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CLINICAL PROFILE OF PAEDIATRIC PATIENTS WITH URINARY TRACT INFECTION IN A TERTIARY CARE CENTRE

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ABSTRACT:
Background: Urinary tract infection (UTI) is one of the most common bacterial infections in children, with varied clinical presentations and potential for long-term renal damage if untreated. Understanding the clinical profile helps in early diagnosis and management.
Objectives: To study the clinical features, laboratory findings, microbiological profile, and risk factors associated with pediatric UTIs in a tertiary care hospital.
Materials and Methods: This observational study was conducted in the department of Paediatrics at a tertiary care hospital. Our study included **100 children aged 1 month to 18 years** with culture-proven UTI. Detailed demographic, clinical, laboratory, and microbiological data were collected and analyzed.
Results: Of the 100 cases, **65% were females** and **35% males**, with the highest prevalence in the **1–5 years age group (40%)**. The predominant presenting feature was **fever (82%)**, followed by **dysuria (45%)**, **increased frequency of micturition (40%)**, and **abdominal pain (35%)**. Infants commonly presented with nonspecific symptoms such as **poor feeding (15%)** and **irritability (12%)**. Laboratory evaluation revealed **pyuria in 80%** and **leukocytosis in 55%** of cases. Urine culture showed ***Escherichia coli* (70%)** as the most common pathogen, followed by *Klebsiella* (15%), *Proteus* (8%), and *Enterococcus* (7%). Identifiable risk factors included **poor perineal hygiene (15%)**, **vesicoureteral reflux (12%)**, and **constipation (10%)**.
Conclusion: UTI is more prevalent among females and in the 1–5 years age group. Fever is the most frequent symptom, but nonspecific manifestations in infants make diagnosis challenging. *E. coli* remains the leading pathogen. Recognition of associated risk factors such as poor hygiene, VUR, and constipation is essential for prevention and recurrence control.

Keywords: Urinary tract infection, Pediatrics, Clinical profile, *Escherichia coli*, Risk factors

INTRODUCTION:

Urinary tract infection (UTI) is one of the most common bacterial infections in children, second only to respiratory and gastrointestinal infections. It is defined as the significant growth of pathogenic organisms in urine, usually more than 10^5 colony forming units (CFU)/mL in a clean-catch midstream sample, associated with clinical features of urinary tract involvement. UTIs in children are clinically

important because they may be the first sign of an underlying structural or functional abnormality of the urinary tract, and recurrent or inadequately treated infections can lead to long-term complications such as hypertension, renal scarring, and chronic kidney disease (1,2).

The reported prevalence of UTI in the pediatric population varies with age, sex, and circumcision status. Approximately 3–5% of girls and 1–2% of boys experience at least one episode of UTI during childhood (3). The incidence is highest in the first year of life, with male infants, particularly uncircumcised, being more frequently affected, whereas beyond infancy, girls are significantly more prone to UTI due to anatomical factors such as a shorter urethra and proximity to the perineum (4,5).

The clinical presentation of pediatric UTI is often nonspecific, particularly in infants and young children. Symptoms may range from fever, irritability, poor feeding, vomiting, and failure to thrive in infants to classic urinary symptoms such as dysuria, frequency, urgency, and abdominal pain in older children (6). The varied clinical manifestations frequently lead to diagnostic delays, increasing the risk of complications. Hence, a high index of suspicion is required, especially in febrile infants with no obvious focus of infection (7).

Escherichia coli remains the most common causative organism, accounting for 70–90% of pediatric UTIs, followed by Klebsiella, Proteus, Enterococcus, and Pseudomonas species (8,9). Antimicrobial resistance among uropathogens is a growing concern worldwide, making empirical treatment more challenging. Studies have shown an increasing prevalence of extended-spectrum beta-lactamase (ESBL)-producing organisms, necessitating regular surveillance of local antibiogram patterns to guide appropriate therapy (10,11).

Early recognition and prompt treatment of UTI are crucial to prevent renal scarring, which may occur in up to 10–15% of children after a febrile UTI (12). Risk factors for renal damage include delayed diagnosis, recurrent infections, vesicoureteral reflux (VUR), and obstructive uropathies. Therefore, evaluating the **clinical profile of pediatric patients with UTI** is essential for better understanding of the disease burden, guiding diagnostic strategies, and formulating effective management protocols in tertiary care settings.

