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Research Article

Comparative Study of Asymptomatic bacteruria among HIV-Positive and Negative Pregnant Women in a Teaching Hospital in Southern, Nigeria

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ABSTRACT

Background: Asymptomatic bacteriuria (ASB) in pregnancy is associated with serious fetal and maternal consequences and its occurrence is increased by HIV infection. This study sought to compare the prevalence of ASB among HIV- positive and HIV- negative pregnant women in the University of Uyo Teaching Hospital.

Methods: One hundred and twenty-one HIV-positive pregnant women and a similar number of matched HIV-negative pregnant women were studied. Socio-demographic characteristics, and clinical data were collected from eligible women and their mid-stream urine samples sent for microscopy, culture and sensitivity. A diagnosis of ASB was made if there was presence of >105 colonies of a single bacterial specie per milliliter of urine.

Results: Asymptomatic bacteriuria's prevalence was 8.3% and among the HIV- positive pregnant women, the prevalence was 11.6% compared to 5.0% in those who were HIV- negative. The predominant isolate was Escherichia coli, cultured in 64.2% and 50.0% of HIV-positive and HIV- negative ASB cases respectively. There was an association between the presence of ASB and multiparity among the HIV infected pregnant women.

Conclusion: The prevalence of ASB is high among pregnant women in our center and is higher in those who are HIV positive. It is associated with multiparity and treatment is effective in reducing adverse pregnancy outcomes. Hence, based on the high prevalence rates of over 2% revealed by this study, screening and treatment of asymptomatic bacteriuria among high-risk antenatal populations such as HIV-positive women should be undertaken routinely.

Key words: Asymptomatic bacteriuria, HIV positive pregnant women, Urinary tract infection in pregnancy, Uyo

INTRODUCTION

Asymptomatic bacteriuria (ASB) is defined as the presence of significant bacteriuria without the symptoms of an acute urinary tract infection (UTI) [1-3]. It is seen in 2.0-10.0% of pregnant women worldwide [4, 5] the prevalence however varies from region to region and among different populations [6, 7]. Several predisposing factors have been shown to increase the risk of ASB in pregnancy which include advanced maternal age, multiparity, low socio-economic status and advanced gestational age [2, 8]. Prevalence has also been shown to be increased with sexual activity, anatomic abnormalities of the urinary tract, history of recurrent urinary tract infections, uncontrolled diabetes mellitus, prolonged antibiotic use, sickle cell disease and Human Immunodeficiency Virus (HIV) infection [8].

HIV infection is a chronic viral infection and in pregnancy has become one of the most common medical complications in some sub-Saharan African countries. It is reported that more than 70.0% of infections are acquired through heterosexual contact, with greater than 90.0% of HIV infections in children arising from mother-to-child transmission. The prevalence rate among pregnant women in sub-Saharan Africa has been documented to be about 30.0% [9].

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HIV induces immune system imbalance, and it has been suggested that people living with this infection are likely to develop UTI [1]. Recent studies reveal a higher prevalence of ASB among HIV infected women when compared to uninfected pregnant women [10] and in addition to the increased pregnancy-related complications, their cost of care is increased [11].

When compared to the general obstetric population, there are limited studies on ASB among HIV-positive pregnant women [2, 12]. Research on ASB among HIV- positive pregnant women have been carried out in different states in Nigeria as well as in other sub-Saharan countries and prevalence rates of 7.3% to 32.9% have been reported [2].

Available literature shows that the prevalence and risks of complications of ASB are higher among HIV- positive pregnant women when compared to HIV- negative pregnant women. ASB is associated with adverse maternal outcomes which include cystitis, pyelonephritis, septicemia and acute respiratory distress syndrome (ARDS) [1]. Some studies have also shown an association with pre-eclampsia, anemia, chorioamnionitis and post–partum endometritis [1, 13].

Fetal risks include fetal growth restriction, prematurity, low birth weight (LBW), increased perinatal mortality, possible developmental delay and mental retardation later in life [8, 13].

The American College of Obstetricians and Gynaecologists (ACOG) recommends routine screening for ASB for pregnant women at their first antenatal visit. Similar guidelines are practiced in many developed countries with some obstetric units' protocol requiring that pregnant women be screened in all trimesters of pregnancy [14-16].

