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Prevalence of Urinary Tract Infection and Antibiotic Sensitivity of Bacterial Isolates in Apparently Healthy Male Population of the University of Uyo, Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. Author SIU designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Author SIU managed the analyses of the study. Author NOA managed the literature searches. Both authors read and approved the final manuscript.

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ABSTRACT

In this study a total of 255 apparently healthy male students of the University of Uyo, aged 17 to 50 years (mean = 26 years) were evaluated for UTI following informed consent. Properly collected midstream urine (MSU) was obtained from each participant and significant bacteriuria determined using surface streak plate method combined with isolation, identification, and antibiotic susceptibility testing. Primary culture isolation was on Cystine Lactose Electrolyte Deficient (CLED) medium and significant bacteriuria was considered as 105 CFU/ml of urine sample. The prevalence of UTI was determined as 5.9% (15/225) and the prevalence increased with progressive increase in age, attaining its peak in those aged 24 – 26 years with the prevalence rate of 33.3% (5/15). No UTI was found in those aged 17 years and less, while persons aged 30 years and above had a comparatively lower rate with prevalence rate of 20% (3/15). *Escherichia coli* had the largest frequency of occurrence with prevalence rate of 26.7% (4/15) among those infected, which was closely followed

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by *Staphylococcus aureus, Coagulase negative Staphylococcus, Proteus sp, Pseudomonas sp* and *Enterococcus sp* with prevalence rate of 20%, 20%, 13.3%, 1%, 1%, 1% respectively. This study reveals a high prevalence rate of UTI with *E. coli* as the most frequently encountered organism. It also revealed a significant level of susceptible to common antibiotics by *Escherichia coli* in contrast to a total resistance to all antibiotics exhibited by *Klebsiella* sp.

Keywords: Urinary tract infection; antibiotics; sensitivity; susceptibility; bacteriuria.

1. INTRODUCTION

Urinary Tract Infection (UTI) is a general term referring to infection occurring anywhere along the urinary tract, from the urethral meatus to the kidney, ureters, bladder, and urethra and they are classified based on their location in the urinary tract. Such infection may therefore enter the urinary tract from below, usually spreading from the skin to the urethra and bladder [1].

Genao, and Buhr, [2], Stamm and Hooton [3] and Lipsky [4] observed that research on Urinary Tract Infection has been focused on women because of much higher incidence. However, men are also not free of this condition and some may present with a more complex disease and higher risk of complication. This is due to the over lapping of the male urinary tract and reproductive tract. Several studies have revealed that UTI is the most common bacterial infection encountered by clinicians in developing countries including Nigeria. In this regard, Yismaw et al. [5] concluded that UTI is a serious infection in both male and female.

In males UTI, includes cystitis, Pyelonephritis, prostratitis, osteomyelitis. However bacterial cystitis in male is uncommon in the absence of anatomical abnormality, defect in bladder emptying mechanism or urethral catherization. In the normal host, UTI may occur due to infection of other portion of genitourinary tract typically prostate. Older males with prostatic hypertrophy have incomplete bladder emptying predisposing them to UTI on the basis of urinary statis. However in males aged 3 months to 50 years, incidence of UTI is low, therefore, the possibility of an anatomical abnormality must be encountered or entertained in this group [6].

Generally, Urinary tract infection can be caused by a variety of predisposing factors either working alone or in combination with others leading to inoculation of the urinary tract. Urine and faecal elimination habits are considered an important possible cause of UTI, infrequent micturation and incomplete emptying of the bladder in children represent important factors in the causation of incontinence during the day and of seemed effective in improving children's micturation habit thereby changing the frequency of wettings and the infrequency of UTI. Male children with day time wetting with or without night wetting often have very often bladder sphincter dysfunctions which are in turn correlated with recurrent UTIs [7].

Hvidberg et al. [8] and Nicolle [9] also observed that UTI was the most commonly observed infections in clinical practice, and may also contribute to the most common nosocomial infection in many hospitals and account for about 35% of such infections. Similarly Nester et al. [10] asserted that "Urinary Tract Infection is a serious nosocomial infection in the United States of America, it is also estimated that about 5 – 6% of patients admitted to the hospital develops a nosocomial infection which UTI is the most prominent adding 4.5 billion to the price of health care", while Jack et al. [11] observed that one hundred and fifty million patients are diagnosed yearly resulting in at least six billion dollars in health care expenditure. Guedich et al. [12] reported that in the year 1997, UTI accounted for approximately 7 million office visits and 1 million emergency departments' visits, resulting in 100,000 hospitalizations in the United States.

