



A SEVEN MONTHS RETROSPECTIVE STUDY ON URINARY TRACT INFECTION AMONG PATIENTS AT AMINU KANO TEACHING HOSPITAL, KANO - NIGERIA

^{1*}Chedi, B.A.Z. ²Wannang, N.N ¹Halliru, M.A. and ¹Bichi, L.A.

¹Department of Pharmacology, Bayero University, Kano.

²Department of Pharmacology, University of Jos.

Correspondence author: b2chedi@yahoo.com

ABSTRACT

Urinary Tract Infection (UTI) is a significant health problem world wide, affecting all ages and both sexes. It is the most common infectious complication associated with serious risk in pregnancy and responsible for a high rate of morbidity in neonates and children. Most often antibiotics are prescribed in UTI before bacteriological results are available. The aim of the study was to determine the prevalence of the disease among different sexes and age groups as well as the predominant bacterial pathogens and their sensitivity to antibiotics so as to guide empirical antibiotic therapy. Data of 123 patients who had a positive urine culture at Aminu Kano Teaching Hospital seen in December 2004 to July 2005 was collected retrospectively and evaluated. The results showed that Escherichia coli was the most encountered uropathogen accounting for 39.8%, Proteus sp 26%, Klebsiella 21.1% while Pseudomonas sp was the least accounting for 0.8%. Females (especially at the child-bearing ages) were found to have a higher frequency of UTI (54.5%) as against their male counter parts (45.5%) in the area studied. The isolated pathogens showed more sensitivity to cephalosporins and flouroquinolones (31.3 and 40.6% respectively) and less to penicillins (13.6%). They may therefore be used as an alternative to penicillins.

Key words: Urinary Tract Infection, Uropathogen, Retrospective Study, Kano

INTRODUCTION

Urinary tract infection (UTI) usually refers to the presence of bacteria ($> 10^5$ bacteria per ml of urine) in the urinary tract together with symptoms, and sometimes signs, of inflammation. It is characterized by frequency of micturation, dysuria, pyuria, nocturia, fever, occasional suprapubic pain, and haematuria. UTI is one of the most commonly occurring bacterial infections among men and women (Liza and Jonathan 2006). Each year it resulted in more than 7 million hospital visits, complicate or necessitate more than 1 million hospital admissions and use more than 1 billion US dollars of global healthcare expenditure (Haley *et al* 1985; Patton *et al*, 1991). The infection is a problem of all ages, although its prevalence varies markedly. The highest incidence mostly occurs in healthy young women who present with symptoms of acute uncomplicated bacterial cystitis or pyelonephritis (Gallagher and Hemphill, 2001).

UTI is mostly caused by gram-negative aerobic bacilli found in the gastrointestinal tract known as Enterobacteriaceae. Included in this family are the *Escherichia coli*, *Klebsiella*, *Enterobacter*, *Citrobacter*, *Proteus* specie and *Serratia* species. Other common pathogens include *Staphylococcus epidermidis*, *Staphylococcus saprophyticus* and *Enterococcus* species which presumably result in UTI following colonization of the vagina or perianal skin. Less common organisms such as *Gardrenella vaginalis*, *Mycoplasma* specie and *Ureaplasma*

urealyticum may infect patients with intermittent or indwelling catheters (Boscia *et al*, 1986).

Identification of the causative organisms and of their sensitivity to drugs is important because of the range of the organisms and the prevalence of resistant strains. Therapeutic decisions should therefore be based on accurate and up-to-date antimicrobial susceptibility. While it is important to be aware of local variation in sensitivity pattern, the preference for best-guess therapy seem to be a choice between oral cephalosporins and co-amoxiclav (Liza and Jonathan 2006), with the proviso that therapy can be refined ones sensitivities are available. Other drugs which have been used for the treatment of UTI include cotrimoxazole, penicillins and older quinolones such as nalidixic acid. Sultamicillin, azithromycin, and gentamycin had 'good' to 'very good' effectiveness against the organisms while the newer fluorinated quinolones such as ofloxacin, ciprofloxacin and cefuroxime demonstrated excellent effectiveness against the organisms (Okafor 1997; Oluwa 2003), but are best reserved for treatment failures and more complicated infections since overuse of these agents can lead to increase resistance. The present study was undertaken to retrospectively identify the common pathogens and drug sensitivity pattern of the isolates encountered among patients who attended the hospital within the period of December 2004 to July 2005 so as to guide empirical treatment.