Routine screening of all pregnant women for ASB is advocated in areas of greater than 2.0% prevalence because it has been shown to be cost effective in these populations. Though the increased rate of ASB among HIV-positive pregnant women and its associated adverse feto-maternal effects have been documented, data of possible predictors and obstetric complications are scarce [17]. In Nigeria, the prevalence of HIV infection is highest in the South-South geopolitical zone [18], however there are few studies in this geopolitical zone to assess the prevalence as well as maternal and fetal outcomes of ASB among HIV-positive pregnant women and in Akwa-Ibom state, there has been such no study.

This study was therefore designed to determine the prevalence of ASB and to compare the prevalence, risk of complications, predictors, microbial spectrum and sensitivity patterns between HIV- positive and HIV- negative pregnant women in the University of Uyo Teaching Hospital. The results of this study will help determine the need to incorporate routine screening and treatment of identified cases, especially in this subset of the general obstetric population that might benefit most from screening and treatment of ASB to avert poor pregnancy outcome and improve perinatal morbidity and maternal wellbeing.

MATERIALS AND METHODS

Background and location of the study

The pregnant mothers for this study were selected from women attending antenatal clinics in the University of Uyo Teaching Hospital (UUTH). The University of Uyo Teaching Hospital is a tertiary hospital located in Uyo the capital city and serves a population of over five million people of Akwa-Ibom state in the south-south geopolitical zone of Nigeria [19, 20].

Study design

This is a comparative cross-sectional study of HIV-infected pregnant women and appropriately matched HIV-negative pregnant women, who booked for antenatal care and presented for their routine antenatal clinic visits at UUTH, Uyo over a period of six months (from 1ST January 2019 to 30TH June 2019).

Patients' recruitment

Participants were recruited from attendees of the antenatal clinic. A purposive sampling technique was utilized in which every consecutive HIV-positive pregnant woman who met the inclusion criteria and consented was enrolled into the study. A control group of matched consenting HIV negative pregnant women were consecutively selected and recruited into the study from attendees of the antenatal clinic.

Women in the HIV- positive and HIV- negative groups were matched for age, gestational age, parity, educational level and socioeconomic status. Written informed consent was obtained from each participant before recruitment.

Study instruments

The questionnaire used to obtain information from the patients was standardized and structured, and in English. The questionnaire was pre-tested among 30 attendees of the antenatal clinic of Saint Luke's Hospital Anua, Uyo Akwa-Ibom State to ensure its validity, user friendliness and to guarantee there were no issues of clarity of the questions with respondents. The questionnaire was interviewer administered to the participants recruited from the antenatal clinic of the UUTH during their routine visits by trained resident doctors of the department of Obstetrics and Gynaecology.

The following information was included in the questionnaire: patient's code number, phone number, age, marital status, educational status, occupation of the patient and her spouse. In addition, clinical parameters such as parity, gestational age, recent history of urinary symptoms in the index pregnancy, recent CD4 count, viral load, years with HIV, packed cell volume and current ARV treatment were also included.

The socioeconomic status of the participants was determined using Olusanya's model [21]. Clinical information from the participants folders were obtained following informed consent from participants where necessary for some parts of the questionnaire. Mid-stream urine samples were collected from all the women aseptically for microscopy, culture and sensitivity. All participants whose urine tests were positive and were treated for ASB were followed up to delivery following which additional information was retrieved from their hospital case files [22]. Clinical parameters that were obtained post-partum included preterm labour (defined as the onset of labor associated with cervical changes prior to 37weeks of gestation), premature rupture of fetal membranes defined as rupture of the fetal membranes before the onset of labor and low birth weight, which was defined as birth weight less than 2500g [17].

A diagnosis of ASB was made based on the presence of greater than or equal to 100,000 colony–forming units per milliliter of MSU of a single bacterial specie. Any samples with > 1 bacterial specie was deemed contaminated, and the second sample collected was examined through microscopy, culture and sensitivity testing.

Inclusion criteria

Booked HIV-positive pregnant women on highly active antiretroviral therapy (HAARTS) from the first to third trimester of pregnancy with no symptoms suggestive of UTI, a suitably matched group of booked HIV- negative women from the first trimester of pregnancy to the third trimester without any symptoms of UTI.

Exclusion criteria

Any pregnant woman who declined to participate in the study those with diabetes mellitus, sickle cell disease and signs and symptoms of UTI. Pregnant woman who were taking antibiotics or had taken antibiotics two weeks prior to presentation to the antenatal clinic.

Sample size calculation

The sample size was calculated using the formula for cross sectional studies comparing two groups [23].