Urinary Tract pathogens include *Escherichia coli, Enterobacter, Proteus, Salmonella, Staphylococcus, Pseudomonas, Serratia, and Klebsiella*. The family Enterobacteriaceae are the common pathogen causing 84.3% of urinary tract infection [13]. *Escherichia coli* causes 85% of community acquired Urinary Tract Infection and more than 80% of cases of uncomplicated pyelonephritis. The medically equally important *Serratia*, *Klebsiella* accounts for 6 – 17% of all nosocomial urinary tract infection in individuals with complicated urinary tract infection [14-15].

It is generally recognized that in the cases of urinary tract infection, antimicrobials are administered after a sensitivity test have been

carried out, antibiotics used in treatment of UTI must be active against urinary pathogens with low rate of resistance, to be free from side effect palatable. These antibiotics include: Sulphonamide, Nitrofurantoin, Ampicillin, Septrin, Tetracycline, Augmentin, Ciprofloxacin, Sulphamethoxazole, Streptomycin, Nalidixic acid [1,16].

However some UTI Pathogens are resistant to some antimicrobials or antibiotics, for example gram- negative organisms such as *Escherichia coli* are resistant to many antibiotics that affect gram-positive organisms. It is to be noted that currently, that there is no vaccine for the prevention of urinary tract infection, therefore chances of contracting urinary tract activities that are known to predispose one to urinary tract infection can be lessen by drinking adequate quality of water and maintain proper hygiene [17].

In Nigeria, most published data on UTI focused mainly on those with infection or other secondary disease(s) which includes UTI in HIV/AIDS patients [18], UTI in diabetic patients [6]. Therefore, there is no published data on the prevalence of UTI among the apparently healthy class. This study therefore exclusively focuses on the prevalence of UTI in apparently healthy male population of the University of Uyo. In other words, it is a pioneer work in this aspect.

2. MATERIALS AND METHODS

2.1 Study Site

This study was carried out at the University of Uyo, Akwa Ibom State. The Institution was established in the year 1991. The School is located in Uyo metropolis. Uyo where the school is located is the Capital of Akwa Ibom State. The state has a population of 309,573, of which 153,113 are males and 154,640 are females according to the report from Akwa Ibom State Census in 2006.

2.1.1 Study subjects

The Study subjects consist of apparently healthy male students with no reported physical illness who were seen at their various male hostels. Each student was counseled on individual basis and students following their informed consent were given sterile universal containers to summit midstream urine.

2.1.2 Sample size

Samples (Urine) were collected consecutively from male students' population of University of Uyo until a sample size of 255 was reached.

2.1.3 Antimicrobial susceptibility test discs

Biotec brand (UK) of antibiotic discs was obtained and refrigerated (2.8℃) as recommended by its manufacturer until required for used.

2.2 Microbiological Analysis

Standard microbiological and aseptic techniques were employed in this study, where kits were used; its manufacturer's instruction was strictly adhered to.

2.2.1 Sample collection

Following informed consent, male students aged 17-50 years were provided with sterile universal containers and educated on how to collect a clean catch mid-stream-urine (MSU). Subjects who refused consent were ignored. Samples were collected early in the morning and preserved in a portable cooler lined with ice blocks and transported to the laboratory within one hour. The process was repeated each time with a different set of students until a sample size of 255 was attained.

2.2.2 Media preparation

The primary media employed for urine culture were Cystine Lactose Electrolyte Deficient (CLED) Agar, Nutrient Agar, Simmon's Citrate Agar, Urease Agar and Peptone Water Agar. All media were prepared according to the manufacturer's instruction.

2.2.3 Macroscopy

The macroscopy of urine simple were carried out to examine for colour and turbidity of the urine sample and recorded according to age groups.

2.2.4 Urinalysis

Each collected sample of Urine were tested by using the dipstick technique for protein, leukocyte, nitrite and pH using multisticks of Medi-Test combi 9R SGL within two hours of arrival in the laboratory.

