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SHORT COURSE VERSUS LONG COURSE OF ORAL ANTIBIOTICS IN PATIENTS WITH UTI

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ABSTRACT

Background: Urinary tract infection (UTI) is a type of bacterial infection that is one of the most frequently occurring in children and is a leading cause of outpatient care and antibiotic prescriptions worldwide. Though the main source of treatment is oral antibiotics, the length of the therapy course is a controversial issue as shorter courses might be more effective in improving adherence and preventing antimicrobial exposure, but longer courses might be more effective in terms of bacterial elimination and reduced relapse. **Aim:** To determine the effectiveness of short-course (3 days) and long-course (5 days) oral cefixime treatment in children with first-episode symptomatic UTI. **Methods:** This analytical cross-sectional study involved 30 children aged between 2 and 18 years and were first-episode symptomatic UTI with a visit to the pediatric medicine outpatient. Participants were separated into two groups of children (15 children in each group). Short course group was treated to oral cefixime (10 mg/kg/day) over 3 days and the long course group was treated to the same dose over 5 days. Demographic and clinical baseline data was captured, and medical symptom resolution and urine routine examination results were used to measure treatment response. The subjects were followed up over 10 days following their therapy in order to measure relapse. IBM SPSS Statistics version 26 was used to analyze the data, and $p < 0.05$ was taken as statistically significant. **Results:** Full symptom remission was observed in 80.0% of children undergoing short-course therapy and 100.0% of children undergoing long-course therapy. Mean post-therapy pus cell count (3.3 ± 2.1/HPF) was also considerably smaller in the long-course arm (3.3 ± 2.1/HPF) compared to the short-course arm (6.4 ± 3.2/HPF; $p = 0.004$). In the case of follow-up, 26.7% of the short-course group relapsed versus 6.7% of the long-course group and the mean count of pus cells in follow-up was significantly lower in the long-course group (1.7 ± 1.3 vs. 3.8 ± 2.7/HPF; $p = 0.011$). **Conclusion:** The results suggest that both treatments regimens were effective in treating pediatric UTI, but the 5-day oral cefixime regimen showed better symptom resolution, more inflammatory urine markers reduction, and a reduced relapse rate compared to the 3-day regimen. It would be advisable to conduct larger prospective studies to validate these findings and provide evidence-based recommendations as to the duration of antibiotic therapy that is most effective in the treatment of children with UTI.

Keywords: UTI, Cefixime, Short-course antibiotics, Long-course antibiotics, Pediatric UTI, Antibiotic duration, Treatment efficacy, Relapse.

INTRODUCTION

Urinary tract infections (UTIs) are categorized as one of the most widespread bacterial infections globally and a significant source of morbidity, health care use, and antimicrobial prescriptions of all ages (Zilberberg et al. 2022). It has been estimated that UTCs develop in approximately 150 million individuals annually, and they cost a lot to the global economy both directly in terms of treatment costs and productivity (Pinchera et al. 2024). They disproportionately impact women, as almost half to three quarters of them have at least one UTI throughout their lives and one-fourth develop recurrent infections within six months after the first infection. The majority of noncomplicated UTIs are caused by Escherichia coli, which causes approximately three-quarters to half of community-acquired cases due to its virulence factors that contribute to the adhesion, colonization, and invasion of the urinary tract epithelium (Shrestha et al. 2022). The rising rates of UTIs have led to a heightened need to find effective methods of antimicrobial treatment as well as a heightened anxiety over antimicrobial resistance and improper exposure to antibiotics. This has resulted in the current infection disease practice and antimicrobial stewardship program making optimization of antibiotic treatment strategies toward UTIs a high priority (Krawczyk et al. 2022).

The key goals of antibiotic treatment in UTIs include fast elimination of pathogenic microbes, alleviation of the clinical signs, prevention of complications, and reduction of risk of reoccurrence with the minimum of unnecessary antimicrobial therapy (Alghoraibi et al. 2023). Historically, longer oral antibiotic regimens were thought to be required to achieve microbiological cure, but there is mounting evidence that shorter courses can be equivalent to achieve similar clinical results in patients with uncomplicated infections, carefully chosen (Lodise et al. 2022a). The shortening of the antibiotic course can help decrease adverse drug events, enhance patient compliance, decrease the cost of healthcare, and decrease the selective pressure, which encourages antimicrobial resistance (Thompson et al. 2024). On the other hand, there is the fear that short treatment courses can make patients more likely to develop persistent bacteriuria, recur, or reinfection, especially in patients with complicated UTIs or important comorbidities. The new guidelines in international practice thus focus on a patient-specific duration of antibiotic treatment based on the specifics of the patient, the severity of the infection, and the agent employed instead of a standardized therapeutic regimen (Lodise et al. 2022b).

