Prevalence of bacterial vaginosis in pregnant women in Maiduguri, North-Eastern Nigeria

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Abstract

Objective: This study determined the prevalence and socio-demographic characteristics of bacterial vaginosis (BV) among pregnant women with abnormal vaginal discharge.

Study Design: Descriptive cross-sectional study.

Setting: University of Maiduguri Teaching Hospital.

Materials and Methods: Vaginal swab samples and data on epidemiological risk factors were collected from 400 consecutive pregnant women with complaints of abnormal vaginal discharge. The data was analyzed using the SPSS 16.0 statistical software. Association between variables was compared by using the Chi-square (χ^2) and Fisher's exact tests while $P < 0.05$ was considered significant at 95.0% confidence level.

Result: The prevalence of BV among pregnant women with abnormal vaginal discharge was 17.3%. Age 20-24 years, multigravidity, lack of western education and unemployment were associated with increased prevalence of BV. Yellowish, watery vaginal discharge ($P = 0.001$) was associated with BV. Dysuria, dyspareunia and lower abdominal tenderness were associated with BV ($P = 0.001$). Fifty three (77%) of patients had BV during the second trimester compared to 6 (9%) who had it in the 1st trimester of pregnancy ($P = 0.012$).

Conclusion: The high prevalence of BV in this study may necessitate adequate screening of pregnant women with abnormal vaginal discharge in order to give appropriate treatment and avoid complications associated with it.

Key words: Bacterial vaginosis, pregnancy, vaginal discharge

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Introduction

Pregnant women commonly develop increased vaginal discharge, which in many instances is not pathological.[1] However, abnormal vaginal discharge is the result of vulvovaginal infections that include bacterial vaginosis (BV), candidiasis or trichomoniasis.[1-4]

Vaginal flora of a normal asymptomatic reproductive-aged woman includes multiple erobic or facultative species as well as obligate anaerobic species.[5] Of these, anaerobes are predominant and outnumber erobic species approximately 10 to 1.[6] These anaerobes include gram negative organisms such as *Prevotella* species, *Bacteroides*, *Fusobacterium* species, *Veillonella* species and gram positive bacilli such as *Propionibacterium* species, *Eubacterium* species and *Bifidobacterium* species.[5,7] These anaerobic bacteria cause non-specific vaginitis.[8]

BV is a poly-microbial syndrome characterized by a shift in vaginal flora from a predominant population of lactobacilli to their gradual or total replacement with anaerobes such as *Gadnerella vaginalis*, *Prevotella*, *Bacteroides* and *Mobiluncus* species and other bacteria including mycoplasma and *Ureaplasma* species.[9] BV is one of the most frequent conditions encountered in sexually

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transmitted diseases (STD), genitourinary medicine or other reproductive health clinics throughout the world.[9,10] The condition had been previously called *Haemophilus vaginalis* vaginitis, non-specific vaginitis and G. *vaginalis* vaginitis.[11]

BV has been strongly associated with poor pregnancy outcomes such as preterm delivery, low birth weight infants and several studies have now established associations between BV, human immunodeficiency virus and puerperal sepsis.[6,12] Other obstetric complications include premature rupture of fetal membranes, late miscarriage and postpartum endometritis while pelvic inflammatory disease, post-hysterectomy cuff infection and postabortal sepsis are some of the gynecological complications.[13]

Because of adverse maternal and fetal outcomes associated with BV in pregnancy, pathological vaginal discharge deserves further evaluation and appropriate management in our environment.[10] In spite the over 20% prevalence of BV in pregnancy,[6] published data regarding the epidemiology of BV in pregnancy in developing countries are few.[10] Unfortunately, a good number of pregnant women complaining of vaginal discharge are frequently assumed to have and treated for vaginal candidiasis without adequate investigations. The purpose of this study was to provide data on BV in pregnant women with abnormal vaginal discharge, attending the antenatal booking clinic of the University of Maiduguri Teaching Hospital (UMTH), North-Eastern Nigeria.

