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Prevalence of Asymptomatic Bacteriuria in Secondary School Students in Benin City (Pp. 145-151)

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Abstract

*A total of 180 secondary school students (62 males and 118 females) selected randomly from the three local government areas in Benin City were screened from March to May 2007 for the presence of bacteria in their urine. Standard bacteriological methods were used in the screening of mid-stream urine samples collected to determine significant asymptomatic bacteriuria. Results obtained from the study showed that the prevalence rate was 15% distributed into 12.78% females and 2.22 males and urine culture yielded 27 samples with isolates. The isolates were *Candida sp.* (48.28%), *Escherichia coli* (17.24%), *Streptococcus faecalis* (13.79%), *Staphylococcus aureus* (10.34%) and coagulase negative *Staphylococcus* (10.34%). High occurrence of *Candida sp.* in the female could be as a result of intake of broad spectrum antibiotics which reduces competition in the normal flora in the female genitourinary tract thereby favoring its proliferation part of which may ascend the urethra. Good personal hygiene and de-emphasizing self prescription of drugs which could lead to antibiotics resistance are recommended measures to curtail the prevalence of asymptomatic bacteriuria in secondary school students.*

Introduction

Asymptomatic bacteriuria is a form of urinary tract infection (UTI) characterized by the presence of significant amount (up to 10^3 cfu/ml) of bacteria in the urine. It can occur in both infants and adult without any age specificity and in up to 6% of healthy individuals (Ghandhi, 2006). It is usually associated with increased risk of intra-uterine growth, retardation and low birth weight in infants (Harris et al., 1976) and development of cystitis or pyelonephritis especially in pregnant women (Kass, 1970). Presence of moderate amount of bacteria in the urine may not require serious medical attention because they may not be harmful to the individual; unlike other urinary tract infections with symptoms like suprapubic pains, concomitant fever, chill and/or back pain, bladder irritation, and discharge from the urethra, frequent urination, foul smelling urine and occasional haematuria (presence of blood in urine). However, persons with certain condition and within some age groups could at a higher risk like; diabetics, elderly people, pregnant women, kidney transplant patients, children with vesico-ureteral reflux and patients with infected kidney stones (Glauser, 1981). Women are more predisposed to UTIs than men. About 20% of women who have a UTI will have another and 30% of those yet another and of the last group, 80% will have recurrences (Hyattsville, 2004). Fishbane (2005) reported that the higher incidence in females reflects the shorter urethra and lack of a prostrate and the higher incidence in teens and young adults representing urethral trauma due to active sex. According to Freedman et al. (1965), infection in elderly men is uncommon with prevalence of 1% at the age of sixty years and above and usually caused by the use of catheters in the long run. People with diabetes have a higher risk of a UTI because of the changes in the immune system also abnormalities of the urinary tract also set the stage for UTI (Hyattsville, 2004).

Generally urinary tract infections do not pose deadly threats if treated promptly. Various antibiotic therapies are available for adequate treatment but if left untreated it could lead to kidney damage and possibly death. Therefore, the aim of this paper includes the following:

1. To investigate the prevalence of asymptomatic bacteriuria in secondary school students in Benin City
2. To determine the organisms involved in the infection and
3. To find out if the prevalence of the infection can be correlated with age and sex

Materials and Methods

Mid-stream urine samples were collected from 180 students (62 males and 118 females) within the age range of 11 to 20 years from secondary schools randomly selected in Ikpoba-Okha, Oredo and Egor Local Government Areas of Edo State, Nigeria between March and May 2007. The urine samples were collected with sterile plastic bottles.

Isolation of Bacteria Species

The following media MacConkey agar and blood agar were prepared according to manufacturers' specification and used for isolation of bacteria. Under aseptic condition, the urine samples were cultured in the media and incubated at 37°C for 24 hours. Plates that showed significant growth were separated for biochemical analyses, sensitivity tests and Gram staining.

Some urine sample were poured into plastic test tubes and centrifuged at 2000rpm/s for 10 minutes. The supernatant was decanted and using a drop pipette, two drops of the filtrate or sediment were put on a microscope slide with cover slip in place and viewed under x40 objective of a light microscope.

Identification and Characterization

Colony characteristics were observed and were confirmed using the chemical tests. Organisms suspected to be pathogenic were inoculated into peptone, citrate, glucose, urea and mannitol media and incubated at 37°C for 24 hours. Identification and confirmation of organisms were done with the aid of laboratory manual of biochemical tests.

Results

Table 1 shows the age group and sex distribution of the secondary school students sampled from the three local government areas in Benin City for the study. The highest set of female respondents across the age groups was reported in Oredo L.G.A (76); while the highest male respondents were recorded in Egor L.G.A. (34).

The result showing comparative frequency of asymptomatic bacteriuria between male and female respondents in the screened population is presented in table 2. Irrespective of the fact that the total number of males sampled was generally less than half of the females, percentage of occurrence was generally higher for females than males. The total number of positive cases 27 out of 180 persons sampled, representing 15% further distributed into 4 males (2.22%) and 23 females (12.78%).

