Section: Paediatrics

Original Research Article

OUTCOME IN FEBRILE CHILDREN AGED 5-15 YEARS WITH SUSPECTED URINARY TRACT INFECTION IN A TERTIARY CARE HOSPITAL

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Received : 08/11/2025
Received in revised form : 24/12/2025
Accepted : 12/01/2026

Keywords:
Outcome, Febrile Children, Aged 5-15 Years, Urinary Tract Infection.

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DOI: 10.47009/jamp.2026.8.1.31

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2026; 8 (1); 152-156

ABSTRACT

Background: UTI is one of the common pediatric problems with the potential to produce long term morbidity. The objective is to determine the outcome of urinary tract infection in children suspected to have urinary tract infection aged from 5 years to 15 years in a tertiary care hospital. **Materials and Methods:** This study is hospital based prospective observational study conducted for duration of 18 months in the Department of Pediatrics among febrile children aged between 5 to 15 years. **Result:** Urine culture is the gold standard in diagnosing the UTI. Urine Culture positivity is found to be significant in urine microscopy with, ≥5 pus cells /HPF as compared to <5 pus cells/HPF. Hence it is deduced from our study that, higher the number of pus cells, greater is the chance of urine culture being positive. Of total 100 cases, 17% had urine culture positivity, of which, 2% patients had <5pus cells/hpf in urine routine and other 15% had >5pus cells/hpf in urine routine. Most common organisms causing UTI are E.coli followed by klebsiella species. E.coli was also found to be higher in female subjects having UTI. In our study, presence of bacteria in urine routine was associated with more chances of having UTI. Of 100 cases, ultrasound scan had abnormal findings in 21% of cases. Of abnormal USG cases, 4 cases had hydronephrosis and were referred to higher center for MCU and DMSA scan. In 2 of those referred cases, vesico-ureteric reflex was present. All other cases were treated with appropriate antibiotics based on urine culture sensitivity report. Repeat culture after appropriate antibiotic usage was negative. **Conclusion:** Outcome of the study, all patients with UTI in this study recovered with treatment. There were no deaths among these children.

INTRODUCTION

Urinary tract infection (UTI) is common bacterial infection in infants and children. Before the age of 14 years, the risk of UTI is 1-3% in boys and 3-10% in girls.[1,2] UTI diagnosis is often missed in infants and young children, as urinary symptoms are minimal and often non-specific. Rapid evaluation and treatment of UTI are essential to prevent renal parenchymal damage and renal scarring that can cause hypertension and progressive renal damage.[3] Pediatricians should know the clinical features, diagnosis, management, evaluation of children with UTI. Even single confirmed UTI should be taken seriously, especially in young children, due to the potential for renal parenchymal damage.

Most urinary tract infections lead to scarring or diminished kidney growth, mainly seen in infants in the first year of life.[4] Hence it is essential to recognize urinary tract infection in febrile children to prevent long morbidity complications like renal scarring.[5]

Significant bacteriuria and pyuria with fever in children should be suspected of pyelonephritis since acute pyelonephritis consists of 2/3rd of febrile UTI's in early childhood.[6]

Pyelonephritis, if untreated, results in renal scarring, hypertension, and end- stage renal disease.7] Approximately 13% to 15% of an end-stage renal disease thought to be related to urinary tract infection.[8] In children Focal renal scarring caused by pyelonephritis caused a 10% risk for end-stage renal disease. As an adult a 15% risk for toxemia during pregnancy, and a 23% risk for hypertension, as revealed in a study in Sweden.[9,10]

Hence the present study is undertaken to determine the outcome of urinary tract infection in children suspected to have urinary tract infection aged from 5 years to 15 years in a tertiary care hospital.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

MATERIALS AND METHODS

This Prospective Observational Study was conducted among Febrile children with symptoms of UTI aged between 5 to 15 years admitted to the Department Of Pediatrics, PESIMSR Hospital, Kuppam. Duration of study was 18 months (Jan 2019 – Jun 2020).

Sampling method: Purposive Sampling

Sample size: 100

Sample size calculation is based on a study of Gupta P, Mandal J et al (2015) Profile of urinary tract infections in pediatric patients. Indian Journal of Medical Research11.

Inclusion Criteria

Febrile children aged between 5 to 15 years admitted to the pediatric ward with clinically suspected UTI with one or more following symptoms or signs:

- Abdominal Pain,
- Vomiting,
- Burning Micturition,
- Dysuria,
- Increased Frequency Of Micturition
- Suprapubic Tenderness
- Renal Angle Tenderness

Exclusion Criteria

- 1. Children who received antibiotics within 48 hours before admission.
- 2. Children with known congenital Genitourinary Anomalies.
- 3. Children with definitive foci of infection other than urinary tract as the cause of fever.