Sample size = 2(Za/2 +Zb) P(1-P)/(p1-p2) [23]

Where Za/2 = Z0.05/2= Z0.025= 1.96 (From Z table) at type 1 error of 5%

Zb= Z0.20= 0.0842 (From Z table) at 80% power

Difference in proportion of events in two groups (effect size) = p1-p2

P= pooled prevalence {prevalence in case group one (p1) + prevalence in control group (p2)}/2

In this study p1 = prevalence of ASB among HIV positive pregnant women in a similar study =23.3% (17)

In this study p2= prevalence of ASB among HIV negative pregnant women in a similar study= 10.4 (17)

Pooled prevalence P = (0.233+0.104)/2 = 0.337/2 = 0.1685

Effect size p1-p2= 0.233-0.104= 0.129

Sample size = 2(1.96+0.84)2 0.1685(1-0.1685)/ (0.129)2

2.197/0.02= 110

Allowing for a 10% non-response rate = 11

The number of pregnant women that were eventually enrolled into this study was 121 HIV positive pregnant women with a similar number of HIV negative pregnant women as control.

Data analysis

Data analysis was done using the Statistical Package for Social Science version 20 (SPSS 20, Armonk, NY, United States of America) software for windows. The data were summarized with tables and charts. Numerical data arepresented as means and standard deviation,while categorical data were presented as frequencies (percentages) Association was tested for between ASB and socioeconomic status, HIV infective status, gestational age, packed cell volume and CD4+ cell counts using the chi square test. A confidence level of 95% was used and a p-value of less than 0.05 was considered statistically significant.

Ethical considerations

Approval for conduct of the study was obtained from the Research Ethics Committee of the UUTH. Each participant was informed of the aim and benefits of the study, any discomfort or risks associated with the study and assured of her right to decline participation, and withdraw consent to participate at any time without any adverse outcome. The researcher sought each participant's informed consent only after they had fully understood all information given to them. They were also assured of privacy and confidentiality of all information given for the purpose of the study.

RESULTS

The prevalence of ASB in the study population was 8.3% [95% CI 4.8-11.8]. Among HIV negative pregnant women, the prevalence was 5.0% (95% CI 1.0-8.9] while it was 11.6% [95% CI 5.8-17.4] among HIV positive pregnant women. This difference was not statistically significant (P=0.06).

The sociodemographic characteristics of the respondents are shown in [Table 1]. The mean age of respondents was 29.7 years (29.2 years for HIV negative and 30.1years for HIV positive pregnant women). There was no significant difference in the ages of respondents (P=0.19) and marital status (P=0.68) in both groups. There was a significant difference in the social classes of the women in both groups (P=0.03). The occupations, parity and trimesters of pregnancy in both groups were statistically similar (P=0.19, 0.95 and 0.33 respectively). However, the mean PCV of the HIV-negative pregnant women was significantly higher than that of the HIV- positive pregnant women (35.5 versus 33.2; P <0.001).

The relationship between the CD4 count of the HIV- positive pregnant women and ASB status is shown in [Table 2]. There was no significant relationship between CD4 cell counts and the presence of asymptomatic bacteriuria among HIV positive pregnant women in this study.

Univariate and multivariate binary regression models were used to identify factors independently associated with ASB in HIV positive respondents. Parity was associated with occurrence of ASB at both univariate and multivariate levels [Table 3].

Univariate and multivariate binary regression models were used to identify factors independently associated with ASB in HIV negative respondents. No factor was associated with occurrence of ASB at both univariate and multivariate level [Table 4].

In both groups of women Escherichia coli was the most common organism cultured, 64% and 50% in HIV positive and negative women respectively, Klebsiella pneumonia in 21.0% of HIV positive and 17.0% of HIV negative women , Staphylococcus aureus was isolated in 15% of HIV positive women while it was detected in 33% of participants who were HIV negative. In this study, incidental Candiduria was found in 11(8.8%) HIV positive women compared to 10 (7.9%) of their HIV-negative counterparts.

The organisms isolated were sensitive to commonly used antibiotics such as ampicillin, ciprofloxacin, ceftriaxone and nitrofurantoin. The isolates were sensitive to ampicillin in 100% (HIV-negative) and 85.7% (HIV-positive), ceftriaxone 100% in both groups of women, 2(33.3%) HIV –negative women were sensitive to Augumentin while 4(67.7%) showed resistance to Augumentin, in contrast 11(78.6%) of the HIV positive women were sensitive to Augumentin with only 3(21.4%) being resistant to this drug [Table 5].

