Asymptomatic Bacteriuria In Female Students Population Of A Nigerian University

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Citation

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Abstract

Background: Asymptomatic bacteriuria refers to the presence and multiplication of bacteria in the bladder urine in the absence of symptoms of urinary tract infection. Asymptomatic bacteriuria has been observed to be a strong criterion for urinary tract infections. It is therefore a means of predicting urinary tract infections. It is also common among females especially as they grow older.
Materials And Methods: Mid stream urine samples were collected from 300 healthy asymptomatic undergraduate students of Lagos State University between ages of 16 and 26 who were randomly sampled. Each specimen was cultured on MacConkey agar and Blood agar. The inoculated plates were incubated (using Gallenkamp model cooled incubator) at 37°C aerobically for 24hours. Those without growth were re-incubated for an additional 24hours. Antibiotic sensitivity of the isolates was also assessed.
Results: Thirty samples (10%) showed significant bacteriuria while 270(90%) showed no bacteriuria or non-significant bacteriuria. Escherichia coli was found to be the most predominant, (50%), followed by Staphylococcus aureus (20%), Streptococcus faecalis (13.33%) Staphylococcus albus (10%) and Klebsiella (6.67%). Co-trimoxazole was the most effective antimicrobial agent against the isolates, while the isolates were resistant to Ampicillin and Tetracycline.
Conclusion: Escherichia coli is the most common bacteria for asymptomatic bacteriuria in female university undergraduates in this study. The incidence of the bacteriuria is higher than both the younger age group in our environment as well as other parts of the world. Education on abuse and unrestricted use of antibiotics should be encouraged.

INTRODUCTION

The term 'bacteriuria' means the presence of bacteria in urine. It may results from contamination during or after collection of urine or it may indicate the presence of bacteria in bladder urine. To distinguish among these possibilities; $Kass_1$ introduced the term “significant bacteriuria” which was defined as the occurrence of 10^5 or more bacteria per ml of a voided midstream urine aseptically collected. Bacteriuria can be divided into symptomatic and asymptomatic. Asymptomatic bacteriuria refers to the presence and multiplication of bacteria in the bladder urine in the absence of symptoms of urinary tract infection while symptoms are present in symptomatic $cases_3$.

Bacterial infections of the urinary tract are commonly seen in outpatients, hospitalised patients and apparently healthy populations. Asymptomatic bacteriuria occurred reliably more frequently in females as compared with males and it is a major criterion of urinary tract $infection(UTI)_{14}$. Reasons adduced to this include shorter and wider urethra and its proximity to the anus. It was therefore thought necessary to investigate incidence of asymptomatic bacteriuria in female undergraduate students and also to study the effects of commonly used antibiotics on the bacteria isolated.

MATERIALS AND METHODS

Three hundred healthy asymptomatic undergraduate students of Lagos State University between ages of 16 and 26 were randomly sampled. Students with any symptom suggestive of urinary tract infection or those who have taken antibiotics two weeks before or were currently on antibiotics, or pregnant were excluded from the study. Midstream urine samples were collected from clinically healthy female students into sterile universal bottles. The samples were examined immediately or refrigerated (4°C) and examined within 6 hours of collection.

Each of the urine samples (5ml.) was centrifuged for 1min and examined under the microscope (Griffin model) for the

presence of yeast cells, parasites, leucocytes, erythrocytes and granular casts.

Each specimen was cultured on MacConkey agar and Blood agar. The inoculated plates were incubated (using Gallenkamp model cooled incubator) at 37°C aerobically for 24hours. Those without growth were re-incubated for an additional 24hours. Samples with 10^5 or more bacteria per ml were recorded as showing significant bacteriuria. Bacterial species were identified according to standard bacteriological tests.

Pure isolates were tested by the plate diffusion method for antibiotic susceptibility on the Diagnostic Sensitivity Teat (DST) agar (OXOID CM26) with antibiotic disc. The sensitivity plates were incubated aerobically for 18hours and the zone of inhibition was noted.

RESULTS

The colour of the urine samples ranged from colourless, straw, to turbid. From the microscopic examination, 18 samples contained epithelial cells, 7 samples, leucocytes, 16 samples, yeast cells, 3 samples, granular casts and crystals. No Trichomonas vaginalis was found. Thirty samples (10%) showed significant bacteriuria while 270(90%) showed no bacteriuria or non-significant bacteria.

