Original Article

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# Evaluation of Urinary Tract Infections among Children in a Tertiary Care Teaching Hospital

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## Abstract

**Background:** Urinary tract infection is one of the most common bacterial infections in children (UTI). 6–8% of febrile babies, unwell children in general practise, and older children with urinary symptoms will get a UTI. **Subjects and Methods:** A total of 124 patients with urinary tract infections were included in this study. Children with a fever of 37.5 degrees Celsius or higher, two episodes of vomiting in two days, pain during micturition, pain or tenderness, or a change in urine colour were included in the study. Children who had taken antibiotics in the previous two weeks were not included in the study. **Results:** The results of the urine culture were 102 (82.3%) instances with gramme negative bacteria culture positive. E.coli positive cultures were found in 60 (48.4%) of the samples. Klebsiella positive cultures were found in 32 instances (25.8%). Positive cultures for Staphylococcus aureus were found in 11 (8.9%) of the patients. Enterococcus positive cultures were found in 10 (8.01%) of the patients. There were 07 cases of citrobactor (5.6%). **Conclusion:** Urinary tract infection is a common concern among children. Nowadays, UTI affects the great majority of children. Circumcision of males and undernutrition were found to be substantially linked to UTI in our study. Gram negative bacteria were the most typically isolated microbes from urine culture.

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

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## Introduction

One of the most prevalent bacterial diseases in children is urinary tract infection (UTI). A UTI will affect 6–8% of feverish newborns, sick children in general practise, and older children with urinary symptoms.[1,2] According to studies, by the age of six, the cumulative incidence of urinary tract infection among children in America can reach 180,000 of the annual birth cohort. Girls are affected 3-7 percent of the time, whereas boys are affected 1-2 percent of the time.[3,4] Children with urinary tract infections account for around 1 million clinic visits and 500,000 emergency room visits each year. Although the majority of urinary tract infections are not serious, only a small percentage of children require inpatient care. In about 2–3% of instances, hospitalisation is required.[5] Managing inpatient urinary tract infections as a result of this contributes to significant healthcare costs. In children, the epidemiology of urinary tract infection differs depending on their age, gender, and other factors. Boys are more susceptible than girls during the first year of life, and then the incidence increases among girls.[6] Boys who have non-circumcised offspring are at an 8-fold higher risk than other boys.[7] Up to the age of seven, at least 5% of girls and 2% of boys have had a UTI at least once.[8] The majority of urinary tract infections are caused by bacteria, although other species such as fungi, viruses, and parasites also play a role. Gram-negative bacteria such as E. coli, Klebsiella, Proteus, and Pseudomonas spp., as well as Gram-positive bacteria such as streptococci, Enterococcus, and Staphylococcus aureus, are typically found in UTIs.[9] The purpose of this study was to establish the most commonly isolated organism in culture and to examine the features of children with urinary tract infection.

## Subjects and Methods

Between October, 2018 and December, 2019, the current prospective study was conducted in the OPD of the Department of Pediatrics, World College of Medical Sciences

Research and Hospital, Jhajjar, Haryana, India, in conjunction with the Department of Microbiology. Children with a fever of 37.5 degrees Celsius or higher, two episodes of vomiting in two days, pain during micturition, pain or tenderness, or a change in urine colour were included in the study. Children who had taken antibiotics in the previous two weeks were not included in the study. The study was authorised by the institutional ethical board, and all of the participants were informed about it and given written consent in their native language. The guardians provided socio demographic data, which was entered into pre-designed questionnaires. All of the individuals' clinical indications and symptoms, as well as their nutritional status, were recorded on the same proforma. After cleansing the urethral meatus, a midstream urine sample was collected in a sterile container. The sample was delivered to the microbiology section for culture. The specimen was cultured on blood agar and Mac-Conkey agar. More than 105 colony forming units per ml of urine were required for culture positive status, as well as the growth of a single organism. The bacterial isolates were identified using colony features and gramme staining. All of the data was tabulated and analysed using the SPSS-16 software. For comparison, a percentage of the results was obtained.

## Results

A total of 124 patients with urinary tract infections were included in this study. The individuals were 6.04 ±1.9 years old on average. The characteristics of the participants with UTI are shown in [Table 1]. There were 25 (20.2%) infants under the age of one year, 49 (39.5%) patients aged one to four years, 28 (22.6%) patients aged five to eight years, and 22 (17.7%) kids aged nine to twelve years. This survey included 37.1 percent males and 62.9 percent females. The majority of children with UTI lived in urban areas (53.2%), whereas the remaining 46.8% lived in rural areas. There were 116 children who were malnourished (93.5%) and 08 children who were healthy (6.5%). Fever was the most common presenting symptom in 72.6 percent of the children, followed by vomiting in 33.9 percent. Dysuria was seen in 13.7 percent of the children, and abdominal pain was seen in 12.9 percent of the children. In 77.4 percent of the youngsters, there was no history of urinary tract infection. It was unfamiliar to 169 percent of the participants. 64.5 percent of the children had no history of antibiotic use. Antibiotic usage was reported by 40.9 percent of the participants.

