



Frequency of Urinary Tract Infection in Simple Febrile Seizures in Children Aged 6 Months to 5 Years

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ABSTRACT

Background: The most common type of convulsion in young children is febrile seizures. Urinary tract infections (UTIs) may be to blame, but they may not be found without proper testing. **Objective:** To determine the frequency of UTIs in children aged 6 months to 5 years presenting with simple febrile seizures. **Methodology:** This descriptive cross-sectional study took place over six months, from September 6, 2024 to March 06, 2025, at the Mayo Hospital in Lahore, in the Department of Pediatric Medicine, Unit II. A non-probability consecutive sampling method was used to include 102 children between the ages of 6 months and 5 years who were having simple febrile seizures. To identify UTI, a urine complete examination (UCE) and a urine culture and sensitivity test were done. We used SPSS version 26.0 to look at the data and chi-square tests for subgroup analysis. A p-value of less than 0.05 was considered statistically significant. **Results:** There were 102 children, and the average age was 29.45 months with a range of 15.30 months. 56.86% were boys. It took an average of 6.78 ± 3.25 minutes for a seizure to happen, and all the children had fever (mean: $38.85 \pm 0.65^\circ\text{C}$). UTI was found in 15.69% of cases, with Escherichia coli being the most common strain (62.50%). UTI was strongly linked to younger age (6–12 months, $p=0.041$) and seizures lasting less than 5 minutes ($p=0.048$). **Conclusion:** A significant proportion of children with simple febrile seizures had underlying UTIs, highlighting the need for routine urine screening in such cases to prevent complications.

INTRODUCTION

The most common type of convulsion in young children is febrile seizures, which usually happen when they have a fever and aren't sick in some other way [1]. About 2 to 5 percent of children between the ages of 6 months and 5 years have them, which makes them a big problem in pediatrics [2]. People who have simple febrile seizures have them all over, they last less than 15 minutes, and they don't happen again in 24 hours [3]. The exact mechanism is still not clear, but it is thought that these seizures are caused by an immature brain's overreaction to cytokines released by fever and high body temperature [4].

One of the most important things to do when a child comes in with febrile seizures is to look for possible underlying reasons, especially infections [5]. People know that urinary tract infections (UTIs) are a common bacterial illness in children and can make them more likely to get fevers [6]. In this age group, UTIs often

have vague symptoms like fever, irritability, nausea, or feeling tired, which makes it hard to diagnose without specific lab tests [7]. Because of this, febrile seizures may be the first sign of an undetected UTI, which could cause delays in diagnosis and treatment [8].

In the past, different studies have found different links between febrile seizures and UTIs, with rates ranging from 5% to 30%. This diversity is probably because of different study groups, diagnosing criteria, and changes in the number of infections in different areas [9]. Because leaving untreated UTIs can lead to damage in the kidneys and other long-term problems, it is very important to catch them quickly and treat them properly. However, in many clinical settings, children with febrile seizures don't always get a regular urine analysis, which could mean that they aren't properly diagnosed [10,11].

To improve clinical screening methods, it is important to know how often UTIs happen in children

who are having simple febrile seizures. Finding these UTIs early may help avoid problems like pyelonephritis and kidney damage, and it may also keep people from having to go through pointless tests when the chance of infection is low.

Objective

To find out the frequency of UTI among children presenting with simple febrile seizures aged between 6 months and 5 years.

MATERIALS AND METHODS

Study Design and Settings

The study took place over six months at the Mayo Hospital in Lahore in the Department of Pediatric Medicine, Unit 2. It was a descriptive cross-sectional study and data was collected during the period from September 6, 2024 to March 06, 2025.

Inclusion and Exclusion Criteria

According to the practical description, children aged 6 months to 5 years who had febrile seizures were included. This included both boys and girls who had simple febrile seizures. Children with known brain diseases, a family history of seizures or epilepsy, a history of birth asphyxia, or who were taking anti-epileptic drugs were not allowed to take part.

Sample Size and Sampling Technique

The WHO sample size tool was used to figure out that the sample size should be 102 cases, with a 95% confidence interval, a 7% absolute precision, and a 15.2% chance that children would have febrile seizures and a UTI. A non-probability, consecutive sampling technique was used for patient selection.

