

# Demographic and Clinical Characteristics of UTI with its Prevalence in Febrile Children Less Than 5 Years of Age in Tertiary Care Centre of Moradabad, Uttar Pradesh

Sunil Kumar

Assistant Professor, Department of Paediatrics,  
Teerthanker Mahaveer Medical College & Research Centre, Moradabad, UP, India.

## ABSTRACT

**Introduction:** UTI is infrequently associated with mortality, it is still a significant cause of morbidity. Early diagnosis is critical to preserve renal function of growing kidney. The aim of the Present study was to determine the Demographic and clinical characteristics of UTI with its prevalence in febrile children less than 5 years of age in tertiary care centre.

**Materials and Methods:** The UTI investigation protocol recommended ultrasound, voiding cystourethrography (VCUG), and DMSA scan. Clinical and laboratory parameters at the index infection, including highest measured temperature, highest C-reactive protein (CRP), bacterial findings, and the number of febrile recurrences, were recorded. The diagnosis of UTI required bacteriuria of a single species of at least 100,000 colony-forming units (CFU)/ml in twomidstream or bag samples, 10,000 CFU/ ml or more in one catheter sample or any bacterial growth in urine obtained by suprapubic aspiration.

**Results:** Fever was the most common symptom accounting for 90.8% of patients with nausea and vomiting (32.7%), Headache (29.6%), dysuria (38.8%), abdominal pain (46.9%) and anorexia (32.7%), Myalgia (7.1%).

**Conclusion:** UTI is a common childhood illness at Moradabad. Males were almost twice more common than in females with fever being the most common presenting symptom followed by lower urinary symptom.


**Keywords:** Urinary Tract Infection, Ultrasound, Voiding Cystourethrography (VCUG).

## \*Correspondence to:

**Dr. Sunil Kumar,**  
Assistant Professor,  
Department of Paediatrics,  
TMMC & RC, TMU,  
Moradabad, UP, India.

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## INTRODUCTION

Reported rates of urinary tract infection (UTI) in children consulting for any acute condition varies widely from 2% -20% depending on setting and inclusion criteria.<sup>1,2</sup> UTI implies presence of actively multiplying organisms in the urinary tract.<sup>3</sup>

UTI occurs in 3-5% of girls and 1% of boys during childhood, while it is more common in boys during the first year of life.<sup>4</sup> The male to female ratio varies with age, observed as 2.8-5.4:1.0 in the first year of life and changing to 1:10 in the second year of life.<sup>4</sup> The patient with UTI in early infancy presents with abnormal crying, malodorous urine, vomiting, diarrhea and jaundice.<sup>5</sup>

Seventy to ninety percent of female children are suffering with UTI, the causative organism is usually *Escherichia coli* (*E. coli*) followed by *Klebsiella* and *Proteus* while in males older than one year *Proteus* is as common as *E. coli* as a bacterial cause of UTI. Early diagnosis is critical to preserve renal function of the growing kidney.<sup>4</sup> Antibiotic therapy is the main stay of treatment.<sup>6</sup>

Antibiotics can prevent complications of infections such as pyelonephritis and renal scarring in susceptible children. Although

long term antibiotic prophylaxis reduces symptomatic UTIs, benefits should be considered against the risk of microbial resistance.<sup>7</sup> Many attempts have been made for a replacement method to prevent recurrent UTI (RUTI), but no approved medications have yet been suggested. Clinical searches suggest alternatives including the consumption of cranberry, mannose, and probiotics.<sup>8-10</sup> Bacteria in the stool are causative agents for almost all cases of ascending UTIs, so it is logical to assume that diet may affect the risk of UTI recurrences.<sup>8,9</sup>

Fever remain a more common presentation in neonates, infants and younger children, whereas older children present with classic signs of UTI.<sup>11</sup> Renal scarring has been cited as one of the most common causes of end stage renal disease in both adults and children.<sup>12</sup>

The aim of the Present study was to determine the Demographic and clinical characteristics of UTI with its prevalence in febrile children less than 5 years of age in tertiary care centre of Moradabad, Uttar Pradesh.

