



Urinary Tract Infection among Male and Female Students in Ambrose Alli University, Ekpoma, Edo State, Nigeria.

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Abstract: This study determined urinary tract infection (UTI) among male and female students in AAU. One hundred apparently healthy students comprising of 50 males and 50 females within the age range of 18-30 years were enrolled for this study. The samples used were early morning mid-stream urine. The samples were subjected to microscopic examination and also cultured on Cysteine Lactose Electrolyte Deficient (CLED), Blood agar and MacConkey agar. The isolates were subjected to biochemical tests and antibiotic susceptibility. Results showed that out of the 100 students, only 10 students had UTI. Out of 50 males, only 2 had UTI and out of 50 females only 8 students had UTI. Results showed that age group 21-25years was found to be mostly infected (with a value) accounting for 8% of the total isolates with 1 male and 7 females while age group 26-30years was the second most infected accounting for 2% of the total isolated with 1 male and 1 females. Antibiotic susceptibility showed that, of all the antibiotics used (Streptomycin, Gentamycin, Ciprofloxacin, Augmentin, Ceporex, Tarivid, Septrin, Riflaxcin, Nalidixic acid, Ampicilin, Erythromycin, Norfloxacin, Rifampicin, Chloramphenicol, Ampiclox, Amoxil, Levofloxacin and Norfloxacin) Streptomycin showed a higher sensitivity pattern followed by Gentamycin and Ciproflox for both gram positive and gram negative organisms.

1 INTRODUCTION

Urinary tract infection (UTI) is an infection that affects any part of the urinary tract (kidneys, ureters, bladder and urethra) (Stamm and Hooton, 1993). Stamm and Hooton, (1993) referred to UTI as a clinical (symptomatic) or subclinical (asymptomatic) disease that may involve just the lower tract or both the lower and upper tracts. Although urine contains a variety of fluids, salts and waste products, it usually does not have bacteria in it. But when bacteria get into the bladder or kidney and multiply in the urine, they cause a UTI (Feld *et al.*, 1989; Nicolle *et al.*, 1992). Infection may involve single site, such as urethra - urethritis, prostrate-prostatitis, bladder- cystitis, kidney – pyelonephritis but the whole system is always at a risk of invasion by bacteria once any part is infected (Atlas, 1986).

Infections of the urinary tract are the most common infections for which antibiotics are prescribed and are among the most frequently occurring infections arising in the hospital setting. Each year UTIs account for more than five to seven million physician office visits, 20 percent of all prescriptions, and require or complicate more than one million hospital admissions in the United States (Schleupner, 1997).

UTI affects all age groups, but women are more susceptible than men due to short urethra, absence of prostatic secretion, pregnancy and easy contamination of the urinary tract with faecal flora (Awanesset *et al.*, 2000). Infection particularly in pregnancy and in elderly can be asymptomatic (Al-Dujaily, 2000) but asymptomatic bacteriuria is associated with an increased risk of intrauterine growth retardation and low birth weight (Harris *et al.*, 1976). Furthermore, untreated asymptomatic bacteriuria can lead to the development of cystitis in approximately 30% of cases, and can lead to the development of pyelonephritis in about 50% of cases (Kass, 1970). Microbiologically, urinary tract infection exists when pathogenic microorganism are detected in the urinary tract (Tolkoff and Rubin, 1986). The infection is generally considered significant and requires treatment when 10^5 colony forming units (cfu) or more per milliliter of urine are present in a properly collected specimen (Kass, 1957; Brooks *et al.*, 2004).

2 MATERIALS AND METHODS

2.1 Area of Study

This study was carried out in Ekpoma, The Headquarter of Esan West Local Government area of Edo State. It is located at latitude $6^{\circ} 45'N$ and longitude $6^{\circ} 08'E$. It is moderately populated with the peoples' occupation being farming and trading. The main sources of water in the locality are rainfall and well. The well is augmented by irrigation scheme provided by the Government for public use. University is situated in this region. It is usually cold at night and very hot during the day. It also has undulating topography (World Gazetteer, 2007).

