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Research article

BACTERIURIA IN APPARENTLY HEALTHY INDIVIDUAL IN OSOGBO

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ABSTRACT: Out of the 248 samples analysed, 27 (10.9%) were significant for asymptomatic bacteriuria. The occurrence of pathogenic organisms was seen to differ significantly by age and sex among the volunteers. *Escherichia coli* is the most frequently isolated pathogen with 40.7%, followed by *Klebsiella spp* (33.3%), *Pseudomonas aeruginosa* (18.5%), and *Citrobacter spp* (7.4%). In this study, the occurrence of these organisms was highest in the age group of 5-14 (13.8%) years while the age group 25-34 had the least (8.1%) and the females (11.5%) were more affected than males (9.8%).

Keywords: Bacteriuria, healthy, urine, sex, antibiotics.

INTRODUCTION

Bacteriuria is the presence of bacteria in the urine (Collins and Lyne., 1995). Significant bacteriuria traditionally refers to the laboratory finding of greater than 10^5 colony-forming units (CFU) of bacteria per ml of urine (Bryan.,2011).The presence of a significant quantity ($>10^5$ CFU) of bacteria in a urine specimen properly collected from a person without symptoms and signs of a urinary tract infection characterises asymptomatic bacteriuria (Rubin et al.,1992). Though urinary tract infection (UTI) is accompanied by typically symptoms such as frequent, urgent, burning with urination and in children, it may include; fever, loss of appetite and vomiting (Healthplus.,2012) but, none of these is found in asymptomatic bacteriuria. Asymptomatic bacteriuria occurs in a small number of healthy individuals (Linda.,2012).Its prevalence has been found to increase with age, sexual activity and parity (Nicolle.,1997) (Olutosin et al.,2010) Also, premenopausal, non-pregnant women with asymptomatic bacteriuria are more likely to experience subsequent symptomatic urinary tract infection (Hooton et al.,2000), while during pregnancy; they are at 20 to 30 fold increased risk of developing pyelonephritis than women without asymptomatic bacteriuria (Kincaid and Bullen.,1965). Urinary tract infections are the most frequent bacterial infection in women (Medlineplus; 2009), (Colgan and Williams; 2011). They occur most frequently between the ages of 16 and 35 years, with 10% of women getting an infection yearly and 60% having an infection at some point in their lives (Nicole;2008), (Salvatore et al.,2011). Urinary tract infections occur four times more frequently in females than males (Salvatore *et al.*, 2011). Elderly men are shown to have higher risk of developing urinary tract infection with systemic complications after undergoing invasive urologic procedures without preoperative antibiotic prophylaxis and bowel preparation (Huang et al.,2006).Urinary tract infection may affect 10% of people during childhood (Salvatore *et al.*, 2011). Among children, urinary tract infections are the most common in uncircumcised males less than three months of age, followed by females less than one year (Bhat *et al*;2011). .About 7% of girls and 2% of boys suffer from UTI at least once before they reach the age of six (Healthplus24; 2012). In a group of children with a fever, ranging in age between birth and two years, two to 20% were diagnosed with a UTI (Bhat *et al.*,2011). The most common symptoms of UTI is frequent, urgent urination with burning sensation or sharp pain in the lower abdomen (Charles, 2012). There is a need to know if there has been any major increase in the prevalence of bacteriuria in apparently healthy individuals in Osogbo metropolis after eight years when Adefioye *et al.*, 2004 reported it and to compare the susceptibility and resistance pattern of antibiotics as to the previous studies. This work is designed to study the prevalence of bacteriuria in apparently healthy individuals in Osogbo.

MATERIALS AND METHODS

The study was carried out in Osogbo metropolis of Osun state, Nigeria between September and December, 2012. The samples were collected from apparently healthy individuals of both sexes and of different ages living in different areas of Osogbo, Osun state. The samples collected were of those who consented to participate in study.

They were told to collect clean midstream urine in order to avoid contamination. The samples were immediately taken to the medical microbiology laboratory for processing. About 5ml of urine sample was centrifuged at 2500rpm for 5 minutes. The supernatant was discarded and the deposit was re-dissolved in a small amount of urine left in the tube and examined under the light microscope using $\times 40$ objective lens for pus cells, red blood cells, cast, crystals, epithelial cells, bacteria and ova parasites. Identification of parasites was done using the criteria of WHO (WHO., 1991). The media used were MacConkey agar, Chocolate Agar, Muller Hinton Agar and Peptone water. The inoculated plates were incubated aerobically for twenty four hours at 37°C as recommended by Kass (Kass., 1957). The disc diffusion method of Bauer et al (1966) was used for this study. One or two colonies were picked from the culture plate and emulsified into 3ml of peptone water and then allowed to stay for five minutes. The bacterial suspension was poured into the Muller Hinton agar and the excess was discarded. An antibiotic disc containing the following antibiotics; ceftazidime ($30\mu\text{g}$), cefuroxime ($30\mu\text{g}$), gentamicin ($10\mu\text{g}$), cefixime ($5\mu\text{g}$), ofloxacin ($5\mu\text{g}$), augmentine ($30\mu\text{g}$), nitrofurantoin ($300\mu\text{g}$), ciprofloxacin ($5\mu\text{g}$) was placed on each of the culture and incubated over night at 37°C . The antibiotic diffusion into the medium and areas of zone of inhibition around each of the disc were examined. Those organisms that were sensitive to the antibiotics were inhibited at a distance from the disc while those resistant grew round the edge of the disc. The diameters of zones of inhibition of sensitive organisms were measured with meter rule.