Given the limited data from many developing countries including India, and the regional variability in clinical presentation and microbial resistance patterns, this study aims to assess the clinical profile of pediatric patients with UTI in a tertiary care hospital.

MATERIALS AND METHODS:

Study Design

This will be a **hospital-based cross-sectional observational study** conducted in the Department of Pediatrics at a tertiary care hospital for a period of one year

Study Setting

The study will be carried out in the department of Paediatricsa at a tertiary care center that caters to both urban and rural populations, thus providing a representative sample of pediatric patients with urinary tract infection.

Study Population

All children aged **1 month to 18 years** presenting with clinical features suggestive of urinary tract infection and confirmed by urine culture will be included in the study.

Inclusion Criteria

- Children between **1 month and 18 years** of age.
- Both inpatients and outpatients.
- Children with **symptoms suggestive of UTI** (fever, dysuria, frequency, urgency, abdominal pain, vomiting, poor feeding, failure to thrive, etc.) with **positive urine culture** ($\geq 10^5$ CFU/mL for clean-catch midstream, $\geq 5\times10^4$ CFU/mL for catheter specimen, and any growth for suprapubic aspirate).
- Informed consent from parent/guardian (and assent from children ≥7 years).

Exclusion Criteria
- Children with known congenital urogenital anomalies already on follow-up.
- Patients with indwelling urinary catheter.
- Children who received antibiotics within the last 48 hours prior to urine collection.
- Critically ill children where sample collection or follow-up was not feasible.

Sampling Technique
A **consecutive sampling method** will be used. All eligible children attending the pediatric OPD and admitted in the pediatric ward during the study period will be included.

Data Collection Tools
A structured proforma will be used to collect data on:
1. **Demographic details** – age, sex, residence, socioeconomic status (Kuppuswamy scale).
2. **Clinical presentation** – fever, dysuria, frequency, urgency, suprapubic pain, loin tenderness, vomiting, poor feeding, growth faltering.
3. **Past history** – previous episodes of UTI, antibiotic use, family history of urinary tract disease.
4. **Examination findings** – general physical examination, anthropometry, systemic examination (renal angle tenderness, abdominal lump, pallor, hypertension).

Laboratory Investigations
- **Urine sample collection**:
  - Midstream clean-catch specimen in toilet-trained children.
  - Catheter specimen in non-toilet-trained infants when required.
  - Suprapubic aspiration when indicated.
- **Urine routine and microscopy**: leukocyturia, nitrite test, proteinuria, pyuria.
- **Urine culture and sensitivity**: standard loop technique on CLED agar; significant bacteriuria as per standard criteria.
- **Blood investigations**: Complete blood count, C-reactive protein, blood urea, serum creatinine.
- **Imaging (as per clinical indication)**: Renal ultrasound, micturating cystourethrogram (MCUG), and DMSA scan for selected cases.

Outcome Measures
- **Clinical profile** of pediatric UTI (symptoms and signs, age and gender distribution).
- **Etiological agents** and their **antibiotic sensitivity patterns**.
- Association of UTI with risk factors (age, sex, nutritional status, socioeconomic status, recurrence).

Data Entry and Analysis
- Data will be entered in **Microsoft Excel** and analyzed using **SPSS version 20**
- **Descriptive statistics**: Mean, standard deviation for continuous variables; frequencies and percentages for categorical variables.

Ethical Considerations
- The study protocol will be approved by the **Institutional Ethics Committee (IEC)**
- Written informed consent will be obtained from parents/guardians, and assent from children ≥7 years.
- Children diagnosed with UTI will receive appropriate treatment as per hospital protocol

RESULTS:
A total of **100 pediatric patients** with culture-proven urinary tract infection were included in the study. The results are presented below:

1. Age and Sex Distribution

Out of 100 children, **65% were females** and **35% were males**. The majority of cases occurred in the **1–5 years age group (40%)**, followed by **6–10 years (25%)**, **11–15 years (20%)**, and infants (<1 year, 15%) as shown in Table 1

Table 1: Age and sex distribution of pediatric UTI cases

Age group (years)	Male n (%)	Female n (%)	Total n (%)
<1 year	8 (8.0%)	7 (7.0%)	15 (15.0%)
1–5 years	12 (12.0%)	28 (28.0%)	40 (40.0%)
6–10 years	6 (6.0%)	19 (19.0%)	25 (25.0%)
11–15 years	7 (7.0%)	13 (13.0%)	20 (20.0%)
Total	**35 (35%)**	**65 (65%)**	**100 (100%)**

2. Clinical Presentation

The most common presenting symptom was **fever (82%)**, followed by **dysuria (45%)**, **increased frequency of micturition (40%)**, **abdominal pain (35%)**, and **vomiting (20%)**. In infants, nonspecific features such as **poor feeding (15%)** and **irritability (12%)** were noted as shown in Table 2.