## MATERIALS AND METHODS

This was a prospective hospital-based study conducted in collaboration with microbiology department in Teerthanker Mahaveer Hospital, TMU University, Moradabad, Uttar Pradesh. Total 98 patients were included in this study. Patients from 2 months to 5 years were admitted to the pediatric ward and visited in outpatient department (OPD) with diagnosis of UTI based on history with routine and microscopic examination of urine were considered for this study.

Written informed consent was obtained from the parents of the participants, and oral consent was required from each child. All procedures followed were approved in accordance with the guidelines of the ethical committees of the Teerthanker Mahaveer Medical College, hospital and research Centre.

In patients with negative results on dipstick, microscopic, or automated urinalysis, urine culture is unnecessary if there is an alternative cause of the fever or inflammatory signs. However, if the dipstick and/or urinalysis are positive, confirmation of UTI by urine culture is mandatory. The UTI investigation protocol recommended ultrasound, voiding cystourethrography (VCUG), and DMSA scan. Clinical and laboratory parameters at the index infection, including highest measured temperature, highest C-reactive protein (CRP), bacterial findings, and the number of febrile recurrences, were recorded. The diagnosis of UTI required bacteriuria of a single species of at least 100,000 colony-forming units (CFU)/ml in two midstream or bag samples, 10,000 CFU/ml or more in one catheter sample or any bacterial growth in urine obtained by suprapubic aspiration. Febrile recurrence was defined as UTI with temperature of 38.5 °C or more. Data were collected using a questionnaire regarding demographic and clinical data. A clean catch mid-stream specimen in wide mouthed container to hold around 20 ml specimens was collected. In routine and microscopic examination of urine report if white blood cell count were more than 5 per high power field then it is considered as significant pyuria and culture will be send. Clinical signs and symptoms of a UTI depend on the age of the child. Newborns with UTI may present with jaundice, sepsis, failure to thrive, vomiting, or fever. In infants and young children, typical signs and symptoms include fever, strong-smelling urine, hematuria, abdominal or flank pain, and new-onset urinary incontinence. School-aged children may have symptoms similar to adults, including dysuria, frequency, or urgency.

Treatment with appropriate drug, response to the drug and complication were also recorded. Data analysis was done with SPSS version 21.0 program. Data were presented as mean±SD (standard deviation) Categorical data were analyzed by using Chi-square test. Continuous data were analyzed by using independent sample T test. The p value was considered significant if it is less than 0.05.

## RESULTS

The present study included total 98 patients in which 52 were male and 46 were females. (Table 1)

Fever was the most common symptom accounting for 90.8% of patients with nausea and vomiting (32.7%), Headache (29.6%), dysuria (38.8%), abdominal pain (46.9%) and anorexia (32.7%), Myalgia (7.1%) (Table 2).

*E. coli* (84%) was the most common organism found followed by *Klebsiella pneumonia* (16%), *Proteus mirabilis* (7%) and 2% were

other pathogens like *Enterococcus species* (Table 3). In USG findings only 27% had abnormal finding like hydronephrosis, calculi, intra renal pelvis, enlarged and inflamed kidney, thicken bladder wall and multiple internal echoes. All isolated *E. coli* was sensitive to Imipenem, Nalidixic acid, Netilmicin and Vancomycin. *E.coli* were 80-90% sensitive to Amikacin, Ceftriaxone, Cefuroxime, Ofloxacin, Gentamicin and Nitrofurantoin. Only 12.4% of *E. coli* was sensitive to Ampicillin. Though Co-trimoxazole was drug of choice for UTI, only 52.3% of *E. coli* cases were sensitive to it. *Klebsiella* and *Proteus* were 100% sensitive to Amikacin and Imipenem. *Proteus* was even more sensitive to the Cephalosporin group of drugs in comparison to *Klebsiella*, while *Klebsiella* is more sensitive to the Penicillin group of drug (p=0.05).

