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Original Research Article

Prevalence of urinary tract infection among asymptomatic female students of Nasarawa State Polytechnic Lafia, North Central Nigeria

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Abstract

This study was designed to assess the prevalence of urinary tract infections among asymptomatic female students of Nasarawa State Polytechnic, Lafia, Nigeria. A structured questionnaire was used to access demographic data of research participants following informed consent. A total of 214 urine and HVS samples were collected and investigated using microscopic examination after which biochemical test was conducted on the isolates. Organisms isolated include; *Staphylococcus aureus* which had the highest prevalence of 47(43.93%) in urine and 54(50.47%) in HVS samples, *Escherichia coli* was next with 30(28.04%) in urine and 13(12.15%) in HVS, *klebsiella* and *Proteus sp.* were 18(16.82%) and 17(15.89%) respectively. Other organisms isolated were *Streptococcus sp.* and *Candida sp.* having equal number for both samples 9(8.41%) in urine and 20(18.69%) in HVS. *Trichomonas vaginalis* 6(5.61%) was identified in urine samples only with the highest prevalence occurring in age group 20-29. This study highlights the need for provision of good hostel accommodation with adequate and hygienic toilet facilities for the students especially the female ones while proper education on the use of toiletries and good hygiene practices should be advocated.

Keywords: Urinary Tract Infection, Urine, High Vaginal Swab(HVS),Asymptomatic Female Students

INTRODUCTION

Urinary Tract Infection (UTI) is a major public health problem that affects both sexes especially the females. According to Salvatore *et al.* (2011), UTI is the leading cause of morbidity and mortality amongst individuals of all ages with an estimated 50% of women being infected at some point in their lives. Infection normally occurswhen bacteria and other pathogens invade the urethra and eventually penetrate the bladder; which may affect the kidney if left untreated (Flores-Mireles *et al.,* 2015).Several risk factors have been reportedly associated with UTIs; this include cystitis, female gender, a prior UTI, sexual activity, vaginal infection, diabetes, obesity and genetic susceptibility (Foxman, 2014; Hannan *et al.,* 2012). Regions that may be infected are the upper and lower urinary tractlike the bladder (Cystitis) and Kidney (Pyelonephritis) (Nester *et al.*, 2004). Infection with the urinary tractis caused by a wide range of pathogens including *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Enterococcus faecalis* and *Staphylococcus saprophyticus;* while *Escherichia coli*

is the leading cause of acute and uncomplicated cases,*Staphylococcus spp* is known to cause bladder infection (Blango *et al.,* 2014; Flores-Mireles *et al.,* 2015). Upon successful invasion of the into the system, the individual begins to present clinical signs and symptoms which includes; difficulty in passing outurine and frequent urination in case of cystitis as a result of bladder infection Etminan *et al*. (2017), whereas conditions like high fever and flank pain are commonly experienced in cases of kidney infection. Others symptoms includes; lower abdominal pain, jaundice due to loss of blood, itching, formation of blisters and ulcer in the genital area, supra-pubic pain, vaginal and urethral discharge (e-medicine, 2005; Amali *et al*., 2009).Though, several studies have been conducted in different age groups at different locations however; limited studies have been carried out to look at female students' exposure to urinary tract infection in Nigeria (Ani *et al.,* 2016). This study was therefore designed to examine the prevalence of urinary tract infection amongst asymptomatic female students of Nasarawa State Polytechnic Lafia, North Central Nigeria.

Study Area

This study was conducted in Nasarawa State Polytechnic Lafia and itsenvirons. Lafia is the capital city of Nasarawa State with three major ethnic groups and diversified languages. Lafia is a town in North-central Nigeria and has a population of 330,712 (NPC, 2006). The major crops cultivated includes but not limited to yam, cassava, beniseed, and melon. Lafia is situated at 8.48^0 North latitude, 8.52^0 East longitude and 290 meters above sea level and has an average temperature of 31^0C.

