

Research Article**Asymptomatic Bacteriuria among antenatal Women Attending private Hospital in Lagos, Nigeria****Olaniyan J. A. Tosin¹, Akinleye O. Mathew^{1*}, Folorunso J. Bello², Ipaye T. Oludare³, Abdulraheem. L. Dolapo⁴, Ayodele F. Abosede¹**¹Department of Medical Microbiology & Parasitology, College of Health Sciences, Olabisi Onabanjo University Teaching Hospital P.M.B 2001, Sagamu, Ogun –State, Nigeria²Department of Medical Laboratory, Health Services Directorate, Olabisi Onabanjo University P.M.B 2002, Ago-Iwoye, Ogun-State, Nigeria³General Hospital, Ijebu-Igbo, Ogun-State, Nigeria⁴College of Health Technology, P.M.B 430, Offa, Kwara State, Nigeria***Corresponding author**

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Abstract: Pregnant women are at increased risk for UTIs as a result of decline in immunity appears to promote the growth of both commensal and non-commensal microorganisms. A total of 140 mid-stream urine samples were collected from asymptomatic pregnant women attending antenatal clinic in private hospital, Lagos. The age's group of the women ranged from 15 to 54 years. About 5-10mls of clean catch urine was cultured on Mac-Conkey and Blood agar aerobically at 37⁰C while urine also cultured on Sabouraud agar and incubated at 28⁰C room temperature. Antibiotic sensitivity test were carried out using the Kirby-Bauer disc diffusion method. Out of the 140 women examined, 52 had significant bacteriuria representing a prevalence of 37.1% in the study population. Pregnant women in their second trimester from the study had the highest prevalence of significant bacteriuria (45.3%) with age ranges between 15-24 years having the highest prevalence (39.0%). E. coli has the highest value (30.7%) while Proteus and Citrobacter species has lowest value of (5.8%) each respectively. Ciprofloxacin; Augmentin and Ceftriaxone were found to be the most effective antimicrobial against the urinary isolates. Asymptomatic bacteriuria (ASB) in pregnancy is common in private hospitals in Lagos and has no statistically significant relationship with trimester and age-group.**Keywords:** Uropathogens, Antibiotic susceptibility, Urine, Pregnant women

INTRODUCTION

Urinary tract infection is a common problem encountered in pregnancy due to the morphological and physiological changes that takes place in the genitourinary tract during pregnancy. It is of two types symptomatic and asymptomatic. Urinary tract infection can involve the kidneys and is called pyelonephritis or it may involve the bladder and is called cystitis, urinary tract infection can also be without symptoms termed asymptomatic bacteriuria (ASB). The signs and symptoms vary with the type of UTI. Asymptomatic bacteriuria (ASB) is significant bacterial colonization of the lower urinary tract without any symptoms. Pre disposing factors to ASB, are; low socio-economic status, increasing age, multiparity, sexual behavior, urinary tract anomalies, previous treatment for UTI, other medical conditions like diabetes, sickle cell disease, and immune compromised states like AIDS and spinal cord injuries. ASB will be complicated by progression to pyelonephritis in up to 20-40% if left

untreated and only 3% will progress to symptomatic infection if treated [1-3]. ASB accounts for 2 to 10% pregnancies in affluent countries and up to 86.6% developing and under-developed countries [4]. Pregnant woman with ASB are at high risk for maternal and foetal complications [5]. Maternal complications include overt UTI in 30-40% of antenatal women as pregnancy progresses. The foetus is at high risk for prematurity [6, 7] low birth weight Romero [8], IUGR and perinatal mortality. Bacteriuria during pregnancy has a greater tendency to progress to pyelonephritis than in non-pregnant women. This is common during pregnancy, the apparent reduction in immunity of pregnant women appears to encourage the growth of both commensal and non-commensal microorganisms [9]. The physiological increase in plasma volume during pregnancy decrease urine concentration and up to 70% pregnant women develop glucosurea, which encourages bacterial growth in the urine [10, 11]. Symptomatic bacteriuria could lead to pyelonephritis

and adverse obstetric outcomes such as prematurity, low birth weight [12] and higher foetal mortality rates [13, 14]. The adverse effects of undiagnosed asymptomatic bacteriuria on mother and child have made researchers to suggest routine culture screening for all pregnant women attending antenatal clinic [15] in order to prevent mother and child from any form of complication that may arise due to infection. The diagnosis and management of asymptomatic bacteriuria (ASB) is a very important aspect of antenatal care as it is consistent with general health promotion, specific protection, early diagnosis and treatment. Asymptomatic bacteriuria is a common bacterial infection of the urinary tract requiring medical treatment in pregnancy. Diagnosis and treatment of asymptomatic bacteriuria is important as approximately 20-40% of these women, if untreated during pregnancy, will develop a symptomatic urinary tract infection (UTI) [16]. It is also in keeping with the goal of safe motherhood initiative; that women safely go through pregnancy and childbirth and produce health babies. Untreated asymptomatic bacteriuria is a risk factor for acute cystitis (40%) and pyelonephritis (25-30%) in pregnancy [17]. Several studies have shown different prevalence rates of asymptomatic bacteriuria in pregnancy with quoted values ranging from 3-10% in most develop countries [8]. In most Asian countries and Sub-Saharan Africa, including Nigeria, higher prevalence rate ranging from 26-56% is quoted [18, 19]. This variation in the prevalence of asymptomatic bacteriuria is explained by differences in the population characterizes and most importantly, difference in screening methodology and criteria for the diagnosis of asymptomatic bacteriuria in these studies, which in most case are at variance with the accepted standard. The aim of the study was to evaluate the prevalence of asymptomatic bacteriuria in pregnant women, its causative agent and to ascertain factors that predispose these women to bacteria.

