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Full Length Research Paper

Bacterial Uropathogens And Their Antibiotic Susceptibility Pattern At Dessie Regional Health Laboratory

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Abstract

Urinary tract infection (UTI) is one of the most common bacterial infections encountered by clinicians in developing countries which can involve the urethra, bladder, and kidney. UTI affects all age groups, but women are more susceptible than men. Antibiotic resistance of urinary tract pathogens has increased worldwide. Knowledge of the antibiotic resistance patterns of uropathogens in specific geographical locations is an important factor for choosing an appropriate empirical antimicrobial treatment. Therefore, the aim of this study was to determine the type and antibiotic resistance pattern of bacterial urinary pathogens isolated from patients referred to Dessie Regional Health Research Laboratory from September 2013 to August 2014. A prospective cross sectional study was conducted and urine samples were collected using the mid-stream "clean catch" method from 156 clinically-suspected cases of urinary tract infections and tested bacteriologically using standard procedures. Antimicrobial susceptibility test was performed using Kirby-Bauer disk diffusion method. From 156 urine specimens, bacterial isolates were found in 49 (31.4%). The most common pathogens isolated were Escherichia coli (55.1%), *Klebsiella* spp. (16.3%), *Proteus* spp. (12. %) *P. aeruginosa* (4.1%) *S. aureus* (6.1%), *Enterococcus* spp. (4.1%) and *Citrobacter* spp. (2.0%). All isolates in the study showed high rate of resistance to ampicillin, tetracycline, penicillin, vancomycin, cloxacillin and amoxicillin (>72.9%) however, the majority of bacterial isolates were sensitive to ciprofloxacin, ceftriaxone, nitrofurantoin, and norfloxacin. In this study *E. coli* was the most prominent bacterial isolates with increased prevalence in adult, female and married patients particularly. History of catheterization was significant risk factors for UTI. The present study also showed a high incidence of resistance to most antimicrobial agents tested. As drug resistance among bacterial pathogens is an evolving process, routine surveillance and monitoring studies should be conducted for providing knowledge to physicians on the updated and most effective empirical treatment of UTIs.

Keywords: Uropathogen, Antimicrobial susceptibility, Dessie.

INTRODUCTION

Urinary tract infections are among the most common bacterial infections that lead patients to seek medical attention (Adedeji and Abdulkadir, 2009; Ahmed et al., 2000 and Chatterjee *et al.,* 2009) and it has large socio-economic impacts. Worldwide, about 150 million people are diagnosed with UTI each year, costing the global economy in excess of 6 billion US dollars (Akram *et al.,* 2007) and in developing countries with an estimated annual global incidence of at least 250 million (Getenet Beyene and Wondewosen Tsegaye, 2011).

Most urinary tract infections are initiated by organisms that gain entrance from the natural environment to the bladder through the urethra and are more common in women than men due to short urethra, absence of prostatic secretion, pregnancy and easy contamination of the urinary tract with faecal flora (Awarness *et al.,* 2000; Haider *et al.,* 2010). Urinary pathogens vary depending upon age, sex, catheterization, hospitalization and previous exposure of antimicrobials (Awarness *et al.,* 2000). The prevalence of antimicrobial resistance with urinary tract infection is increasing and varies according to geographical and regional location, therefore up to date information is essential for clinicians for appropriate antimicrobial therapy (Fantahun Biadglegne and Bayeh Abera, 2009).

Antimicrobial resistance (AMR) to commonly prescribed antibiotics in urinary tract infection is an expanding global problem and has been observed in both developed and developing countries. Resistance has emerged even to newer, more potent antimicrobial agents (Ahmed *et al.,* 2000). According to (DACA, 2009), emergence of antimicrobial resistance is a result of the use, overuse and misuse of antibiotics both in humans and animals. In Ethiopia, there are indications on the misuse of antibiotics by health care providers‟, unskilled practitioners, and drug consumers. These coupled with rapid spread of resistant bacteria and inadequate surveillance contributed to the problems and urinary tract infections are the major causes of death in Ethiopia. (USAID, 2002; DACA, 2009).