MATERIALS AND METHODS

This study was carried out in Aminu Kano Teaching Hospital, northwestern Nigeria. Data of 123 patients who had positive urine culture between December 2004 and July 2005 was systematically collected from the registry of Microbiology Department and their case files traced from the medical record department. Demographic data of each patient, sex, marital status, associated risk factor, pathogens isolated and their antibiograms were noted and recorded.

RESULTS

Escherichia coli was found to be the predominant cause of UTI among the isolates with 39.8% occurrence while *Pseudomonas* was the least with 0.8% (Fig. 1). The pathogens showed more sensitivity to flouroquinolones followed by cephalosporins and less to aminoglycosides, nitrofurantoin and penicillins (Table I). Figure 2 showed that adults of 21 – 30 years had the highest percentage (23%) occurrence of UTI and females predominate in all ages with exception of the extreme end of the ages (< 1 and > 60 years). Systemic disorders especially hypertension and diabetes mellitus, concomitant infections, malnutrition and pregnancy were found to be strongly associated with increase risk of acquiring UTI in the area (Fig. 3).

DISCUSSION

Among the pathogens isolated *Escherichia coli* had the highest percentage of occurrence (39.8) compared to *Proteus* sp (26.0), *Klebsiella* sp (21.1), *Enterococcus faecalis* (7.3), *Citrobacter* sp (3.3), *Staphylococcus* sp (1.5) and *Pseudomonas* sp (0.8). Similar findings were earlier reported by Abdul and Onile (2001). An association seems to exist between sex and the nature of the uropathogens; almost all the isolates were more prevalent in females except *Proteus* sp and *Enterococcus faecalis*, which were more common in males.

The predominance of *Proteus specie* in males may be due to the source of the infection, which is commonly associated with indwelling catheterization and prostate enlargement (Simon *et al*, 2001). The age group with highest frequency of UTIs was 21–30 years with females predominating in all the age groups except in less than 1 and above 60 years (Fig. 2). This can be due to pregnancy in females and prostatic diseases in elderly male.

Furthermore, the results showed that married women are more likely to be affected than their single or widowed counterparts while the reverse was the case in males (Fig. 4).

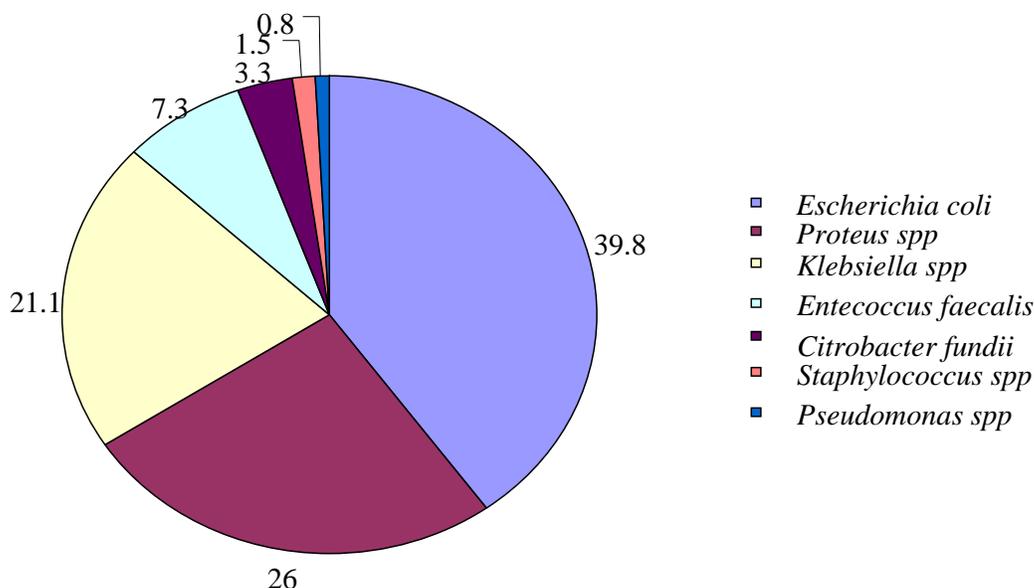


Fig 1: Percentages of uropathogens isolated from patients with UTI at AKTH between December 2004 and July 2005

