



**To study the clinical profile of children (aged 1month-14yrs) suffering from urinary tract infection**

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**Abstract**

Urinary tract infections (UTIs) are common bacterial infections in children. The diagnosis of UTI is very often missed in young children due to minimal and nonspecific symptoms. Hospital based observational prospective study conducted at Department of Pediatrics, S.P. Medical College and P.B.M associated group of Hospital, Bikaner. Total 250 clinical cases were included. Maximum patients presented with abdominal symptoms (72%), urinary symptoms (23.2%), followed by respiratory symptoms in 18.0% cases, CNS symptoms (8.8%) and non-specific symptoms in 47.2% cases. Fever was the most common presenting complaint (148 cases) 59.2% followed by vomiting, pain abdomen, oliguria, Diarrhoea, generalized swelling, burning micturition, cough, decreased appetite, respiratory distress, excessive cry, chills and rigor, abnormal body movement, yellow colour of urine, headache while least common present history was chest pain and joint swelling where 1 case each was found. UTI is a common childhood illness. Females were more commonly affected than males. Fever being most common presenting symptom followed by vomiting and pain abdomen.

**Keywords:** Urinary tract infections (UTIs), Females, Fever

**Introduction**

Urinary tract infections (UTIs) are a common and important clinical problem in childhood and may lead to systemic illness and renal injury in the short term; with repeated infections, renal scarring, hypertension, and end-stage renal dysfunction may develop. The overall prevalence of UTI is estimated at 5% in febrile infants but varies widely by race and gender.<sup>1,2</sup>

The highest prevalence rates of childhood UTI occur in uncircumcised male infants under 3 months of age (prevalence ~20%), and among females (prevalence ~8%). Uncircumcised older male children have the lowest prevalence of UTI (~1%).<sup>3</sup>

Etiological agents of UTI are variable and usually depend on time, geographical location and age of patients. However, *Escherichia coli*, *Proteus mirabilis*, *Enterobacter agglomerans*, *Citrobacter freundii* and *Klebsiella pneumonia* account for over 70% of cases<sup>4</sup>.

**Materials And Methods**

Study design: Hospital based observational prospective study.

**Study place:** Department of Pediatrics, S.P. Medical College and P.B.M associated group of Hospital, Bikaner

**Sample size:** Total 500 clinical cases were included.

**Sampling Method:** Convenience sampling.

**Inclusion criteria:** All children in the age group of 1month to14 years admitted in hospital with a probable diagnosis of urinary tract infection that is later confirmed by a positive urine culture.

**Exclusion criteria:** Infants below 1 month old were excluded.

**Data Collection:** Patients from the age of 1month to 14 years presenting with urinary symptoms (dysuria, urgency, frequency, incontinence, hematuria and suprapubic pain) and those with fever without focus were enrolled in the study. History was noted and children clinically examined. Complicated UTI (involvement of upper urinary tract) was diagnosed if there was presence of any one or all of the following- fever >39<sup>o</sup>C, systemic toxicity, persistent vomiting, dehydration, renal angle tenderness and raised serum creatinine. Recurrent UTI was considered if there was a previous history of one or more episodes of proven UTI.

**Data Analysis**

To collect required information from eligible patients a pre-structured pre-tested Proforma was used. For data analysis statistical software SPSS was used and data were analyzed with the help of frequencies, figures, proportions, measures of central tendency, appropriate statistical test.

**Observations**

Table 1: Distribution of cases according to age and gender

| Age Group (years) | Gender |      |      |      | Total |      |
|-------------------|--------|------|------|------|-------|------|
|                   | Female |      | Male |      |       |      |
|                   | No.    | %    | No.  | %    | No.   | %    |
| <1                | 16     | 11.0 | 19   | 18.1 | 35    | 14.0 |
| 1-5               | 57     | 39.3 | 44   | 41.9 | 101   | 40.4 |
| 6-10              | 43     | 29.7 | 28   | 26.7 | 71    | 28.4 |
| >10               | 29     | 20.0 | 14   | 13.3 | 43    | 17.2 |
| Total             | 145    | 100  | 105  | 100  | 250   | 100  |

|       |     |      |     |      |     |      |
|-------|-----|------|-----|------|-----|------|
| <1    | 16  | 11.0 | 19  | 18.1 | 35  | 14.0 |
| 1-5   | 57  | 39.3 | 44  | 41.9 | 101 | 40.4 |
| 6-10  | 43  | 29.7 | 28  | 26.7 | 71  | 28.4 |
| >10   | 29  | 20.0 | 14  | 13.3 | 43  | 17.2 |
| Total | 145 | 100  | 105 | 100  | 250 | 100  |

