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Research Article

Bacteriological Profile of Uropathogens in Pediatric Patients at Crimson Hospital, Butwal, Province No. 5, Nepal

Ram Bahadur Khadka*, Balram Neupane, Ravin Bhandari, Dhakaraj Pant and Nabin Pahari

Department of Health Science, Crimson College of Technology (Pokhara University), Butwal, Nepal

***Address for Correspondence:** Ram Bahadur Khadka, Department of Health Science, Crimson College of Technology (Pokhara University), Butwal, Nepal, Tel: +977-985-703-0840; E-mail: rambahadurkhadka00@gmail.com

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ABSTRACT

Urinary Tract Infections (UTIs) is most necessary reason for mortality and morbidity to all age teams with around one hundred fifty million cases occurring globally each year. Aim of this study was to identify the urinary tract infection in pediatricts patients.

A retrospective study was conducted in Crimson Hospital Manigram, Butwal, total 183 sample were collected by employing a sterile urinary container, below 12 years age excluding the patients already on antibiotic medical aid. All specimens were inoculated on routine culture media & isolation was done by standard bacteriology procedures. All isolates were differentiate by performing staining techniques, biochemical test and antibiotic Susceptibility test.

Ninety three sample in mac-conkey's agar shows disaccharide ferment, motile, gram negative bacilli, inodle positive, MethylRed positive, Voges Proukaer and turn negative having some strains of beta-haemolysis on nutrient agar. The percentage of *Escherichia coli* isolated in female was 95%, positive sample were the age of below twelve years and remaining five it had been male.

In this study, female's youngsters were largely affected because the most typically isolated organism by *E.coli* followed by enterobacteria oxytoca. *E.coli* was most sensitive to Amikacin, Gentamycin and resistant preponderantly to Norfloxacin. The uropathogens to common antimicrobial agents should be taken into consideration once choosing treatment plans for UTI.

Keywords: Urinary tract infection; Escherichia; Pediatric; Susceptibility test

INTRODUCTION

Escherichia coli could be a sort of microorganism that usually lives in our bowel. It's conjointly found within the gut of some animals. Most sort of *E.coli* are harmless and even facilitate keep your channel healthy. Whereas several folks associate *E.coli* with sickness you'll be able to conjointly get respiratory illness, respiration issues, and tract infection from differing kinds of the microorganism. In fact, seventy fifth to ninety fifth of tract infections are caused by *E.coli* [1]. Tract infection is one in every of the foremost common medical specialty infections. It distresses the kid, considerations the oldsters, and will cause permanent excretory organ harm. It's the foremost necessary reason for mortality and morbidity within the world moving all age teams across the life. Worldwide, concerning one hundred fifty million folks are diagnosed with UTI annually, cost accounting the world economy in more than six billion North Americian nation bucks. UTI could be building infections per the annual report revealed by Department of Health Services (2059/60), morbidity of UTI in Asian country was 1, 25, 0584 [2,3]. Infants and toddlers cannot localize UTI symptoms, cannot submit spontaneous excrement samples, and produce other distinct characteristics compared to youngsters over twenty four months of age; thus, we'll modify this review of UTIs into a pair of age groups: youngsters but twenty four months archaic (whom we'll outline as infants and toddlers during this review) and youngsters a pair of years archaic and older [4].

UTI is characterized by the presence of more than 10^5 CFU/ml urine in the mid-stream urine sample [6]. Bacteria are common cause of UTI in children with Escherichia coli being the most commonly isolated pathogen. Susceptibility patterns of the bacteria isolates vary with geographic region and acts as a reference for guiding the empirical therapy [7]. Antibiotic are usually given empirically before the laboratory results of urine cultures are available. To ensure appropriate therapy, current knowledge of the organisms that cause UTI and their antibiotic susceptibility is mandatory [8].

Escherichia coli remained the most common causative agent of uncomplicated UTI for many years with 75-90% causes of UTI infection. *Klebsiella pneumonia* accounts second highest organisms.