Studies from different regional and district hospitals of the country showed that the problem of antimicrobial resistance is rising in Mekelle (Lidya Aguma *et al.,* 2011), Jimma (Getenet Beyene and Wondewosen Tsegaye, 2011), Hawassa (Mucheye Gizachew *et al.,* 2013) and Bahir Dar (Fantahun Biadglegne and Bayeh Abera, 2009; Silabat Melaku *et al.,* 2012). The problems are also visible in Dessie town which may contribute for the rise of antimicrobial resistance in the area, where the existence is shown by antimicrobial susceptibility patterns of 8 years retrospective analysis against commonly used and available antimicrobials in the town to a urinary tract infection (Mulugeta Kibret and Bayeh Abera, 2010. In such elevated resistance situations epidemiological information and antimicrobial sensitivities of the bacterial strains frequently isolated from urinary tract patients are very important as a guide for empirical treatment.

MATERIALS AND METHODS

Sample collection, culturing and identification

The study was conducted on Desse Regional Health and Research Laboratory (DRHRL) that serve outpatients in the north east Ethiopia (south wollo). The study populations were consisting of patients sent from the referral hospital and clinics having positive community-acquired urine cultures with a colony count of ≥ 105 CFU/ml. The retrospective cross sectional study was made on 156 patients with in an observation period of 12 months (September 2013 to August 2014). Data on age, sex, result of urine culture, etiological agent, and susceptibility pattern were obtained from UTI patients sent to the laboratory with pre designed questionnaire after giving their informed consent. Midstream urine samples were collected in sterile containers from suspected cases of urinary tract infections in DRHRL. Each adult patient was carefully instructed regarding the collection of a mid-stream urine sample. Urine samples were obtained by sterile urine bags in infants after disinfecting the perineum. Urine culture was done using a calibrated loop on nutrient agar, MacConkey agar (Oxoid, England) and Blood agar (Oxoid, England).

The plates incubate at 37°C aerobically for 24 h as described by Cheesbrough (2006). For this study, significant bacteriuria was defined as culture of a single bacterial species from the urine sample at a concentration of 105 CFU/ml associated with microscope findings of > 10 WBC per high power field (Kashef *et al.,* 2010). Identification of bacterial pathogens was made on the basis of Gram reaction, morphology, and biochemical features. Identification of Gram negative enteric rods were done with the help of biochemical tests, which include Triple sugar iron agar, Indole, Simmon‟s citrate agar, Lysine decarboxylase, Urease and Motility.

Antimicrobial susceptibility test

Antimicrobial susceptibility was done by the standard disk diffusion method according to (Kashef *et al.,* 2010; CLSI, 2011). Mueller-Hinton agar plates were incubated for 24 hours after inoculation with organisms and placement of the disks and inhibition zones were measured. Diameters of the zone of inhibition around the disc was measured to the nearest millimeter using a caliper, and the isolates were classified as sensitive, intermediate, and resistant according to the standardized table supplied by the CLSI (2011).The commercial antibiotics used for isolates were ciprofloxacin (5 µg), gentamicin (10 µg), ampicillin (10 µg), nitrofurantoin (300 µg), nalidixic acid (30 µg), ceftriaxone (30 µg), amoxicillin (30 µg), norfloxacin (10 µg)), penicillin (10µg), and vancomycin (30 µg), doxycycline (30 µg), tetracyclen (30 µg), cloxacillin (5 µg), cotrimoxazole (25 µg).

Data analysis

Data analysis was performed using SPSS, version 16.0; Socio-demographic and UTI risk factors were compared using the chi-square test. Statistical significance difference were consider at value of $P<0.05$.

RESULTS

Overview of demographic characteristics and isolation rates of pathogens

Risk factor for urinary tract infection in the study area generally considered as demographic characteristics were sex, age, marital status, educational level and residence of the 156 urine samples processed, 49 (31.4%) showed positive cultures. Gram-negative bacteria represented 43 (87.7%) of the positive bacterial cultures, whereas Gram-positive were 6 (12.3%). The overall sex distribution of the subjects was 107 (68.6%) females and 49 (31.4%) males and the sex distribution for the 49 positive cultures was 40 (81.6%) females and 9 (18.4 %) males with a statistical significance (p= 0.02) predominance of females with UTI. 100 (64.1%) married and 45 (28.8%) single with statistically significant association (p= 0.02) (Table1).

