

FREQUENCY OF CULTURE POSITIVE URINARY TRACT INFECTION IN FEBRILE CHILDREN IN BACHA KHAN MEDICAL COMPLEX/GAJJU KHAN MEDICAL COLLEGE SWABI

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ABSTRACT

Background: Urinary tract infections (UTIs) are a prevalent cause of fever in young children and, if untreated, can result in significant kidney consequences. The purpose of this study was to investigate the prevalence of culture-positive UTIs in sick children aged 1 to 11 years, as well as to evaluate the relationship between gender and culture findings.

Methods: For six months, a descriptive cross-sectional study was carried out at Bacha Khan Medical Complex/Gajju Khan Medical College, Swabi. A convenient method was used to find 96 children with fevers between the ages of one and five. Descriptive statistics, chi-square, and correlation analysis were used for data analysis using SPSS version 27.

Results: Among the 96 patients, 43.8% were female and 56.3% were male. The most prevalent symptoms, as indicated by 62.5% of patients, were urgency and increased urination. According to culture findings, 56.3% of patients tested positive, with females having a substantially higher positivity rate (71.4%) than men (44.4%) ($p = 0.008$). The most frequently identified organisms were *Escherichia coli* (56.3%), *Klebsiella* (37.5%), and *Proteus* (6.3%), the last one of which was exclusively detected in male patients. There were notable positive associations between age and both fever ($r = 0.489$) and UTI recurrence ($r = 0.421$). Higher maximum temperature was also strongly correlated with recurrent UTIs ($r = 0.684$), all at $p < 0.01$, with antibiotic usage varied by gender.

Conclusion: Females had a higher percentage of culture-positive UTIs, with *E. coli* being the most common infection. The prescription of antibiotics showed clear gender-based disparities, highlighting the need for focused, research-based treatment approaches.

INTRODUCTION

Among the most prevalent bacterial illnesses in children, urinary tract infections (UTIs) can afflict people of all ages, including newborns and babies. Because of their wide range of clinical symptoms, propensity for complications, and increased risk of recurrence, UTIs in paediatric patients pose serious diagnostic and treatment problems. Particularly in recurrent or untreated cases, early and precise identification is essential to avoid possible kidney

injury, scarring, or even long-term effects like hypertension or chronic kidney disease [1, 2].

Numerous factors, such as age, gender, hygiene, anatomical anomalies, and underlying systemic or immunological diseases, affect the occurrence of UTIs in children. Congenital abnormalities usually cause UTIs to be more common in males during the neonatal period, while anatomical features such as a shorter urethra and its proximity to the anus cause

UTIs to become more common in girls after infancy. In newborns, symptoms may include fever, irritability, and poor feeding; in older children, symptoms may include dysuria, abdominal pain, frequency, and urgency [3, 4].

Since urine culture helps establish the presence of substantial bacteriuria, directs proper antibiotic therapy, and offers insights into evolving resistance patterns, it continues to be the gold standard for the conclusive diagnosis of UTI. In addition to confirming the clinical suspicion of a UTI, a positive urine culture is essential for infection control and epidemiological surveillance [5]. The most prevalent pathogen identified by this method is *Escherichia coli*, which is followed by other Gram-negative bacteria like *Klebsiella*, *Proteus*, and *Pseudomonas* species. Significantly, the increasing prevalence of antibiotic resistance in urinary infections has raised concerns, highlighting the necessity of routinely reviewing local microbiological trends and resistance profiles [6,12]. The research intends to fill knowledge gaps in Pakistan about the microbial spectrum and resistance patterns in paediatric UTIs, with a focus on common pathogens, antibiotic susceptibility, age-gender connections, and routine urine culture. This study aims to determine the prevalence of UTI confirmed by urine culture, gaining valuable insights into the clinical picture of UTI, its associations, and improving patient outcomes by devising an improved management plan following the given outcomes.

METHODOLOGY

Study Design

This descriptive cross-sectional study was carried out at Bacha Khan Medical Complex/Gajju Khan Medical College in Swabi. The goal was to assess the prevalence of culture-positive urinary tract infections (UTIs) in children with fever. The study lasted six months and began after receiving consent from the Institutional Ethical Review Board (IERB).

Age of patients

The study cohort consisted of children between 1 to 11 years who attended the emergency room or ambulatory clinic with fever as their primary complaint, regardless of whether or not they had particular urinary symptoms. The age range was chosen because of a high incidence of febrile infections and the diagnostic difficulty of UTIs in babies and toddlers.

Sampling strategy

A convenient, non-randomized sampling method was used. After gaining their parents' or guardians' informed agreement, all eligible children who presented throughout the study period and satisfied the inclusion criteria were enrolled one after the other.