RESULTS

Out of the 248 samples analysed, 27 (10.9%) were significant for asymptomatic bacteriuria. The occurrence of pathogenic organisms was seen to differ significantly by age and sex among the volunteers. Table 1 shows that, *Escherichia coli* was the most frequently isolated pathogen with 40.7%, followed by *Klebsiella spp* (33.3%), *Pseudomonas aeruginosa* (18.5%), and *Citrobacter spp* (7.4%). In this study, occurrence of these organisms was highest in the age group of 5-14 (13.8%) years while the age group 25-34 had the least (8.1%) and the females (11.5%) were more affected than males (9.8%) as shown in Table 2. The antibiotic susceptibility test showed that the bacterial isolates varied in their sensitivity and resistance patterns to a number of antibiotics used in this study. The isolates showed high sensitivity to ofloxacin (100%), ciprofloxacin (100%) and gentamicin (85.2%).

Table 1: Types and Rate of Occurrence of Bacteria from the Urine Samples of Apparently healthy individuals in Osogbo.

ORGANISMS	ISOLATION RATE					
	MALE	%	FEMALE	%	TOTAL	%
<i>Escherichia coli</i>	3	27.3	8	72.3	11	40.7
<i>Klebsiella spp</i>	2	22.3	7	77.8	9	33.3
<i>Pseudomonas aeruginosa</i>	4	80.0	1	20	5	18.5
<i>Citrobacter spp</i>	0	0	2	100	2	7.4
TOTAL	9	33.3	18	66.7	27	10.9

Table 2: Distribution of the Significant Bacteriuria Among Apparently Healthy Individuals by Sex and Age.

Age group (year)	Male			Female			Total		
	No examined	No positive	% positive	No examined	No positive	% positive	No examined	No positive	% Positive
5-14	8	2	25%	21	2	9.5%	29	4	13.8%
15-24	42	6	14.3%	69	8	11.6%	111	14	12.6%
25-34	37	1	2.7%	50	6	12%	87	7	8.1%
35-44	5	0	0.0%	16	2	12.5%	21	2	9.5%
Total	92	9	9.8%	156	18	11.5%	248	27	10.9%

Table 3:Antimicrobial Sensitivity Pattern of Isolates from Urine of Apparently Healthy Individuals in Osogbo.

Antibiotics	No of isolate tested	No of isolate sensitive	%	No of isolate resistant	%
Ceftazidine (30µg)	27	22	81.5%	5	18.5%
Cefuroxime (30µg)	27	27	100%	0	0%
Gentamicin (10µg)	27	23	85.2%	4	14.8%
Cefixime (5µg)	27	22	81.5%	5	18.5%
Ofloxacin (5µg)	27	27	100%	0	0%
Augmentin(30µg)	27	0	0%	27	100%
Nitrofuraton (300µg)	27	5	18.5%	22	81.5%
Ciprofloxacin(5µg)	27	27	100%	0	0%

DISCUSSION

Out of the 248 individuals that participated in this study, only 27(10.9%) had urine samples with significant bacteria growth of which 18 (66.7%) of these individuals were females between the ages of 5 to 44 years as compared to males who were 9(33.3%) in number. This study agrees with the findings of Adefioye et al. (2004), Aiyegoro et al. (2007), and Onifade et al., (2011). The higher incidence of infection in female could possibly be attributed to various factors such as their short urethra and its nearness to the anus (Horberman and Wald.,1997), (David.,2011),decrease in the estrogen level as menopause approaches (Dielubanza and Sehaeffer;2011), or pregnancy (Charles.,2012,Smaill,2007).The use of spermicide or diaphragm which reduces the number of normal flora of the vaginal increases the risk of infection (Nicolle;2008, Stapleton, Stamms.,1997, Charles.,2012). The incidence of asymptomatic urinary tract infection among the males is highest between the ages of 5-14 years. The findings in this study support those of Onifade et al. (2011) and Foxman, (2002). Foxman, 2002 reported that urinary tract infection is most prevalent in the young male because of anatomical anomalies and intractable incontinenes of the urinary tract infection in the adult respectively. In females, the age group between 35-44 years were the most affected with incidence rate of 12.5%. This is attributed to the sexual activity and frequency among this age group (Medlineplus., 2009). *Escherichia coli* (40.7%) was the most common bacteria isolated in this study and shows that *Escherichia coli* is the predominant cause of asymptomatic bacteriuria in apparently healthy individuals. This supports the works of Nicolle, (2003), Adefioye et al.,(2004),Richards et al.,(2006). The second commonest organism was *Klebsiella* spp (33.3), followed by *Pseudomonas aeruginosa* (18.5%) and *Citrobacter* spp (7.4%). The in-vitro sensitivity patterns in this study revealed that Ofloxacin, Ciprofloxacin and Gentamicin were highly effective for most of the bacteria isolated with susceptibility rate of 100%, 100% and 85.2% respectively. This confirms the works of Aiyegoro et al., (2007). Augmentin was not effective at all. In this study, nitrofuratoin also had 18.5% resistance rate which was in contrary with the reports of Goldraichi and Manfrori (2002), and Adefioye et al; (2004). This could probably be due to development of new strains of these organisms through mutation, misuse or use of fake drugs or presence of capsule in these pathogenic organisms (Weber et al., 2005; Esan et al., 2006).

CONCLUSION

Conclusively, this study has been able to determine the incidence of asymptomatic bacteriuria in apparently healthy individuals in Osogbo and also, the causative agents of this infection. The study also agrees that *Escherichia coli* is still the major cause of asymptomatic bacteriuria amongst other causative agents. The susceptibility pattern of the isolates to the antibiotics revealed that that ofloxacin, ciprofloxacin and gentamicin are highly effective against their infection in this environment.

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