The age range of the patients was between 3-87 years with a median of 35.3 and the majority of the patient 104 (66.6%) have 26-44 age range followed by 30 (19.9%) were between 15-25 years. Statistical significance was observed (p=0.03) among UTI patients of different age group. Socio demographic characteristic such as education status, occupation and residence statistics showed that, the majority of them 132 (84.6%) live in urban area, 24 (15.4%) were from rural area and 117 (75%) were literate or able to read and write. Regarding the occupation of patients 48 (30.8%) governmental employed, 58 (37.2%) private employed, 22 (14.1%) are farmers, 10 (6.4%) students, and 18 (11.1%) are others as the detail of socio demographic factors with growth rate of pathogens are presented in table 2. High number of cases in UTI of urban dwellings and better educated peoples might be due to their awareness level to seek medical treatment even for mild cases.

The different microorganisms isolated during the study period were shown in table 3. It is clear that *E. coli* were the predominant gram-negative uropathogen 27 (55.1%) causing UTI followed by *Klebsiella* species 8 (16.3%) and *Proteus* species 6 (12.2%). Other urinary pathogens were isolated in a relatively few number. *P. aeruginosa* accounts 2 (4.1%) whereas *S. aureus* 3 (6.1%) was the common uropathogen isolated among the Gram-positive bacteria followed by *Enterococcus* species 2 (4.1%) and *Citrobacter* species 1 (2.0%).

Of the 156 patients 139 (88.5%) had no history of catheterization while 17 (10.9%) have the history of catheterization with considerable positive cultures and statistically significant difference were observed between catheterized and non-catheterized UTI patients (p=0.04, OR=2.8) (Table 4). Of Urinary tract infection patient admitted to the DRHRL, 74 (47.4%) were used antibiotics prior to culture practice. Samples from patients without antibiotic therapy showed statistically significant growth than who were taking antibiotics in the time of culturing (p=0.02, OR=2.3). Bacterial pathogens obtained from catheterized patients were *E. coli*, *klebsiella* species, and *Proteus* species. Relatively *E. coli* (18.5%) contribute a higher number than the other isolated microorganisms and the report was not show that *S. aureus*, *P. arugenisa*, *Enterococcus* species and *Citrobacter* species were found in catheterized UTI patients. More than half of the UTI patients caused by *E. coli* 17 (62.9%) were taken antibiotics prior to giving their urine to the laboratory (Table 5).

Drug susceptibility patterns of bacterial Isolates

Antibiotics effective for *E.coli*, were nitrofurantoin 6 (100 %) and ciprofloxacin 25 (92%). Comparatively other better antibiotics for this pathogen were ceftriaxone, gentamicin, cotrimoxazole, and nalidixic acid with resistant rate of 16%, 16.6%, 13.1% and 18.2% respectively (Table 6). The resistant pattern was high for doxycycline (60%), norfloxacin (66.6%), tetracycline (82.6%), penicillin (100%) ampicillin (92.6%) and amoxicillin (85.6%).

Klebsiella species, the second dominant pathogens in this study were better sensitive for ciprofloxacin (85.8%), ceftriaxone (80%), but high resistant for amoxicillin (85.8%) clocxacillin (80.2%) , tetracycline (71.4%), nitrofurantoin (80%) and no sensitivity was observed at all for ampicillin. *Pseudomonas aeruginosa* was sensitive only for ciprofloxacin Proteus species were sensitive for ceftriaxone (80%), ciprofloxacin (84.4%), and nitrofurantoin (82.3%) while their resistant pattern was very high for gentamicin (75%) nalidixic acid (40%) cotrimoxazol (66.6%) and teteracycline (40%) with no sensitivity to doxycycline (100%). *S. aureus* showed high resistance to most of the antibiotic tested for example, tetracycline, vancomycine and nalidixic acid each with (100 %).

Majority of bacterial isolates except *S. aureus* were sensitive to ciprofloxacin (81.9%), ceftriaxone (77%), nitrofurantoin (73.8%) and norfloxacin (66.7%) as the details are displayed in (Figure 1). The result also indicated that the majority of bacterial isolates showed high resistant rate to penicillin (100%), vancomycine (100%) nalidixic acid (52.3%), ampicillin (98.2%), amoxicillin (94.3%), tetracycline (72.9%), norfloxacine (39.1%), cloxacillin (74.3%) and doxycycline with sensitivity rate of (60.8%).