**Table 1: Gender Distribution of UTI.**

Sex	Number (%)
Male	52(53.06%)
Female	46 (46.9%)
Total	98(100%)

**Table 2: Clinical Manifestation**

Symptoms	Total	Percentage
Fever	89	90.8
Headache	29	29.6
Nausea/vomiting	32	32.7
Abdominal Pain	46	46.9
Dysuria	38	38.8
Dribbling	8	8.2
Anorexia	32	32.7
Myalgia	7	7.1

**Table 3: Bacteria isolates in UTI**

Bacteria isolates	%
<i>E. coli</i>	84%
<i>Klebsiella</i>	16%
<i>Proteus</i>	7%
Others	2%

## DISCUSSION

There was no consistent symptom common to all patients with UTI other than fever. In the present study, among all these children. UTI is recognized increasingly as a common cause of fever in young children.<sup>13-15</sup>

The most common antibiotics used for the subjects in this study were Co-trimoxazole, Amoxicillin and Norfloxacin. Among all antibiotics used for UTI, Amoxicillin yielded the fastest response time to the symptoms. The mean response time of the drugs prescribed was 2.36±1.09 days. *E. coli* (84%) was the most common organism found followed by *Klebsiella pneumonia* (16%), *Proteus mirabilis* (7%) and 2% were other pathogens like *Enterococcus species*. Antibiotic susceptibility patterns of Mymensingh Medical College shown *E.coli* was more than 80% sensitive to Amikacin, Cefotaxime and Nitrofurantoin.<sup>16</sup> A different study done at the Nepal Medical College showed that *E.coli* was more than 80% sensitive to Nitrofurantoin, Cefotaxime and Amikacin.<sup>13</sup> In the same study *E.coli* was sensitive to

Co-trimoxazole in only 34.6% of patients, which was close to our study where sensitivity was 41.9%. In our study, *E. coli* was sensitive to Ampicillin in 13.9% of cases. Among all common medications, *E. coli* was highly resistant to Ampicillin as well as Co-trimoxazole. Clinical signs and symptoms of a urinary tract infection depend on the age of the child, but all febrile children two to 24 months of age with no obvious cause of infection should be evaluated for urinary tract infection. Evaluation of older children may depend on the clinical presentation and symptoms that point toward a urinary source (e.g., leukocyte esterase or nitrite present on dipstick testing; pyuria of at least 10 white blood cells per high-power field and bacteriuria on microscopy). Other treatment options include amoxicillin/clavulanate and cephalosporins. Prophylactic antibiotics do not reduce the risk of subsequent urinary tract infections, even in children with mild to moderate vesicoureteral reflux. Constipation should be avoided to help prevent urinary tract infections. Ultrasonography, cystography, and a renal cortical scan should be considered in children with urinary tract infections.<sup>17</sup>

UTI is recognized increasingly as a common cause of fever in young children.<sup>14,18,19</sup> Dysuria and vomiting were the predominant symptoms. Urinary symptom like dysuria, and dribbling of urine were noted. Other studies also indicate high association of these symptoms and urinary tract infection.<sup>20,21</sup> Other symptoms were pain abdomen, nausea and vomiting, anorexia, back pain and myalgia. Another study done by Bayin Philippine and Sharma in Nepal also found abdomen pain in almost half of the cases.<sup>19,20</sup>

## CONCLUSION

The sensitivity to the isolated organisms to these commonly used drugs is low. Amikacin, Ceftriaxone and Norfloxacin were the antibiotics with the highest sensitivity. Though Co-trimoxazole and Amoxicillin can be used for empirical therapy in UTI, the urine of all suspected cases of UTI should be cultured and sensitivity pattern determined for appropriate treatment. *E. coli* was the most common organism cultured in the urine of these children. The drug of choice used in UTI treatment was Co-trimoxazole and Amoxicillin. UTI is a common childhood illness at Moradabad. Males were almost twice more common than in females with fever being the most common presenting symptom followed by lower urinary symptom.

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