

Original Research Article

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Asymptomatic Bacteriuria in Pregnant Women at Kosti Teaching Hospital, Kosti-White Nile State (Sudan)

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ABSTRACT

Asymptomatic bacteriuria is a condition in which urine reveals significant growth; with no symptoms and signs of urinary tract infection, it is common during pregnancy and lead to serious complications. The objectives of this study were to determine the frequency of asymptomatic bacteriuria among pregnant women in Kosti teaching hospital, department of Obstetrics (White Nile State- Kosti-Sudan) and to identify the causative organisms and their antibiotics susceptibility pattern. This study was a prospective descriptive cross sectional study conducted in the department of Obstetrics and Gynecology at Kosti teaching hospital, from January to March 2017. A total of 192 pregnant women with no symptoms and signs of urinary tract infection were enrolled in the study. Midstream urine sample for culture was collected from each participant. All urine samples were inoculated on cystine lactose electrolyte deficient (CLED) and blood agar media, and incubated aerobically for 24 h at 37°C. The colonies then identified by Gram staining technique and conventional biochemical tests. Antibiotics susceptibility testing of the isolated organisms was done by using Kirby Bauer disc diffusion method. Out of the 192 pregnant women enrolled in the study, the prevalence of asymptomatic bacteriuria was 25/192(13%).The study showed that asymptomatic bacteriuria was significantly associated with the age of the pregnant women (P value 0.009), the prevalence increase with decrease in age and it was 25% in the age group (12-20 years), 11.93% in the age group (21-30) and only 2.56% among the age group above 30 years. The differences of asymptomatic bacteriuria according to the trimesters was not significant (P value = 0.264). *Escherichia coli* was the most frequent causal organism 8/25(32%) followed by *Proteus species* 7/25(28%), *Klebsiella pneumoniae* 4(16%), *Staphylococcus saprophyticus* 3/25(12%), *Pseudomonas aeruginosa* 2/25(8%) and *Streptococcus agalactiae* 1/25(4%). Isolates revealed high susceptibility to amikacin (84%), followed by ciprofloxacin (76%), and gentamycin (56%).However, all isolates were resistant to cotrimoxazole. High prevalence of asymptomatic bacteriuria was noted among pregnant women in Kosti teaching hospital and more common in younger pregnant. *Escherichia coli* was the most frequent isolate. Most of the isolated bacteria were sensitive to Amikacin and Ciprofloxacin.

Keywords

Staphylococcus saprophyticus,
Streptococcus agalactiae,
Klebsiella pneumoniae

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Introduction

Bacteriuria is the presence of bacteria in urine. (Kunin, 1994). It is generally accepted that 10^5 or more colony forming units of bacteria per milliliter of urine is significant bacteriuria whether the patient is symptomatic or asymptomatic (Najar *et al.*, 2009). Asymptomatic bacteriuria is a condition in which urine culture reveals the presence of more than 10^5 bacteria per milliliter but without the patient showing symptoms of urinary tract infection (Scott *et al.*, 1990). The diagnosis relies upon microbiologic findings (Garingalo-Molina, 2000; Ali *et al.*, 2011). Asymptomatic bacteriuria is common in pregnancy and may lead to serious complications. It leads to acute cystitis in (40%) and pyelonephritis in (25-30%) (Scott *et al.*, 1990). Pyelonephritis can lead to prenatal and maternal complications, including preterm delivery, low birth weight, fetal mortality, hypertension, anemia and renal insufficiency (Gilstrap and Ramin, 2001; Smail and Vazquez, 2007; Cunningham *et al.*, 2010; Foxman, 2010). The reduction in immunity of pregnant women appears to encourage the growth of both commensally and non-commensally microorganisms (Stamm and Hooton, 1993). Many researchers have reports on the prevalence of asymptomatic bacteriuria among pregnant women (Bloomberg *et al.*, 2005). It has been reported in 20% of the pregnant women and it is the most cause of admission in obstetrical wards (Ali *et al.*, 2011; Obirikorang *et al.*, 2012). Asymptomatic bacteriuria has been reported among 13.0% pregnant women at Khartoum North Hospital, Sudan (Hamdan *et al.*, 2011).

