

Research Article,

Bacteriological Profile and Antibiotic Sensitivity Pattern in Patients with Urinary Tract Infection in Janakpur, Nepal

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Abstract:

Background: Urinary tract infections are most common bacterial infection in routine clinical practice. It is also most common nosocomial infection in many hospitals. Antibiotics are usually given empirically before urine culture reports available and treatment failure rate used to be significantly high. Study of causative agents and their antimicrobial sensitivity pattern are important factors helping formulating antibiotic policy. Generally, most common uropathogen is Escherichia Coli. Tertiary care hospitals, catering of already partially treated or mal treated patients as major chunk, may have varying etiologies and different sensitivity patterns.

Objective: To study the culture and sensitivity patterns of urinary tract infections in patients presenting with urinary symptoms in local hospitals.

Study design: A cross sectional study

Materials and methods:

Study was conducted at Madanta Research Clinic Private Limited from 12th March 2021 to 12th September 2021. Urine from cases suspected to have symptoms suggestive of UTI were sent for bacteriological culture and sensitivity. Demographic profiles of each participant along with pathogen isolated, culture sensitivity pattern was documented. Data analysis was done in IBM spss 25.

Results:

A total 200 samples were selected for bacteriological culture and sensitivity out of which 32% were male and 68% were female. Around 50% of participants were in age group 20-40. There was no growth in 64% sample. Among positive samples (36%), E. coli (most common) was detected in 91.66%, Klebsiella was detected in 6.94%. Gentamicin, Amikacin and Nitrofurantoin were most common antibiotics sensitive to organisms in culture and Cephalosporins group of antibiotics are commonly resistant.

Conclusions:

E. coli is the most common organism isolated in urine culture in our region Janakpur. Cephalosporins are resistant in majority of cases whereas Aminoglycosides like Amikacin, Gentamicin and Nitrofurantoin are found to be highly sensitive in most of positive cases.

Keywords: Culture, sensitivity, Urinary Tract infections, Antibiotics, Resistant, Escherichia coli, Amikacin, Ceftriaxone

Introduction:

Urinary tract infection (UTI) is one of the commonest infections more common in female than male specially of reproductive age group.

The common etiological agents are Escherichia coli, Klebsiella, Proteus and Pseudomonas.^{2,4,5}

Bacteriological investigations of UTI are not complete without an antibiotic sensitivity test of

the isolate. Micro-organisms causing UTI vary in their susceptibility to antimicrobials from place to place and time to time.⁶ UTI can involve infection from urethra to the kidneys. Symptoms in case of cystitis induced painful and frequent urination where as conditions like high grade fever and flank pain are seen in pyelonephritis.⁷ Due to the empirical use of antibiotics in infectious diseases and lack of susceptibility test in this region, resistance to commonly used antimicrobial agents increasing yearly. By knowing common isolated uropathogene and their antimicrobial susceptibility is beneficial in planning treatment protocols.⁸

As city Janakpur is surrounded by many small villages without approach to basic laboratory facilities and well-equipped hospitals resulting into baseless use of antimicrobial like cephalosporins, aminoglycoside and fluoroquinolones by many untrained practitioners thereby promoting emergence of resistance. Now several physicians like me of this region experiencing problem in selecting best antimicrobial for UTI and other infectious diseases. So, this study was conducted to determine the bacteriological profile and antibiotic sensitivity patterns in UTI.

Methodology:

This was a cross-sectional observational study conducted in Madanta Research Clinic Private Limited over 7month period from 12th of March 021 to 12th of September 021.

Patients presented with symptoms suggestive of UTI such as fever, dysuria, frequency, urgency, hesitancy and flank pain were subjected to urine culture and sensitivity. Patients who were already

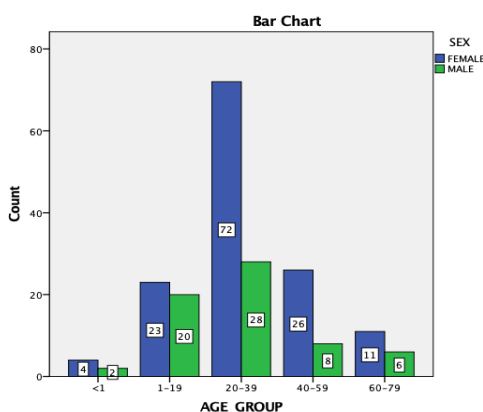
catheterized, immunocompromised, patients suffering from structural deformities like phimosis or paraphymosis and patients who had taken antibiotics within past 24hr were excluded from the study.