In present study, out of total 250 cases, majority of cases were between 1 to 5 years (40.4%) followed by 6-10 years (28.4%), more than 10 years (17.2%) and less than 1 year (14%). Male predominance over female below 1 year with male to female ratio 1:1.8, while above 1year females were affected more.

Table 2: Distribution of cases according to socioeconomic status

| Socioeconomic Status | No. of Cases | %    |
|----------------------|--------------|------|
| Lower                | 11           | 4.4  |
| Lower Middle         | 57           | 22.8 |
| Middle               | 74           | 29.6 |
| Upper Middle         | 65           | 26.0 |
| Upper                | 43           | 17.2 |
| Total                | 250          | 100  |

Out of total 250 cases, majority of patients i.e. 74(29.6%) were from middle socioeconomic status followed by 65(26%) belonged to upper middle socioeconomic status, 22.8% cases belonged to lower middle socioeconomic status, 17.2% cases belonged to upper socioeconomic status while 11(4.4%) were from lower socioeconomic status.

Table 3: Distribution of cases according to BMI

| BMI                 | No. of Cases | %    |
|---------------------|--------------|------|
| <-2SD (underweight) | 43           | 17.2 |
| Normal              | 203          | 81.2 |
| >2SD (overweight)   | 4            | 1.6  |
| Total               | 250          | 100  |

According to BMI, 203(81.2%) cases had their BMI within normal range while 43(17.2%) and 4(1.6%) cases had their BMI less than -2SD and >2SD respectively.

Table 3: Clinical distribution of cases according to present history

| Present History        | No. of Cases | %    |
|------------------------|--------------|------|
| Fever                  | 148          | 59.2 |
| Abdominal Symptoms     |              |      |
| Vomiting               | 80           | 32.0 |
| Pain abdomen           | 60           | 24.0 |
| Diarrhoea              | 37           | 14.8 |
| Constipation           | 3            | 1.2  |
| Urinary Symptoms       |              |      |
| Oliguria               | 55           | 22.0 |
| Burning Micturition    | 28           | 11.2 |
| Yellow Colour of Urine | 11           | 4.4  |
| Frequent Urination     | 7            | 2.8  |
| Haematuria             | 7            | 2.8  |
| Respiratory Symptoms   |              |      |
| Cough                  | 26           | 10.4 |
| Respiratory Distress   | 19           | 7.6  |
| CNS Symptoms           |              |      |
| Abnormal Body Movement | 12           | 4.8  |
| Altered Sensorium      | 5            | 2.0  |
| Vertigo                | 5            | 2.0  |
| Non-Specific           |              |      |
| Generalized Swelling   | 36           | 14.4 |
| Decreased Appetite     | 20           | 8.0  |
| Excessive Cry          | 18           | 7.2  |
| Chills & Rigor         | 15           | 6.0  |
| Headache               | 10           | 4.0  |
| Groin Pain             | 6            | 2.4  |
| Nausea                 | 3            | 1.2  |
| Not Gaining Weight     | 3            | 1.2  |

|                |   |     |
|----------------|---|-----|
| Skin Lesion    | 3 | 1.2 |
| Leg Pain       | 2 | 0.8 |
| Chest Pain     | 1 | 0.4 |
| Joint Swelling | 1 | 0.4 |

According to presenting history, maximum patients presented with abdominal symptoms (72%), urinary symptoms (23.2%), followed by respiratory symptoms in 18.0% cases, CNS symptoms (8.8%) and non-specific symptoms in 47.2% cases. Fever was the most common presenting complaint (148 cases) 59.2% followed by vomiting, pain abdomen, oliguria, Diarrhoea, generalized swelling, burning micturition, cough, decreased appetite, respiratory distress, excessive cry, chills and rigor, abnormal body movement, yellow colour of urine, headache while least common present history was chest pain and joint swelling where 1 case each was found.