Escherichia coli was found to be the most predominant, (50%), followed by Staphylococcus aureus (20%), Streptococcus faecalis (13.33%) Staphylococcus albus (10%) and Klebsiella (6.67%).

The result of the sensitivity test (Table3) showed that E. coli strains were most sensitive to Co-trimoxazole followed by Cefuroxin but were resistant to Ampicillin and Tetracycline. Klebsiella was sensitive to Cotrimoxazole and very resistant to Ampicillin and Penicillin. Overall.Co-trimoxazole was the most effective while Ampicillin and Tetracycline were the least effective against the bacteria strains.

Figure 1

Table 1: Level of bacteriuria

	Number of occurrence	%occurrence
Significant bacteriuria	30	10.0
Samples with insignificant growth	216	72.0
Samples with no growth	54	18.0
TOTAL	300	100.0

Figure 2

Table 2: Bacterial species isolated from asymptomatic LASU female students urine.

Bacteria	Number of occurrence	% occurrence
E.coli	15	50.0
S.aureus	6	20.0
S.albus	3	10.0
S. faecalis	4	13.3
Klebsiella	2	6.7

Figure 3

Table 3: Sensitivity pattern of some bacteria isolated from the urine of asymptomatic students

	E. coli	*S. aureus*	*S. albus*	*S. faecalis*	*Klebsiella*
Co-trimoxazole	13	5	0	3	2
Nalidixic acid	9	4	-	2	2
Nitrofurantoin	10	4	-	2	1
Chloramphenicol	-	2	2	1	0
Streptomycin	4	0	-	0	1
Tetracycline	3	0	0	0	0
Ampicillin	2	0	0	0	0
Cefuroxin	4	0	1	1	0
Gentamycin	12	0	1	2	0
Cloxacithine	0	0	0	0	0
Erythromycin	0	0	3	0	0

DISCUSSION

The term 'bacteriuria' means the presence of bacteria in urine. Bacteriuria can be divided into symptomatic and asymptomatic. Asymptomatic bacteriuria refers to the presence and multiplication of bacteria in the bladder urine in the absence of symptoms of urinary infection while symptoms are present in symptomatic cases[3]. Urinary tract bacterial infections are common in women. Moreover, they tend to recur throughout life and in the same relatively small group of women. In some instances, however, especially with frequent sexual activity, pregnancy, stone disease, or diabetes, symptomatic cystitis or pyelonephritis develops and antimicrobial therapy is indicated[4].

Asymptomatic bacteriuria is a common finding, and past history of symptoms such as frequency and dysuria is common[5]. Akinkugbe et al.[6], report incidence of asymptomatic bacteriuria in paediatric populations while Omer and Ahmed[7] report incidence in school children and Olusanya and Olutiola[8] report incidence in students of high school in Nigeria.

It has also been reported that bacteriuria is common among women probably due to the proximity of female urethra to the anus, its short length and its termination beneath the labia[10]. It has been observed that bacteriuria in young girls and women is preceeded by colonisation of the vaginal introitus by the specific species of Enterobacteriaceae that produces the infection. Adhesion property of the bacteria is an important factor that mediate the ability of a bacterial

species to colonise the vaginal or any mucosal surface.

Bacteria associated with bacteriuria in asymptomatic female in this study are E. coli, S.aureus, S. albus, S. faecalis and Klebsiella. E. coli accounts for the greatest percentage (50%) of micro-organisms associated with significant bacteriuria. This is similar to many previous reports[2, 3, 8,9].

It accounts for 47% of all isolates, whereas in general practice it accounts for more than 90% hence most work on the pathogenesis of urinary tract infection has focused on this micro-organism.

The current study shows a 10% incidence of significant bacteriuria. This value is higher than 5% incidence bacteriuria among students of secondary schools[7] and females of 14-17year of age with 3.3% bacteriuria[11]. The higher value obtained could be possibly due to increase in sexual activities among the University age group and /or increased age compared to the secondary school students. The age of the students screened ranges between 16 and 26 compared to less than 16 years of secondary school age. The value of 1.4-2.1% obtained in Europe[13] several years ago was much lower than our current report. This may be attributed to the difference in socio-economic and hygiene levels of the people. Asymptomatic bacteriuria occurred reliably more frequently in females as compared with males and it is a major criterion of urinary tract infection(UTI)[14].