Table 1: Antibiotic sensitivity pattern of bacteria isolated from patients with UTI at AKTH between December 2004 and July 2005

Bacterial Isolate	Antibiotic Class (%)							
	PEN	CEP	MAC	AMN	FLO	COT	NIT	NAL
<i>Escherichia coli</i>	31.4	65.7	-	29.5	73.3	4.8	82.4	-
<i>Proteus</i> sp	25.0	79.2	-	43.5	76.9	-	52.6	41.2
<i>Klebsiella</i> sp	40.0	63.9	100.0	57.1	90.9	-	80.0	37.5
<i>Entecoccus faecalis</i>	100.0	85.7	-	50.0	100.0	-	66.7	-
<i>Citrobacter fundii</i>	67.2	87.3	-	64.7	92.4	-	-	-
<i>Staphylococcus</i> sp	56.7	58.5	89.0	23.1	37.7	-	-	-
<i>Pseudomonas</i> sp	21.9	66.5	-	69.3	78.9	-	-	-

Key: PEN – Penicillins, CEP – Cephalosporins, MAC – Macrolides, AMN – Aminoglycosides, FLO – Flouroquinolones, COT – Cotrimoxazole, NIT – Nitrofurantoin, NAL – Nalidixic acid

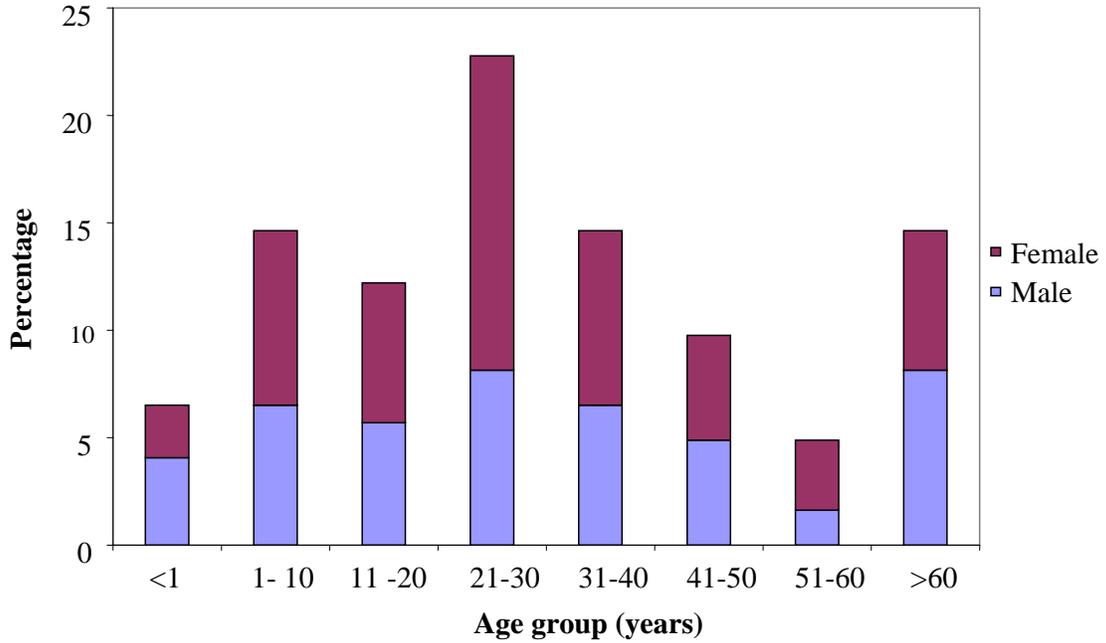


Fig 2: Prevalence of UTIs per age and sex distributions from patients with UTI at AKTH between December 2004 and July 2005