Mid -stream samples of urine were collected in sterile containers and immediately processed for culture and sensitivity testing. Mac Conkey agar was used for culture and Kirby-Bauer disk diffusion method was used to determine the antibiotic susceptibility of the isolated colonies. Muller-Hinton plates were used to identify sensitivity pattern. Organisms isolated were subjected to ceftriaxone, cefepime, amoxycillin, ciprofloxacin, ofloxacin, levofloxacin, nalidixic acid, amikacin, gentamicin and nitrofurantoin.

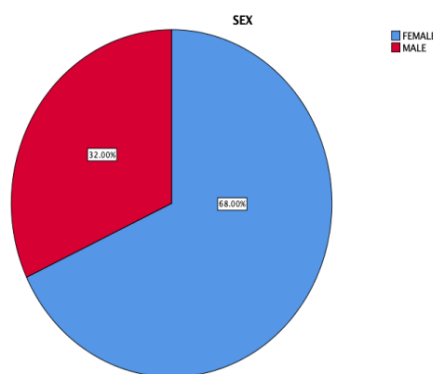
Data were entered in IBM spss-25 and analysis done. The results were presented through texts, tables and graphs. Descriptive studies were used to summarize demographic data, bacterial profile and susceptibility pattern of isolates. Written consent was taken from each and every participant and informed that all data were kept confidential.

Observations:

A total 200 samples were selected for culture and sensitivity with 32% male and 68% female. Around 50% were in age group 20-40. There was no growth in 64% sample. Of 36% positive urine culture, E. coli was detected in 91.66%, Klebsiella was detected in 6.94%, staphylococcus was detected in 1.38% sample. E. coli was 84.72% sensitive to amikacin, 86.11% sensitive to gentamicin, 68% to levofloxacin, 68% to nitrofurantoin, 47.22% to ciprofloxacin, 13.8% to ceftriaxone.

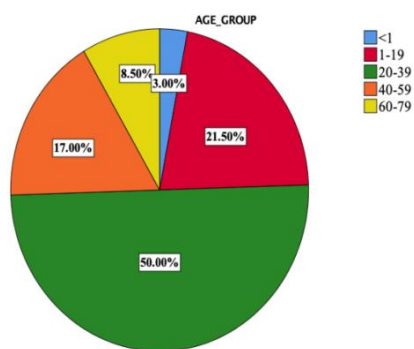


[A]

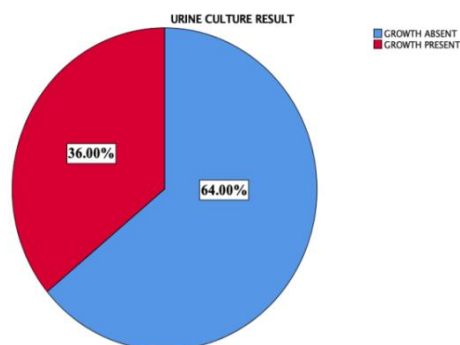


[B]

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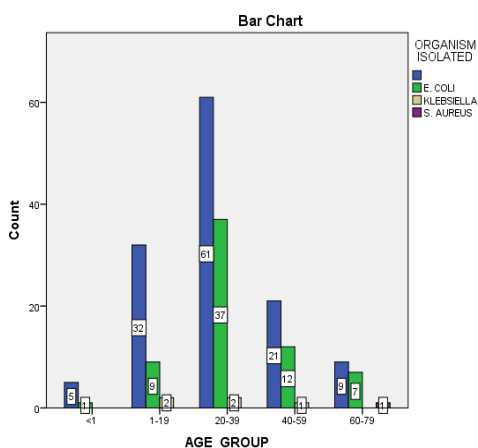