Patients and Methods

This study carried out at department of Obstetrics and Gynecology-Kosti teaching hospital, Kosti – White Nile State –Sudan,

during the period from January to March 2017. It is a prospective cross sectional descriptive study. One hundred and ninety two pregnant women with no symptoms of urinary tract infections, with different age and different gestational age come to department of Obse and Gyne - Kosti teaching hospital, were enrolled in this study. Non pregnant or pregnant women with symptomatic urinary tract infection were excluded. From each participant midstream urine sample for culture was collected in sterile containers. Personal and clinical data were obtained by a questionnaire.

Isolation and identification

Using calibrated loop method all urine samples were inoculated on cystine lactose electrolyte deficient (CLED) and blood agar media, and incubated aerobically for 24 h at 37°C. After studying the colonial morphology, the colonies then identified by Gram staining technique and conventional biochemical tests.

Antimicrobial susceptibility testing

Susceptibility of isolated organisms to gentamicin (10ug), amikacin (30ug), ciprofloxacin (5ug) and co- trimoxazole (25ug) were tested by Kirby Bauer disc diffusion method. Suspensions of the isolates were adjusted to turbidity of 0.5 McFarland standards. Then the bacterial suspensions were spread on Mueller-Hinton agar and antibiotics discs placed on agar. All plates were incubated at 37°C for 24 hours. Zones of inhibition of the isolates were measured and reported as susceptible or resistant.

Results and Discussion

This study was conducted on the period from January to March 2017 at Kosti teaching hospital, department of Obse and Gyne. The prevalence of asymptomatic bacteriuria in

pregnant women at Kosti teaching hospital was 25/192(13%). The study revealed that 25% of pregnant women in the first trimester attending at Kosti hospital were with asymptomatic bacteriuria, and lesser percentages were noted in women in the second and third trimesters 11.7% and 11.6%, respectively (Table 1). However, the different of asymptomatic bacteriuria according to the trimesters was not significant (P value = 0.264). *Escherichia coli* was the most frequent isolated organisms 8/25(32%) followed by *Proteus species* 7/25(28%), *Klebsiella pneumoniae* 4/25(16%) for each, *Staphylococcus saprophyticus* 3/25(12%), *Pseudomonas aeruginosa* 2/25(8%) and *Streptococcus agalactiae* 1/25(4%) (Table 2). The study showed that asymptomatic bacteriuria was significantly associated with the younger pregnant women (≤ 30 years) and decreased among older pregnant women (P value 0.009). Hence asymptomatic bacteriuria was noted in 25% of pregnant women in the age group (12-20 years), 11.93% in the age group (21-30) and only 2.56% among age group above 30 years as shown in Table 3. The isolated bacteria showed high susceptibility to amikacin (84%), followed by ciprofloxacin (76%), and gentamycin (56%). However; all isolates were resistant to cotrimoxazole as shown in Table 4.

The complication of asymptomatic bacteriuria in pregnant women results in increase of morbidity of the mothers and has effects on the fetus which may result in fetal growth retardation, hypertension and anemia. In this

study the prevalence of asymptomatic bacteriuria in pregnant women at Kosti teaching hospital was 13% this is lower than the earlier 78.7% reported in Nigeria (Amadi *et al.*, 2007) and 16.1% reported in Ethiopia (Nisha *et al.*, 2015). It is higher than that reported in Ghana, Ethiopia and Saudia Arabia 1.7% - 8.6% (Turpin *et al.*, 2007; Gabre-Selassie, 1998; Debebe, 2005; Al Sibiani, 2011).

The most prevalence organism observed in this study was *Escherichia coli* 8/25(32%), This finding agrees with earlier reports showed that *Escherichia coli* was the most predominant etiological agent in asymptotic bacteriuria in pregnant women, with variable percentages from 25.2% to 53% (Nisha *et al.*, 2015; Turpin *et al.*, 2007; Debebe, 2005; Al Sibiani, 2011; Blomberg *et al.*, 2005). This could be due to the fact that *Escherichia coli* is a predominant microorganism in intestinal tract that can contaminate the skin area near to urethral opening and poor hygienic practices by pregnant women enhance entry of the organism to urinary tract causing infections.

