

## Prevalence of urinary tract infections in febrile children admitted in tertiary care institute of Uttar Pradesh

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### Abstract

**Background:** Urinary Tract Infections (UTI) are a common cause of fever and are one of the most common bacterial infections seen in children. It is the most common reason that make under 5 children visit Emergency/Outpatient departments. The reported rate of recurrent UTI is around 12- 30% with risk greater in Infants < 6 months, severe vesico-ureteric reflux and abnormal nuclear renal scans at time of first infection.

**Material and Method:** Cross-sectional study was carried out among 378 children in age group of two months to six years who were admitted in Pediatrics ward of tertiary care hospital with complaint of Fever. A pre-designed, structured questionnaire was used to collect information from participants which included demographic data, clinical presentation and clinical examination findings. The diagnosis of Urinary Tract Infection was confirmed by urine culture. The collected information was entered in Microsoft-Excel 2007 Software. Data was analyzed by using SPSS software version 17.0.

**Results:** The prevalence of Urinary Tract Infection in the present study came out to be 11.9%. The age group and sex of child was found to have statistically significant association with Urinary Tract Infection. Pain in abdomen/back/flank, burning micturition and increased urine frequency were also having statistically significant association with Urinary Tract Infection. On Urine microscopy examination, occasional pus cells were observed in 3.97% children, less than 5/hpf pus cells were observed in 8.73%, 5-10/hpf pus cells were observed in 6.35% children whereas plenty of pus cells were observed in 12.7% children.

**Conclusions:** The prevalence of UTI was less in children less than 2 years of age. Females had a higher prevalence of UTI as compared to males.

**Keywords:** Urinary tract infection, febrile illness, fever, burning micturition

### Introduction

Children with fever comprise a substantial proportion of the practice in Outpatient department and Emergency Medicine <sup>[1]</sup>. Fever is the most common reason for children under 5 years of age to visit Emergency/outpatient departments. Unlike occult bacteremia or severe bacterial illness in Infants and children, little attention has been given to identification of Urinary Tract

Infections (UTI) in febrile children in the emergency department, despite high prevalence of UTI's and significant associated morbidity in children. Quite often, child receives antibiotics empirically, without adequate evaluation for UTI. Fever is often the only symptom in children with UTI <sup>[1]</sup>.

Urinary tract infections (UTI) are a common cause of febrile illness in young children. UTI are one of the most common bacterial infections seen in children. It has been estimated that UTI are diagnosed in 1% of boys and 3-8% of girls. In the first year of life UTI is more prevalent in boys with rates of 2.7% compared with 0.7% in girls <sup>[2]</sup>. Most infections in boys occur in the first three months of life <sup>[3]</sup> but by school age, the rate has decreased in boys and increased in girls <sup>[2]</sup>. Studies have shown a 10-12 fold increased risk of UTI in uncircumcised boys <sup>[3]</sup>. The reported rate of recurrent UTI is around 12-30% with risk greater in infants < 6 months, severe vesico-ureteric reflux and abnormal nuclear renal scans at time of first infection <sup>[4]</sup>.

### Amis and Objectives

To study of prevalence of Urinary Tract Infections in febrile children admitted in tertiary care institute of Lucknow, Uttar Pradesh.

### Material and Method

The Cross-Sectional study was conducted in the Department of Pediatrics, MIMSR Medical College, Latur. Children in age group of two months to six years having fever and admitted in Pediatrics ward of hospital were included in the study. Children with congenital kidney anomaly, children without fever and those above and below the mentioned age group, those whose parents didn't give consent to participate in the study were excluded.

Sample size was calculated by conducting a pilot study in the Department of Pediatrics of MIMSR Medical College. The prevalence of UTI in pilot study came out to be 8%. Thus, the sample size was calculated with prevalence 8%, significance level 5%,  $Z = 1.96$  and corresponding maximum error with 0.04. So, sample size came out to be 176. However, in the final study 378 participants were recruited.

A pre-designed, semi-structured questionnaire was used to collect information from participants. The information included demographic data, clinical presentation and clinical examination findings. Laboratory investigation such as Complete Blood Count, Urine routine, Urine microscopy, Urine culture (if >5 pus cell in Urine microscopy) and any other relevant investigation (Ultrasound, Serum electrolyte, Micturating Cysto Urethrogram etc.) were also done. The diagnosis of UTI was confirmed by urine culture. The collected information was entered in Microsoft-Excel 2007 Software. Data was analyzed by using SPSS software version 17.0. Statistical tools used were proportions & percentages.