The other Gram negative pathogens causing UTI are Proteus mirabilis and *Pseudomonas aeruginosa*, however, *Enterococci sp* and *Staphylococcus saprophyticus* are the most frequently encountered Gram positive bacteria in UTI [9,10]. To ensure appropriate therapy, current knowledge of the organisms that cause UTI and their antibiotic susceptibility testing in mandatory.

Due to rising antibiotic resistance among uropathogens, it's necessary to own native hospital based mostly information of the organisms inflicting UTI and their antibiotic sensitivity patterns. Hence the present study serves to know the prevalence of most common uropathogens *Escherichia coli* and their antimicrobial susceptibility pattern in pediatricts patients of Crimson Hospital.

MATERIALS AND METHODS

Study design, specimen collection and bacterial identification

This retrospective study was undertaken within the department of biological science in Crimson Hospital Butwal to isolate the UTI pathogens and verify their antibiotic status pattern. One hundred eighty three excreta samples were collected of below 12 years age teams and each genders excluding the patients already on antibiotic medical aid consulting in biological science department of Crimson Hospital every which way from the pediatricts patients sterile, wide mouthed instrumentality from the patients, the laboratory with a suspected case of UTI throughout the amount of January first to March thirteen 2017. Sample was processed consistent with the Clinical Laboratory Common Place Institute (CLSI) tips. The organism was cultivated in several culture media and confirmed by colony morphology, gram staining, hanging drop preparation and organic chemistry testing and changed Kirby Bauer's disc diffusion technique to assess the antibiotic sensitivity pattern by the Escherichia coli isolated from the clinical specimen. Sample showing over 10^5 CFU/ml of excreta were thought of as vital and isolated microorganism strains were more known microbiologically consistent with common place laboratory strategies [11].

Data were entered into Microsoft stand out and analyzed by mistreatment IBM SPSS 21.

Antimicrobial susceptibility testing

Antibiotic susceptibility testing was performed by applying Modified Kirby Bauer's disc diffusion technique as recommended by CLSI pointers [12]. The antibiotics used were Amikacin, Gentamycin, Nitorfurantoin, Ciprofloxacin, Levofloxacin, Cefpodoxime, Cefixime, Cefotaxime, Ofloxacin, Ceftriaxone (Hi-media, India). *E. coli* (ATCC 25922) was used as standard control strains.

RESULTS

Out of total 183 youngsters with suspected UTI enclosed during this study, 146 (79.78%) samples Showed microorganism growth within which total ninety three *Escherichia coli* isolated throughout culture and remaining fifty three microorganism growth showed others common uropathogens. In gift study UTI occurred a lot of in females than in males, comprising 104 (71.23%) and 42 (28.76%) severally.

The most common uropathogens was *Escherichia coli* isolates from 93 pediatrics patients with percentage of 63.69%. *E.coli* was most prevalent in pediatrics patients followed by *Klebsiella oxytoca* 17 (11.64%), *Klebsiella pneumonia* 15 (10.27%), *Morganella morganni* 8 (5.47%), *Proteus mirabilis* 5 (3.42%), *Enterobacter* species 4 (2.73%), *Staphylococcus aureus* 2 (1.36%), and *Pseudomonas aeruginosa* 2 (1.36%) (Table 1 & 2).

The antibiotic sensitivity test is also carried out by using MHA with different commonly used antibiotics and the sensitivity patterns of isolated bacteria from pediatricts patients urine sample has shown in table 3. Most common uropathogen isolated in the urine culture of pediatricts patients was *E.coli.* Second most common uropathogens was Klebsiella oxytoca followed by Klebsiella pneumonia and *Morganella morganii* (Table 4). In table 4 (a) & 4 (b) shows the isolates were more sensitive to Amikacin, followed by others antibiotics Ciprofloxacin, Gentamycin, Cephotaxime and Ceftriaxone. The most of the strains isolated in our study demonstrated resistance with Nalidixic Acid, Cefpodoxime followed by Nitrofurantoin and co-trimaxazole. In figure 1 shows the total number of positive growth and figure 2 indicate prevalence of pediatrics patients according to age groups. Similarly figure 3 shows about different types of bacteria isolated and figure 4 indicate about resistance pattern against different antibiotics for those isolated bacteria.