2.2.5 Inoculation of urine samples and determination of significant bacteriuria

All samples were inoculated onto CLED using standard loop technique. Hence a sterile calibrated wire loop, which holds 1/500 ml (0.002 ml), was used to inoculate a loopful of urine on a quarter plate of CLED Agar using streaking technique. Each sample was inoculated in duplicate. The CLED plates were incubated in an inverted manner, aerobically at 37℃ for 24 hours. After the incubation period, each plate was examined for purity of isolates. Samples that yielded pure (not mixed) growth were counted. An average colony count of 25 and above in pure growth was considered significant.

2.2.6 Isolation of and preservation pure culture

Using standard streak plate technique, a sterile wire loop was used to pick a loopful colony from the mixed culture, then streaked on a freshly prepared nutrient agar and incubated inversely and aerobically for 24 hours at 37℃.

2.2.7 Stock culture preparation/preservation

A pure colony obtained from each sample was ascetically streaked on slant surface of nutrient agar contained in sterile stock bottles (McCartney bottles). These were incubated for 24 hours aerobically at 37℃ and stored by refrigerating at 4℃.

2.2.8 Characterization and identification of bacterial isolates

To characterize and identify the isolated organisms, the organisms were subjected to various tests such as cultural and biochemical test of the organisms. Identification was done based on the taxonomic scheme of Cowan [19].

2.3 Antibiotic Susceptibility Test

The Kirby-Bauer method was used to screen for the antibiotic susceptibility pattern. The isolates were inoculated on to Muller Hinton Agar plates by streaking. The multiple antibiotic discs were applied to each plate with sterile forceps with lowest concentration towards the center of the agar plate. The plates were incubated at 37℃ for 24 hours. The zones of inhibition of the growth were measured by the use of scale ruler in centimeter, which then was transferred to millimetre ruler for the value. Clear zone of inhibition indicated susceptibility of the organisms while absence of such zone was also reported.

2.4 Statistical Analysis

Simple percentage was used to express the frequency of occurrence of bacterial isolates where necessary.

3. RESULTS AND DISCUSSION

3.1 Age Distribution of Study Subjects

One hundred percent of the participants in this study were males. Subjects aged 17 years or less formed less than 1% of the study population, while those aged 18 – 20 and 21 – 23 years formed 9.02% and 31.8% of the study subjects respectively. Only 17.7% of the subjects were 30 years or over. The highest number of samples was collected from participants aged 24 – 26 years (32.15%, 82/255) while the least number of samples were collected from participants aged ≤ 17 years (0.78%, ^{2}/255). A Summary of this distribution is presented in Table 1.

Table 1. Age distribution of study subjects

Age (years)	Number of samples collected (n = 255, %)
≤ 17	2 (0.78)
18 – 20	23 (9.02)
21 – 23	81 (31.76)
24 – 26	82 (32.16)
27 – 29	22 (8.63)
≥ 30	45 (17.7)

3.2 Macroscopic Appearance of Urine Samples

A summary of the macroscopic examination of all the urine samples collected is presented in Table 2 according to the age of the study subjects. Approximately 41.6%(106/255) of all the urine samples examined regardless of age had deep amber appearance. No bloody urine was detected nor was any pus or clot seen in any of the 255 samples examined. Cloudy urine sample was only associated with 15 subjects with its peak in persons aged 24 – 26 years.

3.3 Biochemical Examination of Urine Samples According to Age of Study Subjects

A summary of the biochemical examination of all the collected urine samples is presented in Table 3. About two third of all the subjects' presented slightly acidic urine, while 25 subjects (9.8%) had urine that was neutral and 45 subjects (17.6%) had alkaline urine. All subjects aged 17 and below presented acidic urine while the highest prevalence of alkaline urine was found in subjects aged 21 to 23 years (31/255, 12.15%).

Twenty subjects (7.8%) were positive for leukocytes with the highest prevalence seen in persons aged 30 years or over. A low level of nitrite and protein was detected in all the participants (8/255, 3.1% and 7/255, 2.7% respectively). The highest prevalence of protein was detected in those aged 18-20 years (5/255, 1.96%).

3.4 Prevalence of UTI According To Age of Study Subjects

The highest number of UTI positive cases was seen in participants aged 24 – 26 with prevalence rate 33.3% (5/15) while no UTI was detected in participants aged less or equal to 17 years. The overall prevalence of UTI among all the study subject in this study was 5.9%, (15/255). A summary of prevalence of UTI according to age is illustrated in Table 4.