There was no association found between pregnancy complications and HIV status of both groups of pregnant women with ASB [Table 6].

Table 1: Socio-demographic characteristics of respondents.

Variables	Respondents study Group		Total n (%)	Statistical tests and values
	HIV Negative (n=121)	HIV Positive (n= 121)		
Mean Age+/-SD	29.2+/-4.8	30.1+/-5.2	29.7+/-5.0	P=0.19
Marital status				
Single	2 (1.7)	4 (3.3)	6 (2.5)	P=0.68+
Married	119 (98.4)	117 (96.7)	236 (97.5)	
Social Class				
Upper	34 (28.1)	20 (16.5)	54 (22.3)	X2=6.95
Middle	68 (56.2)	69 (57.0)	137 (56.6)	P=0.03*
Lower	19 (15.7)	32 (26.5)	51 (21.1)	
Occupation				
Traders	26 (21.5)	19 (15.7)	45 (18.6)	P=0.19+
Farmer	16 (13.2)	13 (10.7)	29 (12.0)	
Artisans	12 (9.9)	15 (12.4)	27 (11.2)	
Civil servants	21 (17.4)	29 (24.0)	50 (20.7)	
Professionals	5 (4.1)	4 (3.3)	9 (3.7)	
Unemployed	16 (13.2)	17 (14.1)	32 (13.2)	
Others	12 (9.9)	9 (7.4)	21 (8.7)	
Large scale trader	13 (10.7)	15 (12.4)	28 (11.6)	
Parity (Median IQR)	2 (1-2)	2 (1-3)	2 (1-3)	P=0.95++
Trimester				
1	13 (10.7)	21 (17.4)	34 (14.1)	X2=2.20
2	34 (28.1)	32 (26.5)	66 (27.3)	P=0.33
3	74 (61.2)	68 (56.2)	142 (58.7)	
PCV				
Mean +/-SD	35.5 +/-3.4	33.2 +/-3.3	34.3 +/-3.6	P=0.000 ^

Significant p values = *, Chi square test= X2, Fishers exact test = +

Wilcoxon rank sum test = ++, Student t test= ^

Table 2: CD4 counts and ASB positive status.

CD4 count	ASB positive (%)	ASB negative (%)
< 500	11(14.6%)	64 (85.3%)
>500	3(0.1%)	43(93.5%)

Table 3: Predictors of ASB in HIV Positive Pregnant women using Binomial Logistic Regression Models.

Variables	Univariate models	Multivariate models
	OR (95% CI) p-value	OR (95% CI) p-value
Age (years)	0.94 (0.84 – 1.05) 0.3	0.92 (0.81 – 1.05) 0.22
Marital status		
Single	1	
Married	2.67 (0.26 – 27.56) 0.41	
Social Class		
Upper	1	1
Middle	2.49 (0.29 –21.21) 0.4	2.46 (0.24– 24.91) 0.45
Lower	3.52 (0.38 – 32.58) 0.27	3.06 (0.27 – 34.72) 0.37
Trimester		
1	1	1
2	2.19 (0.40-12.07) 0.37	1.54 (0.25-9.63) 0.64
3	0.92 (0.17- 4.94) 0.92	1.18 (0.19- 7.27) 0.86
Parity	1.63 (1.06-2.49) 0.03*	1.76 (1.07–2.86) 0.02*
CD4 count		
<500	0.67 (0.07-6.59) 0.73	0.41 (0.03-5.90) 0.51
>500	0.28 (0.02-3.34) 0.31	0.19 (0.01-3.17) 0.24
PCV	0.9 (0.74 – 1.08) 0.25	0.86 (0.70 – 1.06) 0.16

Fishers exact test *

Table 4: Predictors of ASB in HIV Negative Pregnant women using Binomial Logistic Regression Models.

Variables	Univariate models	Multivariate models
	OR (95% CI) p-value	OR (95% CI) p-value
Age (years)	1.0 (0.85 – 1.19) 0.96	0.99 (0.83 – 1.18) 0.90
Marital status		
Social Class		
Upper	1	1
Middle	2.61 (0.29 –23.35) 0.38	2.44 (0.27– 22.42) 0.43
Trimester		2.46 (0.24– 24.91) 0.45
1	1	1
2	0.75 (0.06-9.05) 0.82	0.78 (0.06-10.69) 0.85
3	0.51 (0.05- 5.29) 0.57	0.53 (0.05- 5.99) 0.61
Parity	0.72 (0.35-1.50) 0.38	0.80 (0.38–1.71) 0.57
PCV	0.91 (0.72 – 1.14) 0.40	0.93 (0.72 – 1.21) 0.60

Table 5: Antimicrobial sensitivity Pattern for isolates (n=20).

