pISSN 2349-3283 | eISSN 2349-3291

# **Original Research Article**

DOI: http://dx.doi.org/10.18203/2349-3291.ijcp20190727

# **Incidence of urinary tract infection in febrile children**

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Received: 01 January 2019 Accepted: 31 January 2019

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### **ABSTRACT**

**Background:** Urinary tract infection is diagnosed by the growth of many organisms of a single specimen in the urine with presence of many symptoms. bacteriuria is defined as growth with a colony of >105/ml of a single species in a midstream clean catch urine sample.

**Methods:** A cross sectional study was undertaken in febrile children with urinary tract infection attending Department of Paediatrics, tertiary care hospital, Bangalore during the period January 2017 to December 2017.

**Results:** Out of the 200 children studied, 93 children belonged to the age group of 6 year to 12 year and 57 children belong to 1 year to 6-year age group and 50 children belongs to 12 year to 18-year age group. 97 children showed significant pyuria in centrifuged urine sample of which 49 were males and 48 were females. Majority 45 children were belonging to age group of 6 year to 12 year. Out of 97 children showed significant pyuria in centrifuged urine sample of which 46 children 5-10 cells/HPF and 27 children showed > 10 cells/HPF and 24 cases showed < 5cells / HPF. Out of 200 children, in 29 cases urine culture showed *E. coli* growth and 51 cases showed no growth.

**Conclusions:** Urinary tract infections are common in childhood. Nearly all UTIs are caused by bacteria that enter the opening of the urethra and move upward to the urinary bladder and sometimes the kidneys.

Keywords: Pus cells, Pyuria, urine culture, Urinary tract infection

### INTRODUCTION

Infection of the urinary tract is identified by growth of a significant number of organisms of a single species in the urine, in the presence of symptoms. Significant bacteriuria is growth with a colony count of >105/ml of a single species in a mid-stream clean catch urine sample.<sup>1</sup>

Prevalence of UTI was reported as 4.1% in 193 febrile children less than 2 years of age and in febrile girls as 7.4% by Roberts K et al, 12 (1983) whereas Bauchner et al, in 1987 stated a prevalence of only 1.7% in 664 febrile children younger than 5 years of age. In a study by Hoberman et al, (1993) the prevalence of UTI in febrile infants was reported as 5.3% and in infants less than 2

months was 4.6% and in infants with no suspected UTI with associated other illnesses the prevalence of UTI was 5.1%.

The overall prevalence rate of UTI in febrile infants was estimated by Dharnidharka et al, (1993) as 5.4%. Srivaths PR et al, (1996) reported the prevalence rate of UTI in children less than 2 years of age as 2.48%. Shaw KN et al, and Gorelick MH et al, in 1999 reported the prevalence rates of UTI in febrile infants in the emergency department as 3-5%.<sup>3,4</sup>

Prevalence of UTI in preschool children was reported as 4.4% by Fallahzadeh MH et al, (1999). The prevalence of UTI varies with age.<sup>5</sup> During the 1<sup>st</sup> year of life, the male:

female ratio is 2.8: 5.4:1. Beyond 1-2 years, there is a striking female preponderance, with a male: female ratio of 1:10. In febrile infants younger than 8 weeks of age, Lin DS et al, in 2000 reported a prevalence of UTI as 13.6% whereas in 2002 Dziewit JA et al, reported a prevalence of UTI as 64.2%. 6.7

According to Schlager TA et al, (2001) UTI accounted for 7.5% of 442 febrile episodes in infants <8 weeks of age; 5.3% of 945 episodes in those <1 year of age; 4.1% of 501 episodes in children <2 years of age; 1.7% of 664 episodes among children <5 years of age.<sup>8</sup>

The prevalence reported in girls aged 1 to 5 years is 1 to 3%, whereas few infections occur in males of that age. Nethersole PY et al, (2001) reported prevalence of 4.1% to 7.5% in febrile young children.<sup>9</sup>