Materials and Methods

This was a descriptive cross-sectional study conducted in the Department of Obstetrics and Gynecology of UMTH, Maiduguri, North-Eastern Nigeria.

Consecutive 400 pregnant women presenting to the antenatal clinics of UMTH with the complaint of vaginal discharge from 7th December 2010 to 15th July 2011 were sampled. Sample size of 400 was obtained based on the prevalence of abnormal vaginal discharge in pregnancy of 54.3% reported from Jos.[14] Patients who douched with chemicals, those with genital malignancy in pregnancy, those who used antibiotics in the preceding 4 weeks and those who did not consent were excluded from the study.

Upon counseling and recruitment, information on socio-demographic variables, obstetric history, sexual and reproductive risk factors were obtained. Information obtained includes age, marital status, educational status, occupation and occupation of husband, parity and gestational age, abdominal pain, dysuria and vulvar pruritus.

Each patient was placed in dorsal position and an appropriately sized sterile Cusco bivalve speculum immersed in warm water was gently inserted in to the vagina to expose the external cervical Os. The cooperation of the subject was continually reinforced by slow gentle placement of the speculum. The vulva, vagina and cervix were inspected for abnormalities such as erythema, excoriation marks and discharge. The color, smell and consistency were noted. High vaginal swab was collected and immediately taken to the medical microbiology laboratory of the UMTH, for preparation according to standard procedure.[15]

BV was diagnosed by the presence of clue cells on microscopy of a saline mount, presence of discharge pH of greater than 4.5, presence of ammoniacal odor on addition of a drop of 10% potassium hydroxide to the vaginal discharge prepared on a glass slide and evaluation of gram stained vaginal smear at oil immersion power ($\times$100 and above) objective for clue cells; usually representing at least 20% of vaginal epithelial cells. Subjects found to have BV were treated with oral metronidazole 500 mg 12 hourly for 7 days.[16]

Ethical clearance was obtained before the study was carried out and informed consent was obtained from the subjects before enlistment in to the study.

The SPSS 16.0 statistical software (Polar engineering and consulting, 2007) was used to analyses the results; association between organisms and studied variables was compared using the Chi-square (χ^2) and Fisher's exact tests while $P < 0.05$ was considered significant at 95.0% confidence level.

Results

During the period of study, 1,280 pregnant women were seen at the antenatal booking clinic among, which 400 complained of vaginal discharge, giving prevalence of vaginal discharge in pregnancy of 31.5%. Sixty nine of these women had BV, giving prevalence of BV among pregnant women with abnormal vaginal discharge of 17.3%.

Table 1 shows the socio-demographic characteristics of respondents. The age range of the pregnant women was between 15 years and 42 years, with a mean age of 23.55 $\pm$ 6.171. The prevalence of BV decreased with increasing age from 20 years up to the age of 42 years and more pregnant women aged 20-24 years had BV than those in other age groups.

The parity range was from 0 to 13, with a mean parity of 2.77 $\pm$ 2.45. The prevalence of BV was 49 (71%) in Para 1-4 and 4 (6%) among the grand multipara. Thirty seven (54%) of those with primary level of education had BV while those with secondary and tertiary education constituted 7 (10%) and 8 (11%) respectively. Sixty five (94%) of women with BV were married compared with 2 (3%) who were single and another 2 (3%) who were divorced.

Eighteen (26%) of those with BV were civil servants, 14 (20%) were petty traders and 37 (54%) were unemployed pregnant women.

Table 2 showed the clinical features associated with BV. Thirty four (17%) of the 200 women with vulval itching had BV compared to 83% without the condition ($\chi^2 = 0.018$, $P = 0.895$). Dysuria ($\chi^2 = 1.133$, $P = 0.000$) was significantly associated with BV with 59% of the 74 patients with dysuria having BV. Thirty (73%) and 27 (67.5%) of those with dyspareunia and lower abdominal tenderness had BV ($\chi^2 = 78.620$, $P = 0.000$).

