

# Assessment of Urinary Tract Infections among Children Visited in Medical Institute.

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## ABSTRACT

**Background:** Urinary tract infection is one of the frequent and serious bacterial infection amongst children. Children that are diagnosed with urinary tract infection account for about 1 million of office visits annually and 500,000 visits to emergency department. The present study was done to assess the characteristics of children with urinary tract infection and determine the most commonly isolated organism in culture. **Methods:** The present prospective study was conducted in the OPD of Department of Pediatrics, Pacific Institute of Medical sciences, Udaipur, Rajasthan, India. The socio demographic information was obtained from the guardians and filled in pre designed questionnaires. Midstream urine sample was collected in a sterile container after cleaning the urethral meatus. The criteria for culture positive was more than 105 colony forming units per ml of urine and growth of a single organism. All the data was arranged in a tabulated form and analyzed using SPSS software. **Results:** The present study enrolled a total of 150 subjects with urinary tract infections. The mean age of the subjects was 5.89 +/-2.87 years. There were 20% (n=30) subjects less than 1 year of age, 40% (n=60) subjects each were between 1-5 years and 6-14 years of age. Dysuria was seen in 14% children and pain in abdomen was observed amongst 12% children. There were 82% (n=123) subjects with culture positive for gram negative bacteria. **Conclusion:** In our study, circumcision amongst boys and undernutrition was significantly associated with UTI. The most commonly isolated microorganisms from urine culture were gram negative bacteria.

**Keywords:** Culture, circumcision, Urinary,

## INTRODUCTION

Urinary tract infection is one of the frequent and serious bacterial infection amongst children.<sup>[1-3]</sup> Studies have shown that the cumulative incidence of urinary tract infection amongst children in America ranges up to 180,000 of the annual birth cohort by 6 years of age. The incidence varies between 3-7% amongst girls and 1-2% amongst boys.<sup>[4,5]</sup> Children that are diagnosed with urinary tract infection account for about 1 million of office visits annually and 500,000 visits to emergency department. Although majority of the urinary tract infections are not complicated but few children require inpatient supervision. Hospitalization is essential in around 2-3% of cases.<sup>[6]</sup> Due to this managing inpatient urinary tract infection is contributing to major healthcare expenses. The epidemiology of urinary tract infection varies with age, gender and other

factors amongst children. The susceptibility of boys during the first year of life is more than girls and after that the incidence increases amongst girls.<sup>[7]</sup> The boys with non circumcised children have 8 times higher risk than others.<sup>[8]</sup> Up to 7 years of age, at least 5% girls and 2% boys have suffered from UTI at least once.<sup>[9]</sup> Majority of urinary tract infections occur because of bacteria whereas other causative organisms like fungi, viruses and parasites also have role to play.<sup>[10]</sup> Gram negative bacilli like E. coli, Klebsiella., Proteus., Pseudomonas ssp and Gram-positive organisms, like streptococci, Enterococcus, and Staphylococcus aureus are also commonly seen associated with UTI.<sup>[9,10]</sup> The present study was done to assess the characteristics of children with urinary tract infection and determine the most commonly isolated organism in culture.

## MATERIALS AND METHODS

The present prospective study was conducted in the OPD of Department of Pediatrics, Pacific Institute of Medical sciences, Udaipur, Rajasthan, India. The study included children with fever higher or equal to 37.5 degree centigrade, two episodes of vomiting in two days, pain during micturition, pain or tenderness

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or change in urine color. Children taking antibiotics within the last 2 weeks were excluded from the study. The study was approved by the institutional ethical board and all the subjects were informed about the study and a written consent was obtained from them in their vernacular language. The socio demographic information was obtained from the guardians and filled in pre designed questionnaires. Clinical signs and symptoms of all the subjects along with their nutritional status was also filled in the same proforma. Midstream urine sample was collected in a sterile container after cleaning the urethral meatus. The sample was sent to the department of microbiology for culturing. Blood agar and MacConkey agar was used for culturing of the specimen. The criteria for culture positive was more than 105 colony forming units per ml of urine and growth of a single organism. Colony characteristics and gram staining was used to determine the bacterial isolates. All the data was arranged in a tabulated form and analyzed using SPSS software. Percentage of the results was obtained for comparison.