Methodology: Ethical committee approval was obtained. Febrile Children with symptoms and signs suggestive of urinary tract infection between 5-15 years age group were chosen.

Informed written consent was taken from the child's parent or guardian. The child's history is then recorded in the proforma, clinical examination was done and findings were noted in the same proforma.

Then the parent or guardian was explained to collect a clean-catch midstream urine sample. It was advised for boys to wash genitalia with water, then retract the prepuce gently and collect the Mid-stream urine sample. In the same way,girls were advised to wash genitalia with water, separate both labia and collect the midstream urine sample. Then the collected sample was sent to laboratory for analysis.

In the laboratory urine physical, biochemical and pathological examination were done. And urine culture was done for all the suspects.

USG abdomen was done to determine kidney, ureter, urinary bladder and urethral abnormalities and the USG findings were recorded.

Statistical Analysis: The analysis and interpretation of this study were based on the data collection during the study period. The results are compared with the help of descriptive and inferential statistics. The data was recorded in excel sheets and analyzed by using STATA14.1. A probability of less than 0.05 is considered significant.

RESULTS

The major portion of UTI was present in the age group of 5 to 8 years in the present study. incidence of UTI was more in females.

Cases are classified according to the modified Kuppaswamy's socioeconomic status scale and divided as follows, 10%, 17%, 19%, 22%, and 32% belong to Class I, II, III, IV, and V respectively.

Of 100 cases, 27%, 40% and 33% had fever of <3 days, 3-5days and >5days respectively.

The most common symptoms were pain abdomen, vomiting, and burning micturition found in 61%, 59%, and 43% cases, respectively, in decreasing order.

Risk factors for UTI were present in 43% of study subjects.

Of 43% of cases having risk factors 23%,14%, 2%, 7%, 14%, 30% and 10% had tight clothing, h/o UTI, constipation, labial adhesions, phimosis, voiding difficulty and worm infestation respectively.

Table 1: Distribution of Study Subjects According To Urine Pus Cells in Urine Routine

Pus cells	No. of subjects	Percentage
<5Cells	20	20%
5-10 cells	49	49%
10-15cells	23	23%
15-20 cells	5	5%
20-25 cells	1	1%
>25cells	2	2%
Total	100	100%

Urine for pus cells of 100 cases showed that there were >25 cells, 20-25 cells, 15-20 cells, 10-15 cells,5-10 cells and < 5cells in 2%,1%, 5%, 23%,49% and 20% respectively.

RBC"S in urine routine

Table 2: Distribution of Study Subjects According To RBC"s In Urine Routine.

RBC	No. of subjects	Percentage
NIL	92	92%
OCCASIONAL	5	5%
PRESENT	3	3%
Total	100	100.0

Urine analysis of 100 cases, 8% of cases had RBC in the urine. Another 92% did not have any RBCs in urine routine.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Table 3: Distribution Of Study Subjects According to albumin in urine routine

Albumin	No. of subjects	Percentage
1+	16	16%
2+	1	1%
TRACES	35	35%
NIL	48	48%
Total	100	100%

Urine albumin of 100 cases in this study suggests that 1+, 2+, and traces of albumin were found in 16%, 1%, and 35% of urine routine, respectively.

Table 4: Distribution of Study Subjects According To Bacteria in Urine Microscopy

Bacteria	No. of subjects	Percentage
Absent	81	81%
Present	19	19%
Total	100	100%

Of 100 urine microscopy done on study subjects, 19% of cases turned out to be positive for bacteria in the urine.

Table 5: Distribution of Study Subjects According To Organisms Growth Present In Urine Culture Sensitivity

Organisms growth in U/C/S	No. of subjects	Percentage
CONS	1	1%
E.COLI	8	8%
KLEBSIELLASPECIES	6	6%
PROTEUS. MIR	1	1%
PSEUDOMONAS	1	1%
NO GROWTH	83	83%
Total	100	100%

Of 100 cases, 17% of patients were urine culture positive, of which the most common organism causing urinary tract infection is E Coli (8%) the next one is Klebsiella species (6%).

Table 6: Distribution of Study Subjects According to the Duration of Hospital Stay

Hospital stay	No. of subjects	Percentage
< 3 days	44	44%
3-5 days	30	30%
>5 days	26	26%
Total	100	100%

Based on duration of hospital stay, 44%, 30% and 26% of cases stayed in hospital were < 3 days, 3 to 5 days and > 5days.

Table 7: Distribution Of Study Subjects According To Ultrasound Findings In Suspected Cases of Urinary Tract Infection.

Ultrasound	No. of subjects	Percentage
Abnormal	21	21%
Normal	79	79%
Total	100	100%

Ultrasound was done on 100 cases, of which 21% had abnormal findings and 79% cases are normal.