Table 2. Summary of macroscopic appearance of urine samples according to age of study subjects

Age (years)	Deep amber (n = 106, %)	Amber (n = 90, %)	Pale Amber (n = 59, %)	Clear (n = 240, %)	Slightly cloudy (n = 15, %)
≤ 17	1 (0.94)	1 (1.11)	0 (0)	2 (0.83)	0 (0)
18 – 20	5 (4.72)	10 (11.11)	8 (13.56)	20 (8.33)	3 (20)
21 – 23	80 (75.47)	0 (0)	1 (1.70)	81 (33.75)	0 (0)
24 – 26	20 (18.87)	20 (22.22)	42 (71.19)	73 (30.42)	9 (45)
27 – 29	0 (0)	20 (22.22)	2 (3.39)	22 (9.17)	0 (0)
≥ 30	0 (0)	39 (43.34)	6 (10.16	42 (17.5)	3 (20)

Table 3. Summary of result of biochemical examination of urine samples according the age of subjects

Age (Yrs)	Protein positive (n=7, %)	Nitrite positive (n=8, %)	Leukocyte positive (n=20, %)	pH				
				4 (n=73, %)	5 n=60, %)	6 n=36, %)	7 n=40, %)	8 n=46, %)
≤ 17	0 (0)	0 (0)	0 (0)	0 (0)	2 (3.3)	0 (0)	0 (0)	0 (0)
18– 20	5 (71.4)	0 (0)	2 (10)	5 (6.8)	10 (14.7)	4 (11)	3 (7.5)	1 (2.2)
21– 23	2 (28.6)	3 (37.5)	0 (0)	20 (27.4)	12 (20)	12 (33.3)	6 (15)	31 (67.4)
24– 26	0 (0)	2 (25)	15 (75)	40 (54.8)	20 (33.3)	10 (27.8)	5 (12.5)	6 (13.0)
27– 29	0 (0)	0 (0)	3 (15)	5 (6.8)	6 (10)	0 (0)	11 (27.5)	0 (0)
≥ 30	0 (0)	3 (37.5)	0 (0)	3 (4.1)	10 (14.7)	10 (27.8)	15 (37.5)	7 (15.2)

Table 4. Prevalence of UTI according to age

Age (Yrs)	Number of samples collected (n = 255, %)	Number of positive cases (n = 15; %)
≤ 17	2 (0.78)	0 (0)
18 – 20	23 (9.02)	2 (13.3)
21 – 23	81 (31.76)	3 (20)
24 – 26	82 (32.16)	5 (33.3)
27 – 29	22 (8.63)	2 (13.3)
≥ 30	45 (17.65)	3 (20)

3.5 Morphological, Cultural and Biochemical Characteristics of Isolates

A summary of the morphological, cultural and biochemical characteristics of the encountered bacteria isolates is presented in Table 5.

3.6 Prevalence of Bacterial Types Associated with Positive UTI Subjects

The most frequently encountered bacteria isolates were *E. coli* with prevalence rate (4/15, 26.7%) while *S. aureus* and *Klebsiella* sp had an equal prevalence (3/15, 20.7%), Coagulase negative *staphylococcus* had a comparatively lower prevalence (2/15, 13.3%) while *Enterococcus* sp*, Pseudomonas* sp, *Proteus* sp had the same lowest frequency of occurrence. A summary of this frequency of bacteria isolated from UTI positive study subjects is presented in Table 5.

Table 5. Summary of frequency of bacteria isolated from UTI positive study subjects

Isolate	Frequency (n =15, %)
Escherichia coli	4 (26.7)
S. aureus	3 (20)
Klebsiella sp	3 (20)
Coagulase negative Staphyloccus	2 (13.3)
Proteus sp	1 (6.7)
Enterococcus sp	1 (6.7)
Pseudomonas sp	1 (6.7)

3.7 Antibiotics Susceptibility Pattern of the Bacteria Isolates

The highest level of resistance was seen in *Klebsiella* species, which was resistant to all the antibiotics used while the highest level of sensitivity was seen in *E. coli*. About 80% of the isolates were sensitive to Nitrofurantoin while all isolates (100%) were resistant to amoxillin. A summary of this antibiotics susceptibility pattern of the bacteria isolated from urine samples is illustrated in Table 6.

4. DISCUSSION

In this study, streak plate method was employed for the detection of significant bacteriuria using CLED as a medium. A total of 255 apparently healthy males were evaluated for their UTI status. Refusal to participate in the study was one of the major preliminary problems encountered. Approximately 20% of people approached refused participation. Overall, only 2 subjects aged 17 years or below participated while subjects 30 years and above was limited to 17.7% of the total participants.