Table 1. Socio-demographic characteristics of patient with UTI at DRHRL

Socio-demographic characteristics	Positive No(%)	Negative No(%)	Total No(%)	X^2	P-value
Sex					
Male	9 (5.7)	40 (25.6)	49 (31.4)	5.6	0.02
Female	40 (25.6)	67 (42.9)	107 (68.6)		
Age (years)					
<4	-	1 (0.6)	1 (0.6)	10.8	0.03
5-14	-	3 (1.9)	3 (1.9)		
15-25	6 (3.8)	24 (15.4)	30 (19.2)		
26-44	42 (26.9)	62 (39.4)	104 (66.7)		
>44	2 (1.3)	16 (10.3)	18 (11.5)		
Marital Status					
Not applicable	-	4 (2.5)	4 (4.5)	9.5	0.02
Single	10 (6.4)	35 (22.4)	45 (28.8)		
Married	39 (25)	61 (39.1)	100 (64.1)		
Divorced	-	7 (4.5)	7 (4.5)		

Table 2. Educational status, residence and occupational characteristics of patients with UTI at Dessie Regional Health Research Laboratory (n=156)

Socio demographic characteristics	Positive No (%)	Negative No (%)	Total No (%)	X^2	p- value
Educ. status					
Not applicable	-	7 (4.5)	7 (4.5)	3.8	0.44
Not formal ed.	4 (2.6)	10 (6.4)	14 (8.9)		
Primary (1-6)	5 (3.2)	12 (7.7)	17 (10.9)		
Secondary (7-12)	24 (15.4)	44 (28.2)	68 (43.6)		
Tertiary (12 +)	16 (10.3)	34 (21.8)	50 (32.1)		
Occupation					
Gov.emp.	18(11.5)	30(19.2)	48(30.8)	4.5	0.20
Private emp.	22(14.1)	36(23.1)	58(37.2)		
Residence					
Farmer	5(3.2)	17(10.9)	22(14.1)	0.54	0.46
Urban	43(27.6)	89(57.1)	132(84.6)		
Students	1(0.6)	9(5.8)	10(6.4)		
Rural	6(3.8)	18(11.5)	24(15.4)		
Others	3(1.9)	13(9.6)	18(11.5)		

Table 3. Organisms isolated from urine sample in urinary tract infection patient at DRHRL (n=156)

Isolates	Number	Percentage
Gram-negative		
E. coli.	27	55.1
Klebsiella species	8	16.3
Proteus species	6	12.2
P. aeruginosa	2	4.1
Gram-positives		
S. aureus	3	6.1
Enterococcus species	2	4.1
Citrobacter species	1	2.0

Table 4. Prevalence of isolated organisms in patients with history of catheterization and antibiotic use at DRHRL (n=156)

	Culture status					
Category	**Positives No (%)**	**Negative No (%)**	**Total No (%)**	**χ2**	**p-value**	**OR**
Prophylaxis						
Used	30 (40.5)	44 (59.5)	74 (100)	5.4	0.02	2.3
Not used	19 (23.2)	63 (76.8)	82 (100)			
Catheterization						
Catheterized	9 (53)	8 (47)	17(100)	4.1	0.04	2.8
Non- catheterized	40 (28.8)	99 (71.2)	139 (100)			

Table 5. Prevalence of bacteria among UTI patients with history of catheterization and prophylaxis at DRHRL (n= 156)

Bacterial Isolates	**Category**			
	Catheterized (n=9)	**Non-catheterized (n=40)**	**Prophylaxis (n=30)**	**No prophylaxis (n=19)**
E.coli (n=27)	5(18.5%)	22(81.5%)	17(62.9%)	10(37.1%)
Klebsiella spp. (n= 8)	1 (12.5%)	7 (87.5%)	5 (60%)	3 (30%)
Proteus spp. (n= 6)	3 (50%)	3 (50%)	4 (66.7%)	2 (33.3%)
P. aruginosa (n= 2)	-	2 (100%)	1 (50%)	1 (50%)
S. aureus (n= 3)	-	3 (100%)	3 (100%)	-
Enterococcus spp. (n= 2)	-	2 (100%)	-	2 (100%)
Citrobacter spp. (n= 1)	-	1 (100%)	-	1 (100%)