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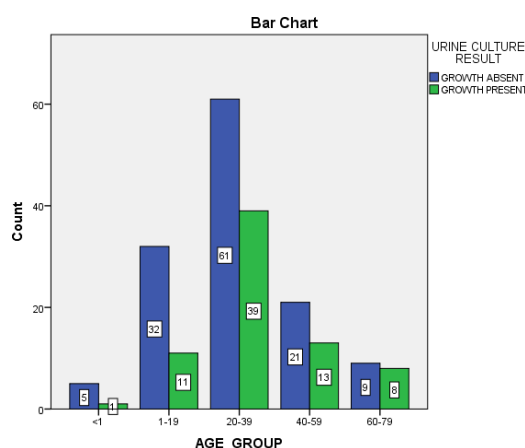


[D]

[A]. Bar diagram showing sex distribution across different age group. [B]. Total percentage of male and female
[C]. Distribution of participants across age group. [D]. Urine culture results in the form, Growth present and absent.



[E]



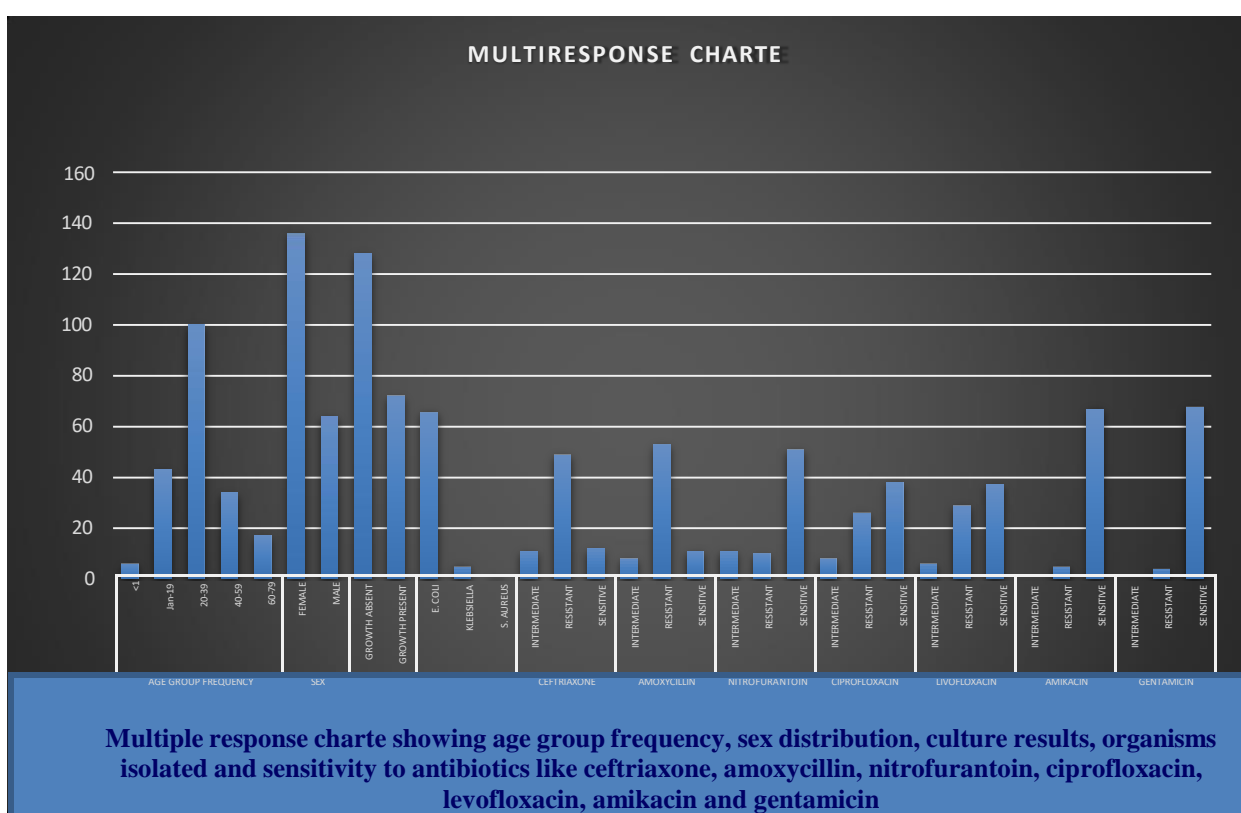
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Table: 1 showing organisms isolated in culture and sensitivity pattern of different antimicrobial agents