Table 1: Distribution of Positive/ Negative growth with total gender.

Culture Result	Numbers	Gender Distribution
Positive Culture (Bacterial Growth)	146	104 (Female) 42 (Male)
Negative Culture (Bacterial not - Growth)	37	25 (Female) 12 (Male)
Total Sample	183	Female = 129 Male = 54

Table 2: Prevalence of UTI in pediatric patients of different age & sex groups (Below 12 years).

Age (Group) D-Days, M-Months/ Y-Years	Male	Female	Total (*n* = 146)	Percentage
1M - 6M	7	2	9	6.16
7M - 1Y	7	13	20	13.69
2Y - 3Y	8	15	23	15.75
4Y- 5Y	2	12	14	9.58
6Y - 7Y	6	10	16	10.95
8Y - 9Y	3	21	24	16.43
10Y - 11Y	7	18	25	17.12
12Y	2	13	15	10.27
Total	42	104	146	100%

Table 3: Different Bacteria Isolated from UTI cases of pediatrics Patients.

Organisms	Total number of cases	Isolated Percentage
Escherichia coli	93	63.69
Klebsiella oxytoca	17	11.64
Klebsiella pneumonia	15	10.27
Morganella morganni	8	5.47
Proteus mirabilis	5	3.42
Enterobacter species	4	2.73
Staphylococcus aureus	2	1.36
Pseudomonas aeruginosa	2	1.36
Total	146	100

DISCUSSION

The study evaluated the causative agents of UTI mostly by *Escherichia coli* and their antimicrobial susceptibility patterns in urine sample of pediatricts patients from Crimson Hospital Butwal Females pediatricts patients are highly affected in compared to men.

In our study the prevalence rate of isolation of uropathogens were 146 (25.04%) out of total 183 urine sample from pediatrics patients which were enrolled in our study. G.K. Rai, et al. studies showed similar result with prevalence of 25.7%, Chhetri, et al. (21.8%), and Raza, et al. (19.70%) [13-15]. Studies showed slightly lower in comparison to our study. Result is much higher in comparison to the findings from Rodriguez, et al. [16] (9.8%), and less in comparison to the findings conducted by G.K. Rai, et al (37.4%) in Kathmandu Nepal [11].

In our present study prevalence rate in female patients occurred more than in males. Out of 146 isolated obtained 104 (71.2%) were from females while 42 (28.76%) were from males. Similar result were found in studies done by Shrestha et al showed 69.1% females compared to 30.9% male pediatricts patients with urine culture positive. The study showed that UTI is more common in females than in males due to the anatomical structure and lack of secretion produced from prostate which has bactericidal property. In this study *E.coli* (63.69%) was the commonest organism which is responsible for UTI in pediatricts patients. The second most common pathogenic microorganism was Klebsiella oxytoca (11.6%), followed by Klebsiella pneumonia (10.27%), Morganella morganii (5.47%), Proteus mirabilis (3.42%), Enterobacter species (2.73%), Staphylococcus aureus (1.36%), and Pseudomonas aeruginosa 2 (1.36%) .This finding is most similar to the other studies where *E.coli* are the most frequently isolated uropathogens causing UTI [17].

The antimicrobial sensitivity and resistance pattern may differ from community to community and hospital to hospital. Our study showed the highest percentage of sensitivity with Amikacin .Similar Sensitivity patterns done by Raza, et al. [13] showed the most sensitive antibiotic was found to be Amikacin.