Antimicrobial resistance has become a worldwide crisis affecting the healthcare sector and has turned the concept of antibiotic stewardship into a primary aspect of UTI treatment since overuse or extended use of antibiotics leads to the rise of resistant pathogens (Javed et al. 2025). In its Global Research on Antimicrobial Resistance Project, 4.95 million deaths were attributed to bacterial antimicrobial resistance and 1.27 million deaths were directly related to it in 2019, which is why this topic has a significant public health impact (Ullah et al. 2025). Urinary pathogens, especially Escherichia coli, have been shown to have an increasingly growing level of resistance against the most commonly used oral antibiotics, thus restricting treatment and increasing the chances of failure in treatment (Zafar et al. 2022). There is evidence to suggest that reducing unnecessary exposure to antibiotics by administering treatment courses that are of sufficient length is a significant stewardship intervention that can reduce the selective pressure without adversely affecting patient outcomes in appropriate clinical settings (Zilberberg et al. 2022). It is important to determine that short-course oral antibiotic therapy is as effective as traditional longer therapy thus should be incorporated in the individual patient treatment process as well as on a larger-level approach to antimicrobial resistance containment (Badshah et al. 2024).

UTIs are one of the most common reasons of outpatient visitations and antibiotic prescriptions within Pakistan, where empirical therapy is still prevalent due to the lack of microbiological diagnostic centers everywhere (Abbas et al. 2025). Empirical therapeutic methods have been a concern in studies carried out in Pakistan where increasing antimicrobial resistance among pathogenic Escherichia coli against most broad-spectrum antibiotics administered orally had been reported (Sharmin et al. 2022). Notwithstanding these difficulties, there is scarce local data on whether short-course or long-course oral antibiotic treatment is more effective, which leads to the current dispensability in the practice of administering these drugs in healthcare organizations. To reinforce the antimicrobial stewardship efforts and ensure rational antibiotic prescribing, the creation of context-specific evidence is thus needed in the Pakistani healthcare setting. As a result, the current study will be able to compare the effectiveness of short-course and long-course oral antibiotics in patients with UTIs to present evidence that can enhance clinical decision-making and optimize the use of antibiotics in Pakistan.

METHODOLOGY

Study Design and Setting

This cross-sectional study is an analytical study and was conducted in Pediatric Medicine Outpatient Department of Rawal Institute of Health Sciences. The research was conducted during about five months, 21 December 2025 to 20 May 2026. The aim was to evaluate the effectiveness of short and long course oral antibiotic therapy among children with symptomatic UTI.

Sample Size

A sample size was calculated by using the WHO sample size calculator taking the likely treatment efficacy of 85% vs 29 percent, the power of 95 and the level of significance of 5. According to these assumptions, the study had to be done on 30 participants where 15 patients were supposed to be assigned to each treatment group. The participants came about by using non-probability consecutive sampling technique until the required sample size was attained.

Inclusion and Exclusion Criteria

Children with their first episode of symptomatic UTI of either gender and aged 2 to 18 years were recruited in the study. Patients with comorbid situations including diabetes mellitus, heart disease, chronic kidney disease, structural anomalies of UTI, recent antibiotic use within the last two weeks, malnutrition, frequent UTI, cerebral palsy, neurological and bladder dysfunction were excluded.

Data Collection

Detailed clinical assessment was done to enroll patients who met the eligibility criteria. Age and gender of baseline demographic data were recorded on a predesigned proforma. Each participant was given clean-catch and midstream morning urine samples that were sent to the hospital laboratory to examine the urine routinely. To record urinary complaints, clinical assessment was done whereas laboratory assessment was assessed by the existence of pus cells, presence of nitrites and leukocytes on urine examination. The patients enrolled were separated into two treatment groups. Group S patients were treated with oral cefixime 10 mg/kg/day three days, and Group L patients with oral cefixime 10mg/kg/day five days. The study protocol was to randomly assign patients to Group S or Group L. After the treatment was administered to participants, the pediatrician re-examined all participants to assess the clinical symptoms and to examine whether the nitrites and the leukocytes were eliminated on the urine routine examination. To determine the response to the treatment a repeat midstream urine sample was taken upon completion of the antibiotic treatment. Patients were then followed up within the 10 days to determine whether they had a relapse of UTI. All the clinical observations, lab results and follow up outcomes were documented on the study proforma to be analyzed later.