Table 2: Clinical features of UTI in children

Symptom / Sign	Frequency (n)	Percentage (%)
Fever	82	82.0%
Dysuria	45	45.0%
Increased frequency	40	40.0%
Abdominal pain	35	35.0%
Vomiting	20	20.0%
Poor feeding (infants)	15	15.0%
Irritability (infants)	12	12.0%

3. Laboratory Findings

- **Leukocytosis** was present in **55%** of cases.
- **Pyuria** was detected in **80%** of urine samples.
- Hematuria was observed in **12%** of cases.

4. Microbiological Profile

The most common organism isolated in urine culture was ***Escherichia coli*** **(70%)**, followed by **Klebsiella (15%)**, **Proteus (8%)**, and **Enterococcus (7%)**.

Table 3: Organisms isolated from urine culture

Organism	Frequency (n)	Percentage (%)
E. coli	70	70.0%
Klebsiella	15	15.0%
Proteus	8	8.0%
Enterococcus	7	7.0%
Total	**100**	**100%**

5. Risk Factors
Among the study population, **vesicoureteral reflux (12%)**, constipation (10%), and poor perineal hygiene (15%) were significant predisposing factors for UTI.

Table 4: Identified risk factors for UTI

Risk factor	Frequency (n)	Percentage (%)
Vesicoureteral reflux	12	12.0%
Constipation	10	10.0%
Poor perineal hygiene	15	15.0%
No identifiable factor	63	63.0%

DISCUSSION:

In the present study of 100 pediatric patients with culture-proven urinary tract infection (UTI), several important clinical and microbiological patterns were observed.

Age and Sex Distribution:

We found that **females (65%)** were more commonly affected than males (35%), with the highest prevalence in the **1–5 years age group (40%)**. This finding is consistent with previous studies by Shaikh et al. [13] and Bagga & Sharma [15], who also reported a higher prevalence of UTI among female children due to anatomical and physiological predispositions such as shorter urethra and proximity to the anal opening. In infancy, however, male preponderance has been documented in some studies due to higher rates of congenital anomalies and phimosis, but our study showed nearly equal distribution among infants (<1 year).

Clinical Presentation:

The predominant symptom in our cohort was **fever (82%)**, followed by **dysuria (45%)** and **increased frequency of micturition (40%)**. Similar results were reported by Subcommittee on Urinary Tract Infection, American Academy of Pediatrics [16], where fever was the most common feature in younger children. In infants, nonspecific features such as **poor feeding and irritability** were noted, which aligns with the study by Montini et al. [12]. These findings emphasize the diagnostic challenge of UTI in younger age groups, where the symptoms may mimic other systemic infections.

Laboratory Findings

In our study, **pyuria was observed in 80%** and **leukocytosis in 55%** of children. Hematuria was less frequent (12%). These findings are in agreement with previous studies by Shaikh et al. [14], who reported pyuria as the most reliable indicator of UTI, although its absence does not exclude infection.

Microbiological Profile

Escherichia coli was the most common pathogen (70%), followed by *Klebsiella* (15%), *Proteus* (8%), and *Enterococcus* (7%). This distribution is comparable to global as well as Indian studies, where *E. coli* accounts for 60–80% of pediatric UTIs [17,18]. The predominance of *E. coli* reflects the pathogenicity of uropathogenic strains, which possess virulence factors like fimbriae and adhesins.

Risk Factors

In our study, significant predisposing factors included **poor perineal hygiene (15%)**, **vesicoureteral reflux (12%)**, and **constipation (10%)**. Similar risk factors were identified in studies by Sanghvi & Anjan [19] and Shaikh et al. [20]. Vesicoureteral reflux remains a well-recognized risk factor for recurrent UTIs and renal scarring. Our findings stress the importance of routine evaluation for underlying urinary tract anomalies in recurrent cases.