Ethical Considerations

Informed consent was obtained from study participants. Where applicable, landlords/caretakers were informed and permission granted for the authors to access their compounds.

Sample Collection and Analysis

A structured questionnaire was administered to each sampled student to obtain information before samples were collected, each student was enlightened on the purpose and importance of the study to them and their immediate community. Following consent from the students, a total of 214 urine and HVS samples were collected for the research. Sterile universal containers were used to collect midstream urine, while sterile swab sticks were used to collect high vaginal swab (HVS) of each volunteered student by the laboratory scientist using standard procedure (Cheesbrough, 2004).

RESULTS AND DISCUSSION

The following results in the tables (1-4) below were obtained from the study.

DISCUSSION

From the 214 samples analyzed, results of themicroscopic examination revealed the presence of pus cells, yeast cells, casts, calcium oxalate and epithelial cells of urine (90.65%) and HVS and (71.69%) which indicateshigh rate of infection. Similarly, Dibua *et al.* (2014) reported the presence of mild to moderate pus cells (white blood cells); crystals such as calcium oxalates, tyrosine, cysteine and triple phosphate; epithelial cells and Schistosoma eggs with numerous red blood cells signifying microbial infections since pus cells are white blood cells that have succumbed in defense of the body against pathogens that invade it. *Staphylococcus aureus* was the most prevalent organism with 47(43.93%) in urine and 54(50.74%) in HVS (table 2). In the same accord, Ekwealor et*al.* (2016) in their study reported high prevalence of *S. aureus* with majority of patients having significant bacteriuria *Escherichia coli isolates,* were the second predominant isolates 30(28.04%) and 13(12.15%) in both the urine and HVS; which could be due to the proximity of the anus to the vaginaand its inherent virulence for urinary tract colonization. Another commonest bacteria isolated was *Klebsiella sp.*18(16.82%) and *Proteus sp.* 17(15.89%) which were found in urine samples only hence, supporting the study of Baguma *et al.* (2017) which reported that 40% of UTI are caused by Gram negative species. *Streptococcus sp. and Candida sp.* were the least isolates 9(8.41%) in urine and 20(18.69%) in HVS respectively whereas *T. vaginalis*, 6(5.61%) was only found in urine samples. Mixed infection was reported in table (3); this could be associated with gastro-intestinal or genito-urinary fisulae, bladder outlet obstruction, neurogenic bladder and indwelling catheters (Bergamin and Kiosoglous, 2017). Infection could have also possibly occurred despite precautions taken to prevent I mixed infections observed as in table 3. Based on age distribution, the results showthat age group 20-29 years had the highest prevalence of urinary tract infection 158(90.80%) which may possibly be linked to the sexual activeness of their age groups. Age group 30 years and above had the lowest prevalence of 11(50.00%) as shown in table 4 which agrees with the suggestion of Durowade, (2017). The high prevalence of pathogenic organisms observed in this study may have been resulted

Table 1. Microscopic examination of Urine and HVS samples

Sediments	No. of occurrence in Urine sample (%)	No. of occurrence in HVS sample (%)
Pus cell	50 (46.73)	38 (35.51)
Yeast cells	14 (13.08)	20 (18.69)
Casts	12 (11.21)	02 (1.00)
Calcium oxalate	10 (9.35)	02 (1.87)
Epithelial cells	21 (19.63)	45 (42.06)

Table 2. Prevalence microbial isolates from Urine and HVS samples

Organisms isolated	No. of students examined	No. of organisms in urine sample (%)	No. of organisms in HVS sample (%)
Staphylococcus aureus	107	47 (43.93)	54 (50.74)
Escherichia coli	107	30 (28.04)	13(12.15)
Klebsiella sp.	107	18 (16.82)	-
Proteus sp.	107	17 (15.89)	-
Streptococcus sp.	107	9 (8.41)	20 (18.69)
Candida sp.	107	9 (8.41)	20 (18.69)
Trichomonas vaginalis	107	6 (5.61)	-