In our study the most resistance drug to *E.coli* was found to be Norfloxacin followed by co-Trimaxazole. In present study the UTI caused by *E.coli* is not so effective by Co-Trimoxazole. The above mentioned result correlated with study done by Babypadhmini [18].

Indiscriminate use of antibiotic without proper antibiotic susceptibility testing and easy access of antibiotics as well as poor monitoring of antibiotic sensitivity pattern during the care and

Table 4 (a): Different Antibiotic Sensitivity Pattern of isolated bacteria to commonly used antibiotics.

Antibiotics	*E.coli*	*Klebsiella oxytoca*	*Klebsiella pneumonia*	*Morganella morganii*	*Proteus mirabilis*	*Enterobacter species*	*Staphylococcus aureus*	*Pseudomonas aeruginosa*
Amikacin	30	2	4	2	2	1	1	0
Gentamycin	16	5	2	1	1	0	0	1
Ciprofloxacin	14	2	3	2	1	2	1	0
Co-Trimoxazole	3	0	1	0	0	0	0	0
Cefpodoxime	7	0	2	1	0	0	0	0
Cephotaxime	8	3	1	1	1	1	0	1
Nitrofurantoin	5	2	0	0	0	0	0	0
Ceftriaxone	8	3	2	1	0	0	0	0
Norfloxacin	2	0	0	0	0	0	0	0

Table 4(b): Over all Antibiotic sensitivity pattern of isolated uropathogens from pediatricts patients.

Antibiotic	Sensitive
Amikacin	42
Gentamycin	26
Ciprofloxacin	25
Co-trimaxazole	4
Cefpodoxime	10
Cephotaxime	16
Nitrofurantoin	7
Ceftriaxone	14
Norfloxacin	2

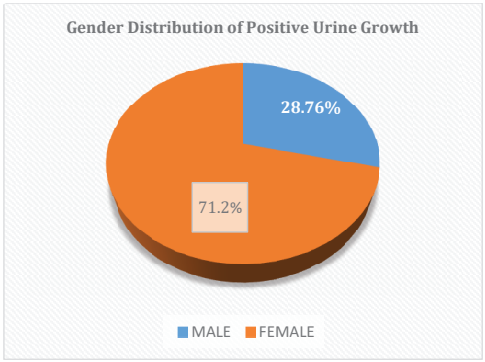


Figure 1: Distribution of Positive/ Negative growth with total gender.

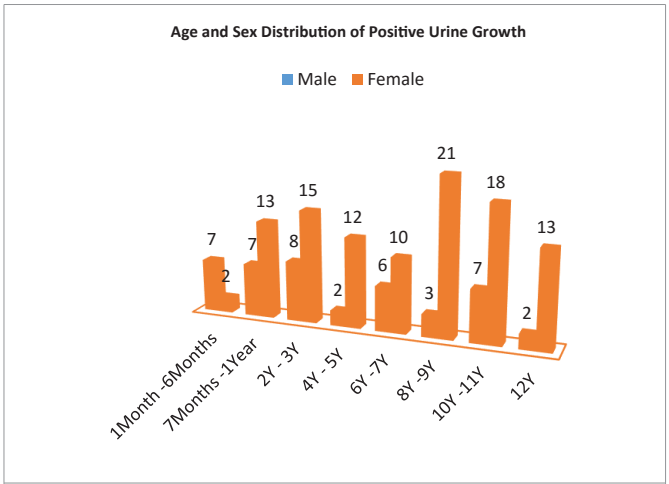


Figure 2: Prevalence of UTI in Pediatric Patients of different age & sex groups (Below 12 years).