Other bacteria isolated from this study included S. aureus (20%), S. albus (10%), S. faecalis (13.33%) and Klebsiella (6.67%). Akinkugbe et al., 1973 found E. coli in two-thirds of the urban children while S. aureus was the commonest among children who are asymptomatic. Olusanya and Olutiola 1984, isolated S. aureus (25%)from the majority of the healthy female students closely followed by E. coli. (21%) Omer and Ahmed, 1992, found S. aureus as the commonest case of asymptomatic bacteriuria followed by E. coli.

Co-trimoxazole and Nitrofurantoin were very effective against E. coli in the current study in agreement with other previous reports[8] . Co-trimoxazole was also effective on other isolates except S. albus which was sensitive only to Erythromycin. The result also showed that there was a rapid decline in Ampicillin and Tetracycline sensitivity. It has been suggested that the effectiveness of Co-trimoxazole against isolates may be due to its ability to act on both Gram positive and Gram-negative microorganisms[14].

The high prevalence of resistance to the commonly used antibiotics such as Ampicilllin and Tetracycline has caused considerable alarm. This may be due to failure to control the sale and restrict the use of antibiotics in our community.

In conclusion, while improved level of hygiene is likely to assist in reducing asymptomatic bacteriuria which may be complicated by urinary tract infection, the general pubic should be educated on the danger in taking unprescribed drugs and therefore stop indiscriminate use of antibiotics. The sale of such drugs as antibiotics must be restricted to physician's prescription. The female should always clean from forward to backward after using the toilet so as not to transfer the microorganisms from the bowel to the vagina. These will help in reducing the high rate of asymtomatic bacteriuria among our university female students.

References

1. Kass, E.H. Asymptomatic infections of urinary tract. Trans. Assoc. America Physicians. 1956; 69: 56-64
2. Burke, H. and Rhamy, K. (1970). Lower urinary tract problems related to infections: Diagnostic and treatment. Paediatric Clinical North America Journal 17, 233-253.
3. Kunin, C. M. (1972). Detection, prevention and management of urinary tract infections. Henry Kipton Publication London.
4. Sheffield JS, Cunningham FG Urinary tract infection in women Obstet Gynecol. 2005 Nov;106(5 Pt 1):1085-92.
5. Turck, M. and Stamm W. E. Nosocomial infection of urinary tract. America Journal of Medicine. 1981; 70: 651-654.
6. Akinkugbe, F.M., Familusi, J. B. and Akinkugbe O.O. Urinary tract infection in infancy and early childhood. East Africa Medical Journal 1973; 50: 514-520.
7. Omer E. E. and Ahmed, E. I. (1992). Urinary tract infection in school children. Medicine Digest. 1992; 18(6): 3-7.
8. Olusanya and Olutiola P.O. Studies of bacteriuria in patients and students in Ile-Ife, Nigeria.West Africa Journal of Medicin. 1984; 3(3): 177-183.
9. Roos V, Ulett GC, Schembri MA, Klemm P.. The asymptomatic bacteriuria Escherichia coli strain 83972 outcompetes uropathogenic E. coli strains in human urine. Infect Immun. 2006 Jan; 74(1): 615-24.
10. Sheffield JS, Cunningham FG. Urinary tract infection in women. Obstet Gynecol. 2005 Nov;106(5 Pt 1):1085-92.
11. Brumffit W., Gargan R. A. And Hamilton-Miller J. M. T. () Periurethral enterobacterial carriage preceeding urinary infection. Lancet i, 1987; 824-826.
12. Oner YA, Ahangari T, Artinyan E, Oz V, Kocazeybek B. A research on asymptomatic bacteriuria in 14- to 17-year-old female students. Urol Int. 2004;73(4):325-8.
13. Savage, D. C., Wilson, M. I., Ross, E. M. and Fee W. W. (). Asymptomatic bacteriuria in girls entrants in Dundee primary Schools. British Medical Journal. 1969; 3, 75-80.

14. Nurullaev RB. The role of Asymptomatic bacteriuria in epidemiologic study of the urinary tract infection(UTI). Lik Aprava, 2004 Oct-Nov, (7): 23-5

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