### Results

In present study, the prevalence of UTI was 11.9%. The diagnosis of UTI was confirmed by urine culture and it was observed that urine culture sample of 45 children out of 378 children was positive for UTI. (Table-1)

**Table 1:** Distribution according to Prevalence of UTI

Prevalence of UTI	No. of children (N)	%
UTI present (growth on culture)	45	11.90
UTI absent	333	88.10
Total	378	

It was observed that age and sex had statistically significant association with Urinary Tract Infection (UTI). Pain in abdomen/back/flank, burning micturition and increased urine frequency were also having statistically significant association with UTI infection. There was no statistical association observed between UTI and decreased urine output. (Table-2)

**Table 2:** Association of Demographic variables and clinical symptoms with UTI

		UTI present (n=45)		UTI Absent(n=333)		P value
		No.	%	No.	%	
Age	<12 month	9	20.00	75	22.52	0.0089*
	13-24 month	3	6.67	60	18.02	
	25-36 month	12	26.67	57	17.12	
	37-48 month	0	0.00	45	13.51	
	49-60 month	9	20.00	39	11.71	
	61-72 month	12	26.67	57	17.12	
Sex	Male	18	40.00	225	67.57	0.0002*
	Female	27	60.00	108	32.43	
Pain in abdomen/back/flank	Present	36	80.00	72	21.62	0.0000*
	Absent	9	20.00	261	78.38	
Burning micturition	Present	36	80.00	42	12.61	0.0000*
	Absent	9	20.00	291	87.39	
Increased urine frequency	Present	33	73.33	33	9.91	0.0000*
	Absent	12	26.67	300	90.09	
Urine output	Lowered	3	6.67	33	9.91	0.4866
	Normal	42	93.33	300	90.09	

\*Statistically significant

Cold and Cough was most commonly associated complaint in children and was reported in 34.92% children followed by vomiting and loose stools which were seen in 7.14% children. (Table-3)

**Table 3:** Distribution of other complaints observed in participants according to gender (n=378)

Complaints	Male		Female		Total	
	No.	%	No.	%	No.	%
Blood in Stool	0	0.00%	3	3.23%	3	0.79%
Breathlessness	9	5.08%	0	0.00%	9	2.38%
Constipation	3	1.69%	6	6.45%	9	2.38%
Convulsion	6	3.39%	6	6.45%	12	3.17%
Cough, Cold	87	49.15%	45	48.39%	132	34.92%
Decrease Muscle Tone	3	1.69%	0	0.00%	3	0.79%
Dysentery	3	1.69%	0	0.00%	3	0.79%
Dyspnoea	0	0.00%	3	3.23%	3	0.79%
Edema	3	1.69%	3	3.23%	6	1.59%
Generalised Weakness	3	1.69%	0	0.00%	3	0.79%
Loose Stool	21	11.86%	6	6.45%	27	7.14%
MR	3	1.69%	0	0.00%	3	0.79%
Phimosis	3	1.69%	0	0.00%	3	0.79%
Pustules Over Body	0	0.00%	3	3.23%	3	0.79%
Throat Pain	9	5.08%	9	9.68%	18	4.76%
Undescended Testes	3	1.69%	0	0.00%	3	0.79%
URTI	0	0.00%	3	3.23%	3	0.79%
Vomiting	21	11.86%	6	6.45%	27	7.14%
Total	177	100.00	93	100.00	270	71.43

On urine microscopy examination, occasional pus cells were observed in 3.97% children, less than 5/hpf pus cells were observed in 8.73%, 5-10/hpf pus cells were observed in 6.35% children whereas plenty of pus cells were observed in 12.70 samples children. (Table-4)

**Table 4:** Distribution of participants according to urine microscopy findings (N=378)

Presence of Pus cell	No.	%
No pus cell	258	68.25
Occasional pus cells	15	3.97
<5/hpf	33	8.73
5- 10/hpf	24	6.35
Plenty of pus cell	48	12.70
Total	378	100

In the present study, out of the total 45 cases, complication were observed in 5 cases. Out of them hydronephrosis and deranged kidney function test were diagnosed in 2 cases each whereas renal calculi was diagnosed in one case. (Table-5)

**Table 5:** Distribution of participants according to presence of other complications

Complication	No. of children (n=45)	%
Hydronephrosis	02	4.44
Renal calculi	01	2.22
Deranged RFT	02	4.44
Total	05	11.11

## Discussion

The prevalence of UTI in the present study was 11.9%. The finding is comparable to findings reported by Okwara *et al.* [5] where prevalence of UTI came to be 14%.

