

# Febrile Seizures in Children

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## Key points:

- Introduction of Febrile Seizures
- Types and Risk Factors
- Clinical Presentation of Febrile Seizures
- Indications for Medical Attention
- Management and Treatment
- Prognosis and Outcomes
- Nurse's Role in Febrile Seizures

Febrile seizures (FS) are convulsive episodes associated with fever, primarily affecting children between 6 months and 5 years of age, in the absence of central nervous system infections. These events are most common around the second year of life. Fever, resulting from immune-mediated inflammatory responses during infections, increases neuronal excitability, which can precipitate seizures. Contributing risk factors include viral infections, genetic susceptibility, neurodevelopmental disorders, micronutrient deficiencies (such as zinc and iron), maternal smoking, and psychological stress. While the majority of FS are benign and resolve without lasting effects, they can be distressing for caregivers and require careful management. However, prolonged febrile seizures may increase the likelihood of developing temporal lobe epilepsy (TLE) later in life.<sup>1</sup>

## Types and Risk Factors

Febrile seizures are classified into two main types:

### 1. Generalized Febrile Seizures

### 2. Complex Febrile Seizures

#### Generalized Febrile Seizures

Generalized seizures are the most common type lasting a few seconds to 15 minutes, affect the whole brain, triggering abnormal electrical activity that often results in convulsions. This surge of activity typically

starts in the thalamus and extends to other regions of the brain.

#### Complex Febrile Seizures

Complex febrile seizures, while less frequently observed, are distinguished by specific clinical criteria, including seizure episodes lasting longer than 15 minutes, the occurrence of multiple seizures within a 24-hour period, or the presentation of focal neurological signs.

Children with complex febrile seizures are at risk of developing secondary epilepsy, which can impact their growth and development. This study identified key risk factors for secondary epilepsy, including family history, seizure type, frequency, and duration. Individuals with a family history of epilepsy are more susceptible and should avoid triggers like high fever and brain trauma to reduce their risk.<sup>2</sup>

#### Clinical Presentation of Febrile Seizures

Febrile seizures typically manifest as convulsive episodes, characterized by initial stiffness followed by repetitive jerking movements. Associated symptoms may include changes in breathing, leading to transient cyanosis (blue discoloration of the skin).<sup>3</sup>



**Figure 1:** Signs and Symptoms of Febrile Seizure.<sup>9</sup>

### Indications for Medical Attention

Medical help is compulsory for febrile seizures when they occur for the first time, last longer than five minutes, involve breathing issues, or reoccur within a 24-hour period. Immediate medical attention is also warranted if symptoms such as vomiting, a stiff neck, respiratory distress, or pronounced drowsiness are present. In contrast, typical simple febrile seizures (SFS) generally do not require medical intervention. However, if febrile seizures are frequent, an EEG may be considered due to a small associated risk of later epilepsy. In cases of febrile seizures plus (FS plus), further diagnostic workup, such as neuroimaging or genetic testing, might be appropriate if an underlying pathology is suspected. Atypical febrile seizures, particularly febrile status epilepticus (SE), usually necessitate more comprehensive evaluation due to a heightened risk of complications.<sup>4</sup>

### Management and Treatment

When a child experiences a febrile seizure, caregivers should remain calm to ensure effective care. To prevent injury and aspiration, gently place the child on the floor, positioning them on their side. Clear the area of any objects that could pose a choking hazard, and avoid restraining the child or placing objects in their mouth.<sup>5</sup>

Children generally recover quickly following an initial febrile seizure, but a medical evaluation is recommended to confirm the diagnosis and exclude other potential causes. Fever management typically involves the use of acetaminophen or ibuprofen. For more complex febrile seizures, pharmacological intervention with intranasal midazolam, intravenous benzodiazepines or rectal diazepam may be necessary to prevent seizure recurrence or prolongation.<sup>6</sup>

### Prognosis and Outcome

The overall prognosis of febrile seizures is generally favorable, complex febrile seizures (CFS) are linked to a higher risk of adverse neurological outcomes, including the potential development of epilepsy. Children with CFS were found to have more frequent EEG abnormalities and elevated neuron-specific enolase (NSE) levels, indicating greater neuronal dysfunction or injury. These findings suggest that CFS may negatively influence long-term neurological prognosis compared to simple febrile seizures (SFS). Moreover, the combined detection of EEG and NSE significantly enhances the ability to predict brain function outcomes, demonstrating high sensitivity despite a slight reduction in specificity. Therefore, the integration of both diagnostic tools may offer improved prognostic accuracy. However, to ensure reliable clinical outcomes, these results should be interpreted in conjunction with comprehensive clinical assessments and other supportive diagnostic methods.<sup>7</sup>

### Nurse's Role in Febrile Seizures

Pediatric nurses play a vital role in both the treatment and prevention of febrile seizures. A key component of their practice involves educating mothers on child health care to reduce the frequency and severity of febrile seizures. Nursing interventions include organizing educational programs, distributing informational leaflets, conducting routine health screenings, and administering appropriate pharmacological treatments. The overarching objectives of pediatric nursing in this context are to

protect, promote, and maintain the health and well-being of children affected by febrile seizures. Essential components of care also encompass promoting healthy lifestyles, preventing disease, providing both direct and holistic (including spiritual) care, supporting families in the management of chronic pediatric conditions, guiding informed health decisions, and participating in research to enhance evidence-based pediatric healthcare.<sup>8</sup>

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