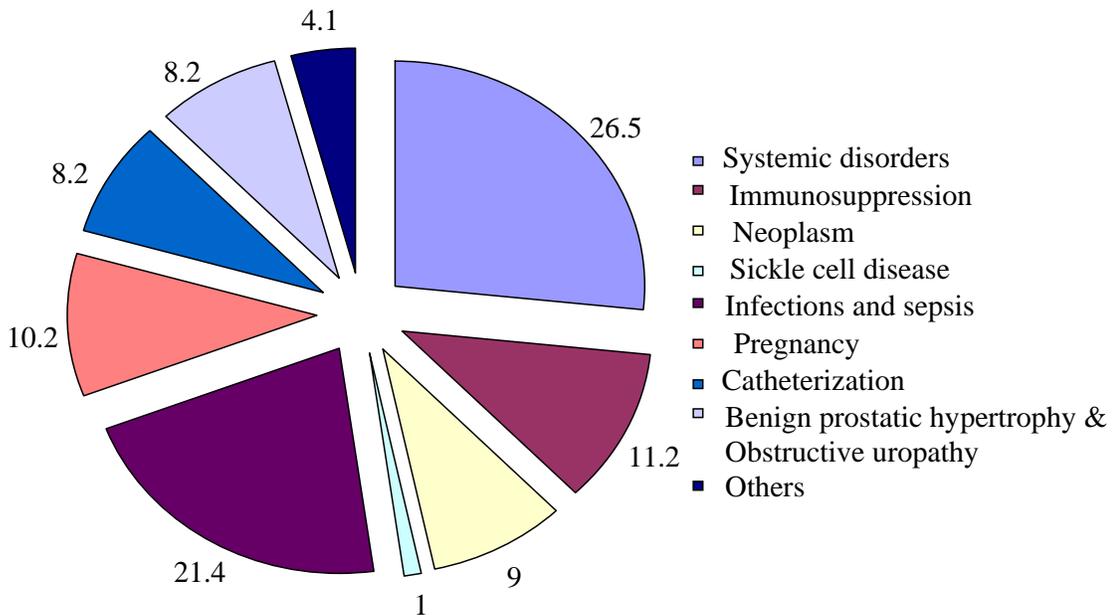


Fig 3: Percentages of associated risk factors to UTIs in AKTH between December 2004 and July 2005