Shaw *et al.* [6] reported prevalence of 3.3% in Philadelphia, while Mussa-Aisien *et al.* [7] reported a prevalence of 9% in a study which was conducted in Nigeria. As compared to the present study lower prevalence was reported by Dharni Dharaka *et al.* [8] who reported a prevalence of 5.4% in febrile infants, Hoberman *et al.* [9] who reported prevalence of 5.3% in infants.

The age wise distribution of children suffering from UTI showed that majority of children were more than 2 years of age. The prevalence of UTI was less in children less than 2 years of age. The sex wise distribution showed that majority of the children suffering from UTI were female (60%). Thus, females had a higher prevalence of UTI as compared to males in our study. Similar findings were reported by Mussa-Aisien *et al.* [7], Epaphura Festo *et al.* [10], Hoberman A *et al.* [9] and Okwara *et al.* [5] who observed that significant proportion of female in their study had UTI compared to male. The reason of Female children having UTI more commonly is short urethra which is in close proximity to the anus, this facilitates easy ascent of bacterial pathogens from the gastrointestinal tract to the urinary tract. Nader Shaikh *et al.* [11] in their meta-analysis study observed that Female infants with fever had a relatively high prevalence rate of UTI. Kathy N. Shaw *et al.* [12] studied 2411 febrile children with a rectal temperature > 38.5°C with aim to study the prevalence of UTI by sex, age and clinical parameters and it was observed that prevalence of UTI was 3.3% (95% CI: 2.6,4.0), with higher prevalence in girls. Strikingly, white girls had a 16.1% (95% CI: 10.6, 21.6) prevalence rate of UTI.

In present study, it was observed that the age and gender had statistically significant association with the urinary tract infection. Pain in abdomen/back/flank, burning micturition and increased urine frequency were having statistically significant association with UTI

whereas no statistical association was observed with decreased urine output. Kathy N. Shaw *et al.* <sup>[12]</sup> observed high prevalence of UTI in children with malodorous urine or hematuria (8.6%), abdominal or suprapubic tenderness (13.2%), children who appeared ill (5.7%) or had fever of  $>39^{\circ}\text{C}$  (3.9%) though these signs were uncommonly elicited. Symptoms of vomiting, diarrhoea, irritability and poor feeding were common in febrile children with UTI but equally common in those febrile due to other causes.

Mussa-Aisien *et al.* <sup>[6]</sup> conducted a study in Nigeria among 300 children and observed that hyperpyrexia (temperature greater than  $41.1^{\circ}\text{C}$ ), abdominal pain and fever of at least seven days duration was associated with a significantly increased UTI prevalence. In comparison, diarrhoea, vomiting, anorexia, irritability and jaundice were infrequently found and did not have a significant UTI association. Clark *et al.* <sup>[13]</sup> stated that high-grade fever is a common symptom of UTI. Loin pain, dysuria and urinary frequency may be present, but in young children these symptoms were difficult to discern. Young children presented usually with only non-specific symptoms such as irritability, vomiting, diarrhea and failure to thrive.

In present study, urine microscopy examination showed occasional pus cells in 3.97% children, less than 5 pus cells in 8.73% children, 5-10 pus cells were observed in 6.35% children whereas plenty of pus cells were observed in 12.7% children. Epaphura Festo *et al.* <sup>[10]</sup> studied 370 cases and 25.67% were diagnosed to have more than 5 pus cells on urine microscopy. The findings reported by Epaphura Festo *et al.* <sup>[10]</sup> were comparable with the present study.

In the present study out of the total 45 cases of UTI, complication were observed in 5 cases which included hydronephrosis, deranged kidney function tests and renal calculi. Findings observed were comparable with complications observed by Ali *et al.* <sup>[14]</sup>, Neelam Taneja *et al.* <sup>[15]</sup> and Epaphura Festo *et al.* <sup>[10]</sup>.

## Conclusion

The prevalence of Urinary Tract Infection (UTI) was 11.9%. The prevalence of UTI was less in children less than 2 years of age. Females had a higher prevalence of UTI as compared to males.

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