Table 8: Distribution Of Study Subjects According To Ultrasound Findings

Ultrasound	No. Of Subjects	Percentage
Normal	79	79%
Cystitis	16	16%
Pyelonephritis	1	1%
Unilateral hydronephrosis with cystitis	3	3%
Bilateral hydronephrosis with cystitis	1	1%
Total	100	100%

Of 21% of abnormal ultrasound cases, 16% had cystitis,1% pyelonephritis, 3% had unilateral hydronephrosis (2 had left-sided& 1 right-sided) with cystitis and 1% had bilateral hydronephrosis with cystitis.

Table 9: Distribution of Study Subjects According to Final Diagnosis

Final Diagnosis	No. of subjects	Percentage
CULTURE POSITIVE UTI Complicated UTI Cystitis with Recurrent UTI Cystitis with culture Positive UTI Simple UTI	17 1 1 11 4	17%
CULTURE NEGATIVE UTI Cystitis with culture Negative UTI	83 8	83%
Total	100	100%

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Out of 17 culture-positive urinary tract infections, the most common presentation were cystitis (11), simple urinary tract infections (4), cystitis with recurrent urinary tract infection (1) and complicated urinary tract infection (1).
Out of 20 cystitis study subjects, 12 were culture-positive urinary tract infections and 8 were culture-negative urinary tract infections. Same is depicted in the figure 22A and figure 22B.

DISCUSSION

Rapid evaluation and treatment of UTI is important to prevent renal parenchymal damage and renal scarring that can cause hypertension and progressive renal damage.[5] Pediatricians should be aware of the clinical features, diagnosis, management and evaluation of children with UTI. Even a single confirmed UTI should be taken seriously, especially in young children, due to the potential for renal parenchymal damage.[6]
Untreated pyelonephritis results in renal scarring, hypertension and end stage renal disease.[7] Approximately 13% to 15% of end stage renal disease is thought to be related to urinary tract infection.[6] Focal renal scarring caused by pyelonephritis in children caused 10% risk for end stage renal disease, a 15% risk for toxaemia during pregnancy as an adult and 23% of hypertension.
Hence urine routine serves as a quick measure to screen urine tract infection with febrile illness having urinary tract symptom and signs. A positive urine routine is backed by urine culture sensitivity and imaging modalities as stated by IAP, thus helping in diagnosis, treatment and prevention of complications.[8-11]
In a study done by Unsal H et al,[12] it was found that pyuria was present in 75% of cases and bacteria were infrequently seen in 13%. In our study, pyuria is present in 80% of study subjects and bacteria in urine microscopy are seen in 14%, hence our study is in concordance with above study.
Most common causative organism was E. coli (45.8%) followed by Klebsiella, Proteus and Pseudomonas. This is comparable with the studies by A Sharma et al and AkramM et al from Aligarh, India.[13,14]
Studies by Mantadakis E et al,[15] and Islam M et al,[16] showed E. coli as most common organism but with varying proportions. It is in concordance with that of present study.
In a study by Kizilca O et al, of 344 children with UTI, the commonest organism was E.coli out of which 41.4% were ESBL producing. Among the Klebsiella species, 53.2% were Klebsiella ESBL species.[17] In comparison with present study, E Coli is 47% followed by Klebsiella 33.3% which is in concordance with above study.
In a study done by Aiyegoro O.A et al., in 2007, it was found that urine culture was positive in 12% of total study subjects of 301 aged between 5 to 18 years. Females were at higher risk of getting affected and urine culture positivity was higher in females. Most common organisms were Ecoli(52%), Klebsiella (25%), Proteus Mirabilus(13%), Streptococcus (5%) and Pseudomonas (2%).[18] In comparison with that of the present study, the percentage of positive urine culture was 18%, females are more affected and E coli is the most common organism. Hence the study done by Aiyegro O A et al is in concordance with the present study.
In a study by Ranjana B et al, and their colleagues in 2016 concluded that majority of pathogens were isolated from female (54.2%) patients. E.Coli was commonest isolate.[19] This study is in concordance with that of the present study since female subjects are commonly affected, E coli is the most common organism that is isolated.
The present study is a hospital based study, hence demography of urinary tract infection children may be biased. A community based study is required to know the exact demographic profile.
In the present study, UTI in children aged <5 years and 16 to 18 years children are not included. Hence symptoms, signs and risk factors analyzed don't reflect the entire paediatric population.
In urine routine, dip stick analysis in our hospital laboratory didn't have nitrites and leucocyte esterase, which if available would have added more credibility to the present study.

CONCLUSION

Hence the clinicians' major goal for the young children with UTI is early diagnosis. In order to eradicate infection in the growing kidney and to allow identification of urinary tract abnormalities before the deterioration of renal function, early detection and treatment of the first infection in infant may be the only way to reduce the incidence of renal damage.

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ISSN (O): 2687-5365; ISSN (P): 2753-6556

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ISSN (O): 2687-5365; ISSN (P): 2753-6556