Antimicrobial agent	***E. coli* (n=27)**		***Kelebsiella* spp. (n=8)**		***Proteus* spp.(n=6)**		***S. aureus* (n=3)**		***P. aeruginosa* (n=2)**		***Enterococcus* spp. (n=2)**		***Citrobacter* spp.(n=1)**	
	#T	**R (%)**	**#T**	**R (%)**	**#T**	**R (%)**	**#T**	**R (%)**	**#T**	**R (%)**	**#T**	**R (%)**	**#T**	**R (%)**
CP	25	(8)	7	(14.2)	6	(16.6)	3	(33.3)	2	-	2	-	1	-
OB	-		7	(80.2)	-	-	3	(66.6)	2	(50)	2	(100)		-
TE	23	(82.6)	7	(71.4)	5	(40)	3	(66.6)	2	(100)	2	(50)	1	(100)
CRO	25	(16)	5	(20)	5	(20)	2	-	1	-	2	(100)	1	-
CN	18	(16.6)	7	(57.1)	4	(75)	3	(66.6)	2	(50)	2	-		-
SXT	23	(13.1)	7	(57.1)	6	(66.6)	-	-	-	-	-	-	-	-
AMC	27	(85.6)	7	(85.8)	-	-	3	(100)	-	-	2	(100)	1	(100)
NA	11	(18.2)	-	-	5	(40)	1	(100)	-	-	-	-	-	-
F	6	-	5	(80)	6	(17.7)	3	(33.3)	-	-	-	-	1	-
AM	15	(92.6)	5	(100)	-	-	-	-	2	(100)	-	-	1	(100)
P	4	(100)	-	-	-	-	-	-	-	-	2	(100)	-	-
NOR	9	(66.6)	-	-	-	-	-	-	-	-	-	-	1	-
VA	-	-	-	-	-	-	1	(100)	-	-	2	(100)	-	-
DO	10	60	3	(33.3)	1	(100)	2	(50)						

Key: #T= total number of tests, (R %) = Percent resistance, Ciprofloxacin (CP), Gentamicin (CN), Ampicillin (AM), Nitrofurantoin (F), Nalidixic acid (NA), Ceftriaxone (CRO), Amoxicillin (AMC), Norfloxacin (NOR), Penicillin (P), Vancomycin (VA), Doxycycline (DO), Tetracyclen(TE), Cloxacillin (OB) and Cotrimoxazole (SXT).

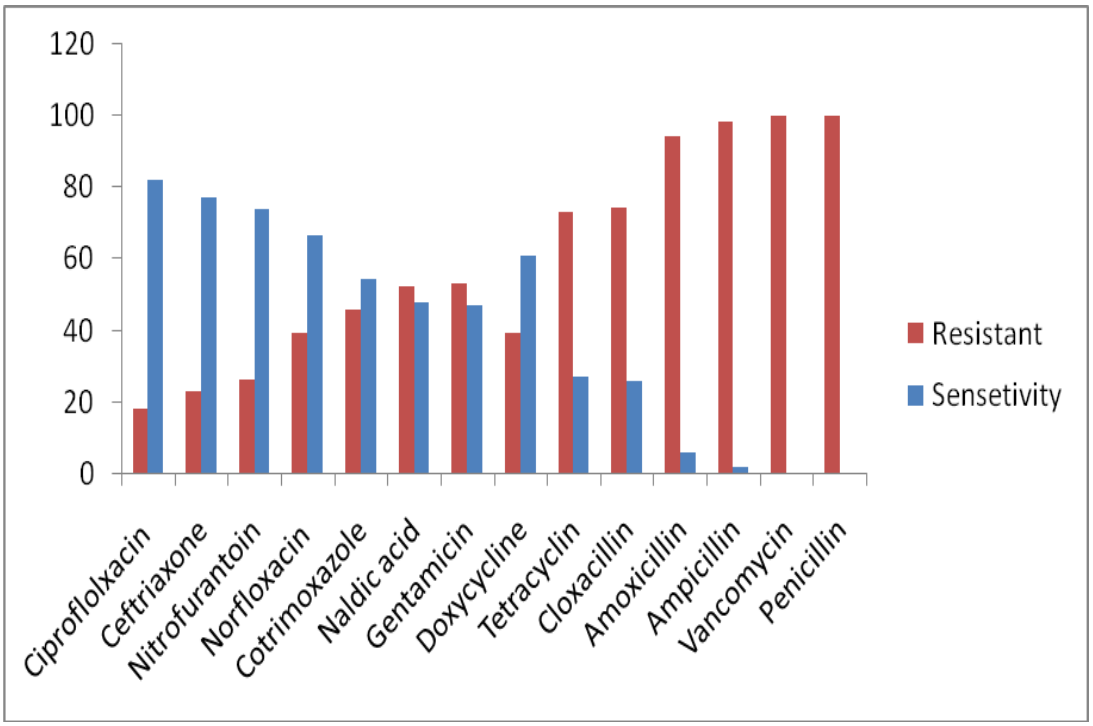

Figure 1. Over all resistant patterns of bacterial isolates in favor of antibiotic agent tested