The results of the urine culture are shown in [Table 2]. There were 102 (82.3%) instances with gramme negative bacteria culture positive. E.coli positive cultures were found in 60 (48.4%) of the samples. Klebsiella positive cultures were found in 32 instances (25.8%). Positive cultures for Staphylococcus aureus were found in 11 (8.9%) of the patients. Enterococcus positive cultures were found in 10 (8.01%) of the

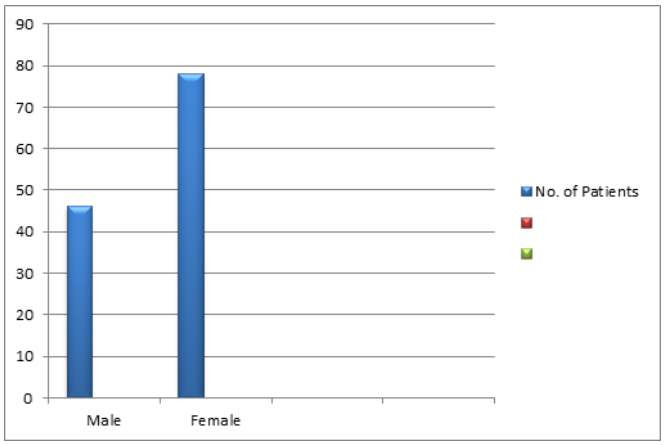


**Figure 1: Shows the distribution of gender.**

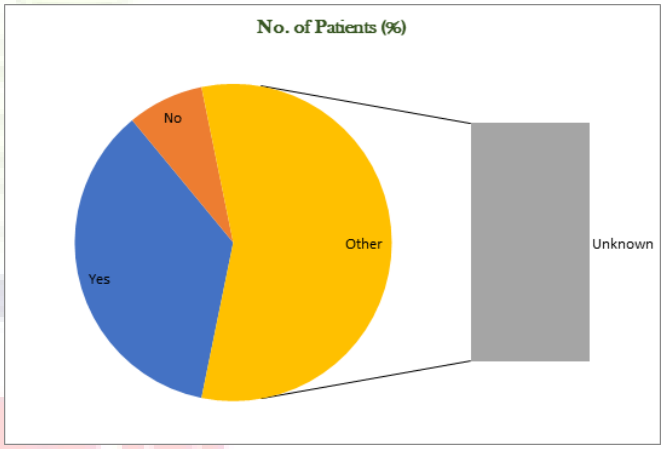


**Figure 2: Shows the h istory of antibiotic use subjects.**

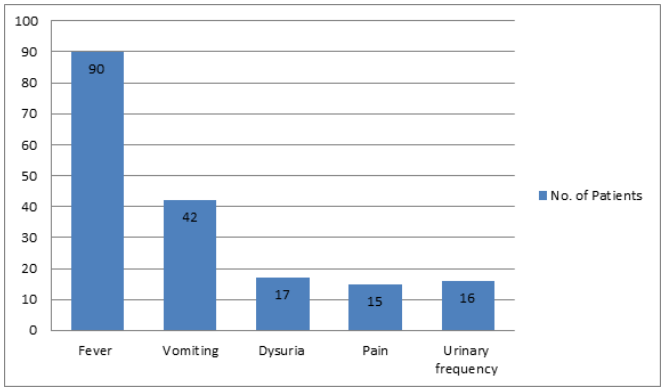


**Figure 3: Shows the distribution of subjects a/c to clinical signs.**

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

| Parameters | | No. of Patients (%) (n=124) |
|---|---|---|
| Gender | Male | 46 (37.1%) |
| | Female | 78 (62.9%) |
| Residence | Urban | 66 (53.2%) |
| | Rural | 58 (46.8%) |
| Age(years) | <1 | 25 (20.2%) |
| | 1-4 | 49 (39.5%) |
| | 5-8 | 28 (22.6%) |
| | 9-12 | 22 (17.7%) |
| Circumcision in | Yes | 13 (34.2%) |
| | No | 25 (65.8%) |
| History of | Yes | 33 (40.9%) |
| | No | 11 (8.9%) |
| | Unknown | 80 (64.5%) |
| History of UTI | Yes | 07 (5.6%) |
| | No | 96 (77.4%) |
| | Unknown | 21 (16.9%) |
| Clinical signs | Vomiting | 42 (33.9%) |
| | Fever | 90 (72.6%) |
| | Dysuria | 17 (13.7%) |
| | Pain | 15 (12.1%) |
| | Urinary frequency | 16 (12.9%) |
| Under nutrition | Yes | 116 (93.5%) |
| | No | 08 (6.5%) |

patients. There were 07 cases of citrobactor (5.6%).