Table 3 shows the distribution of bacterial isolates from the urine samples with significant microbial growth in culture. A total of five bacteria species were isolated from the 27 positive cases from the sampled population and they were namely; *Escherichia coli*, *Staphylococcus aureus*, and Coagulase negative *Staphylococcus*. *Candida* sp. recorded the highest frequency in the samples with a percentage frequency of 48.28% while the lowest frequency of 10.34% was reported for the two variants of *Staphylococcus*. According to Fishbane (2005), UTI caused by *Staphylococcus* spp. is usually via blood stream and not ascending infection and when it occurs, it is usually accompanied by evidence of severe inflammation in sexually active women.

Discussion

Asymptomatic bacteriuria is common, with varying prevalence by age, sex, sexual activity, and the presence of genitourinary abnormalities. In healthy women, the prevalence of bacteriuria increases with age, from about 1 percent in females five to 14 years of age to more than 20 percent in women at least 80 years of age living in the community (Nicolle, 2003). According to Lyamuya et al. (2010), the prevalence of asymptomatic bacteriuria is 2 to 3 times higher among women with diabetes compared to women without diabetes (Patterson et al., 1997). Various risk factors for bacteriuria in women with diabetes have been suggested including sexual intercourse, age and degree of glycosuria, duration of metabolic control, complications of diabetes, macroalbuminuria and high body mass index (BMI) (Andriole, 2002). The exact pathogenesis of this problem has not been clearly delineated. *Escherichia coli* is the most common organism isolated from patients with asymptomatic bacteriuria (Zhanel et al., 1995; Geerlings et al., 2000). Infecting organisms are diverse and include Enterobacteriaceae, *Pseudomonas aeruginosa*, *Enterococcus* species, and group B *Streptococcus*. Organisms isolated in patients with asymptomatic bacteriuria will be influenced by patient variables: healthy persons will likely have *E. coli*, whereas a nursing home resident with a catheter is more likely to have multi-drug-resistant polymicrobial flora (e.g. *P. aeruginosa*). *Enterococcus* species and gram-negative bacilli are common in men (Warren et al., 1982; Mims et al., 1990).

An appreciable proportion of students (15%) of the local government area in Benin City have significant level of bacteria in their urine. The greater number of females with proportionately higher prevalence rate (12.78%) as against the males (2.22%) is corroborated by the findings of Kunin et al. (1964) who reported prevalence rate of approximately 20% in women. The

urine samples that tested positive for the presence of bacteria confirmed the criteria for diagnosis of potent urinary tract infection (UTI), which is the presence of leukocytes in urine and the fact that pyuria may not be an absolute determinant of the presence of an infection because it may be absent in some cases (Lenette et al., 1974).

Unlike in previous studies where *E. coli* has been the most abundant organism in bacteriuria (Delzel and Leferve, 2006), *Candida* sp. was most frequent in the present work with a prevalence rate of 48.28%. However it was observed that the pus cells obtained from samples containing *Candida* sp. were less than five while *E. coli* with a prevalence rate of 13.79% had samples containing pus cells greater than five. The preponderance of *Candida* sp. over *E.coli*, *Staphylococcus aureus*, *Streptococcus faecalis* and Coagulase negative *Staphylococcus* could be attributed to indiscriminate use of broad spectrum antibiotics which reduces competition in the normal flora of the vagina thereby giving the opportunity for proliferation of *Candida* sp. which may ascend the urethra.

Conclusion

In conclusion, asymptomatic bacteriuria is prevalent among female secondary school students in Benin City with *Candida* sp. and *E. coli* as the commonest aetiological agent. Further studies need to be done on wider population samples in health facility as well as community settings, to assess the magnitude of asymptomatic bacteriuria in women in the country. It would also be interesting to assess the antimicrobial sensitivity pattern of the offending pathogens for the purpose of formulating evidence-informed treatment guidelines. Personal hygiene should be encouraged while self prescription of drugs which could lead to antibiotic resistance should be discouraged.

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Table 1 Age and sex distribution of study population

	MALES				FEMALES			
	11-13	14-17	18-20	TOTAL	11-13	14-171	18-20	TOTAL
Egor	1	24	9	34	3	18	7	28
Ikpoba-Okha	14	13	1	28	7	7	-	14
Oredo	-	-	-	Nil	3	45	28	76
TOTAL	15	37	10	62	13	70	35	118

Table 2 Distribution of prevalence in relation to sex in screened population

	No. of positive cases	No. of negative cases	Total screened population
MALES	4(2.22%)	58(32.22%)	62
FEMALES	23(12.78%)	95(52.78%)	118
TOTAL	27(15%)	153(85%)	180

Table 3 Frequency distribution of isolates

	<i>E. coli</i>	<i>S. aureus</i>	<i>S. faecalis</i>	<i>Candida</i> sp.	Coagulase negative <i>Staphylococcus</i>	TOTAL
MALES	1	2	-	-	1	4
FEMALES	4	1	4	14	2	25
TOTAL	5	3	4	14	3	29
%	17.24	10.34	13.79	48.28	10.34	100
FREQUENCY						