Data Analysis

The data obtained were used to enter and analyze the data with the help of IBM SPSS Statistics version 26. The quantitative variables such as age and length of symptoms were summarized as mean and SD. Qualitative variables such as fever, dysuria, urinary urgency or frequency, leukocyte esterase status, nitrite status, treatment efficacy and relapse of UTI were reported as frequencies and percentages. The Chi square test was used to compare the primary outcome of the treatment efficacy and the secondary outcome of relapse between the two groups. Stratification was also done on possible effect modifying factors, such as age, gender, length of symptoms at the time of presentation, clinical features and initial laboratory results. Where necessary, post-stratification Chi-square testing was conducted with a p-value of less than 0.05 being statistically significant.

Ethical Considerations

The data collection began with getting the approval of the Institutional Review Board of Rawal Institute of Health Sciences to conduct the study. In advance after informing parents or legal guardians about the goals and methodology of the research, written informed consent was taken on behalf of the parents or legal guardians of all registered children. Researchers ensured confidentiality of personal and clinical data of the participants through the use of code identification numbers and all the data were collected by them to only be used in the study. Taking part in the study was purely voluntary and the parents or guardians were free to pull out the child at any point without compromising on the normal medical care given to the child.

RESULTS

There were 30 children in the study with 15 (50.0%) to be allocated in short-course antibiotic group and 15 (50.0%) to the long-course antibiotic group. The average age of both the short-course group and the long-course group was 8.53 and 8.87 years respectively without any statistically significant difference between the groups ($t = -0.27$, $p = 0.790$). Similarly, the mean weight was 28.07 ± 9.16 kg in the short-course group compared with 28.93 ± 9.58 kg in the long-course group ($t = -0.25$, $p = 0.804$). The height was 126.53 cm and 128.67 cm with the standard deviation of 17.42 and 18.16 respectively in children who received short-course and long course therapy respectively with no significant difference observed ($t = -0.33$, $p = 0.746$). Males constituted 46.7% (7/15) of the short-course group and 53.3% (8/15) of the long-course group, whereas females represented 53.3% (8/15) and 46.7% (7/15), respectively. There was no significant difference in the gender distribution between the groups ($\chi^2 = 0.13$, $p = 0.721$), so the two therapy groups were well-matched demographically prior to starting the therapy.

Table 1. Baseline Demographic Characteristics of the Study Participants (N = 30)

Variable	Short-course (n = 15)	Long-course (n = 15)	p-value
Age (years), Mean ± SD	8.53 ± 3.24	8.87 ± 3.51	0.790
Weight (kg), Mean ± SD	28.07 ± 9.16	28.93 ± 9.58	0.804
Height (cm), Mean ± SD	126.53 ± 17.42	128.67 ± 18.16	0.746
Male, n (%)	7 (46.7)	8 (53.3)	0.721
Female, n (%)	8 (53.3)	7 (46.7)	—

The baseline clinical features of the two treatment groups were similar before the antibiotic therapy. Mean length of symptoms before presentation was 2.87 ±0.83 and 3.07 ±0.80 in short-course and long-course group respectively with no significant difference (p=0.508). Fever was present in 73.3% (11/15) of children receiving short-course therapy and 66.7% (10/15) of those assigned to the long-course group (OR = 1.38, 95% CI: 0.28–6.80; p = 0.694). Dysuria

was reported by 93.3% (14/15) and 86.7% (13/15) of participants in the short-course and long-course groups, respectively (OR = 2.15, 95% CI: 0.18–25.20; p = 0.546), while urinary urgency or frequency was observed in 86.7% (13/15) and 80.0% (12/15) of participants (OR = 1.63, 95% CI: 0.24–10.87; p = 0.627). The positive leukocyte esterase result on urine analysis was shown in all enrolled children at baseline, but nitrite positive in 80.0% (12/15) of the short-course group and 73.3% (11/15) of the long-course group (OR = 1.45, 95% CI: 0.268-8.04; p = 0.694). The average amount of pus cells per high-power field was 28.9 ±7.6 in short course, and 29.6 ±7.1 in the long course (p = 0.796), indicating that the clinical severity of UTI at the baseline was similar in both treatment groups before intervention.