		ORGANISM ISOLATED			
			E. COLI	KLEBSIELLA	S. AUREUS
		Count	Count	Count	Count
CEFTRIAZONE		128	0	0	0
	INTERMEDIATE	0	10	1	0
	RESISTANT	0	46	2	1
	SENSITIVE	0	10	2	0
NITROFURANTOIN		128	0	0	0
	INTERMEDIATE	0	10	1	0
	RESISTANT	0	7	3	0
	SENSITIVE	0	49	1	1
CIPROFOXACIN		128	0	0	0
	INTERMEDIATE	0	8	0	0
	RESISTANT	0	24	2	0
	SENSITIVE	0	34	3	1
LEVOFLOXACIN		128	0	0	0
	INTERMEDIATE	0	6	0	0
	RESISTANT	0	26	3	0

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	SENSITIVE	0	34	2	1
AMIKACIN		128	0	0	0
	INTERMEDIATE	0	0	0	0
	RESISTANT	0	5	0	0
	SENSITIVE	0	61	5	1
AMOXYCILLINE		128	0	0	0
	INTERMEDIATE	0	5	3	0
	RESISTANT	0	51	1	1
	SENSITIVE	0	10	1	0
GENTAMICIN		128	0	0	0
	INTERMEDIATE	0	0	0	0
	RESISTANT	0	4	0	0
	SENSITIVE	0	62	5	1



Discussions:

UTI is a common clinical condition for every clinician in each and every centers. We discuss the relationship between age, sex, pathogen isolated, antibiotic sensitivity pattern. The culture positive cases were 72(36%) out of 200 cases which were enrolled in this study. Edirisinghe et al² and Banerjee et al⁶ in their studies showed culture positive in 31% and 24.5% cases respectively. In another study, culture positive as low as 8.7% has been reported by Mansour et al.⁹ Out of the culture positive samples, female patients were more (69.44%) than male patients (30.55%). Several other studies show similar

findings.^{6,9,10} The high incidence in female is due to anatomical region possibly due to short and wide urethra.¹⁰ Most number of positive urine cultures (54.16%) were seen in age group 20-40 years and most patients were female. This showed that UTI is common in reproductive age group which is comparable to study done by Banerjee et al⁶, obiogbolu et al¹⁰, shahina et al¹¹. The most common organism isolated in our study was E. coli (91.66%) followed by K. pneumoniae(6.99%) which is similar to a study done by Humayun et al⁴ and Mansur et al⁹ where E. coli(70% and 59%) followed by K. pneumoniae(14% and 11.6%) was isolated. There were many other studies which

showed E. coli is the most common organism for UTI^{2, 5-9}. Among antibiotics, Amikacin (84.72%), gentamicin (86.11%) and Nitrofurantoin (68%) showed highest amount of sensitivity. Ceftriaxone was resistant in 86% of cases similar to a study done in india¹². In another study done by Nalim et al, ceftriaxone sensitivity was low (10%) which is comparable to our study. Amoxycillin was resistant in 86% cases in our study as shown by other studies with amoxycillin resistant as high as 77.4% and 84%^{5,14}. Sensitivity to amikacin is 84.72% in our study which is significantly higher than findings of subedi n et al and Niranjan et al where sensitivity was 82.6%. Patients with clinical diagnosis of cystitis and uncomplicated pyelonephritis form the major bulk in our study similar to findings of study done by Bates et al¹⁵.

Conclusion:

We know that proper diagnosis with urine culture and starting appropriate antibiotics based on culture reports plays a major role in preventing an uncomplicated UTI going into a complicated one. E. coli is the most common organism isolated in urine culture in our region Janakpur. Cephalosporins are resistant in majorities of cases where as Aminoglycosides like Amikacin and gentamicin found to be sensitive in most of the cases followed by Nitrofurantoin. Antibiotics sensitivity pattern in our areas will definitely give an idea to clinician regarding empirical treatment in UTI before the availability of laboratory reports.

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