In this study it was noted that the differences of asymptomatic bacteriuria according to the trimesters was not significant (P value = 0.264), this is in agreement with findings reported by other researchers (Olusanya *et al.*, 1993; Selassie, 1998; Sheikh *et al.*, 2000; Ayoyi *et al.*, 2017) they reported that gestational age of the participants did not have any statistical significant influence on asymptomatic bacteriuria.

Table.1 Shows the frequency of asymptomatic bacteriuria in relation to pregnancy duration (trimesters)				
Asymptomatic bacteriuria	1 st trimester	2 nd trimester	3 rd trimester	Total
Positive	5(25%)	7(11.7%)	13(11.6%)	25(13%)
Negative	15(75%)	53(88.3%)	99(88.4%)	167(87%)
Total specimens	20(100%)	60(100%)	112(100%)	192(100%)
P value = 0.264				

Table.2 Shows the distribution of isolated bacterial species from urine in relation to pregnancy duration (trimesters)

Organisms	1 st trimester	2 nd trimester	3 rd trimester	Total
<i>Proteus species</i>	1	2	4	7(28%)
<i>Escherichia coli</i>	1	1	6	8(32%)
<i>Klebsiella pneumoniae</i>	2	2	0	4(16%)
<i>Pseudomonas aeruginosa</i>	0	0	2	2(8%)
<i>Staphylococcus saprophyticus</i>	1	1	1	3(12%)
<i>Streptococcus agalactiae</i>	0	1	0	1(4%)
Total isolates	5(100%)	7(100%)	13(100%)	25(100%)

Table.3 Shows the frequency of significant bacterial growth of urine culture in relation to the age of the pregnant women

Age group	12-20 years	21-30 years	31-40 years	Total
Significant Growth	11 (25%)	13(11.93%)	1(2.56%)	25(13%)
Insignificant or no growth	33(75%)	96(88.07%)	38(97.44%)	167(87.5%)
Total	44 (100%)	109(100%)	39(100%)	192(100%)

P value = 0.009

Table.4 Shows the antibiotics susceptibility test for isolated bacteria

Antibiotic	Susceptible	Resistant	Total tested isolates
Ciprofloxacin	19(76%)	6(24%)	25(100%)
Amikacin	21(84%)	4(16%)	25(100%)
Gentamycin	14(56%)	11(44%)	25(100%)
Cotrimoxazole	0	25(100%)	25(100%)

However, Awonuga found increasing prevalence with gestational age (Awonuga *et al.*, 2010), and Nnatu found decreasing prevalence with duration of pregnancy (Nnatu *et al.*, 1989). The study showed that asymptomatic bacteriuria was significantly associated with the younger pregnant (≤ 30 years) and decreases among older pregnant (P value 0.009), this result is in agreement with some researchers (Savage *et al.*, 1967; Kandil *et al.*, 1982) who observed a much higher prevalence of asymptomatic bacteriuria in younger pregnant women. However, the finding differs from those reported by Kass, Gaymans group, and Woodman (Kass, 1962; Gaymans *et al.*, 1976; Woodman, 2001) who have found a progressive rise in prevalence of bacteriuria with increasing age. It was also

reported that age of the pregnant women did not have any significant influence on asymptomatic bacteriuria (Ayoyi *et al.*, 2017).

The highest susceptibility of isolated bacteria to antibiotics was noted with amikacin (84%), followed by ciprofloxacin (76%), and gentamycin (56%). However, all isolates were resistant to cotrimoxazole. The antibiotic resistant pattern of isolated bacteria in the study could be due to antibiotic abuse and self-medication being common in Sudan.

Asymptomatic bacteriuria had high prevalence among pregnant women at Kosti teaching hospital especially that of age less than thirty years. The most isolated bacteria in asymptomatic bacteriuria was *Escherichia*

coli. Amikacin and ciprofloxacin were the effective antibiotics against most isolated bacteria. Routine urine culture should be carried out on all pregnant women in order to detect asymptomatic bacteriuria and to allow its early treatment in order to avoid its complications.

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