2.2 Study Population

The subjects used in this project work comprised of apparently healthy male and female students of Ambrose Alli University, Ekpoma within the age range of 18 years to 30 years. A total of fifty (50) male and fifty (50) female subjects was recruited for this study. Subjects' data such as name and age was also obtained.

2.3 Sample Size

A total of one hundred (100) samples was used in this study comprising of 50 male and 50 female students. The sample size (N) is calculated from the formula below (Ekejiuet *et al.*, 2002).

$$\text{Samples size (N)} = \frac{Z^2 Pq}{d^2}, \text{ where}$$

N = the desired size

Z = 1.96 (standard score)

P = Prevalence (7%) (0.07)

q = 1 - P (0.92)

d = sample error tolerated (0.05)

N =

$$\frac{1.96^2 \times 0.07 \times 0.92}{0.05^2}$$

=98.9 approximately = 100

2.4 Sample Collection

One hundred (100) early morning mid-stream urine samples was aseptically collected using sterile, wide-mouthed, leak-proof universal bottles from apparently healthy male and female students (aged 18 - 30 years) of Ambrose Alli University, Ekpoma who were not on

antimicrobial therapy at the time of sample collection or who had not taken antimicrobials within 2 weeks prior to sampling after giving their informed consent. The age as well as history of urinary tract infection (UTI) was obtained from the subjects before the collection of samples. Samples collected from the subjects were taken to the Diagnostic and research Laboratory of Microbiology Laboratory Science Department of Ambrose Alli University for microbiological analysis.

2.5 Sample Analysis

Microscopic Examination: A drop of uniformly mixed uncentrifuged urine samples was aseptically placed on a clean grease-free slide and covered with a cover slip. It was then examined microscopically to detect the presence of pus cell, epithelial cell, red blood cell, yeast cell, crystal cells and cast cells using 10x and 40x objectives with condenser iris closed sufficiently to give good contrast (Cheesbrough, 2000).

Isolation and Identification of Isolates: Two micro litre (2µl) of uncentrifuged, uniformly mixed, mid-stream urine (MSU) samples was aseptically inoculated onto Cysteine Lactose Electrolyte Deficient (CLED), MacConkey Agar (MCA) and Blood Agar (BA) media using a standard wire loop of 2mm diameter and incubated at 37°C aerobically for 24 hrs. After incubation the cultures developed on the media were observed and the colonies were counted by colony counter. Colony counts of $\geq 10^5$ per ml were considered as significant growth. Standard identification procedures of colony morphology, Gram staining reaction, motility, catalase test, citrate test, oxidase test, urease test, coagulase test and Indole production tests were used to determine the isolates present in the urine samples (Ochei and Kolhatkar, 2000).

3 RESULTS

The results of the study are based on the microbiological examination of urine samples for the diagnosis of Urinary Tract Infection (UTI) in students attending Ambrose Alli University, Ekpoma, Edo State. A total number of 100 samples were collected, 50 each for both male and female students out of which 2 samples were positive for

UTI in male students and 8 samples were positive for UTI in females. The age distribution was done on 18 – 30 years. Out of the 50 males only two 2(4%) were symptomatic and out of the 50 females, eight 8(16%) were symptomatic.

3.1 Bacterial Infection

The predominant isolates were *Staphylococcus aureus* and *Proteus mirabilis*. The difference in incidence of symptomatic UTI was noted in the female subjects among the age group of 21 -25 years.

Table 1 shows prevalence of positive UTI in male and female students and with the mean±SD of bacterial isolated from infected male and female students. Table 2 shows the distribution of organisms isolated from UTI in both sexes. Table 3 shows the prevalence rate of isolates among different age group in males. Table 4 shows prevalence rate of isolates among different age groups in females.