Inclusion and Exclusion Criteria

Children aged 1–11 years with fever ($\geq 38^{\circ}\text{C}$) and informed consent were included. Children having insufficient clinical or laboratory data, recent antibiotic usage within the previous 48 hours, or suspected congenital urinary tract abnormalities were not included.

Data Entry and Analysis

For statistical analysis, the information from the surveys and lab results was imported into Microsoft Excel and then exported to SPSS version 27. Continuous variables were summarized using descriptive statistics such as mean, median, and mode, whilst categorical variables were summarized using frequencies and percentages. Chi-square tests were used to assess the relationship between demographic characteristics (such as age and gender) and UTI positive. P-values below 0.05 were regarded as statistically significant.

RESULTS

The study comprised 96 individuals in total, of which 54 (56.3%) were male and 42 (43.8%) were female. On a scale of 1 to 11, where 1 represents the youngest, the average age result was 4.88 ± 2.72 . Over the previous six months, patients recorded an average of 1.12 ± 1.06 occurrences of urinary tract infection (UTI). The mean duration of symptoms was around 3.81 ± 1.39 days, and the average highest reported temperature while disease was $101.81 \pm 0.77^{\circ}\text{F}$ (Table 1).

Regarding clinical symptoms, 60 out of all 96 patients (62.5%) reported both urgency and higher urinary frequency (Table 2). In instances of increased urination, these indications were more common in females (71.4%) than in males (55.6%). But according to a chi-square test, there was no statistically significant correlation among gender and more urination ($\chi^2 = 2.540$, $p = 0.111$), suggesting that the distribution of genders had no discernible impact on the occurrence of this symptom.

Table 1: Descriptive Statistics of Key Continuous Variables (n = 96)

Variable	Mean	Std. Deviation	Minimum	Maximum
Age (scale 1-5)	4.88	2.72	1	11
UTI Episodes (6 months)	1.12	1.06	0	3
Max Temperature (°F)	101.81	0.77	100.5	103.1
Duration of Symptoms (days)	3.81	1.39	2	6

Age and the number of UTI episodes in the previous six months ($r = 0.421$, $p < 0.01$) and the highest temperature ($r = 0.489$, $p < 0.01$) were shown to be significantly positively correlated. Furthermore, a significant association was found between the highest temperature and UTI episodes ($r = 0.684$, $p < 0.01$), indicating that greater fever presentations are linked to recurrent infections.

Table 2: Frequencies of Clinical Symptoms and Gender (n = 96)

Variable	Categories	Frequency	Percent (%)
Gender	Male	54	56.3%
	Female	42	43.8%
Urgency	Yes	60	62.5%
	No	36	37.5%
Increased Urination	Yes	60	62.5%
	No	36	37.5%

In a sample of 96 patients, a cross-tabulation of gender and culture findings showed that 44.4% of male patients had positive urine cultures, whereas 71.4% of female patients did. However, the difference was not considered significant ($\chi^2 = 1.165$, $p = 0.280$), presumably due to the limited sample size. The findings do point to a tendency for female UTI patients to have greater bacterial culture positive. Of the 96 patients, females (71.4%) had a substantially higher culture positive rate than men (44.4%) ($p =$

0.008). *Proteus* (6.3%), which was exclusively discovered in men, *Klebsiella* (37.5%), and *E. coli* (56.3%) were the most often isolated organisms in both sexes (Table 3). Gender-specific preferences were evident in antibiotic usage patterns, with Amoxicillin, Augmentin, Ceftriaxone, and Levofloxacin being used in both groups, but Ciprofloxacin and Amikacin were administered solely to females and Cefixime and Cefuroxime to males.

Table 3: Comparison of culture results and isolated organisms among males and females.

Parameter	Female (n = 42)	Male (n = 54)	Total (n = 96)
Culture Result			
► Positive	30 (71.4%)	24 (44.4%)	54 (56.3%)
► Negative	12 (28.6%)	30 (55.6%)	42 (43.8%)
Organisms Isolated			
► <i>E. coli</i>	24 (57.1%)	30 (55.6%)	54 (56.3%)
► <i>Klebsiella</i>	18 (42.9%)	18 (33.3%)	36 (37.5%)
► <i>Proteus</i>	0 (0.0%)	6 (11.1%)	6 (6.3%)

DISCUSSION

This study examined the clinical and microbiological features of 96 patients' UTIs, paying special attention to the distribution of genders, culture findings, pathogenic organisms, and antibiotic use trends. The results showed a statistically significant variance ($p = 0.008$) in the number of culture-positive incidents in males (44.4%) and females (71.4%). This is in line with previous research showing that anatomical

characteristics, such as a shorter urethra and closeness to the anal area, which promote bacterial ascend, make females more susceptible to UTIs [7].

