of the infection but are asymptomatic [18].

Amsel's criteria have been used for making the diagnosis of BV for many years. It combines both laboratory criteria and symptoms. The four diagnostic criteria are: a vaginal fluid pH > 4.5; >20% of epithelial cells are "clue" cells; milky homogenous adherent vaginal discharge; and a positive "whiff" test, which is an amine or "fishy" odour noted after the addition of 10% potassium hydroxide. The presence of three out of the four criteria is recommended by Amsel for diagnosis [19] [20] [21].

Risk factors for bacterial vaginosis include douching [17], race [11] [12] no condom use [17], new male partner, and smoking [19].

Though sexual activity can increase the risk of developing bacterial vaginosis, BV can occur in virgins [22]. BV is thought not to be sexually transmitted.

Bacterial vaginosis also contributes significantly to increased incidence of foetal wastage as it has been implicated as a cause of premature rupture of membranes, chorioamnionitis and spontaneous abortions. Untreated bacterial vaginosis has been shown to cause postpartum endometritis [8] and salpingitis [10], conditions that can invariably alter the Obstetric carrier of the patient.

2. Methodology

This was a prospective study in which the sample size was calculated based on

the known prevalence from a similar study done elsewhere using the formula by Daniel WW [23]. 230 consenting pregnant women, who did not meet the exclusion criteria, were recruited over a period of 13 weeks at the antenatal clinic of the Federal Teaching hospital Abakaliki, Ebonyi state to look at the prevalence of BV.

Ethical clearance was obtained from the ethics committee of the hospital.

The criteria for exclusion included: refusal to give consent, recent history of vaginal bleeding (within the last 48 hours), intercourse within the last 24 hours, gestational age greater than 42 weeks, unsure date, threatened abortion, diabetes Mellitus and premature rupture of membranes.

The purpose of the study was explained to the client at the antenatal clinic hall by residents and house officers trained for the study, and her informed consent obtained before being enlisted in the study. The client had the right to opt out of the study anytime within the study period. Through a structured questionnaire, the medical history was obtained from the clients. These included the age, educational status, history of smoking, douching and the substance used, number of lifetime sexual partners and history of previous premature birth.

After counselling and signing of consents, coded structured questionnaires were administered to the client. Thereafter, clients were taken to the examination room and in the presence of a chaperon, they are put in a lithotomy position and a sterile disposable speculum Cusco's speculum passed. A sterile swab stick with an identification mark, which tallied with that on the questionnaire was then used to collect a sample of vaginal fluid from the posterior fornix.

During the specimen collection, presence or absence of the characteristic thin gray adherent vaginal discharge was noted and filled out in the same questionnaire. The swab was smeared onto a grease-less glass slide which was allowed to air dry and on a pH paper. The pH is recorded. The glass slide had been marked with a diamond pencil with a number that corresponds with the number on the corresponding questionnaire. The swab-stick is then put in a test tube that contains about one millilitre of 10% potassium hydroxide. This was wafted to the nose for the characteristic fishy odour "whiff test". This was also noted on the questionnaire. The smeared glass slide was then sent to the laboratory at the end of the sample collection for staining and examination for clue cells, by a laboratory scientist or the chief researcher. This was immediately noted on the questionnaire.

The information on the questionnaire was matched and cross checked. This was fed into a personal computer and subsequently analyzed using the EPI, info statistical software package version 3.3.2 (2005) of the Centre for Disease Control.

The sensitivities and specificities of the various signs and symptoms of BV were calculated using the standard formula.

3. Results

Two hundred and thirty women who booked for antenatal care, consented and

did not meet the exclusion criteria were enrolled into the study. None of them opted out of the study. The sociodemographic characteristics of the study population are as shown in Table 1. The participants' ages ranged from 16 - 40 years with a mean age of 29.2 ± 4.6 years. Women who were nulliparous were 75 (32.6%), multiparae were 139 (60.4%) while grand multiparous women were 16 (7.0%). Three (1.3%) of the women had no formal education, 21 (9.1%) had primary, 79 (34.4%) had secondary while 127 (55.2%) had tertiary education. All the participants douched, those that used soap and water formed the bulk-155 (67.4%). One hundred and thirty (56.5%) participants have had only one sexual partner, while 88 (38.3%) have had more than one and 12 (5.2%) have had more than three sexual partners in their lifetime. 109 (47.8%) of the total participants reported having any symptom, those presenting with vaginal discharge (81% - 74.3%) accounting for the bulk.

Fifty five women (23.9%) of the studied population had BV. Of the 55 that had BV, 32 (58.2%) reported having any symptoms. 19 (59.4%) had whitish discharge that stuck to the vaginal wall alone, 12 (37.5%) had both whitish discharge and fishy odour after sexual intercourse, while only 1 (3.1%) had fishy odour alone. Considering the diagnostic criteria, vaginal pH of more than 4.5 was present in most (52) [94.5%] of the studied population while 3 (5.5%) had PH less than <4.5. The whiff test was positive in 51 (92.7%) participants who had BV. Clue cells were present in 32 (58.2%), while white vaginal discharge was present in 48 (87.3%) of the BV positive Cases. This is summarized in Table 2, Table 3.