Table 1: Occurrence of Positive Urinary Tract Infection in Male and Female Students

SEX	No of Specimen	No positive	Mean±SD
Male	50	2	0.33±020
Female	50	8	1.33±1.26
TOTAL	100	10	p-value 0.05

Table 2: Distribution of Organisms Isolated from UTI in Both Sexes

ISOLATES	MALE (%)	FEMALE (%)	TOTAL
<i>Escherichia coli</i>	Nil	1(10)	1(10)
<i>Staphylococcus aureus</i>	Nil	4(40)	4(40)
<i>Klebsiella pneumonia</i>	1(10)	Nil	1(10)
<i>Proteus mirabilis</i>	Nil	2(20)	2(20)
<i>Citrobacterfruedi</i>	Nil	1(10)	1(10)
<i>Providenciaspp</i>	1(10)	Nil	1(10)
TOTAL	2(20)	8(80)	10(100)

Table 4: Occurrence Rate of Isolates among Different Age Groups in Female Students

Sex	Organi sm	Age range			Tot al
		16 - 20	21 - 25	26 - 30	
Fem ale	<i>Esherich ia coli</i>	Nil	1	Nil	1
	<i>Staphylo coccus aureus</i>	Nil	4	Nil	4
	<i>Proteus mirabilis</i>	Nil	1	1	2
	<i>Citrobac terfruen di</i>	Nil	1	Nil	1
Tota l		0	7	1	8

Table 3: Occurrence Rate of Isolates among Different Age Groups in Male Students.

Sex	Organi sm	Age range			Tot al
		16 – 20	21 - 25	26 - 30	
Male	<i>Klebsiella pneumonia</i>	-	-	1	1
	<i>Provide nciaspp</i>	-	1	-	1
Total	2	0	1	1	2

4 DISCUSSION

The aim of this work was to ascertain the incidence of UTI in apparently healthy male and female students in Ambrose Alli University, Ekpoma. It was observed that UTI detected in the course of screening students who were judged to be apparently healthy and thus has been found to be more common in female students than in the male subjects due to the incidence of female urinary tract and in relation to their sexual activities.

Though the incidence rate of female (8%) was more than male (2%), it was not statistically significant ($\chi^2=4.0, p < 0.05$). Young men rarely develop UTI and the prevalence of symptomatic UTI is 0.1% or less, this finding agrees with work done by Orr *et al.*, (1996) who reported that young men rarely developed UTI with a prevalence of 0.1% or less.

The bacteria aetiologic agents isolated from male student was relative low with a total number of 2 isolates having a mean±SD of 0.3±0.2 compared to that of female students which has a total number of 8 isolates with a mean±SD of 1.33±1.26. In this study, 2 males were found to be positive for UTI and 8 females were found to be positive and this

agrees with the research of Nicolle (2008) which state that about 10% of female get infected yearly and 60% having an infection at some point of the lives. Reported incidence of true UTI in males is low. Incidence tends to rise as the age increases (Lane and Takhar, 2011). The findings of leukocytes (white blood cells) in urine with or without symptoms is one of the accepted criteria used for the diagnosis of UTI and a good relationship was found between the presence of white blood cells symptomatic UTI in this work.

The most frequently occurring organism in this study is *Staphylococcus aureus* which was isolated in the study from 4 of the total sample cultures which represent 40% with the highest number of isolates coming from the females urinary isolates while *Proteus mirabilis* was the second most prevalent organism isolated in the study from 2 (two) of the total sample cultures representing 20% of the isolates. The finding does not correlate with the findings of Osagiet *al.*, (2011) which reported that *Escherichia coli* was the most frequently occurring organism (26.3%) and *Staphylococcus aureus* being the second most frequent organism (23.3%).

A lot research and data information has been given and recent studies are being carried out on the relationship of UTI among males and females with age. In this study, gender plays an important role in relation to age in the acquisition and dissemination of urinary tract infection as shown by the fact that UTI occurred most in female than males respectively. This difference is in accordance with the observation of other works been done that urinary tract infection in female are more common (Nicolle, 2008; Orr, 1996), disposition of infections can be attributed to the fact that the females have an open urinary tract system which is open and bare (Orr, 1996). Here groups were used in the comparison of age between 21 – 25 years (Table 1) were found to be most infected with a value accounting for about 80% of the total isolates with 1 male and 7 females while age group 26 – 30 years were the second most infected group accounting for 20% of the total isolates with 1 male and 1 female and age group 16 – 20 years were not infected among the isolates.

It is important to note that none of the subjects under study exhibited mixed infection. The

antibiotic susceptibility testing shows that the gram positive organism (*Staphylococcus aureus*) was more sensitive to Erythromycin, Gentamycin, Norfloxacin and Ciprofloxacin while the gram negative organisms were more sensitive to Streptomycin, Ciprofloxacin and Gentamycin.