Table 4: Distribution of cases according to type of UTI

| Age Group (years) | Simple |        | Recurrent |        | Complicated |        |
|-------------------|--------|--------|-----------|--------|-------------|--------|
|                   | Male   | Female | Male      | Female | Male        | Female |
| <1                | 14     | 14     | 1         | 0      | 4           | 2      |
| 1-5               | 37     | 47     | 3         | 4      | 4           | 6      |
| 6-10              | 23     | 38     | 3         | 2      | 2           | 3      |
| >10               | 9      | 24     | 2         | 3      | 3           | 2      |
| Total             | 83     | 123    | 9         | 9      | 13          | 13     |

According to type of UTI, Simple UTI was found in 206(82.4%) cases, 26(10.4%) cases had complicated UTI while recurrent UTI was found in 18(7.2%) of cases. In age group 1 to 5 year recurrent and complicated UTI was more common.

Table 5: Stratified distribution of cases according to complicated UTI

| Stratified Findings | No. of Cases | Percentage |
|---------------------|--------------|------------|
| Hydronephrosis      | 4            | 15.4       |
| Renal Calculi       | 6            | 23.1       |
| PUV                 | 4            | 15.4       |

|                     |    |      |
|---------------------|----|------|
| CKD                 | 3  | 11.5 |
| Cystitis            | 3  | 11.5 |
| Left Ectopic Kidney | 1  | 3.8  |
| Pyelonephritis      | 5  | 19.3 |
| Total               | 26 | 100  |

According to above table, complicated UTI seen in 26 cases, out of which hydronephrosis in 4(15.4%), renal calculi in 6(23.1), PUV in 4(15.4%), CKD and cystitis in 3(11.5%) cases each while pyelonephritis in 5(19.3%) cases and left ectopic kidney in 1(3.8%) case was seen.

### Discussion

In present study, out of total 250 cases, majority of cases were between 1 to 5years (40.4%) followed by 6-10 years (28.4%), more than 10 years (17.2%) and less than 1 year (14%). Male predominance over female below 1 year with male to female ratio 1:1.8, while above 1year females were affected more.

UTI was more common in children of 1-5 age groups. Ineffective toilet training and the resultant ascending infection from urethra may be predisposing children of this age group for UTI. In consensus statement of Indian Pediatric Nephrology Group, it has been mentioned that during the first year of life, male to female ratio is 3-5: 1, beyond 1-2years, there is female preponderance with male to female ratio of 1: 10.

Taneja et al<sup>5</sup> also found maximum number 38.7% cases between 1-5 year, 35.7% of cases were between 5-12 year. They also found male predominance in infancy, which correlate with our study. Sharma et al<sup>6</sup> in his study found 50.0% of cases in age group of 1 to 5 years followed by 27.5% of cases between 6 to 10 year. In the study by Krishnan et al<sup>7</sup>UTI was more common in children of 1-5 age groups (35.5%), which was in concordance with our study, they also found male predominance below 1 year.

In our study, Female (58%) predominance over males with female to male ratio1.38:1. Female are more likely than male to get UTI because urethra is shorter in female so bacteria can reach the bladder more easily. Due to longer course of urethra and the bacteriostatic action by prostatic secretions in them, the incidence of UTI is low in male.

Badhan et al<sup>7</sup> observed that majority of pathogens were isolated from female (54.2%) patients. Al-Mardeni et al<sup>8</sup> observed that out 529 culture positive culture 432 (81.7%) were female.

However unlike to our study, Kalantar et al<sup>9</sup> in his prospective study of 1696 children aged up to 5 years reported male to female ratio of 1.07:1.

In our study maximum number of cases belonged to middle class (29.6%) followed by 26% belonged to upper middle class and 22.8% belonged to lower class according to modified B.G. Prasad scale.

In a study by Rao et al<sup>10</sup> most of the cases were from lower classes with 76.6% and 23.3% incidence in middle class, which is not in concordance with our study.