When the diagnostic criteria were compared between the BV positive group and the BV negative group; the whiff test gave the highest number of true positives (51/55) while the presence of clue cells gave the least number of false negatives. Table 4 lists the sensitivity and specificity of the different diagnostic criteria.

Table 1. Sociodemographic characteristics.

Variable					Level of significance (%)	
Age	**BV + ve**	**%**	**BV − ve**	**%**	**BV + ve**	**BV − ve**
15 - 24	10	18.2	27	15.4	13.4 - 44.1	**17.2 - 30.7**
25 - 34	38	69.1	124	70.9	17.2 - 30.7	69.3 - 82.8
35 - 44	7	12.7	24	13.7	9.6 - 41.1	58.9 - 90.4
Total	**55**		**175**			

Chi square-0.25, df-2, p value-0.88; This is not significant as p is not less than 0.05.

Variable						Level of significance (%)	
Edu. status	**BV + ve**	**%**	**BV − ve**	**%**	**total**	**BV + ve**	**BV − ve**
None	0	0.0	3	1.7	3	0.0 - 6.5	0.4 - 4.9
Primary	7	12.7	14	8.0	21	5.3 - 24.5	4.4 - 13.1
Secondary	26	47.3	53	30.3	69	33.7 - 61.2	23.6 - 37.7
Tertiary	22	40.0	105	60.0	127	27.0 - 54.1	52.3 - 67.3
Total	**55**		**175**		**230**		

Chi square-0.51, df-3, p value-0.03; This is significant as p is less than 0.05.

Table 2. Incidence of BV.

	Frequency	%
BV + ve	55	23.9
BV − ve	175	76.1

Table 3. Diagnostic criteria.

		BV + ve	BV − ve	Total
pH	<4.5	3	58	61
	>4.5	52	117	169
Whiff test	Present	51	30	81
	Absent	4	145	149
Clue cells	Present	32	3	35
	Absent	23	172	195
White sticky discharge	Present	48	61	109
	Absent	7	114	121

Diagnosis of BV is based on any three positive out of the four diagnostic criteria.

Table 4. Sensitivity and specificity of the diagnostic criteria.

	Sensitivity (%)	Specificity (%)
pH	31	95
whiff test	62	97
clue cells	91	88
white discharge	44	94

Presence of clue cells gave the highest sensitivity, while the whiff test is the most specific.

The presence of clue cells has the highest sensitivity (fewest false negatives) and the whiff test the highest specificity (fewest false positives).

4. Discussion

Various prevalences for BV have been published, this being primarily dictated by the study group, and to a lesser extent the biosocial characteristics of the participants. Out of the two hundred and thirty participants, fifty five met three out of the four Amsel's Criteria required for the diagnosis of BV. This gave an incidence of 23.9%. This incidence is not consistent with that of Adinma *et al.* in Nnewi, south east Nigeria 17% [24] and Adeoye *et al.* 10.5% [25] but is consistent with incidences of 25% [26] and 23% [27] obtained by Adekunle and Cecil Klufio respectively. Various figures have been recorded from other regions; India 27.5% [28], 31.6% [29], Helsinki Finland 10.4% [30], USA 16% [31], Kenya 37% [32], South Africa recorded the highest incidence of 52% [33]. The Canadian Study summed up the incidences in most of the groups as they quoted a range of 6.0% to 32% [30] [34] [35] in different studies.

The biosocial characteristics of BV positive participants showed that the highest incidence was in the age range of 25 - 34 (69.1%) followed by those in the age range of 15 - 24 (18.2%). This is not consistent with that of Adinma *et al.* (Nigeria) which was 17.0% for 16 - 20 years [24] and Larsson (Sweden) 18 - 25 years

[36]. Age though was not statistically significant (Chi square = 0.25, df = 2, p = 0.88), and therefore, no age group has a greater tendency of BV acquisition.

When the mother's level of education and the incidence of BV was subjected to statistical analysis, it was found to be significant (Chi square-0.51, df-3, P-0.04). When the educational level of the mother was matched against douching; there was a steady increase in the number that douched as the educational level increased. Also the number increased as the wash agent included other things aside water. Considering that the educational level of the mother helps determine the social class [37] and that all the study participants douched; it could be surmised that aside water, it is likely that those in the higher social classes and thus more educated, used some form of soap and vaginal foams; are likely to have bath with antiseptic liquids, perfumed bubble baths, uses vaginal deodorants and washes underwear with strong detergents [38]. These upset the balance of the naturally occurring bacterial flora and increase the risk of developing BV [39]. Zhang *et al.* [33] found that BV was more in women who douched once or more times per week when compared to those that douched less frequently or not at all. Schwebke [18] collaborated this when he discovered that douching in the previous week was positively associated with BV. When different douching products (vinegar, povidone-iodine, physiological saline) were evaluated, Oderdonk *et al.* [28] [29] found that all, to varying degrees led to a reduction in the total bacteria count.

5. Conclusion

This study demonstrates that bacterial vaginosis is common among pregnant women in Ebonyi State, Nigeria commoner than was previously documented [24] [25].

Studies have shown that awareness of BV is low among pregnant women and physicians alike [39]. Raising the awareness of bacterial vaginosis among our pregnant women and their health care providers will be an important first step in preventing BV and promoting its diagnosis and treatment. It will also be an important first step in preventing the sequela of BV in pregnancy and in the puerperium.

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