Table 7. Multiple antimicrobial resistance patterns of bacterial isolates from patients with urinary tract infection at DRHRL

Bacteria	Antibiogram No (%)					
	R0	**R1**	**R2**	**R3**	**R4**	**R5**
E.coli (n=27)	3 (11.1)	6(22.2)	9(33.3)	5(18.5)	3(11.1)	1(7.4)
Klebsiella species (n=8)	1(12.5)	1(12.5)	2(25)	2(25)	1(12.5)	1(12.5)
Proteus species (n=6)	1(16.6)	-	-	1(16.6)	3(50)	1(16.6)
S .aureus (n=3)	-	-	-	2(66.6)	1(33.4)	-
P. aeruginosa (n=2)	-	-	1(50)	1(50)	-	-
Entrococus species (n=2)	-	1(50)	-	1(50)	-	-
Citrobacter species (n=1)	-	-	1(100)	-	-	-

Key: R0, Sensitive to all, R1, R2, R3, R4, R5, resistant to 1, 2, 3, 4, and 5 antibiotics, respectively

Multidrug resistance pattern of bacteria isolates

The current study showed that most of the bacterial isolates have developed resistance to multiple antimicrobial agents. Table 7 depicts the situation where the community acquired bacterial species have developed resistance to more than two antibiotics. *E. coli*, the most prevalence of UTI also number one in resisting five antibiotics. It showed 22.2%, 33.3%, 18.5%, 11.1%, 7.4% resistant to 1, 2, 3, 4, 5 antibiotics respectively. As can be seen, 25, 25, 12.5, and 12.5 % multidrug resistance rates to two, three, four and five antibiotics respectively was seen for *Klebsiella* species, 83.4% of the Proteus species, showed resistance to more than two antibiotic and *S. aureus* resisted 100% to 3 to 4 antibiotics. Though, the number of isolated organisms small in *P. aeruginosa*, and *Enterococcus* species, each has the resistance rate reach to 50% to two antibiotics and *Citrobacter* species were 100% resistance to one antibiotic.

DISCUSSION

Antimicrobial resistance is a global public health concern that is impacted by human antimicrobial use. The

consequences of antimicrobial resistance are particularly important when pathogens are resistant to antimicrobials that are critically important in the treatment of human disease (WHO, 2007). Therefore, it is important to monitor the status of antimicrobial resistance among uropathogens to improve treatment recommendations. This prospective cross sectional study conducted to determine the frequency and antimicrobial resistant patterns of community-acquired uropathogens in the area using the results of routine diagnostic and susceptibility analysis in Dssie regional Health Research Laboratory (South Wollo).

From 156 urinary tract infection patient sent to the Dessie Regional Health Research Laboratory, 49 (31.4%) were positive culture which indicates high number of UTI cases in the area as described by different studies (Hooton, 2000; APIC, 2008; Adedeji and Abdulkadir, 2009; Fentahun and Bayeh, 2009). This value (31.4%) of positive sample was in accordance with those described in several previous studies 31.2% of Bahir Dar (Fentahun Bedglign, 2009), 35.5% in Hawassa (Mucheye Gizachew *et al.,* 2013) and relatively higher (42%) prevalence in Nigeria (Adedeji and Abdulkadir, 2009).

In this study, as in several previous reports, the most commonly isolated organism in UTI was *Escherichia coli* 27 (55.1%), *Klebsiella* species 8 (16.3%), *Proteus* species 6 (12.4%), *Staphylococcus aureus* 3 (6.1%), and *P. aeruginosa* 2 (4.1%) of the positive culture, and this finding in agreement with the other finding too (Javeed *et al.,* 2011; Adedeji and Abdulkadir 2009; Hryniewicz et al., 2001; Lidya Aguma *et al.,* 2011; Hryniewicz *et al.,* 2001). These organisms cause a variety of infections including UTIs (Chatterjee *et al.,* 2009). *Klebsiella* species was the second most common organism followed by *Proteus* species and *S. aureus*
(Kashef *et al.,* 2010).

