Bacterial Vaginosis among Antenatal Patients in Jos University Teaching Hospital (JUTH)

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Abstract

**Introduction:** Bacterial vaginosis is the commonest cause of abnormal vaginal discharge among women of child bearing age. This study determined the prevalence of bacterial vaginosis in antenatal attendees as well as investigated the relationships between bacterial vaginosis status, previous adverse obstetric outcome and present HIV status.

**Methods:** Study was cross-sectional using interviewer administered questionnaires. Vaginal samples were collected by physicians and diagnosis made using Amsel criteria. Data analysis was by EPI-INFO 3.5.3. Categorical variables were compared using Chi square and continuous variables using the student t-test. Statistical significance was placed as p<0.05.

**Result:** Of the 252 subjects studied, 20 were positive for bacterial vaginosis giving a prevalence rate of 7.9%. Of the 23 subjects that had a previous adverse pregnancy outcome, 2 were positive for bacterial vaginosis. Of the 9 subjects that were positive for HIV, Only 1 was positive for bacterial vaginosis.

**Conclusion:** The associated social and behavioural factors studied did not show any statistically significant association with bacterial vaginosis. The number of HIV positive subjects was low and therefore this study lacked sufficient power to draw conclusions on an association between positive bacterial vaginosis status and HIV status.

**Keywords:** Bacterial vaginosis; Pregnancy; HIV; Nigeria

Introduction

Bacterial vaginosis (BV) is a genital tract infection that is characterised by an overgrowth of predominantly anaerobic organisms (Gardnerella vaginalis, Prevotella spp., Mycoplasma hominis and Mobiluncus spp.) in the vagina leading to a replacement of Lactobacilli and an increase in the vaginal pH from less than 4.5 to as high as 7.0 [1-3]. It is the commonest cause of abnormal vaginal discharge in women of child bearing age [1,2,4,5]. The reported prevalence rates vary from as low as 3.5% to as high 55%. These rates include 6.4% in Burkina Faso, 3.5% in Yorkshire, 25% in Baltimore, 47.7% in Uganda, 14.2% in Benin city, 17.5% in Jos and 25% in Osogbo, Nigeria [1,4,6-11].

The main symptom is an offensive fishy smelling vaginal discharge which is characteristically thin, homogenous and adherent to the walls of the vagina. However, almost 50% of affected women are asymptomatic [1-3]. Bacterial vaginosis can be diagnosed clinically in several ways. Consideration is given to availability of methods, the cost and the experience of the clinician. Clinical diagnosis made with the Amsel (Composite) criteria is based upon the presence of any of the following, clue cells on gram stain or wet mount of the vaginal discharge, an anterior fornix vaginal pH of greater than 4.5, the release of a fishy smell on addition of an alkali (10% Potassium Hydroxide) and the presence of the characteristic thin homogenous vaginal discharge.

The Nugent scoring system uses the Gram stain method. It ranges from normal with predominantly lactobacilli to bacterial vaginosis where there is a large number of Gram positive and Gram negative cocci with few or absent Gram positive bacilli (hydrogen peroxide producing lactobacilli) [1,5,12].

The drug treatment includes oral and topical metronidazole and clindamycin [13]. Bacterial vaginosis is associated with obstetric and gynaecological complications which include post-partum endometritis, second trimester miscarriage and pre-term delivery. Bacterial vaginosis is also associated with an increased susceptibility to sexually transmitted diseases including Human Immunodeficiency virus infection [9,10,14,15].

Despite the impact of BV on obstetric outcome, screening for BV has not been instituted into routine ANC in Nigeria. So, only limited studies have been done in Nigeria to evaluate the impact of BV on obstetric outcome.

The study aimed to determine the prevalence of bacterial vaginosis in antenatal attendees at the Jos University Teaching Hospital, as well as investigate the relationships between the bacterial vaginosis status and previous adverse obstetric outcome and present HIV status.