Table 3. Prevalence of mixed infections in urine and HVS samples

Sample	No. examine	No. with single infection (%)	No. with mixed infection (%)	No. with no infection (%)
Urine	107	53 (49.53)	44 (41.12)	10 (09.35)
HVS	107	61 (51.01)	16 (14.95)	30 (28.04)
Total	**214**	**114 (106.54)**	**60 (56.07)**	**40 (37.38)**

Table 4. Prevalence of positive samples with respect to age distribution of participants

Age group (years)	No. examined	No. of positive samples (%)	No. of negative samples (%)
15-19	18	14 (77.78)	4 (22.22)
20-29	174	158 (90.80)	16 (09.19)
30 and above	22	11 (50.00)	11 (50.00)
Total	**214**	**183 (85.51)**	**31 (14.49)**

from the unclean state of their sanitary environment and improper use of toilets/bathrooms.

CONCLUSION

In conclusion, this study shows that urinary tract infection is of public health concern among female students of Nasarawa State Polytechnic, Nigeria. The overall prevalence of 174(81.31%) may have been as a result of the unhygienic state of the students' environment and toiletry.

RECOMMENDATIONS

From the findings of this study, it is evidenced that the prevalence of urinary tract infection is high hence; the need for adequate hygiene practice amongst female students should be encouraged while provision of good female toiletry as part of government intervention in tertiary institutions is highly recommended. Also, proper education on the use of those toilets should advocate.

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Competing Interest

All authors have declared that no competing interest exists.

Authors' contribution

All the authors contributed in this study. AAG conceptualized the research, designed the study, conducted the laboratory analysis, did corrections on the draft copies and coordinated the research. AAM contributed in the laboratory analysis, proof read and approved the submission. AAA vividly revised the manuscript structure and organization.OB, IO, and IY critically reviewed the manuscript and proof read the final draft. All authors read the final draft and approved it for publication.

Ethical consideration

Informed consent was obtained from all study participants prior to enrollment in the study.

REFERENCES

Amali O, Indinyero MD, Umeh EU, Awodi NO. "Urinary tract infections among female students of the university of agriculture, Makurdi, Benue State, Nigeria," *Int. J. Microbiol.* vol. 7, no. 1, pp. 1–5, 2009.View at: Google Scholar

Andabati, G., and Byamugisha, J. (2010).Microbial Etiology and Sensitivity of Asymptomatic Bacteriuria among Ante-Natal Mothers in Mulago hospital, Uganda.*African Health sciences*, 10(4):349-352.

Ani, O. C., Odeta N. P and Onwe S. O. (2016). Burden of Urinary Tract Infection (UTI) among Female Students: South Eastern Nigeria Side of the Story. 12(2): 1-7, 2016, Article no.IJTDH.22390 ISSN: 2278–1005, NLM ID: 101632866

Baguma, A., Atek, K. and Bazira, J. (2017).Prevalence of Extended Spectrum Beta-Lactamases

Bergamin PA, Kiosoglous AJ. Surgical management of recurrent urinary tract infections: a review. TranslAndrolUrol 2017;6(Suppl 2):S153-S162. doi: 10.21037/tau.2017.06.17

Blango MG, Ott EM, Erman A, Veranic P, Mulvey MA. Forced resurgence and targeting of intracellular uropathogenic *Escherichia coli* reservoirs. *PLoS ONE.* 2014;9:e93327. [PMC free article] [PubMed] [Google Scholar]

Brooks, G.F.,Butel, J.S., and Morse, S.A. (2004).Diagnostic Medical Microbiology and Clinical Correlation. Jawetz, Melnick and Adelberg's Medical Microbiology. McGraw Hill Companies: Singapore, 708-718.

Cheesbrough, M.(2004). District Laboratory Practice in Tropical Countries 3rd Edition U. A. Cambridge University Press, 434.