In this study urinary samples of children were also included. Age and gender wise data of prevalence of uropathogenes revealed that a majority of pathogens were isolated from adult patients (85.7 %) with age range of 26-44, principally women are significantly more likely to experience UTI; almost half of all women will experience one UTI during their lifetime (Foxman, 2002). It has been extensively reported that adult women have a higher prevalence of UTI than men, principally the fact that shorter, wider urethra and its proximity to the anus is the predisposing factor for infection (Hooton, 2000; Mumtaz *et al.,* 2008; Adedeji and Abdulkadir, 2009; Fantahun Biadglegne and Bayeh Abera, 2009; Okonko *et al.,* 2009; Getenet Beyene and Wondewosen Tsegaye, 2011), and this is because compared to females the drier environment in the urethra prevents the optimal growth of bacteria.

The antimicrobial activity of prostate secretions and longer distance between the anus and urethra meatus in males are among the factors responsible for the differences in prevalence of pathogens between the two genders (Silabat Melaku *et al.,* 2012). High number of cases occurrence were obtained from married patients which might be due to exposure to sexual actions and other life styles as explained by (Hooton, 2000; Annette, 2010). When we compare the rate of isolates of Gram negative and Gram positive bacteria, Gram negative bacteria were the dominant causative agent of UIT which is in line with others report from Bahir Dar (Fantahun Biadglegne and Bayeh Abera, 2009; Silabat Melaku *et al.,* 2012; Tazebew Demilie *et al.,* 2012), Jimma (Getenet Beyene and Wondewosen Tsegaye, 2011), Mekelle (Lidya Aguma et al., 2011) and Nigeria (Adedeji and Abdulkadir, 2009). In general the uropathogens identified in the study are similar to those of many other studies conducted in different countries (Hryniewicz, 2001).

The risk of developing urinary tract infection among catheterized patients were about 53% which were greater than those who did not have catheter insertion (47%) and the result is not in accordance with the study conducted in Bahir Dar (Silabat Melaku *et al.,* 2012). The risk of developing community acquired UTI among patients who received prophylaxis was 1.6 times higher than those who did not receive prophylaxis; this is comparable with the study in Bahir Dar (Silabat Melaku *et al.,* 2012).

Bacterial uropathogen isolates from patients with UTIs revealed the presence of high levels of single and multiple antimicrobial resistances against commonly prescribed drugs. *E. coli* which is the predominant cause of UTI, showed high percentage of resistance to ampicillin (92.6%), amoxicillin (85.6%), penicillin (100%), tetracycline (82.6%) and low resistance to ciprofloxacin (8%) Ceftriaxone (16%), cotrimoxazole (13.1%) and a comparable rate of sensitivity has been reported for these drugs in previous studies done in Ethiopia and Sudan (Ahmed *et al.,* 2000; Getenet Beyene and Wondewosen Tsegaye, 2011). *Klebsiella* species which is the second most prevalent pathogen of UTI displayed a similar resistance pattern as of *E. coli* and showed (100%) resistant to ampicillin and (85.8%) amoxicillin; however, all isolates were susceptible to ciprofloxacin and all others gram negative and positive isolates were similarly resistant to ampicillin, tetracycline and amoxicillin as to that of *E. coli* and *Klebsiella* species. this finding agree with the study in Nigeria (Okonko *et al.,* 2009) and Bahir Dar (Silabat Melaku *et al.,* 2012).

The Antibiogram shows that multidrug resistance is high for all microorganisms; the association between multi drug resistance (MDR) in *E. coli* is significant (p= 0.03). It showed 22.2%, 33.3%, 18.5%, 11.1%, 7.4% resistant to 1, 2,3,4,5 antibiotics, respectively which is not comparable with a study conducted in Mekelle that showed, respectively 0.58%, 1.17% and 97.65% multi drug resistance to three; four and for more than five antibiotics, respectively (Lidya Aguma *et al.,* 2011). As can be seen in table 6, 25, 25, 12.5, and 12.5 % multi

drug resistance rates to two, three, four and five antibiotics, respectively was seen for *Klebsiella* species. *Proteous* species in this study is similar to the other study in Gondar that showed 85.4% multi drug resistance to more than three antibiotics. From these results one can say that almost all the isolated microorganisms are resistant to more than four drugs.

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