Methods and Materials

The study was carried out between 1st July to 30th September 2013 at the Jos University Teaching Hospital which is a five hundred bed facility located in Jos, the capital city of Plateau state in the middle belt region of Nigeria in West Africa. There are four antenatal clinics held each week from Monday through Thursday during which an average of one hundred patients are seen every day. Antenatal care patients are drawn from all over the state but particularly from residents in the Jos and Bukuru Metropolis. All pregnant women who had ever carried a pregnancy beyond twenty eight weeks gestation were invited to participate. Informed consent was obtained from participants. Women who had been treated with antibiotics two weeks prior to attending the clinic and all primigravida were excluded from the study.

The sample size was calculated using Fishers sample size determination formula putting the prevalence of bacterial vaginosis at

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17.5% [10]. The study design was cross-sectional. Participant selection was by systematic random sampling where every third patient on the antenatal care list who fulfilled the inclusion criteria and was willing to participate in the study was selected. An average of twenty patients were selected each day and eighty patients each week. Selected patients had the study explained again to them after which they signed an informed consent form. Patients that were not literate thumb printed the consent form after an explanation of the study had been made to them in their own language. The questionnaires were pre-tested at the antenatal clinic of the Jos University Teaching Hospital. It was an interviewer administered questionnaire subdivided into three sections which includes Socio-demographic characteristics, questions assessing risk factors for developing BV and Foetal outcome. The questions were used to elicit information about the patient’s parity, ethnicity, marital status, educational qualification and social habits. Specific questions about vaginal douching, contraceptive history, menstrual protection methods, past obstetric history and history of sexually transmitted infections were also included. The questionnaire was clearly written in English Language.

Asides from the administration of questionnaires, a vaginal examination was performed to collect genital samples. Under good illumination, the labia were parted and a sterile non-lubricated Cusco’s speculum was introduced into the vagina. Two sterile cotton tipped swabs were used to take swabs from the posterior vaginal fornix. The swabs were immediately rolled on the 2 clean glass slides. One slide had a drop of isotonic saline placed on it to make the wet preparation which was later read under the microscope at x400 magnification to observe for clue cells. The other slide was allowed to dry. The speculum was then removed and the physical appearance of the vaginal fluid on the speculum was noted and recorded. The pH dipstick was applied to the discharge on the speculum to obtain the pH. The whiff test was then performed on the vaginal fluid on the speculum by the application of two drops of potassium hydroxide. No bimanual examination was done. The air dried slide was transported in a covered container to the laboratory where it was heat fixed and gram stained and observed under oil immersion at x1000 magnification. The swabs were analysed in conjunction with laboratory scientists from the departmental research laboratory.

The diagnosis was based on the Amsel (composite) criteria where the presence of 3 of the 4 aforementioned criteria gives a positive diagnosis. All patients who fulfilled the criteria for bacterial vaginosis were treated with oral metronidazole at a dose of 400 mg 12 h for 7 days. HIV testing was done by a third person who was blinded to the questionnaire and vaginal examination findings using double rapid test with pre and post test counselling.

The data was double entered into the statistical software package EPI-INFO 3.5.3 which was used for analysis. Continuous variables were compared using student t test. Categorical variables were compared using the chi square test and where the numbers were small Fisher exact test was used. Differences were considered significant if p<0.05.

Results

Socio-demographic characteristics of the study participants

Two hundred and fifty two (252) women were recruited for the study of which 20 were positive for bacterial vaginosis, giving a bacterial vaginosis prevalence rate of 7.9%. There were no significant differences in the mean age, mean parity, religious affiliation, level of education and occupation between the two groups.

The mean gestational age at recruitment into the study for the BV positive group (37.5 ± 7.1 weeks) was not significantly different from that for the BV negative group (27.3 ± 8.2 weeks) (Student t-test=0.09, p=0.93).

Analyses of factors known to be associated with the acquisition of bacterial vaginosis

There were 23 subjects with previous adverse pregnancy outcome. No significant difference in the history of previous adverse pregnancy outcome was detected between the two groups. There were 9 subjects who tested positive for HIV giving an HIV prevalence rate of 3.6%. There was no significant difference in the prevalence of HIV infection between BV positive and BV negative groups.

Women who were BV positive were just as likely to be in a polygamous marriage and to have practised vaginal douching as those who were BV negative. The proportions of study subjects that reported a previous history of vaginal discharge or vaginal discharge in the index pregnancy were comparable across both groups of BV status. There was no significant difference in the prevalence of a past history of miscarriage between the two groups and neither was there any difference in the type of menstrual protection they had used. There was no significant difference between the two groups in the use of contraception and among those who had used contraception there was no significant difference, between the two groups, in the use of IUCD as opposed to other forms of contraception.