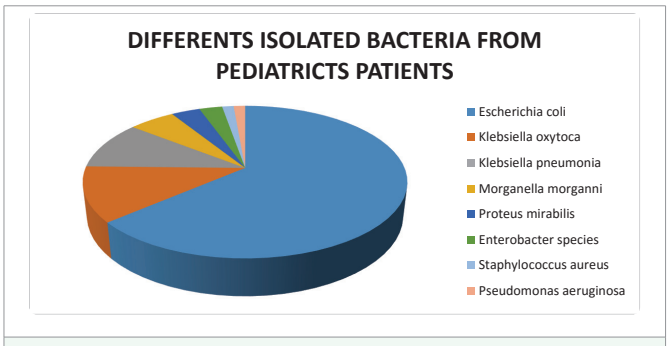


Figure 3: Different types of bacteria isolated from pediatrics patients.

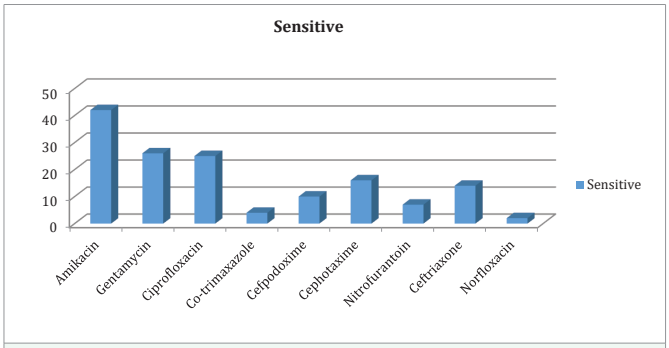


Figure 4: Antibiotic resistance pattern of isolated pathogenic microorganism.

management of UTI in clinical practice , the result is high percentage of resistance to commonly prescribed drugs [19].

An effective national and state level antibiotic policy and guidelines should be mentioned in national strict law to gain effectiveness of the antibiotics and for better treatment of pediatricts patients.

CONCLUSION

E.coli was found as a significant uropathogens wherever females are unit unremarkably affected then male causing UTI in pediatricts patients. Amikacin was found to be a most sensitive antibiotic and Norfloxacin as resistance antibiotic. UTI is most typical in medical specialty population, if not treated well it's going to cause important

morbidity and nephritic scarring, therefore all pediatricians must treat with applicable antibiotics adequately to reduce the antibiotics resistance to chop off the increasing population of pediatricts patients from multiple medication resistance in future.