MATERIALS AND METHODS

Study Area

This cross-sectional study was carried out in the antenatal clinic of Ancel Medical Hospital in Ojo Local Government Area of Lagos, Nigeria. The study covered a period of 6 months from April to September; 2014.

Study Population

One hundred and forty (140) pregnant women attending the antenatal clinic of private hospital, in Lagos State, Nigeria were used for this study. All pregnant women attending the antenatal clinic during the study period and who consented to participate in the study by signing the consent form were clinically evaluated to exclude signs and symptoms of UTI. With the aid of questionnaire, demographic features including age, parity, and gestational age of pregnancy were collected.

Specimen collection

Subjects were properly educated to collect clean catch midstream urine samples into wide mouthed sterile capped containers after proper cleaning of the external genitalia. Urine samples were properly labeled with laboratory number and cultured on appropriate media.

Culture process

Urine samples were cultured using a standard loop calibrated to hold 0.01ml of urine onto blood agar, MacConkey agar and Sabouraud Agar. Inoculated plates were incubated at 37°C aerobically overnight while sabouraud agar was incubated at 28°C room temperature. The plates were read and the organisms were identified using standard cultural and microscopic methods on the inoculated media.

Colony Counts

Colonies were counted on MacConkey and multiplied by the loop volume. A bacterial count of $1 \leq 10^5$ was considered significant for UTI and counts of 10^2 - 10^4 per ml were considered as suspected/doubtful bacteriuria while counts less than 10^2 per ml were considered no significant bacterial growth.

Bacterial identification

Growths on the culture media were identified using their growth characteristics, gram stain and biochemical and sugar fermentation testes. The biochemical tests used were oxidizing test in dole test for lactose fermenting bacteria particularly *Escherichia coli*, *Klebsiella* and *Pseudomonas aeruginosa*.

Antimicrobial susceptibility testing

Antimicrobial susceptibility test were performed using Kirby-Bauer disc diffusion test. The isolates were tested against the following antibiotic.

Ampicillin (10Ug), Ceftriaxone (30Ug),
Gentamycin (10Ug), Nitrofurantoin (30Ug)
Augmentin (10Ug), Ciprofloxacin (5Ug),
Erythromycin (10Ug) and Cloxacillin (30 Ug),

Zone diameter was measured by Clinical laboratory Standard Institute [20].

RESULTS

Of the 140 asymptomatic pregnant women sampled, 52(37.1%) had colony counts of 10^5 colonies/mL; pus cells were found significantly in 93, but bacterial isolates were growth significantly in 52 of the samples studied (Table1). Seven bacterial were isolated while *Candida albicans* is the only yeast isolated (table2). ASB was observed more among women belonging to 24 years and above. It was significant statistically ($p < 0.01$) (Table3). Most of the isolates were resistance to ampicillin and cloxacillin while majority were susceptible to augmentin, ceftriaxone and ciprofloxacin (Table 4).

Table 1: Result of urine culture

Cases	Total number of patients (%)
Significant growth	52 (37.1%)
No significant growth	41 (29.3%)
No growth	47 (33.6%)
Total	140 (100%)

Table 2: Profile of bacteria isolated from cases of significant bacteriuria

Organisms	Number (%)
<i>Escherichia coli</i>	16 (30.7)
<i>Staphylococcus</i> species	13 (25.0)
<i>Klebsiella</i> species	7 (13.5)
<i>Proteus</i> species	3 (5.8)
<i>Citrobacter</i> species	3 (5.8)
<i>Pseudomonas aeruginosa</i>	4 (7.7)
<i>Candida albicans</i>	6 (11.5)
Total	52 (100)

Table 3: Distribution of Asymptomatic bacteriuria by age group and trimester among women at private hospital, Lagos

Characteristic	Total tested (%)	Number positive (%)
Age group		
15-24	41 (29.3)	16 (39.0)
25-34	63 (45.0)	24 (38.1)
35-44	28 (20.0)	10 (35.7)
45-54	8 (5.7)	2 (25)
Total	140 (100)	52 (37.1)
Trimester		
1 st trimester	22 (15.7)	09 (40.9)
2 nd trimester	53 (37.9)	24 (45.3)
3 rd trimester	65 (46.4)	19 (29.2)