According to Bachur R et al, and Harper MB et al, prevalence of UTI was 2.1% overall (2.9% for girls and 1.5% for boys respectively). Among girls, the prevalence of UTI was 5.0% in white patients, 2.1% in Hispanic patients and 1.0% in black patients. Among boys, the prevalence was 2.2% in Hispanic patients, 1.4% in white patients and 0.8% in black patients. Higher prevalence was also seen among patients with a temperature at or above 39°C compared with those whose temperature was between 38.0°C and 38.9°C. The greatest prevalence of UTI (13%) was found among white girls younger than 6 months with a temperature at or greater than 39°C. <sup>10</sup>

Urinalysis enables a provisional diagnosis of UTI; a specimen must be obtained for culture prior to therapy with antibiotics. The diagnosis of urinary tract infection is based on positive culture of appropriately collected specimen of urine. The objective of this study was conducted to find out the incidence of urinary tract infection in febrile children.

# **METHODS**

A cross sectional study was undertaken in febrile children with urinary tract infection attending Department of Pediatrics, tertiary care hospital, Bangalore during the period January 2017 to December 2017. Sample was collected to prevent contamination of periuethral flora, the specimen for urine analysis and culture should be obtained carefully.

Contamination can be minimized by washing the genitalia with soap and water. Antiseptic washes and forced retraction of the prepuce are not advised. The detection of bacteriuria by direct microscopy is a readily available but highly variable method of determining bacteria. Uncentrifuged gram-stained urine that revealed at least one organism per oil immersion field correlated with >105 CFU / ml urine with sensitivity and specificity of almost 90%. finding Five or more organisms per oil immersion field increased the specificity to 99%.

#### Inclusion criteria

- Febrile children between 1 years to 18 years.
- Fever (rectal  $\geq 38.3$ °C or auxiliary temperature  $\geq 37.8$ °C).

## Exclusion criteria

- Children below 1 year.
- Any child who had received antibiotics 48 hours prior was not included in the study.
- Children with known congenital genitourinary anomalies.

#### **RESULTS**

Out of the 200 children studied, 93 children belonged to the age group of 6 year to 12 year and 57 children belong to 1 year to 6-year age group and 50 children belongs to 12 year to 18-year age group.

Table 1: Age and sex wise distribution of cases.

Age group	Male	Female	Total
1-6 year	25	32	57
6-12 year	45	48	93
12 -18 year	30	20	50
Total	100	100	200

Out of 200 children, 97 children showed significant pyuria in centrifuged urine sample of which 49 were males and 48 were females. Majority 45 children were belonging to age group of 6 year to 12 year.

Table 2: Age and sex distribution of 200 febrile children with urine showing >5 pus cells/HPF.

Age group	Male	Female	Total
1 - 6 year	12	15	27
6- 12 year	23	22	45
12 -18 year	14	11	25
Total	49	48	97

Out of 200 children, 97 children showed significant pyuria in centrifuged urine sample of which 46 children 5-10 cells/HPF and 27 children showed > 10 cells/HPF and 24 cases showed < 5cells / HPF.

Table 3: Distribution of pus cells in Urine.

Pus cells	Male	Female	Total
<5 cells	11	13	24
5-10 cells	21	25	46
>10 cells	17	10	27
Total	49	48	97

Out of 200 children, in 29 cases urine culture showed *E. coli.* growth and 51 cases showed no growth.

Table 4: Distribution of organisms in urine culture.

Urine culture	Male	Female	Total
No growth	28	23	51
E. coli	14	15	29
Serratia	03	05	08
Proteus	03	04	07
Pseudomonas	01	01	02
Total	49	48	97

#### DISCUSSION

Out of the 200 children studied, 93 children belonged to the age group of 6 year to 12 year and 57 children belong to 1 year to 6-year age group and 50 children belongs to 12 year to 18-year age group. 97 children showed significant pyuria in centrifuged urine sample of which 49 were males and 48 were females. Majority 45 children were belonging to age group of 6 year to 12 year. Out of 97 children showed significant pyuria in centrifuged urine sample of which 46 children 5-10 cells/HPF and 27 children showed > 10 cells/HPF and 24 cases showed < 5cells / HPF. Out of 200 children, in 29 cases urine culture showed *E. coli* growth and 51 cases showed no growth.