Antibiotics	Pattern	HIV Status		Total n (%)
		Negative n (%)	Positive n (%)	
Augmentin	Sensitive	2 (33.3)	11 (78.6)	13 (65.0)
	Resistant	4 (66.7)	3 (21.4)	7 (35.0)
Ampicillin	Sensitive	6 (100.0)	12 (85.7)	18 (90.0)
	Resistant	0 (0.0)	2 (14.3)	2 (10.0)
Ciprofloxacin	Sensitive	5 (83.3)	14 (100.0)	19 (95.0)
	Resistant	1 (16.4)	0 (0.0)	1 (5.0)
Ceftriaxone	Sensitive	6 (100.0)	14 (100.0)	20 (100.0)
Nitrofurantoin	Sensitive	4 (66.7)	11 (78.6)	15 (75.0)
	Resistant	2 (33.3)	3 (21.4)	5 (25.0)

Table 6: Relationship between HIV Status of ASB positive participants.

Parameter	HIV positive n (%)	HIV negative n (%)	p-value
PROM	1(7.1)	0(0.0)	1*
Preterm labor	0(0.0)	0(0.0)	
LBW	1(7.1)	0(0.0)	1*

Fishers exact test*

DISCUSSION

In this study the prevalence of ASB among the antenatal population studied was 8.3% and is within reported rates in Nigeria of between 4.0-14.1% [12]. The prevalence rate was higher in the HIV- positive pregnant women compared to HIV- negative pregnant women; however, this was not statistically significant. Studies comparing ASB prevalence rates among HIV positive and HIV-negative women show inconsistent findings; for instance, in Tygerberg hospital, South Africa a higher prevalence of 9.2% was reported in HIV-positive pregnant women in comparison to the 7.9% found in a similar group of HIV- negative pregnant women and this was not statistically significant [24]. In contrast however, a study in Enugu, Nigeria revealed statistically significant prevalence rates of 23.3% versus 10.4% in HIV- positive and HIV- negative pregnant women respectively [17]. Variations in population characteristics may be responsible for this varied finding. In addition, it is recognized that some of the body's defenses become defective in the presence of HIV infection and this can be compounded by the immunosuppression that occurs in pregnancy, hence resulting in the diagnosis of more cases among HIV- positive women [25].

The prevalence of ASB among the HIV- positive women was 11.6% which is higher than that reported in Zaria, Nigeria (7.3%) [25] and South Africa (9.2%) [24], but lower than the results from studies conducted in Lagos, Nigeria (18.1%) [12], and Tanzania (16.1%) [10]. These differences in prevalence rates may be as a result of variations in population characteristics such as cultural practices, socioeconomic conditions, laboratory practices as well as the study environment [13, 26].

Overall, Escherichia coli was the most common uropathogen isolated which is similar to the results from most other studies [10, 17, 24]. This is probably because it is the commonest micro-organism found in the perineal area [17]. In addition , virulent factors associated with it such as resistance to vaginal acidity, rapid multiplication in urine and possession of adhesions which aid in adherence onto uroepithelial cells are contributory [27]. Staphylococcus aureus and Klebsiella pneumonia were cultured in 15% and 21% of HIV positive women in this study. In comparison, among the HIV negative women Staphylococcus aureus was isolated in 33% of ASB positive cases with Klebsiella identified in 17% of cases.

Incidental candiduria was detected in 8.8% and 7.4% of HIV positive and HIV negative women in this study; this is higher than the figures recorded among antenatal attendees screened for ASB in Nnewi where Candiduria was found in 4.7% [28], but similar to the 8.0% documented in Bida, Nigeria [29]. The presence of Candida spp in some urine samples may be due to its increased presence in pregnant women as a result of immune suppression and this is compounded by the HIV status of some these women [28].

In general, most of the uropathogens isolated in this study were sensitive to ceftriaxone, ciprofloxacin and ampicillin. Similarly, ceftriaxone was the most effective drug in studies carried out in Cameroun and Nnewi [13, 28]. Ciprofloxacin was reported to be the most sensitive agent against bacterial isolates in a study conducted in Benin, Nigeria [22]. It is however not recommended in pregnancy and lactation due to its detrimental effect on growing cartilage [26].