Outcome to babies of previous adverse pregnancy outcomes

The mean gestational age at previous adverse pregnancy outcome for the BV positive group (29.0 ± 1.4 weeks) was not significantly different from that of the BV negative group (31.6 ± 2.4 weeks) (student t-test=1.47, p=0.15). There are no significant differences between the BV positive and negative groups as regards their demographic characteristics. 38% of the subjects were primipara while 54% of the subjects were multipara. The rest were grand multipara.

Discussion

This study shows a prevalence of bacterial vaginosis of 7.9%. This is at variance with prevalence rates seen in other studies carried out in pregnant and non-pregnant women [3,6-11]. A study in Burkina Faso showed a prevalence of 6.4% while another in Uganda showed a prevalence of 47.7% [4,8]. In Benin city, Nigeria, a study showed a prevalence rate of 14.2%, that study however involved healthy non pregnant volunteer attendees at a reproductive health care service center [9]. In Jos, Nigeria, a study which aimed to determine the risk factors for HIV among pregnant women at the antenatal care clinic, showed a prevalence rate of bacterial vaginosis of 17.5% [16].

The prevalence rate in this study is however in keeping with the prevalence of 7.6% seen in a study in Jos which looked at abnormal vaginal discharge and their causative agents in an antenatal population. The variance in the reported prevalence rates may be attributed to the fact that bacterial vaginosis shows a wide heterogeneity as seen in the study in Burkina Faso where the prevalence rate varied among different locations in the same country [17]. The difference in prevalence rates may also be due to method of diagnosis [18-22]. The Nugent’s criteria was used in most of the aforementioned studies as opposed to the Amsel criteria which was used in this study. The Amsel criteria has been described as subjective and therefore prone to inter observer error and results from the same study population may differ [23-25].
Previous adverse outcome of pregnancy in this study was taken as a history of preterm birth and or pre labour rupture of membranes. Preterm delivery is a major cause of perinatal morbidity and mortality and there is increasing evidence that ascending infection from the lower genital tract is an important causative factor [2,26]. The most powerful predictor of preterm delivery is a prior history of such a delivery [2]. In this study, there is no statistically significant association between previous preterm birth or miscarriage and present BV status suggesting that women with a previous adverse pregnancy outcome are not at any increased risk of having BV. Study findings by Hay et al. have shown that an abnormal outcome in pregnancy was associated with a previous preterm delivery [27]. Their study population was found to have a low prevalence of sexually transmitted infections and therefore bacterial vaginosis in that population was considered to be without confounders. The effect of the abnormal vagina flora was also seen to be an independent predictor of preterm delivery and late miscarriage (16-24 weeks). Bacterial vaginosis is often a chronic recurrent condition [2,4]. If there is an association between BV and preterm delivery, it can therefore be inferred that a weaker association with abnormal vaginal flora and a previous preterm delivery may be expected. This may also be expected for spontaneous abortions [2,4]. If in this study, an association had been detected, it may have been an indication that the previous adverse pregnancy outcome may have had a relationship with BV status but such an inference cannot be drawn from a cross sectional study which lacks the power to ascertain the sequence of events. A large scale prospective study with sufficient power will however be required to study that association effectively [28]. This is especially so if the association is a weak one or the difference is small. Perhaps the timing of the screening for BV is important in order to establish an association. Women who are positive for BV detected early in pregnancy in the first trimester have a greater chance of having an abnormal pregnancy outcome [2,4,22]. Majority of the women in this study were recruited in the third trimester. It is a possibility that those likely to have chronic recurrent BV which may have affected the outcome of their previous pregnancy, will be positive in the first trimester and such a population may demonstrate an association between present BV status and previous adverse outcome of pregnancy. Those that reported a previous adverse pregnancy outcome may also have had other conditions that resulted in the adverse outcome and BV may not have been implicated. There is paucity of research on the relationship between the present BV status and previous adverse pregnancy outcome and it remains to be investigated.