Table 4: Percentage of bacteria isolates susceptible to various antimicrobial agents

Antimicrobial Agents	<i>E. coli</i> (16) n (%)	<i>Staphylococcus aureus</i> (13) n (%)	<i>Klebsiella</i> spp (7) n (%)	<i>Citrobacter</i> spp (3) n(%)	<i>Proteus</i> spp (3) n(%)	<i>Pseudomonas aeruginosa</i> (4) n (%)
AMP	1(6.3)	-	-	-	-	-
CLX	1(6.3)	1(7.7)	1(14.3)	-	-	-
ERY	2(12.5)	1(7.7)	1(14.3)	-	-	-
F	11(68.8)	6(46.2)	4(57.1)	2(66.7)	2(66.7)	1(25.0)
GEN	10(62.5)	7(53.8)	5(71.4)	1(33.3)	2(66.7)	2(50.0)
AUG	12(75.0)	9(69.2)	6(85.7)	2(66.7)	2(66.7)	2(50.0)
CRO	13(81.3)	10(76.9)	6(85.7)	2(66.7)	2(66.7)	3(75.0)
CIP	14(87.5)	11(84.6)	7(100)	7(100)	3(100)	3(75.0)

AMP=Ampicillin, CLX=Cloxacillin, ERY=Erythromycin, F=Nitrofurantoin, GEN=Gentamycin, AUG=Augmentin, CRO=Ceftriaxone, CIP=Ciprofloxacin

DISCUSSION

The results of this work show a high prevalence of asymptomatic bacteriuria among pregnant women in private hospitals in Lagos with (37.1%). This is higher than the 23.9% from the study in Sagamu, Nigeria [21], 7.3% reported in Ghana [22] and 7% reported in Ethiopia [23], lower than the 86.6% earlier reported in Benin City, Nigeria. The uopathogen microorganisms isolated from this study were *Escherichia coli* (30.7%), *Staphylococcus aureus* (25.0%), *Klebsiella* species (13.5%), *Candida albicans* (11.5%), *Pseudomonas*

aeruginosa (7.7%), *Proteus* species and *Citrobacter* species (5.8%) each respectively. The most common bacterial isolated were *Escherichia coli* and *Staphylococcus aureus* with (30.7%) and (25.0%) respectively. Ahmed and Rashid [24], in separate studies also reported *E. coli* as being the commonest pathogen responsible for bacteriuria which is consistent with the findings of this study [22, 25-27] have all reported *E. coli* as the dominant bacterial agent causing asymptomatic UTI. Mohammed [28] suggested that the

high risk of acquiring, *E. coli* is the most common microorganism in vaginal and rectal area.

According to age, the highest prevalence of asymptomatic bacteriuria was observed in pregnant women within 25-34years age group followed by the 15-24years age group and then the 35-44years while the least age group was 45-54years. Turpin [22] reported a higher prevalence of UTI in pregnant women aged 21-25 years in their study. The observed trend of bacteriuria in this study and reports from other studies shows the age range of 25-34 years serving as a risk group for developing UTI in pregnant women. The prevalence of *Staphylococcus aureus* was higher (25.0%) in this study. This agrees with previous studies [4], Amadi [29] which observed an increasing trend in the prevalence of *Staphylococcus aureus* infection among asymptomatic pregnant women.

Researchers observed that pregnant women in the second trimester of pregnancy had the highest prevalence of asymptomatic bacteriuria followed by pregnant women in the third trimester of pregnancy which is in consonance with the findings of Alghalibi [30] who in a study on bacterial urinary tract infection among pregnant women in Yemen reported the second and third trimesters of pregnancy as being associated with the highest prevalence of UTI. It is however, contrary to the findings of Turpin [22] who reported. A high percentage of asymptomatic bacteriuria in the first and second trimesters of pregnancy and attributed it to pregnant women reporting at the antenatal clinic for booking during these periods.

The antibiotic sensitivity patterns from this study showed that most of the *E. coli* was observed to be sensitive to Gentamycin (62.5%) Nitrofurantoin (68.8%), Augmentin (75.0%), Ceftriaxone (81.3%) and Ciprofloxacin (87.5%). The high resistance to Ampicillin, Cloxacillin and Erythromycin observed in this study to all the bacterial isolates may be due to the commonly prescribed antibiotics in community, hospital and also the most easily available. The clinicians should put some conditions into consideration before prescribing the choice of antibiotic. Antibiotic prescription should be based on urine culture, stage of trimester, and how severe the infection.

This study shows that approximately 40% of the pregnant women with asymptomatic bacteriuria in our locality. It is therefore, suggested that urine culture must compulsory before treatment of UTI in pregnant women, and the test should be included as part of routine screening in antenatal clinic guideline in Lagos, Nigeria.

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