## RESULTS

**Table 1: Characteristics of subjects presenting with UTI**

Variable	Frequency	Percentage	
Age(years)	<1	30	20
	1-5	60	40
	6-14	60	40
Gender	Male	57	38
	Female	93	62
Residence	Rural	67	46.7
	Urban	83	53.3
Circumcision in boys (80)	Yes	23	28.7
	No	57	71.3
History of antibiotic use	Yes	41	27.3
	No	12	8
	Unknown	97	64.7
History of UTI	Yes	10	6.7
	No	116	77.3
	Unknown	24	16
Clinical signs	Fever	109	72.7
	Vomiting	51	34
	Dysuria	21	14
	Pain	18	12
	Urinary frequency	18	12
Under nutrition	Yes	142	94.7
	No	8	5.3

**Table 2: Results of urine culture**

Bacteria isolated	Frequency	Percentage
Gram negative bacteria	123	82
E.coli	74	49.3
Klebsiella	36	24
S.aureus	13	8.7
Enterococcus	12	8
Citrobacter	8	5.3
Enterobacter and proteus	7	4

The present study enrolled a total of 150 subjects with urinary tract infections. The mean age of the subjects was 5.89 +/-2.87 years.

[Table 1] illustrates the characteristics of the subjects presenting with UTI. There were 20% (n=30) subjects less than 1 year of age, 40% (n=60) subjects each were between 1-5 years and 6-14 years of age. there were 38% males and 62% females in this study. Majority of children presenting with UTI belonged to urban area (53.3%) and rest 46.7% resided in rural areas. There were 94.7% (n=142) children who were under nourished and 5.3% (n=8) were normal. Fever was the main presenting symptom seen in 72.7% children which was followed by vomiting in 34% children. Dysuria was seen in 14% children and pain in abdomen was observed amongst 12% children. History of urinary tract infection was not seen in 77.3% children. In 16% subjects it was unknown. History of antibiotic use was not there in 64.7% children. There were 27.3% subjects with history of antibiotic use.

[Table 2] demonstrates the results of urine culture. There were 82% (n=123) subjects with culture positive for gram negative bacteria. Culture positive for E.coli was seen amongst 49.3% samples. There were 24% cases with Klebsiella positive cultures. Staphylococcus aureus positive cultures was seen in 8.7% cases. Enterococcus positive cultures was seen amongst 8% cases. There were 5.3% cases of citrobacter.

## DISCUSSION

Urinary Tract Infection is the commonest childhood infection that is associated with increased morbidity and long-lasting complications like scarring, hypertension, and renal failure.<sup>[11]</sup> To reduce the incidence of complications during adulthood, primary diagnosis, correct investigation, satisfactory therapy is required. Real management of subjects suffering from severe urinary tract infection relies commonly on the documentation of pathogenic bacteria and the selection of appropriate antibiotic against the organism. However, diagnosis of urinary tract infection is delayed due to incomprehensible clinical results, especially in infants and children less than 2 years of age.<sup>[8,12]</sup> Also, it is problematic to collect urine and infer the results to check the diagnosis in this age group.<sup>[8]</sup> Hence, empirical antibiotic therapy is often the treatment of choice without culture and sensitivity. Due to this there is an upsurge of antibiotic resistant uropathogens in pediatric practice worldwide; predominantly in developing nations where empirical antibiotics are the mainstay of management in the absence of proper diagnostic methods and the availability of over the counter antibiotics.<sup>[13,14]</sup> In our study, there were 20% (n=30) subjects less than 1 year of age, 40% (n=60) subjects each were between 1-5 years and 6-14 years of age. there were 38% males and

62% females in this study. Majority of children presenting with UTI belonged to urban area (53.3%) and rest 46.7% resided in rural areas. There were 94.7% (n=142) children who were under nourished and 5.3% (n=8) were normal. Fever was the main presenting symptom seen in 72.7% children which was followed by vomiting in 34% children. Dysuria was seen in 14% children and pain in abdomen was observed amongst 12% children. History of urinary tract infection was not seen in 77.3% children. In 16% subjects it was unknown. History of antibiotic use was not there in 64.7% children. There were 27.3% subjects with history of antibiotic use. Different studies have shown that moderate and severe degrees of undernutrition are independently related with increased risk of urinary tract infection that could be due to immunosuppression related with undernutrition.<sup>[12,15]</sup> The antibiotic vulnerability of uropathogens is mutable and is dependent on time, geographical address, demographic and clinical profile of patients.<sup>[16]</sup> In this study, there were 82% (n=123) subjects with culture positive for gram negative bacteria. Culture positive for E.coli was seen amongst 49.3% samples. There were 24% cases with Klebsiella positive cultures. Staphylococcus aureus positive cultures was seen in 8.7% cases. Enterococcus positive cultures was seen amongst 8% cases. There were 5.3% cases of citrobactor. Studies done by Rezaee MA et al and Adjei O et al showed lesser percentage of Klebsiella and S. aureus positive cultures compared to our study.<sup>[17,18]</sup> Studies showed that E.coli was more commonly associated with UTI amongst females compared to males.<sup>[19]</sup>

## CONCLUSION

Urinary tract infection accounts for major problem during childhood. A vast majority of children suffer from UTI these days. In our study, circumcision amongst boys and undernutrition was significantly associated with UTI. The most commonly isolated microorganisms from urine culture were gram negative bacteria.

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