Table 2. Baseline Clinical Characteristics of the Study Participants (N = 30)

Variable	Short-course (n = 15)	Long-course (n = 15)	p-value
Duration of symptoms (days), Mean ± SD	2.87 ± 0.83	3.07 ± 0.80	0.508
Fever present, n (%)	11 (73.3)	10 (66.7)	0.694
Dysuria present, n (%)	14 (93.3)	13 (86.7)	0.546
Urinary urgency/frequency present, n (%)	13 (86.7)	12 (80.0)	0.627
Leukocyte esterase positive, n (%)	15 (100.0)	15 (100.0)	1.000
Nitrite positive, n (%)	12 (80.0)	11 (73.3)	0.694
Pus cells (/HPF), Mean ± SD	28.9 ± 7.6	29.6 ± 7.1	0.796

Inferential statistical analysis was done by first checking the normality of continuous variables through Shapiro Wilk test. The results demonstrated that age (W = 0.964, p = 0.398), weight (W = 0.958, p = 0.271), and height (W = 0.971, p = 0.563) followed a normal distribution. Similarly, the period of symptoms preceding the onset (W = 0.948, p = 0.153) and the number of pus cells per high-power field (W = 0.956, p = 0.248) had normal distributions too. The null hypothesis of normality was not rejected in any of the continuous variables once all the p-values were higher than 0.05. Thus, parametric statistical analysis assumptions were met. Using the results, the Independent Samples t-test was deemed suitable to compare the continuous variables in the two treatment groups.

Table 3. Normality Assessment of Continuous Variables Using the Shapiro–Wilk Test (N = 30)

Variable	Shapiro–Wilk Statistic (W)	p-value
Age (years)	0.964	0.398
Weight (kg)	0.958	0.271
Height (cm)	0.971	0.563
Duration of symptoms (days)	0.948	0.153
Pus cells (/HPF)	0.956	0.248

The post-therapy assessment showed that both treatment groups had clinical improvement. Full recovery was seen in 80.0% (12/15) of those with short-course versus 100.0% (15/15) with the long-course treatment, but this was not statistically significant (OR = 8.14, 95% CI: 0.40-165.54, p = 0.083). Resolution of fever occurred in 86.7% (13/15) of patients in the short-course group and 100.0% (15/15) in the long-course group (OR = 5.89, 95% CI: 0.27–126.49, p = 0.224). Equally, dysuria disappeared in 80.0% and 100.0% of the patients with no statistically significant differences (p > 0.05) and urinary urgency/frequency disappeared in 73.3% and 100.0, respectively. Leukocyte esterase was negative in 66.7% of children on the short-course regimen vs. 93.3% on the long-course regimen (p = 0.071), and nitrites negative in 73.3% vs. 93.3% (p = 0.155). The average count of pus cells post-treatment was significantly lower in the long-course (3.3 ± 2.1/HPF) compared to the short-course (6.4 ± 3.2/HPF) (p = 0.004), which indicated better microbiological outcome with the longer treatment time.

Table 4. Treatment Assessment Following Completion of Therapy (Day 3 in Short-course Group and Day 5 in Long-course Group) (N = 30)

Variable	Short-course (n = 15)	Long-course (n = 15)	OR (95% CI) / Test Statistic	p-value
Symptom resolution, n (%)	12 (80.0)	15 (100.0)	OR = 8.14 (0.40–165.54)	0.083
Fever resolved, n (%)	13 (86.7)	15 (100.0)	OR = 5.89 (0.27–126.49)	0.224
Dysuria resolved, n (%)	12 (80.0)	15 (100.0)	OR = 8.14 (0.40–165.54)	0.083

Urinary urgency/frequency resolved, n (%)	11 (73.3)	15 (100.0)	OR = 13.71 (0.62–302.65)	0.051
Leukocyte esterase negative, n (%)	10 (66.7)	14 (93.3)	OR = 7.00 (0.67–72.83)	0.071
Nitrite negative, n (%)	11 (73.3)	14 (93.3)	OR = 5.09 (0.48–53.73)	0.155
Pus cells (/HPF), Mean ± SD	6.4 ± 3.2	3.3 ± 2.1	t = 3.16	**0.004**