Table 1: Socio-demographic characteristics of respondents (*N*=400)

Characteristics	Frequency of vaginal discharge	
	Presence of BV (*n*=69) (%)	Absence of BV (*n*=331) (%)
Age		
15-19	17 (25)	89 (26.8)
20-24	32 (46.3)	151 (46)
25-29	10 (14.4)	52 (15.7)
30-34	6 (9)	34 (10)
35-39	3 (4.3)	3 (0.9)
40-44	1 (1)	2 (0.6)
Parity		
0	16 (23)	77 (23)
1-4	49 (71)	242 (73)
≥5	4 (6)	12 (4)
Educational status		
No education	17 (25)	86 (26)
Primary school	37 (54)	186 (56.1)
Secondary school	7 (10)	31 (9.4)
Tertiary institution	8 (11)	28 (8.5)
Marital status		
Married	65 (94)	327 (99)
Single	2 (3)	4 (1)
Divorced	2 (3)	0 (0)
Employment status		
Civil servant	18 (26)	89 (27)
Petty trader	14 (20)	19 (6)
Unemployed	37 (54)	223 (67)

BV=Bacterial vaginosis

Table 2: Clinical features and their relation to bacterial vaginosis in the studied patients (*N*=400)

Clinical feature	Presence of BV	Absence of BV	Total	χ^2	*P* value
Vulval itching	34 (17)	166 (83)	200	0.018	0.895
Dysuria	44 (59)	30 (41)	74	1.133	0.000
Dyspareunia	30 (73)	11 (27)	41	1.001	0.000
Lower abdominal tenderness	27 (67.5)	13 (32.5)	40	78.620	0.000

BV=Bacterial vaginosis

Table 3 showed the characteristics of abnormal vaginal discharge from the 400 pregnant women studied. The prevalence of BV was significantly more among those with yellowish vaginal discharge 55 (80%) than in those with greenish 9 (13%) and whitish discharge 5 (7%). Significantly more women with BV compared to those without BV had yellowish vaginal discharge ($\chi^2 = 1.073$, $P = 0.000$). Watery vaginal discharge was significantly more among those with BV than those without the condition 52 (75%) versus 29 (9%) ($\chi^2 = 1.568$, $P = 0.000$) as shown in Table 3. Similarly, 52 (75%) of those with BV had malodorous vaginal discharge compared to 73% without BV ($\chi^2 = 0.148$, $P = 0.700$).

The prevalence of BV was highest 53 (77%) during the second trimester and least 6 (9%) during the 1st trimester. Only 10 (14%) had BV in the last trimester of pregnancy as depicted in Figure 1. This risk in the second trimester was significant when compared with those without the condition during the same period ($\chi^2 = 6.288$, $P = 0.012$).

Of the 69 patients who had BV diagnosed, only 51 (73.9%) returned for follow-up and were treated. The few patients (14) who came for follow-up after treatment confirmed that abnormal vaginal discharge and associated symptoms have ceased.

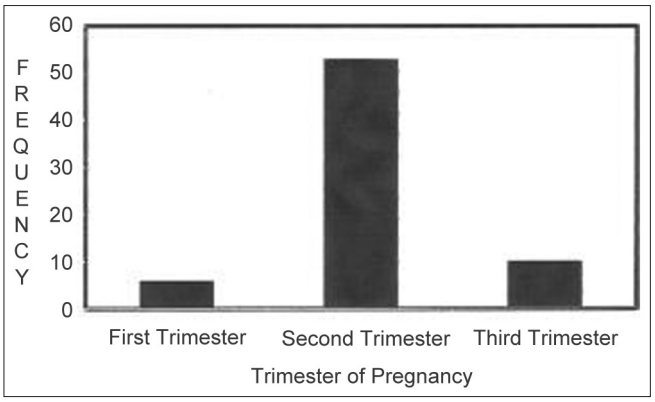

Figure 1: Distribution of bacterial vaginosis according to trimester of pregnancy (*N* = 69)