In our study according to BMI, 203 cases had their BMI within normal range while 43(17.2%) and 4(1.6%) cases had their BMI less than -2SD and >2SD respectively. Our finding did not show any association between BMI and UTI. In favour of our finding, Hammar el al<sup>11</sup> did not found any association with BMI and increased risk of UTI.A study by Geerlings et al<sup>12</sup> did not describe any relationship between obesity and symptomatic UTI. The positive association between high BMI and UTI reported in some previous studies. Study by Semins et al<sup>13</sup> indicated that obesity was a risk factor for UTI.

A study by Ko et al<sup>14</sup> shows association between obesity and UTI only in the 0-5 months old group not in the 6-24 months old group. Bagga et al<sup>15</sup> in his study found significant bacteriuria in (15.2%) malnourished patients.

According to Svanborg et al<sup>16</sup> lower secretory levels of IgA at the mucosal surface or a subclinical vitamin A deficiency present in malnourished children may have predisposed them to urinary tract infection.

In our study fever was the most common presenting complaint in 148(59.2%) cases. Among abdominal symptoms, vomiting was present in 80(32.0%) cases, pain abdomen in 60(24.0%) cases, diarrhoea in 37(14.8%) cases and constipation in 3(1.2%) cases. In urinary symptoms, oliguria in 55(22.0%) cases, burning micturition in 28(11.2%) cases, yellow colour of urine and haematuria in 7(2.8%) cases each. Among respiratory symptoms, cough was present in 26(10.4%) cases and respiratory distress in 19(7.6%) cases. In CNS symptoms abnormal body movement in 12(4.8%) cases, altered sensorium and vertigo in 5(2.0%) cases each, non-specific symptoms were present in 47.2% cases.

In a study by Badhan et al<sup>8</sup>, presenting symptoms were urinary symptoms alone in 29.2%, fever without urinary symptoms in 23.1%, fever with urinary symptoms 18.7%, pain abdomen in 23.3%.

In studies conducted by other authors Sharma et al<sup>6</sup> (65.0%), Krishnan et al<sup>7</sup> shows fever was seen in majority of patients.

In the present study vomiting was present in 80 (32%) cases. Manohar et al<sup>17</sup> found vomiting in 38.0% of Patients which is in line with our study. Rehman et al<sup>18</sup> found vomiting in 28% of cases, Krishnan et al<sup>7</sup> (27.8%), Sharma et al<sup>6</sup> found vomiting in 20.74 % cases.

Above studies shows similar results to our study.

In our study pain abdomen was present in 60 (24%) cases. In a study by Rehman et al<sup>18</sup> abdominal pain was found in 22% of cases. Similar clinical presentation seen in Rao et al<sup>10</sup> (20.0%), Ramgopal et al<sup>19</sup> (17.8%).

Unlike to our study Sharma et al<sup>20</sup> pain abdomen was present in 57.1% cases, Singh et al<sup>67</sup> found similar complaint in 51.9% cases.

In present study oliguria was present in 55(22%) cases. In a study by Malla et al<sup>21</sup> oliguria was found in 7.1% cases and 12.5% cases in study by Vaidya et al<sup>22</sup>.

In our study, simple UTI was found in 206(82.4%) cases, 26(10.4%) cases had complicated UTI while recurrent UTI was found in 18(7.2%) of cases. In age group 1 to 5 year recurrent and complicated UTI was more common.

In a study by Rehman et al<sup>18</sup> recurrent UTI was seen in 30.0% cases, which not correlate with our study.

Complicated UTI seen in 26 cases, out of which hydronephrosis in 4(15.4%), renal calculi in 6(23.1), PUV in 4(15.4%), CKD and cystitis in 3(11.5%) cases each while pyelonephritis in 5(19.3%) cases and left ectopic kidney in 1(3.8%) case was seen.

### **Conclusion**

UTI is a common childhood illness. This study shows age and gender distribution in accordance to available literature. Females were more commonly affected than males. Fever being most common presenting symptom followed by vomiting and pain abdomen. Routine USG examination should be done in all cases of UTI to rule out associated renal anomalies.

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