5 CONCLUSION

The incidence of UTI appears to be more among the female students of Ambrose Alli University, Ekpoma than the male students due to this study and the increase resistance of the isolates to the community of antibiotics hence the need to always carry out antibiotic susceptibility testing of various isolates before commencing treatment. Female students with asymptomatic bacteremia should not receive antibiotic treatment without the knowledge of a physician. Personal hygiene especially proper toilet habits should strictly be adhered to.

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REFERENCES

- Al-Dujaily, A.A. (2000): Urinary tract infection during pregnancy in Tiknit; *Med. J. Tiknit*, 6: 220-224.
- Atlas, R.M. (1986): Basic and Practical Microbiology Textbook. Macmillan Co: New York, NY. 53.
- Awaness, A.M., Al-Saadi, M.G and Aadoas, S.A. (2000): Antibiotics resistance in recurrent urinary tract infection; *Kufa. Med. J*, 3: 159.
- Brooks, F.G., Butel, S.J. and Morse, A.S. (2004): Urinary tract infection; case and clinical correlations. In; Jaewetz, Melnick and Adelberg's medical microbiology, 23rd edition. Brooks, G.F., Butel, J.S. and Morse, S.A. (Editors). McGraw-Hill, New York. Pp. 734-770.

- Cheesbrough, M. (2000): antimicrobial sensitivity testing in: District laboratory practice in Tropical countries. Cheesbrough, M. (ed). Part 2, Cambridge university press.p.76
- Feld, I.G., Green-Field, S.P. and Ogra, P.L. (1989): Urinary tract infections in infants and children; *Pediatr. Rev*, 11(3): 71-77.
- Harris, R., Thomas, V.L. and Shelokov, A. (1976): Asymptomatic bacteriuria in pregnancy; antibody coated bacteria, renal function and intrauterine growth retardation; *Am. J. Obstet. Gynecol*,13.
- Kass, E.H. (1957): Bacteriuria and the diagnosis of infections of the urinary tract; *Arch. Inter. Med*, 100: 709-713.
- Kass, E.H. (1970): Pregnancy, pyelonephritis and prematurity; *Obstet. Gynecol*,13: 239-254.
- Lane, D.R. and Takhar, S.S. (2011): "Diagnosis and management of urinary tract infection and pyelonephritis". *Emergency medicine clinics of North America* 29 (3): 539-552.
- Nicolle, L.E. (2008): "Uncomplicated urinary tract infection in adults including uncomplicated pyelonephritis". *UrolClin North Am* 35 (1): 1-12.
- Nicolle, L.E., Godfrey, K.M., Harding, J.P. and Ronald, A.R. (1992): The association of urinary tract infection with sexual intercourse; *J. Infect. Dis*, 146(5): 579-581.
- Ochei, J. and Kolhatkar, A. (2000): *Diagnosis of infection by specific anatomical site., Medical laboratory Science Theory and Practice (17thedition).Tta, Micraw Hill USA.pp. 97-101.*
- Orr, P., Nicolle, L.E. and Duckworth, H. (1996): Febrile urinary infection in the institutionalized Adult males. *AMJ Med*; 100:71-77.
- Osagie, R.N., Afugwobi, L.N., Eyaufe, A.A., Isibor, J.O., Daibo, O.O., Festus, O.O. and Igbinovia, O. (2011): Prevalence of Bacterial isolates from urinary tract infection (UTI) amongst adults in Ekpoma, Nigeria. *IJB Sci*. 3(2): 42-44.
- Schleupner, C. (1997): Urinary tract infections; *Postgrad. Med*, 101(6): 231-237.
- Stamm, W.E. and Hooton, T.M. (1993): Management of urinary tract infection in adults; *N. Engl. J. Med*, 329:13-28.
- Tolkoff, N.E. and Rubin, R.H. (1986): Urinary tract infection significance and management; *Bull. New York Acad. Med*, 2(2): 131-148.
- World Gazetteer. (2007): Population of Cities, news, divisions. <http://worldgazetteer.com/ng.php>. Retrieved on 23/10/2015.