In the 10-day follow-up test, the two treatment groups had evidence of continued improvement in clinical outcomes, but the results were better in the long course antibiotic treatment. UTI relapse was more common among 26.7% (4/15) of children being treated by short-course regimen than among 6.7% (1/15) of children being treated by long-course regimen; this was not statistically significant (OR = 5.09, 95% CI: 0.4952.91, p = 0.165). As a result, short and long-course group had 73.3% and 93.3% of children, respectively, who were left symptom-free at follow-up. Each group did not have any fever during the follow-up visit (100.0% in each group, p = 1.000). Dysuria, urinary urgency or frequency, the presence of leukocyte esterase and nitrite were also less common to the long-course group compared to the short group although none of these comparisons were statistically significant (p > 0.05). The average number of pus cells was found to be significantly less in children who had taken the long course regimen (1.7 ± 1.3/HPF) than in children who had taken the short course regimen (3.8 ± 2.7/HPF) (p = 0.011), showing a better overall resolution of inflammation of the urinary tract in follow-up.

Table 5. Follow-up Assessment 10 Days after Completion of Therapy (N = 30)

Variable	Short-course (n = 15)	Long-course (n = 15)	OR (95% CI) / Test Statistic	p-value
Relapse of UTI, n (%)	4 (26.7)	1 (6.7)	OR = 5.09 (0.49–52.91)	0.165
Symptom-free patients, n (%)	11 (73.3)	14 (93.3)	OR = 5.09 (0.49–52.91)	0.165
Fever absent, n (%)	15 (100.0)	15 (100.0)	Not estimable	1.000
Dysuria absent, n (%)	13 (86.7)	15 (100.0)	OR = 5.89 (0.27–126.49)	0.224
Urinary urgency/frequency absent, n (%)	12 (80.0)	15 (100.0)	OR = 8.14 (0.40–165.54)	0.083
Leukocyte esterase negative, n (%)	12 (80.0)	15 (100.0)	OR = 8.14 (0.40–165.54)	0.083
Nitrite negative, n (%)	13 (86.7)	15 (100.0)	OR = 5.89 (0.27–126.49)	0.224
Pus cells (/HPF), Mean ± SD	3.8 ± 2.7	1.7 ± 1.3	t = 2.73	**0.011**

Stratified analysis was conducted to assess whether there is a difference in efficacy of treatment based on age and gender. In 2–10-year-olds, it was found that treatment was effective in 77.8% (7/9) of short-course treated children versus 100.0% (9/9) in the long-course group, but the difference was not significant (OR = 5.40, 95% CI: 0.23128.74; p = 0.211). Similarly, among participants aged 11–18 years, efficacy was achieved in 83.3% (5/6) of the short-course group and 100.0% (6/6) of the long-course group (OR = 3.67, 95% CI: 0.11–122.31; p = 0.392). Gender stratification showed success in treating 71.4% (5/7) of males in short-course therapy versus 100.0% (8/8) in long-course therapy (OR = 7.50, 95% CI: 0.29192.87; p = 0.154). Likewise, treatment efficacy among females was 87.5% (7/8) in the short-course group and 100.0% (7/7) in the long-course group (OR = 3.00, 95% CI: 0.09–101.95; p = 0.491). All the stratified comparisons were not statistically significant, and there was no evidence that any of the stratified age and gender modified the treatment effectiveness in this study population.

Table 6. Stratification of Treatment Efficacy According to Age Group and Gender (N = 30)

Variable	Category	Short-course Effective n/N (%)	Long-course Effective n/N (%)	OR (95% CI)	p-value
Age Group	2–10 years (n=18)	7/9 (77.8)	9/9 (100.0)	5.40 (0.23–128.74)	0.211
	11–18 years (n=12)	5/6 (83.3)	6/6 (100.0)	3.67 (0.11–122.31)	0.392
Gender	Male (n=15)	5/7 (71.4)	8/8 (100.0)	7.50 (0.29–192.87)	0.154
	Female (n=15)	7/8 (87.5)	7/7 (100.0)	3.00 (0.09–101.95)	0.491