According to Chon CH et al among children aged less than 1 year, the prevalence of UTI in girls is 6.5% compared with 3.3% in boys. After 1 year of age, the prevalence of UTI in boys decreases to 1.9%, whereas in girls it increases slightly to 8.1%. 11

Musa-Aisien AS et al, studied the prevalence of UTI in 300 consecutively admitted, febrile preschool children with and without a focus of infection and reported the prevalence of UTI was 9% and was significantly higher in girls than in boys. 12

Saleh SI et al, reported prevalence of UTI is between 4.1 and 7.5% in infancy. In school girls, symptomatic and asymptomatic UTI's occur in 1.2-1.9%, while it is quite rare in school boys of similar age.<sup>13</sup>

Kanellopoulos TA et al, reported prevalence of 0.1 to 1% in neonates, increasing to 14% and 5.3% in febrile neonates and infants respectively.<sup>14</sup>

According to Shaikh N et al, in a meta-analysis, the pooled prevalence of UTI in children by age and sex from 18 pediatric studies was determined. Among infants presenting with fever without an identifiable source on examination, the overall prevalence of a UTI was 7.0% but varied from 2.1% to 8.7% based on age and sex. Among verbal children with urinary symptoms, the prevalence of UTI was 7.8%. 15

Shaikh N et al, reported in infants presenting with fever that the overall prevalence of UTI as 7.0%. The pooled prevalence rates of febrile UTI's in females aged 0-3 months, 3-6 months, 6-12 months, >12 months was 7.5%,

5.7%, 8.3%, and 2.1% respectively. Among febrile male infants less than 3 months of age, 2.4% of circumcised males and 20.1% of uncircumcised males had an UTI. <sup>16</sup>

Ferrara P et al, reported prevalence rates of UTI's in children vary from 2.1% to 8.7% depending on age, gender and circumcision status. Uncircumcised febrile male, 50 months of age have the highest prevalence of UTI's (20.1%) but the overall prevalence among male's decreases rapidly after the first year of life when there is a remarkable female prevalence.<sup>17</sup>

A recent meta-analysis by Quigley R et al, on UTI in children from 1966 to 2005 found that the overall prevalence of UTI in children evaluated for fever to be about 7%, but it varied greatly depending on age, sex, and circumcision status. This study has verified that UTI remains the most common serious bacterial infection in children. The prevalence was found to be higher in white infants (8%) than black infants (4.7%). The highest prevalence of UTI was found in uncircumcised male infants less than 3 months of age and females less than 12 months of age. Interestingly in older children with urinary symptoms, the prevalence was only 7.8% in patients whether or not they had fever. 18

Leroy S et al and Gervaix A et al (2011) reported 7% of girls and 2% of boys will have an UTI before 6 years of age among febrile children.<sup>19</sup>

## **CONCLUSION**

Urinary tract infections are common in childhood. Nearly all UTIs are caused by bacteria that enter the opening of the urethra and move upward to the urinary bladder and sometimes the kidneys. Rarely, in severe infections, bacteria may enter the bloodstream from the kidneys and cause infection of the bloodstream or of other organs. During infancy, boys are more likely to develop urinary tract infections. After infancy, girls are much more likely to develop them. UTIs are more common among girls because their short urethras make it easier for bacteria to move up the urinary tract. Uncircumcised infant boys (because bacteria tend to accumulate under the foreskin) and young children with severe constipation also are more prone to UTIs.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

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**Cite this article as:** Naik RR, Venkatesha KR. Incidence of urinary tract infection in febrile children. Int J Contemp Pediatr 2019;6:765-8.