Studies have shown that there is a significant association between abnormal bacterial colonisation detected early in pregnancy and preterm delivery and late miscarriage [2,4,22].

In contrast, a study in Osogbo, Nigeria did not demonstrate any significant adverse effect on pregnancy outcome despite a high prevalence rate of BV of 25% [29-32]. The sample size of that study was however small (204 subjects) compared to the aforementioned studies and a larger sample size may detect a conflicting result.

This study found no significant association between HIV status and BV status. This is at variance with several studies which have shown that there is an increased risk of acquisition of BV in the HIV positive woman [33]. The HIV prevalence in this study population was 3.6% which is less than 7.7% sero-prevalence in Plateau state but close to the national sero-prevalence of 4.1% [34-37].

The lower prevalence of HIV seen may be attributed to the difference in time since the data on the sero-prevalence in Plateau state was collected. The difference in prevalence may therefore signify a drop over the past two years owing to an uptake of HIV prevention strategies. Also, the study population being attendees of the antenatal clinic, may also reflect those with a positive health seeking behaviour which may translate to safer sexual health practices. The study was also open to volunteers and those already aware of their HIV positive status may have opted to stay out of the study. The number of HIV positive subjects in the study is however too small to draw a conclusion from this result.

In this study, sexual and other behavioural factors which have been known to be associated with BV were not found to have a statistically significant association with BV status. In a study in Burkina Faso, an association between polygamy and the use of contraception and positive BV status was found in contrast to a study in Gambia where there was no association between BV status and polygamy [38-40]. In another study in Gambia, however, which looked at subjects with vaginal discharge syndrome, there was no association between BV and HIV, douching and menstrual hygiene [41]. A study among pregnant African American women found an increased risk of acquisition of BV among those who douche in pregnancy [7]. In another United States hospital study of pregnant women with a predominantly African American population, douching was not found to be associated with BV positivity whereas numerous sexual partners and a history of a sexually transmitted disease was associated with BV positivity [36]. IUD users have been found to have a higher frequency of episodes of BV as opposed to users of oral contraceptives. It has been suggested that studies on pregnant women are silent on sexual behaviour as risk factors for B [7].

Of the BV positive patients who had a previous adverse outcome of pregnancy, these events occurred in early third trimester and resulted in 100% neonatal death. In those that were BV negative, the events also occurred in the third trimester but resulted in 42.3% neonatal death. The risk of preterm birth is higher if BV is diagnosed before the 16th week of gestation [22]. Selective screening of women with a history of preterm labour or second trimester miscarriage is recommended [13]. BV detected early in the second trimester is strongly associated with late miscarriage and preterm birth, it is suggested that treatment for BV should be instituted no later than the beginning of the second trimester. Screening and treating beyond 16 weeks will miss some potentially preventable late miscarriages, early treatment may therefore be more effective [2,22].

There is still no evidence that screening and treating all women with BV in the antenatal period will have a major impact on the consequences of preterm birth, there is however a suggestion that early treatment may be more effective. It is suggested that there is a potential but unclear benefit of treating some women at high risk of preterm delivery.

Routine screening of all women with a previous adverse pregnancy (preterm labour) outcome in our environment may therefore not be of benefit in preventing preterm labour. However selective screening of high risk women with a previous history of preterm birth and or preterm labour rupture of the membranes may be of benefit. For such women who present for antenatal care before 16 weeks of gestation, screening may be of benefit as the risk of an adverse outcome of pregnancy is higher when BV is diagnosed before the 16th week of gestation [13,22].

Limitations of study

- Relatively small sample size. A larger sample size would have yielded a stronger inference.
- Prior risk factors of BV were not assessed.
Conclusion

The prevalence of bacterial vaginosis in the antenatal population studied is 7.9%. There is no significant association between previous adverse pregnancy outcome and BV status. It may therefore not be of benefit to routinely screen all high risk antenatal patients with a previous history of preterm birth and or preterm prelabour rupture of membranes for bacterial vaginosis. The number of HIV positive subjects was low and therefore this study lacked sufficient power to enable conclusions to be drawn on an association between positive BV status and HIV status. Sexual behaviour and other behavioural factors known to be implicated in BV, showed no association with positive BV status in this study.

References