Unlike most previous studies carried out in Nigeria, this study focus exclusively on those who presented evidence of healthy status. In a study conducted in Benin and reported by Omeregie and Eghafona [20], a significant level of bacteriuria was found in more than 25% of the participants and all the subjects were HIV positive. There is no published data on UTI among apparently healthy male population of Nigeria. Gorelick and Heffner [21] observed that UTI is biomodal; highest during the first year of life and peaking again during adolescence. In this study, it was observed that UTI increased progressively with age and peaking between the age of 24 and 26years. Subjects 17 years or less recorded no significant bacteriuria while those aged 18-20 years had a prevalence of 13.3%, 21- 23 years 20%, 24-26 years, 33.3% and then dropped in subjects between the age of 27-29 years 13.3% and then increased again to 20% in subject aged 30 years and above. The high level of UTI in subjects may be due to their sexual activities. Although investigation into this aspect was outside the scope of this work, several studies have revealed significant association between UTI and sex.

Many studies have suggested an association between UTI and uncircumcised state; although these studies have been criticized on the methodological grounds a recent case control on 144 children less than five years of age showed that circumcision was strongly associated with a decrease risk of symptomatic UTIs [22]. During the first year of life uncircumcised male have up to 10 times risk of having a UTI [23]. Farrell [24] asserted that the prevalence of UTI among febrile male infants less than 3 month is 2.4% of circumcised males. In this study, the finding of a high level of UTI in a society where its cultural practices mandatory demands for male circumcision cannot be clearly explained rather than accepting Gorelick and Heffner [21] assertion that “Circumcision Status in boys becomes unimportant after first few year of life”.

Table 6. Antibiotics susceptibility pattern of bacteria isolates in suspected case of UTI

Antibiotics used (Conc. µg)	*E. coli*, (n=4, %)	*S. aureus*, (n=3,%)	Coagulase negative Staphylococcus (n=2 %)	*Pseudomonas* sp (*n=1, %)*	*Enterococcus* sp (n =1, %)	*Proteus* sp, *(*n=1,%)	*Klebsiella* sp, *(n=3,%)*
NAL (30)	4(100.0)	0(0.0)	0(0.0)	1(100.0)	0(0.0)	1(100.0)	0(0.0)
OFL (10)	4(100.0)	3(100.0)	2(100.0)	1(100.0)	1(100.0)	1(100.0)	0(0.0)
AUG (30)	4(100.0)	3(100.0)	2(100.0)	1(100.0)	1(100.0)	0(0.0)	0(0.0)
AMX (30)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
GEN (10)	4(100.0)	0(0.0)	2(100.0)	1(100.0)	1(100.0)	1(100.0)	0(0.0)
TET (30)	1(25.0)	3(100.0)	2(100.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
NIT (50)	4(100.0)	3(100.0)	2(100.0)	1(100.0)	1(100.0)	1(100.0)	0(0.0)
COT (25)	4(100.0)	0(0.0)	0(0.0)	0(0.0)	1(100.0)	0(0.0)	0(0.0)

Key: NAL = Nalidixic acid, OFL = Ofloxacin, AUG = Augmentin, AMX = Amoxicilin, GEN = Gentamycin, TET = Tetracycline, NIT = Nitrofurantoin, COT = cotrimaxazole

Table 7. Morphological, cultural and biochemical characteristics of isolates

S/N	Gram reaction	Motility	Catalase	Coaguase	Citrate	Urease	Mr	Vp	Inodle	Manitol	Glucose	Lactose	Sucrose	Probable organism
1	+ve Cocci	-	+	+	-	-	-	-	-	A	A	A	A	*Staphylococcus aureus*
2.	+ve cocci	-	+	-	-	-	+	-	+	AG	AG	A	-	Coagulase negative staphylococcus
3.	-ve Rods	-	+	-	+	+	-	+	-	AG	AG	AG	AG	*Klebsiella* sp
4.	-ve Rods	+	+	NA	-	-	+	-	+	AG	AG	AG	AG	*Escherichia coli*
5.	-ve Rods	+	+	NA	+	-	-	-	-	AG	A	-	-	*Pseudomonas* sp
6.	+ve cocci	-	-	NA	-	-	-	-	-	A	A	A	A	*Enterococcus* sp
7.	-ve Rods	+	+	NA	-	+	+	-	-	-	AG	-		*Proteus* sp