The most frequently isolated bacterium was *Escherichia coli*, which accounted for 56.3% of positive cultures. This is consistent with international findings that show *E. coli* to be the most common pathogen in hospital-associated and community-

acquired UTIs [8]. *Proteus* was only discovered in men with the disease (6.3%), while *Klebsiella* strains were the next most prevalent (37.5%). These findings suggest that there may be gender-related heterogeneity in the distribution of pathogens, which might be impacted by urogenital structure or hygiene habits [9]. The most common clinical symptoms, affecting 62.5% of patients, were urgency and increased urination, which is in line with the usual symptomatology of the lower urinary tract [10]. Fever and UTI recurrence were strongly connected with age, indicating that patients who are older may have more severe or chronic infections. Furthermore, a considerable connection ($r = 0.684$) was seen between greater maximum temperature and recurring infections, suggesting that recurrent urinary tract infections may be linked to systemic involvement or consequences such as pyelonephritis.

Patterns of antibiotic use showed notable gender disparities. Only females were administered Ciprofloxacin and Amikacin, whereas only men were prescribed Cefixime and Cefuroxime. Levofloxacin, Ceftriaxone, Augmentin, and Amoxicillin were often utilised in both sexes. These discrepancies might be due to gender-specific clinical presentations, resistance patterns, or empirical prescription practices. Notably, despite worries about increasing resistance, the widespread use of fluoroquinolones like Ciprofloxacin necessitates more prudent antibiotic management [11]. The significant association between gender and culture positivity, along with organism-specific and antibiotic-use patterns, underscores the need for personalized treatment guided by culture and sensitivity reports.

CONCLUSION

In summary, this study shows that *E. coli* is the most common pathogen in female UTI patients, with a noticeably greater culture positive. Both the distribution of organisms and the prescription patterns of antibiotics showed gender-based disparities. In order to enhance UTI management, our results highlight the necessity of focused, gender-sensitive diagnostic and therapeutic approaches.

REFERENCES

- [1] Khan S, Hanif MS, Seroosh N, Ikhtiar F, Batool U, Jazba NU, Wajid A, Arif A, Wajid U. INCIDENCE OF ANTIMICROBIAL-RESISTANT *ESCHERICHIA COLI* IN UROPATHOGENIC INFECTIONS: AN EMERGING THERAPEUTIC DILEMMA.
- [2] Yang SS, Tsai J-D, Kanematsu A, et al. Asian guidelines for urinary tract infection in children. *J Infect Chemother* 2021; 27: 1543–1554.
- [3] Renko M, Salo J, Ekstrand M, et al. Meta-analysis of the risk factors for urinary tract infection in children. *Pediatr Infect Dis J* 2022; 41: 787–792.
- [4] Wang G, Lin J, Xu J, et al. Analysis of relevant influencing factors for recurrent urinary tract infections in children: exploring predictive factors and intervention measures. *Am J Transl Res* 2024; 16: 4779.
- [5] White B. Diagnosis and treatment of urinary tract infections in children. *Am Fam Physician* 2011; 83: 409–415.
- [6] Williams G, Craig JC. Long-term antibiotics for preventing recurrent urinary tract infection in children. *Cochrane Database Syst Rev*, 2019; 35: 520-535.
- [7] Timm MR, Russell SK, Hultgren SJ. Urinary tract infections: pathogenesis, host susceptibility and emerging therapeutics. *Nat Rev Microbiol* 2025; 23: 72–86.
- [8] Thompson D, Xu J, Ischia J, et al. Fluoroquinolone resistance in urinary tract infections: Epidemiology, mechanisms of action and management strategies. *BJUI Compass* 2024; 5: 5–11.
- [9] Flores-Mireles AL, Walker JN, Caparon M, et al. Urinary tract infections: epidemiology, mechanisms of infection and treatment options. *Nat Rev Microbiol* 2015; 13: 269–284.
- [10] Brandström P, Hansson S. Urinary tract infection in children. *Pediatr Clin* 2022; 69: 1099–1114.
- [11] Jent P, Berger J, Kuhn A, et al. Antibiotics for preventing recurrent urinary tract infection: systematic review and meta-analysis. In: *Open Forum Infectious Diseases*. Oxford University Press, p. ofac327.
- [12] Sarwar U, Naeem M, Nurjis F, Karim S, Raza A. Ultrasound-mediated in vivo biodistribution of coumarin-labeled sorafenib-loaded liposome-based nanotheranostic system. *Nanomedicine*. 2022 Oct 1;17(25):1909-27