Data Collection

Over the course of six months after the summary was approved, 102 cases were studied. Children from the Department of Pediatric Medicine, Unit II, Mayo Hospital, Lahore who met the criteria for inclusion and exclusion were accepted after getting synopsis approved via Ref No. CPSP/REU/PED-2021-066-6688 Dated: September 02, 2024. The Institutional Review Board (IRB) also gave the permission. Parents or guardians gave their written permission after being fully informed. An organized proforma was used to record demographic information. Along with regular studies, a urine complete, urine culture and sensitivity tests were done. Supportive care was given, such as IV fluids, O₂ inhalation, and antipyretics. Based on the results of the urine culture, antibiotic treatment was given.

Statistical Analysis

SPSS version 26.0 was used to enter and examine the data. Mean and standard deviation were calculated for quantitative variables such as age, weight, duration of seizures, and temperature. Qualitative factors like gender, seizure type, presence of UTI, and state of

consciousness were broken down into frequencies and percentages. A p-value less than 0.05 was thought to be statistically significant. The data were separated by age, gender, weight, and length of seizure. Post-stratification, the chi-square test was applied.

RESULTS

Table 1 shows information about 102 children who had simple febrile seizures, including their age, gender, and current health condition. There were 56.86% boys and 43.14% girls, with a mean age of 29.45 ± 15.30 months. The average weight was 12.15 kg, with a range of 2.80 kg. 47.06% of seizures lasted less than 5 minutes, 34.31% lasted between 5 and 10 minutes, and 18.63% lasted between 11 and 15 minutes. The average length of a seizure was 6.78 ± 3.25 minutes. It was $38.85 \pm 0.65^\circ\text{C}$ on average when the children first showed up, and all of them (100%) had a fever.

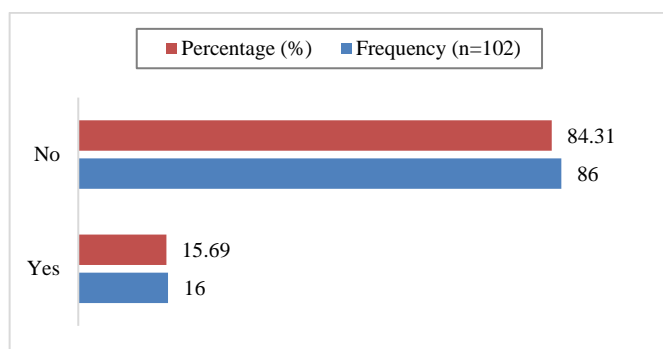
Table 1

Demographic and Clinical Characteristics of Study Participants

Variable	Frequency (n=102)	Percentage (%)
	Mean \pm SD	29.45 ± 15.30
Age (months)	6 – 12	18 17.65
	13 – 24	22 21.57
	25 – 36	21 20.59
	37 – 48	20 19.61
	49 – 60	21 20.59
Weight (kg)	Mean \pm SD	12.15 ± 2.80
Gender	Male	58 56.86
	Female	44 43.14
	Mean \pm SD	6.78 ± 3.25
Seizure Duration (min)	< 5 minutes	48 47.06
	5 – 10 minutes	35 34.31
	11 – 15 minutes	19 18.63
Temperature ($^\circ\text{C}$)	Mean \pm SD	38.85 ± 0.65
Fever at Presentation	102	100.00%

Figure 1

Frequency of Urinary Tract Infection (UTI) in Study Participants



This graph shows how often people in the study got UTIs. Based on a urine complete examination (UCE), 16 of the 102 children (15.69%) had a UTI and 86 (84.31%) did not.

Figure 2
Bacterial Isolates in UTI-Positive Cases (n=16)

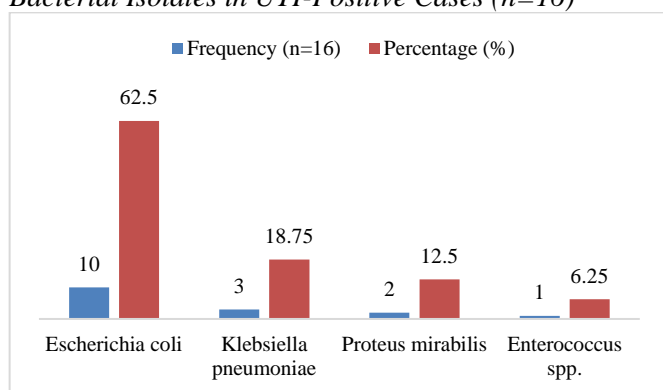


Figure 2 shows how the bacterial strains were spread out in the 16 people who had a UTI. The bacterium that was found most often was *Escherichia coli* (62.50%), then *Klebsiella pneumoniae* (18.75%), *Proteus mirabilis* (12.50%), and *Enterococcus spp.* (6.25%).