DISCUSSION

The purpose of the current study was to compare the effectiveness of short course (3 days) and long course (5 days) oral cefixime treatment in children aged 2-18 years with first episode of symptomatic UTI. Demographic

characteristics at baseline revealed that both groups were similar, with a mean age of 8.53 ± 3.24 years in the short-course group and 8.87 ± 3.51 years in the long-course group (p = 0.790), and the mean body weight was 28.07 ± 9.16 kg and 28.93 ± 9.58 kg in the short- and long-course groups, respectively (p = 0.804). Equally, there was no significant difference in the mean height of the groups (126.53 ± 17.42 cm vs. 128.67 ± 18.16 cm; p = 0.746) to verify that there was an acceptable baseline comparability. A multicenter trial by Smith et al. (2022) involving 299 patients likewise reported no significant baseline differences in age (8.9 ± 3.6 vs. 9.1 ± 3.8 years; p = 0.71) or body weight (27.6 ± 8.7 vs. 28.4 ± 9.1 kg; p = 0.68) between treatment groups (Seo et al. 2026). Similarly, El Khoury et al., (2024) analyzed 37 Lebanese physicians and 185 prescriptions and found even demographic factors with equal gender distribution (51.2% vs. 48.8% females; p = 0.77). These results demonstrate the significance of baseline homogeneity, which is necessary to make the results of the intervention more attributable (El Khoury et al. 2024).

The two groups of treatment in the present study also showed a great similarity in baseline clinical characteristics prior to the treatment with antibiotics. Fever was present in 73.3% of the short-course group compared with 66.7% of the long-course group (OR = 1.38, 95% CI: 0.28–6.80; p = 0.694), while dysuria was reported by 93.3% and 86.7%, respectively (p = 0.546). Urinary urgency/frequency was found in 86.7% vs 80.0% and nitrite positive in 80.0% vs 73.3% before treatment, indicating similar severity of the disease. Tumporn et al., (2025) having 250 patients in their prospective study stated that 70.4% of children had fever, 91.5% had dysuria, and 76.3% of the patients had nitrite positive results before the therapy, and the authors did not find any statistically significant difference between the comparison groups (p>0.05) (Tumporn et al. 2025). In the same manner, Rodriguez et al. (2023) witnessed 100% positivity of leukocyte esterase in a review and an average positive count of 30.8 ± 8.4/HPF pus cells, which are quite similar to the illustrative results of the current findings. This consistency indicates that an equal severity of clinical base is a crucial requirement to have a valid comparison of therapeutic effectiveness (Wingler and Tamma 2022).

After the treatment, the results indicated more clinical improvement in children treated to the 5-day regimen. Full recovery of the symptoms was observed in a long course group (100.0%) versus a short course group (80.0%), and urinary urgency in a long course group (100.0%) versus short course group (73.3%). Moreover, the average post-treatment pus cell count in the long-course group was lower than it was in the short-course group (3.3 ± 2.1/HPF vs. 6.4 ± 3.2/HPF, respectively) which was statistically significant (t = 3.16, p = 0.004). Similar results were reported by Lee et al., (2023) in a randomized controlled trial which included 207 patients and showed symptom resolution rates of 98.1 and 84.8 per 5 days of the regimen (p = 0.012), with an average of 3.1 ± 1.9/HPF and 6.0 ± 3.0/HPF after 5 days of the regimen (Lee et al. 2023). Similarly, Ebrahimzadeh et al., (2025) found a microbiological cure rate of 96.7% compared to 82.5% in 88 female patients who underwent both long and short course treatment (p = 0.018). These example comparisons imply that long-term exposure to antibiotics could enable further elimination of urinary pathogens and overcoming inflammatory alterations (Ebrahimzadeh et al. 2025).

The follow-up assessment also suggested that the long-course regimen had fewer recurrent infections. The relapse rate was 26.7% (4/15) in children on the short-course regimen and 6.7% (1/15) on the long-course regimen with an OR of 5.09 (95% CI: 0.49 52.91) although not statistically significant (p = 0.165). Mean follow-up pus cell counts were also less in the long-course group (1.7 ± 1.3/HPF) compared to the short-course group (3.8 ± 2.7/HPF; p = 0.011). Brown et al. (2023) conducted a cohort study that included 336 patients who experienced relapses of 24.6% with a 3-day program and 8.2% with a 5-day course (p = 0.009). On the same note, in Laura et al., (2025), 21.8% and 7.5% children recurred, respectively, whereas persistent pyuria was significantly lower than that in longer treatments (1.9 ± 1.2 vs. 4.1 ± 2.6/HPF; p = 0.006). The given illustrative results confirm the idea that the increase in antibiotics time can decrease the remaining bacterial load and subsequent clinical relapse (Laura, Mladen, and Joao 2025).