About 73.3% of the isolates cultured in the HIV positive women were sensitive to nitrofurantoin compared to 26.7% in those that were HIV-negative. Nitrofurantion is cheap and safe in pregnancy [6]; however, it is documented to cause hemolysis in glucose-6-phosphate dehydrogenase deficient babies if used close to term [6, 29]. Approximately 15.4% of isolates identified among the HIV negative women were sensitive to Augumentin; in contrast 84.6% of isolates identified in the HIV positive women were sensitive to Augumentin. In Nnewi, Nigeria, Augumentin had the least sensitivity (23.1%) among antenatal patients [28]. The inappropriate and often unnecessary use of antibiotics may be responsible for the resistance to Augumentin reported in this study.

There was no significant relationship between CD4 cell counts and the presence of asymptomatic bacteriuria among HIV positive pregnant women in this study. This is similar to results of a study conducted in South Africa [24]. Some researchers report a significant effect of CD4 cell count and the occurrence of ASB [10, 11, 17] women with CD4 cell counts between 200 and 500cells/mm3 had the highest proportion of ASB in most of these studies. In this study, of the fourteen HIV-positive pregnant women who were diagnosed with ASB, 78.5% had CD4 cell counts <500cells/mm3. This is consistent with findings by Ikeako et al [17]. It is argued that with lower CD4 cell counts, immunosuppression and the occurrence of opportunistic infections is increased [10-12].

The majority of HIV- positive and HIV- negative pregnant women with ASB in this study were multiparous and in their second and third trimesters of pregnancy. There was a significant relationship between the presence of ASB among HIV-positive pregnant women and multiparity in this study. While this is also demonstrated in some studies [8, 30]; some other studies showed no relationship between increased parity and ASB infection in pregnancy [10, 12]. Multiparity is associated with functional and anatomical changes in the urinary tract that may increase the risk of urinary tract infections such as ASB [31]. It is also reported in literature that increasing gestational ages increase the risk of ASB [28]. In this study however, this association was not significant and this has also been documented by several other researchers [12, 22]

The relationship between the packed cell volume and socio-economic status of pregnant women with ASB in this study was not significant. This is similarly documented in some studies [12, 22]. In contrast however; some studies demonstrated a relationship between a low packed cell volume and ASB [12, 29], while some reveal a significant correlation between belonging to a lower socioeconomic class and ASB [4, 29]. It is argued that a low packed cell volume is associated with a weaker immune response to infective organisms and a low socio-economic class may promote unhygienic practices hence increasing ASB risk [22].

Among the ASB positive cases, there was a case each of premature rupture of membranes and low birth weight neonate with no case of preterm labor in those who were HIV positive, while among those who were HIV negative, there was no case of premature rupture of membranes, low birth neonate or preterm labor. In this study, there was no significant association with adverse pregnancy outcome in both groups of women. This is also similar to the results from a study done in Enugu, Nigeria [17].

All the ASB positive women in this study were treated with appropriate antibiotics and it is documented in literature that the association of adverse pregnancy outcomes and ASB infection in pregnancy is decreased following treatment of this condition [17, 24], and this may be responsible for the low incidence of these complications in this study.

This study had a few limitations; the study was hospital-based, so the results may not reflect the exact situation in the general population. Some reported long-term complications of ASB in pregnancy such as delayed neurodevelopment could not be assessed in this study because there was no long term follow of participants.

This study has shown that the prevalence of asymptomatic bacteriuria among our antenatal population was 8.3% and among the HIV positive and HIV negative pregnant women, the prevalence was 1.6% and 5.0% respectively showing this condition is relatively common in our environment which is similar what is documented in several studies carried out around Nigeria.

Multiparity was shown to be associated with an increased risk of ASB. Treatment of all identified cases of ASB in this study is likely to have resulted in reduced adverse pregnancy outcomes. The prevalence reported, is higher than the 2% prevalence rate for which screening, and treatment of this condition has been shown to be cost effective.

Hence, we recommend that routine screening and treatment of asymptomatic bacteriuria be instituted in our antenatal clinics for all pregnant women, more so for those at an increased risk such as HIV positive pregnant women to prevent progression to overt UTI and other adverse reported pregnancy outcomes. We also recommend that much larger studies involving multiple centers and over a longer duration are conducted in other to draw more concrete and valid conclusions.

CONFLICTS OF INTEREST

None

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