Table 2
Stratification of UTI by Age, Gender, and Seizure Duration

Variable	UTI Positive (n=16)	UTI Negative (n=86)	p-value (χ^2 test)
Age (months)	6 – 12	4	0.041
	13 – 24	3	0.089
	25 – 36	3	0.176
	37 – 48	3	0.312
	49 – 60	3	0.421
Gender	Male	9	0.528
	Female	7	0.324
Seizure Duration (min)	< 5 minutes	7	0.048
	5 – 10 minutes	6	0.072
	11 – 15 minutes	3	0.161
	> 15 minutes	0	

Table 2 shows how UTI cases are divided into groups based on age, gender, and length of seizure. It was found that there was a strong link between UTI and age 6–12 months ($p=0.041$) and seizures lasting less than 5 minutes ($p=0.048$). However, there was no significant link found between UTI and gender ($p=0.528$ for men

and $p=0.324$ for women), other age groups, or seizure lengths.

DISCUSSION

Our study examined how often UTIs happened in children with simple febrile seizures (SFS) between the ages of 6 months and 5 years. Out of the 102 children who were studied, 16 (15.69%) were found to have a UTI after a urine complete examination (UCE) and urine culture. These results are in line with those of earlier studies that found UTI rates in children with febrile seizures to be between 5% and 30% [12]. The different stated rates in different studies could be because of different diagnosis criteria, study groups, and changes in how common germs are in different areas.

The most common type of bacteria found in our study was *Escherichia coli*, which was responsible for 62.50% of UTIs. It was followed by *Klebsiella pneumoniae* (18.75%), *Proteus mirabilis* (12.50%), and *Enterococcus spp.* (6.25%). This pattern of bacteria matches what other research has found, which is that *E. coli* is the most common uropathogen in juvenile UTIs [13]. A study by Costea et al. found that 70% of UTIs in children with febrile seizures were caused by *E. coli* and 15% were caused by *Klebsiella spp.* [14]. These similarities make it even more important to find them early and treat them with antibiotics that are specifically designed to stop problems like pyelonephritis and inflammation of the kidneys.

A strong link was found between having a UTI and being younger, especially in children 6 to 12 months old, where 4 out of 18 (22.22%) had one ($p=0.041$). Previous study has shown that younger children are more likely to get UTIs because their urethras are shorter and their immune systems are not fully developed [15]. A study by Naseri et al. found that 28% of feverish babies younger than 12 months had a UTI, which backs up our results [16]. These results show how important it is to check urine, especially in younger children who are having seizures while they are febrile.

When looking at the features of seizures, having a UTI was significantly linked to shorter seizure length (<5 minutes) ($p=0.048$). Some studies, on the other hand, found no significant link between the length of a seizure and the number of UTIs [17]. A recent study on UTI in Pediatrics, on the other hand, said that febrile seizures, even short ones, should be a reason to check for a UTI, especially if there are no other sources of infection [13]. Our results back up this suggestion and show how important it is to have a low threshold for urine tests in young children with seizures who are febrile.

On the other hand, there was no significant link between the number of UTIs and gender ($p=0.528$ for males and $p=0.324$ for females). This is in line with

previous research that found that while females are more likely to get UTIs overall, the number of UTIs related to febrile seizures does not differ significantly between genders [18]. Because untreated UTIs can have serious health effects, especially in young children who are more likely to have kidney problems, our study shows how important it is to routinely test the urine of pediatric patients who are having febrile seizures.

Study Strengths and Limitations

Our study's main strength is that it had clear criteria for who could be included. This made sure that we only looked at children with simple febrile seizures, without brain problems or epilepsy that might have happened before. It was also easier to diagnose UTIs when both the urine complete examination (UCE) and the urine culture were used. Structured statistical analysis is another strength that made it possible to make meaningful comparisons between age groups and seizure types. But the study has some flaws, like the fact that it was only done at one place, which means that the results

might not be applicable to larger groups of people. Also, the relatively small sample size (n=102) may have made it harder for the statistics to find correlations more precisely. To confirm these results and find out what effects UTIs have on children who have febrile seizures over time, more joint studies with bigger sample numbers and longer follow-ups are needed.

CONCLUSION

Our research showed that 15.69% of children with simple febrile seizures also have a UTI. The risk of having a UTI was higher in children aged 6 to 12 months and in children whose seizures lasted less than 5 minutes. *Escherichia coli* was the most common type of bacteria found, which shows how important it is to check urine early and use specific antibiotics. Because an untreated UTI can lead to other problems, our results support regular urinary testing in young children who are having febrile seizures to make sure they get the right diagnosis and care right away.

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