Key: + = Positive, - = Negative, AG = Acid and Gas Production, A = Acid Production, +ve = Positive, -ve = Negative, NA = Not applicable

More than half of the subject evaluated in this study presented a urine sample that was slightly acidic urine while about 10% percentage presented alkaline urine. The number of alkaline urine found in this study may be a contributory factor to a high level of UTI observed among the subjects, several study have revealed high association between alkaline urine and bacterial infection. This is because alkaline urine favours the colonization and survival of bacteria. About 15 subjects presented urine that was cloudy with its peak in persons between the ages of 24-26 years which also had the highest prevalence rate of UTI (33.3%). The turbidity of the subject's urine could be a contributory factor to the high prevalence of UTI in this study. Cloudiness of urine could also be cause by other conditions such as urine schistosomiasis, black water fever and some conditions that cause intravasalar haemolysis [25]. Evaluation of these parameters is outside the scope of this work.

About 2.7% of the subjects urine were protein positive (a condition called proteinuria) which could be a contributory factor to the high prevalence of UTI in the study. Other conditions that cause proteinuria include glomerulonephritis, nephrotic syndrome, eclampsia, urinary schitosomiasis, hypertension and severe febrile illness [25]. 3.1% of the subjects presented urine that was nitrite positive. The presence of nitrite in urine could be attributed to the presence of uropathogens like *E. coli*; *Proteus* sp, *Klebsiella* sp which are able to reduce the nitrate normally present in urine to nitrite [25]. In few cases, diet could also be a contributory factor to presence of nitrite in urine, for instance in vegetarians which their diet contains a lot of nitrate.

The overall prevalence of UTI among all the study subjects in this study was 5.9 %(15/255) indicating a high prevalence rate of UTI in apparently healthy male population of the University of Uyo, Uyo. This study also reveals that Gram-negative bacteria were responsible for 57.1% of urinary tract infection in comparison to Gram positive bacteria which was 42.9%. *E. coli* was the most frequently encountered bacterial isolates having a prevalence rate of about 26.6%, followed by *staphylococcus aureus* and *kelbsiella* sp which had an equal prevalence of 20%, coagulase negative *staphylococcus* 13.3% *proteus* sp*, Enterococcus* sp and *pseudomomas* sp which had the lowest frequency of occurrence with prevalence rate of 1% each, therefore this study is similar to the study reported by Kavaz et al. [16], which asserted that *E. coli* is responsible for most of the UTI cases and also similar to the study conducted by Sawalha [26] which showed that *E. coli* was the most predominant uropathogen with 51.8% followed by *staphylococcus aureus* with 29.6%.

Resistance rate of bacteria against all antibiotics was more than 20% as a result, more of these antibiotics cannot be used as initial empirical treatment for UTI for the organisms isolated, the antibacterial sensitivity profile showed a high resistance rate up to 100% among the first line antibiotics like Amoxiclin. The highest level of resistance was seen in *Klebsiella* sp, while the highest level of sensitivity was seen in *E. coli.* The high resistance rate may be due to the use of antibiotics as growth promoters in food of animals and the misuse of antimicrobial agent as asserted by Johnson et al. [27].

5. CONCLUSION

Prevalence of urinary tract infection in apparently healthy male population of the University of Uyo, Uyo has a concordance with some reports in the literature concerning urinary tract infection. In this study prevalence of UTI was determined to be 5.9%. Participants aged 24 – 26 had a higher level of prevalence (33.3%), which may be due to the fact that in this age range had the highest number of participants and males within this age range may be more sexually active. The study reveals a high prevalence rate of UTI with *E. coli* being the most frequently encountered organism. In addition the study revealed a significant level of susceptible to common antibiotics by *Escherichia coli* in contrast to a total resistance to all antibiotics by *Klebsiella* sp*.* It is recommended that routine checkup should be encouraged whenever urinary tract infection is suspected in order to give the best treatment. Another study should be implemented to measure resistance rate of UTI bacterial pathogens to commonly used antibiotics, this study must include all positive confirmed cases of UTI either for *Escherichia coli, Staphylococcus aureus,* or other uropathogens from all male student in University of Uyo and then do sensitivity test for them. This study can give us a better idea about antibiotic resistance rates.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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