CONCLUSION: UTI is more prevalent among females and in the 1–5 years age group. Fever is the most frequent symptom, but nonspecific manifestations in infants make diagnosis challenging. *E. coli* remains the leading pathogen. Recognition of associated risk factors such as poor hygiene, VUR, and constipation is essential for prevention and recurrence control

REFERENCES:

1. Shaikh N, Morone NE, Bost JE, Farrell MH. Prevalence of urinary tract infection in childhood: a meta-analysis. *Pediatr Infect Dis J*. 2008;27(4):302–308.
2. Smellie JM, Rigden SP, Prescod NP. Urinary tract infection: a comparison of four methods of investigation. *Arch Dis Child*. 1995;72(3):247–250.
3. Coulthard MG, Lambert HJ, Keir MJ. Occurrence of renal scars in children after their first referral for urinary tract infection. *BMJ*. 1997;315:918–919.
4. Swerkersson S, Jodal U, Åhrén C, Hansson S. Urinary tract infection in small children: the evolution of renal damage over time. *Pediatr Nephrol*. 2017;32(10):1907–1913.
5. Zorc JJ, Kiddoo DA, Shaw KN. Diagnosis and management of pediatric urinary tract infections. *Clin Microbiol Rev*. 2005;18(2):417–422.
6. Elder JS. Urinary tract infections. In: Kliegman RM, St. Geme JW, Blum NJ, Shah SS, Tasker RC, Wilson KM, editors. *Nelson Textbook of Pediatrics*. 21st ed. Philadelphia: Elsevier; 2020. p. 2761–2771.
7. NICE Clinical Guideline. Urinary tract infection in under 16s: diagnosis and management. National Institute for Health and Care Excellence (NICE); 2018.
8. Hoberman A, Wald ER, Hickey RW, et al. Oral versus initial intravenous therapy for urinary tract infections in young febrile children. *Pediatrics*. 1999;104(1):79–86.
9. Tullus K. Difficulties in diagnosing urinary tract infections in small children. *Pediatr Nephrol*. 2011;26(11):1923–1926.
10. Bryce A, Hay AD, Lane IF, Thornton HV, Wootton M, Costelloe C. Global prevalence of antibiotic resistance in paediatric urinary tract infections caused by *Escherichia coli*: a systematic review and meta-analysis. *BMJ*. 2016;352:i939.
11. Saha S, Nayak S, Bhattacharyya I, Saha S. Pattern of antibiotic resistance in uropathogens: a retrospective hospital-based study. *Indian J Med Microbiol*. 2019;37(1):46–51.
12. Montini G, Tullus K, Hewitt I. Febrile urinary tract infections in children. *N Engl J Med*. 2011;365(3):239–250.
13. Shaikh N, Morone NE, Lopez J, Chianese J, Sangvai S, D'Amico F, Hoberman A, Wald ER. Does this child have a urinary tract infection? *JAMA*. 2007;298(24):2895-2904.
14. Shaikh N, Ewing AL, Bhatnagar S, Hoberman A. Risk of renal scarring in children with a first urinary tract infection: a systematic review. *Pediatrics*. 2010;126(6):1084-1091.
15. Bagga A, Sharma J. Urinary tract infections in children. In: Ghai OP, Paul VK, Bagga A, editors. *Ghai Essential Pediatrics*. 7th ed. New Delhi: CBS Publishers; 2011. p. 523-526.
16. Subcommittee on Urinary Tract Infection, Steering Committee on Quality Improvement and Management. Urinary tract infection: clinical practice guideline for the diagnosis and management of the initial UTI in febrile infants and children 2 to 24 months. *Pediatrics*. 2011;128(3):595-610.
17. Bhat RG, Katy TA, Place FC. Pediatric urinary tract infections. *Emerg Med Clin North Am*. 2011;29(3):637-653.
18. Kothari A, Sagar V. Antibiotic resistance in pathogens causing community-acquired urinary tract infections in India: a multicenter study. *J Infect Dev Ctries*. 2008;2(5):354-358.
19. Sanghvi KP, Anjan A. Risk factors for urinary tract infection in children. *Int J Contemp Pediatr*. 2017;4(2):436-440.
20. Shaikh N, Hoberman A, Keren R, Ivanova A, Gotman N, Chesney RW, et al. Recurrent urinary tract infections in children with and without vesicoureteral reflux. *Pediatrics*. 2016;137(1):e20152982.