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REFERENCES

1. Crain EF, Gershel JC. Urinary tract infections in febrile infants younger than 8 weeks of age. Pediatrics. 1990; 86: 363-367. **PubMed:** https://www.ncbi.nlm.nih.gov/pubmed/2388785
2. Akram M, Shahid M, Khan AU. Etiology and antibiotic resistance patterns of community-acquired urinary tract infections in JNMC Hospital Aligarh, India. Ann Clin Microbiol Antimicrob. 2007; 6: 4. **PubMed:** https://www.ncbi.nlm.nih.gov/pubmed/17378940
3. Dongol A, Joshi DM, Gautam A. Detection of Pyuria *versus* Bacteriuria in suspected patients of urinary tract infection. Nepal Journal of Science and Technology. 2014; 15: 129-132. http://bit.ly/2vqE2zO
4. Batísky D. Pediatric urinary tract infections. Pediatric Annals. 1996; 25: 266-276. http://bit.ly/2HbgXU3
5. Abera B, Kibret M. Bacteriology and antimicrobial susceptibility of otitis media at dessie regional health research laboratory, Ethiopia. Ethiopian Journal of Health Development. 2011; 25: 161-167. http://bit.ly/3bnEvTP
6. Sibi G, Devi AP, Fouzia K, Patil BR. Prevalence, microbiologic profile of urinary tract infection and its treatment with trimethoprim in diabetic patients. Research Journal of microbiology. 2011; 6: 543-551. http://bit.ly/2w93biH
7. Haque SS. Determination of the prevalence and antibiotic susceptibility pattern of the members of Enterobacteriaceae family from the urine samples of UTI suspected patients from a diagnostic center in Dhaka city (Doctoral dissertation, BRAC Univeristy).
8. Gordon KA, Jones RN, Groups SP. Susceptibility patterns of orally administered antimicrobials among urinary tract infection pathogens from hospitalized patients in North America: Comparison report to Europe and Latin America. Results from the SENTRY Antimicrobial Surveillance Program (2000). Diagn Microbiol Infect Dis. 2003; 45: 295-301. **PubMed:** https://www.ncbi.nlm.nih.gov/pubmed/12730002
9. Fothergill AW. Antifungal susceptibility testing: Clinical Laboratory and Standards Institute (CLSI) methods. In: Gerri S. Hall. Interactions of yeasts, moulds, and antifungal agents. Humana Press; 2012. p. 65-74. http://bit.ly/2uFbIJR
10. Suneetha N, Subbulu P, Rani SU, Reddy BK. Bacteriological study of urinary tract infection. International Journal of Interdisciplinary and Multidisciplinary Studies. 2015; 2: 11-16. http://bit.ly/3btsRH6
11. Rai GK, Upreti HC, Rai SK, Shah KP, Shrestha RM. Causative agents of urinary tract infections in children and their antibiotic sensitivity pattern: a hospital based study. Nepal Med Coll J. 2008; 10: 86-90. **PubMed:** https://www.ncbi.nlm.nih.gov/pubmed/18828428
12. Chhetri PK, Rai SK, Pathak UN, Thapa JB, Devkota KC, Shrestha BO, Shrestha RR. Retrospective study on urinary tract infection at Nepal Medical College Teaching Hospital, Kathmandu. Nepal Med Coll J. 2001; 3: 83-85.
13. Sayani R, Ali M, Shazlee K, Hamid RS, Hamid K. Functional evaluation of the urinary tract by duplex Doppler ultrasonography in patients with acute renal colic. Int J Nephrol Renovasc Dis. 2012; 5: 15-21. **PubMed:** https://www.ncbi.nlm.nih.gov/pubmed/22334796
14. Millan-Rodriguez F, Chechile-Toniolo G, Salvador-Bayarri J, Huguet-Perez J, Vicente-Rodriguez J. Upper urinary tract tumors after primary superficial bladder tumors: prognostic factors and risk groups. J Urol. 2000; 164: 1183-1187. **PubMed:** https://www.ncbi.nlm.nih.gov/pubmed/10992362
15. Shrestha SP, Shrestha AK, Lamsal L, Joshi M. Bacteriological profile of urinary tract infection of children at GMC Teaching Hospital. Journal of Chitwan Medical College. 2013; 3: 22-25. http://bit.ly/39nlP4E
16. Babypadmini S, Appalaraju B. Extended spectrum-lactamases in urinary isolates of *Escherichia coli* and Klebsiella pneumoniae-prevalence and susceptibility pattern in a tertiary care hospital. Indian J Med Microbiol. 2004; 22: 172-174. **PubMed:** https://www.ncbi.nlm.nih.gov/pubmed/17642726
17. Nwankwo EO, Nasiru MS. Antibiotic sensitivity pattern of *Staphylococcus aureus* from clinical isolates in a tertiary health institution in Kano, Northwestern Nigeria. Pan Afr Med J. 2011; 8: 4. **PubMed:** https://www.ncbi.nlm.nih.gov/pubmed/22121413/
18. Dehbanipour R, Rastaghi S, Sedighi M, Maleki N, Faghri J. High prevalence of multidrug-resistance uropathogenic Escherichia coli strains, Isfahan, Iran. J Nat Sci Biol Med. 2016; 7: 22. **PubMed:** https://www.ncbi.nlm.nih.gov/pubmed/27003964/
19. Fair RJ, Tor Y. Antibiotics and bacterial resistance in the 21st century. Perspect Medicin Chem. 2014; 6: 25-64. **PubMed:** https://www.ncbi.nlm.nih.gov/pubmed/25232278/