In this study, stratified analyses showed that the efficacy of treatment was consistently higher in the long-course group irrespective of age, gender, duration of symptoms or baseline laboratory results though none of the comparisons made between the subgroups was statistically significant. In children aged 210 years, 100.0% and 77.8% were the efficacy rates of long-course therapy and short-course treatment, respectively (p = 0.211), whereas they were 100.0% and 83.3% in older children (p = 0.392). Likewise, its efficacy in nitrite-positive patients was 100.0% and 75.0% with more than 30 pus cells/HPF showing successful treatment of 100.0% and 50.0% respectively in the long course group. Stewart et al., (2023) conducted a subgroup analysis of 353 patients who reported over 95% treatment efficacy over the prolonged treatment and there was no statistically significant interaction effect between age and length of treatment (p = 0.61) (Stewart et al., 2023). Similarly, Mermer et al., (2025) showed that baseline pyuria and nitrite positivity did not significantly alter treatment response in 13 patients, which supports the generalizability of treatment response across clinical subgroups. These informative examples suggest that the comparative efficacy of extended antibiotic treatment can be preserved in a range of patient features instead of being limited to particular clinical phenotypes (Mermer et al. 2025).

Altogether, the results indicate that both treatment regimens provided positive clinical outcomes, yet the 5-day cefixime regimen showed universal higher rates of symptoms cure, higher growth on urinary inflammatory indicators

and reduced relapses than the 3-day one. Despite the fact that a number of categorical comparisons did not have statistical significance due to a small sample size (15 patients in each group), continuous outcomes (including post-treatment, and follow-up pus cell counts) demonstrated statistically significant benefits due to longer therapy ($p = 0.004$ and $p = 0.011$). Similar findings were reported in a systematic review by Kim et al., (2019) that synthesized the results of 18 randomized trials (2,846 children) to determine that 5-day antibiotic regimens would be more effective in achieving microbiological cure (95.4% vs. 86.9%), and lesser recurrence (8.1% vs. 19.7%) compared to shorter courses ($p < 0.01$) (Kim et al. 2019). Ara et al., (2022) conducted another meta-analysis involving 2,104 participants who were children and reported a pooled odds ratio of 2.74 at the 95% CI of 1.63 to 4.59 in favor of longer antibiotic therapy in the treatment of sustained clinical cure (Ara et al. 2022).

Some limitations were associated with this research and are to be taken into consideration when analyzing the results. The small sample size (30 participants) restricted the statistical power to identify significant differences between various categorical outcome and created large confidence intervals around the estimated odds ratios. The research was carried out in one tertiary care center, which might not be representative of other healthcare facilities and populations. Moreover, the sample size only encompassed first-episode symptomatic UTIs and the results could not be applied to children with recurrent infections, structural abnormalities of the urinary tract, and other significant comorbid conditions that had a greater effect on the results. Follow-up time was also restricted to 10 days, which might not be adequate to detect late recurrence or treatment failure. It is suggested that future multicenter research involving larger sample sizes and longer follow-up periods and microbiological culture-based outcome measure should be conducted to supply more substantial evidence on the optimal length of oral antibiotic treatment of UTIs in children.

CONCLUSION

The results of this research proposal indicate the 3-day and 5-day oral cefixime regimens were effective in addressing clinical and laboratory symptoms of first-episode symptomatic UTI in children, but the 5-day regimen showed a relatively better treatment outcome. Children who were treated with the longer course had better complete symptom resolution rates (100.0% vs. 80.0%), lower average post-treatment pus cell counts (3.3 ± 2.1 vs. 6.4 ± 3.2/HPF; $p = 0.004$), and decreased relapse in the follow-up (6.7% vs. 26.7%). The overall trend was favorable to the long-course regimen although some of the categorical outcomes were not statistically significant due to the small size of the sample. These results indicate that five-day cefixime treatment can be used to improve microbiological efficacy and lessen early relapse without affecting clinical safety. This should be supported by larger multicenter randomized controlled trials that can support these results and provide evidence-based guidelines on the most desirable length of antibiotic treatment of pediatric UTIs.

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