Table 3: Characteristics of abnormal vaginal discharge in the studied subjects (*N*=400)

Characteristics	Presence of BV (%)	Absence of BV (%)	Total	χ^2	*P* value
A: Color					
White	5 (7)	158 (48)	163	38.766	0.000
Yellow	55 (80)	59 (18)	114	1.073	0.000
Grey	9 (13)	114 (34)	123	12.277	0.000
B: Consistency					
Thick	13 (19)	216 (65)	229	50.263	0.000
Watery	52 (75)	29 (9)	81	1.568	0.000
Frothy	4 (6)	86 (26)	90	13.341	0.000
C: Malodor	52 (75)	242 (73)	294	0.148	0.700

Discussion

The prevalence of BV in this study is comparable to 17% found in a similar study in South-East Nigeria,[17] but lower than the 21-29% reported in some studies among pregnant women in Kenya and South Africa[18-20] and higher than the 11-15% from industrialized countries.[6,21,22] The higher rate in our study may be due to the difference in methodology; Nugent's criteria was used in the later while Amsel's criteria was utilized in the Kenya and South Africa study. Evaluation of tests for BV has shown that the gram stain scoring (Nugent's) is better than most techniques and unfortunately, only few clinicians ever have time to use this method while the microbiology staff strength is inadequate in resource-constraint centers like ours to utilize it effectively.[22,23] Besides methodology, levels of education and other socio-economic factors have been proposed as possible reasons for the lower rate of BV in industrialized countries than in our environment.[22,24]

The highest prevalence occurring among women aged 20-24 years differs from that of Adinma *et al*.[17] and Nwadioha *et al*.,[14] which recorded highest prevalence among women aged 16-20 years and 31-40 years respectively. The common finding in all these studies is that the age groups with the highest prevalence of BV are within the reproductive age, which is the most sexually active age group with the highest risk of pregnancies and STD.[14]

Multigravida constituted the highest group with BV in this study, which concurs with a similar study.[14] This was probably due to increased coital frequency resulting in reduction in the physiological barrier in the vagina, resulting in overgrowth of normal commensals.[25] As with some other studies, the low prevalence of BV among women with secondary and tertiary education could be due to a higher level of sophistication, enlightenment and utilization of orthodox medicine among those with western education.[25-27] Those who lack western education patronize traditional medicine more.[26] This high patronage of traditional medicine, which involves insertions into the vagina predisposes them to vaginal discharge.[27] The increased frequency of vaginal discharge in unemployed patients reflects the role of poverty and dependence in disease causation.[28]

Clinical features such as vulval itching, dysuria, dyspareunia and lower abdominal tenderness as found in this study have been reported from a similar study in Botswana, but they are not specific in making a diagnosis of BV especially in pregnancy where physiological discharge and the presence of candidiasis increase.[29]

BV was more frequently associated with preterm than term pregnancy, which is similar to a study carried out in the South-Eastern Nigeria.[17] This suggests the need for adequate screening of pregnant women with vaginal discharge in order to diagnose and treat BV so as to prevent preterm delivery and complications that may result from it.

In this study, the majority of patients with BV had yellow, watery and malodorous discharge. There have been discrepant descriptions of *G. vaginalis* discharge, some authors reporting the classical description of thin, gray, homogenous and frothy[30] and others a description of white and yellow,[7] which is similar to our findings.

The socio-demographic characteristics associated with BV in this study were similar to those from other studies in Africa, but the prevalence was higher than in corresponding populations in industrialized countries.[14,25] All these findings raise the need for health educational programs through different media to educate pregnant women about the difference between normal and abnormal vaginal discharge and when to consult their doctor.

Further studies on the pattern of complications of BV in pregnant women with abnormal vaginal discharge in this facility are needed to determine future strategies for intervention.

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