**Table 2: Results of urine culture.**

| Bacteria isolated | No. of Patients (%) |
|---|---|
| Gram negative bacteria | 102 (82.3%) |
| E.coli | 60 (48.4%) |
| Klebsiella | 32 (25.8%) |
| S.aureus | 11 (8.9%) |
| Enterococcus | 10 (8.01%) |
| Citrobacter | 07 (5.6%) |
| Enterobacter and proteus | 05 (4.1%) |

## Discussion

The most frequent childhood infection is urinary tract infection, which is linked to higher morbidity and long-term consequences such as scarring, hypertension, and renal failure.[10] Primary diagnosis, proper investigation, and satisfactory therapy are necessary to limit the prevalence of problems during adulthood. The documenting of pathogenic bacteria and the selection of an effective antibiotic against the organism are routinely used in the real-world therapy of patients with severe urinary tract infections. However, due to unintelligible clinical outcomes, the diagnosis of urinary tract infection is delayed, especially in infants and children under the age of two.[7,11] In this age group, collecting urine and inferring the results to check the diagnosis is also difficult.[7] As a result, without culture and sensitivity, empirical antibiotic therapy is frequently the treatment of choice. As a result, antibiotic-resistant uropathogens are becoming more common in paediatric practise around the world, particularly in developing countries where empirical antibiotics are the mainstay of management due to a lack of proper diagnostic methods and the availability of over-the-counter antibiotics.[12,13] There were 25 (20.2 percent) patients under the age of one year, 49 (39.5 percent) patients aged 1-4 years, 28 (22.6 percent) patients aged 5-8 years, and 22 (17.7%) patients aged 9-12 years in our study. This survey included 37.1 percent males and 62.9 percent females. The majority of children with UTI lived in urban areas (53.2%), whereas the remaining 46.8% lived in rural areas. There were 116 children who were malnourished (93.5%) and 08 children who were healthy (6.5%). Fever was the most common presenting symptom in 72.6 percent of the children, followed by vomiting in 33.9 percent. Dysuria was seen in 13.7 percent of the children, and abdominal pain was seen in 12.9 percent of the children. In 77.4 percent of the youngsters, there was no history of urinary tract infection. It was unfamiliar to 169 percent of the participants. 64.5 percent of the children had no history of antibiotic use. Antibiotic usage was reported by 40.9 percent of the participants. Several studies have found that moderate and severe undernutrition are independently linked to an increased risk of urinary tract infection, which could be attributable to undernutrition-

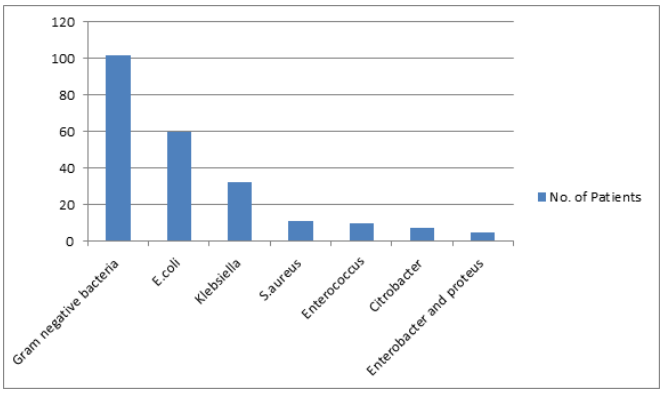


**Figure 4: Shows the results of urine culture.**

related immunosuppression.[11,14] Antibiotic susceptibility of uropathogens varies with time, geographic location, demographics, and clinical profile of patients.[15] In this investigation, gramme negative bacteria were found in 82 percent (n=123) of the participants. E.coli positive cultures were found in 49.3% of the samples. There were 102 (82.3%) instances with gramme negative bacteria culture positive. E.coli positive cultures were found in 60 (48.4%) of the samples. Klebsiella positive cultures were found in 32 instances (25.8%). Positive cultures for Staphylococcus aureus were found in 11 (8.9%) of the patients. Enterococcus positive cultures were found in 10 (8.01%) of the patients. There were 07 cases of citrobactor (5.6%). In comparison to our investigation, Rezaee MA et al and Adjei O et al found a lower percentage of Klebsiella and S. aureus positive cultures.[16,17] E.coli was found to be more usually related with UTI in females than in males in studies.[18]

## Conclusion

In Summary, Urinary tract infection is a common concern among children. Nowadays, UTI affects the great majority of children. Circumcision of males and undernutrition were found to be substantially linked to UTI in our study. Gram negative bacteria were the most typically isolated microbes from urine culture.

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