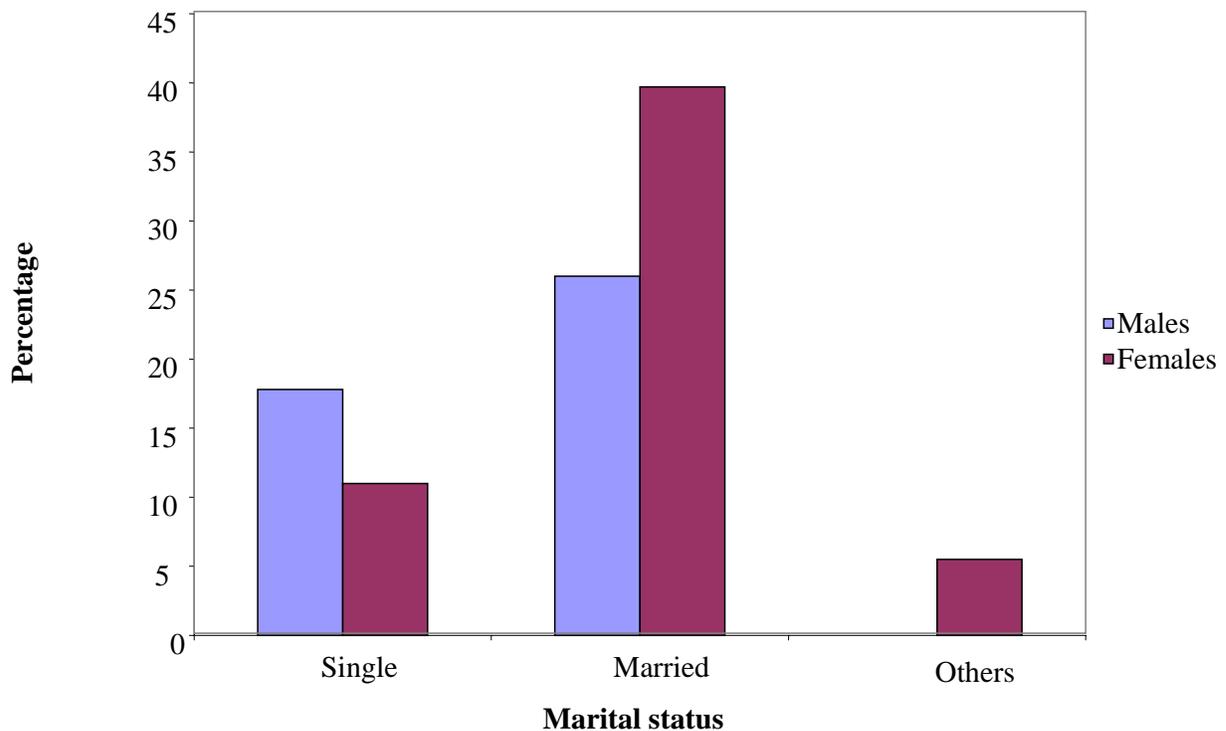


Fig 4: Percentages of UTIs per marital status in patients with UTI at AKTH between December 2004 and July 2005

This could be attributed to the polygamous nature of marriage in the area under study. Figure 3 shows that acquiring UTI is strongly associated with systemic disorders like hypertension (26.5%) and diabetes mellitus (21.4%). Eleven point two percent and ten point two percent of the patients studied were immunocompromised and pregnant respectively, 16.4% had an obstructive uropathy and were catheterized while on admission at the hospital. Other associated risk factors identified were sickle-cell disease (1%), cancer of the cervix, bladder and hematopoietic system (9.2%) and lack of circumcision (4.1%). Similar findings were reported by Gallagher and Hemphill (2001).

A high percentage of multi-drug resistance was also observed for most of the isolated strains especially

for *Escherichia coli*, *Proteus* and *Klebsiella* sp (Table I). The highest level of resistance was found to be to penicillins followed by nitrofurantoin and aminoglycosides respectively. This might be due to easy access, affordability and indiscriminate use of these antibiotics as well as poor patient's adherence to recommended dosage regimens. Although variations in isolate resistance exist between the different age groups, the overall most effective antibiotics were the flouroquinolones and cephalosporins. The low level of resistance to these antibiotics may be due to their better efficacy and high price; therefore not readily available and affordable. The two classes of antibiotics may therefore be used as an alternative to penicillins in patients with UTIs.

REFERENCES

- Abdul, I.F. and Onile, B.A. (2001). Bacterial isolates from the urine of women in Ilorin and their antibiotic susceptibility patterns. <http://www.fnasp.info/ajol/journals/tjog/vol18no2abs.html>. Accessed on 23/8/2006
- Boscia, J.A. et al. (1986). Epidemiology of bacteriuria in an elderly ambulatory populations. *Am. J. Med*, **80**: 208-214.
- Gallagher, S.A. and Hemphill, R.R. (2001). Urinary Tract Infections: Epidemiology, detection and evaluation. <http://www.thrombosis-consult.co./articles/textbooks>. Accessed on 23/8/2008.
- Haley, R.W. et al. (1985). The nationwide nosocomical infection rate: A need for new vital statistics. *Am. J. Epidemiol.*, **121**: 159-167
- Liza, D.L.T. and Jonathan, O. (2006). Urinary Tract Infections: Causes, Sysptoms and Treatment. *Am. J. Epidemiol.*, **132**: 328-337
- Okafor, J.I. (1997). Some pathogenic fungi involved in serious cases of UTIs in Nigeria. *J. Commun. Dis.*, **2**: 101-107
- Oluwa, W.A. (2003). Nosocomical significant bacteriuria. *West African Journal of Medicine*, **22**: 432-441
- Patton, J.P. et al. (1991). Urinary Tract Infections: economic considerations. *Medclin. North Am.*, **75**: 495-513.
- Simon, H. et al. (2001). Urinary Tract Infections. <http://www.reutershealth.com/wellconnected>. Accessed on 23/8/2008