Dibua, U. M., Onyemerela, I. S., &Nweze, E. I. (2014). Frequency, urinalysis and susceptibility profile of pathogens causing urinary tract infections in Enugu State, southeast Nigeria. *Revista do Instituto de Medicina Tropical de Sao Paulo*, *56*(1), 55–59. https://doi.org/10.1590/S0036-46652014000100008

Durowade KA, Babatunde OA, Omokanye LO, et al. Early sexual debut: prevalence and risk factors among secondary school students in Ido-ekiti, Ekiti state, South-West Nigeria. *Afr Health Sci*. 2017;17(3):614-622. doi:10.4314/ahs.v17i3.3.

Ekwealor, P.A., Ugwu, M.C., and Ezeobi, I. (2016).Antimicrobial Evaluation of Bacterial Isolates FromUrine Specimen of Patients with Complaints of Urinary Tract Infections in Akwa, Nigeria *Int. J. Microbiol.*, 6.

E-Medicine.(2005). Urinary Tract Infections.E-Medicine Consumer Health www.e-medicine.com.inc.

Etminan-Bakhsh M, Tadi S, Darabi, R. (2017). Asymptomatic bacteriuria in pregnant women attending Boo-Ali Hospital Tehran Iran: Urine analysis vs. urine culture. *Electronic physician*, *9*(11), 5760–5763.https://doi.org/10.19082/5760.

Fihn, S.D. (2003). Clinical Practice.Acute Uncomplicated Urinary Tract Infection in Women.*N. Engl. J. Med*, 349 (3):259-266.

Flores-Mireles, A. L., Walker, J. N., Caparon, M., & Hultgren, S. J. (2015). Urinary tract infections: epidemiology, mechanisms of infection and treatment options. *Nature reviews. Microbiology*, *13*(5), 269–284. https://doi.org/10.1038/nrmicro3432

Foster, R.T. (2008). Uncomplicated Urinary Tract Infections in Women.*Obstet. Gynecol. Clin., North Am*. 35 (2) 235-48.

Foxman B. Urinary tract infection syndromes: occurrence, recurrence, bacteriology, risk factors, and disease burden. *Infect Dis Clin North Am.* 2014;28:1–13. This paper presents the most recent information about UTIs and their socioeconomic impact. [PubMed] [Google Scholar]

Hannan TJ, et al. Host–pathogen checkpoints and population bottlenecks in persistent and intracellular uropathogenic *Escherichia coli* bladder infection. *FEMS Microbiol Rev*. 2012;36:616–648. [PMC free article] [PubMed] [Google Scholar]

Lin, K., and Fajardo.(2008).US Preventive Service Task Force Screening for Asymptomatic Bacteriuria in Adults .*Ann. Intern. Med*, 149 (1):20-4

Lindsay, E.N., Suzanne, B., Richard, C.,James, C.R., Anthony, S., and Thomas, M.H. (2005). Infectious Diseases Society of America Guidelines for the Diagnosis and Treatment of Asymptomatic Bacteriuria in Adults.*Clinical Infectious Diseases,* 40:643-654.

National Population Census.(NPC, 2006).

Nicolle, L. E. (2008). Uncomplicated Urinary Tract Infections in Adult including Uncomplicated Pyelonephritis. *Journal of Urologic Clinics of North Am*erica, 35 (1): 1-12.

Ojo, O.O., and Anibijuwon, I.I. (2010).Urinary Tract Infection among Female Students Residing in the Campus of the University of Ado Ekiti, Nigeria.*African Journal of Microbiology Research,* 4(12):1195-1198.

Producing Microorganisms in Patients Admitted at KRRH, Southwestern Uganda. *Int. J. Microbiol.* 5.

S. Salvatore, S. Salvatore, E. Cattoni, G. Siesto, M. Serati, P. S orice, M. Torella Urinary tract infections in women Eur. J. Obstet. Gynecol. Reprod. Biol., 156 (2) (2011), pp. 131 136, 10.1016/j.ejogrb.2011.01.028 PMID:2134963.

World Health Organization.(2005). Urinary Tract Infectionsin infants and children in Developing Countries in the Context of IMCI.