

ORIGINAL RESEARCH

A clinical audit on febrile seizure management at the primary care unit of Lady Ridgeway Hospital for Children, Colombo

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Abstract

Introduction: Febrile seizures (FS) are the most common childhood seizures, categorized into simple and complex types. Simple febrile seizures (SFS), which are benign and self-limiting, account for over 70% of cases and often prompt emergency visits, sometimes leading to unnecessary investigations. Data on adherence to FS management guidelines in Sri Lanka are scarce.

Objectives: To evaluate adherence to standard FS management guidelines at the Primary Care Unit (PCU), Lady Ridgeway Hospital (LRH), Colombo.

Methods: A prospective clinical audit was conducted at LRH PCU from August 1-30, 2023, including 25 FS cases via convenience sampling. Data were collected by direct observation using a checklist. Parental counselling was assessed using an expert-validated eight-point guide.

Results: The mean age was 2.63 years, and 56% were male. They presented due to SFS in 68% and complex FS in 32%. There were two children with febrile status epilepticus. URTIs were the most common cause of fever (56%). First-time seizures accounted for 66% of admissions. Over-investigation was observed in 65% of SFS; 9.5% of eligible patients were under-admitted. Buccal midazolam (IV preparation, off-label) was the most frequently used first line.

Parental counselling was inconsistent and inadequate. It was as verbal instructions in 32% and in written form in 16%. Key educational points were incompletely addressed; epilepsy risk was never discussed. However, inappropriate prescription of intermittent prophylaxis (clobazam) was minimal.

Conclusion: The audit revealed over-investigation, under-admission, and inadequate parental counselling, highlighting the need for standardized protocols and structured caregiver education.

KEYWORDS

Seizures, Febrile; Guideline Adherence; Primary Health Care; Health Education; Anticonvulsants

INTRODUCTION

Febrile seizures, or commonly referred to as “febrile fits,” are a frequent medical concern, especially in the paediatric population. According to the International League Against Epilepsy (1993), a febrile seizure is defined as “an

epileptic seizure occurring in childhood after age of one month, associated with a febrile illness not caused by an infection of the central nervous system (CNS), without previous neonatal seizures or a previous unprovoked seizure, and not meeting criteria for other acute symptomatic seizures”.¹



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There are two distinct clinical presentations: simple and complex febrile seizures. Simple febrile seizures, accounting for more than 70%, are typically generalized, last less than 15 minutes, and occur once in a febrile illness. Complex febrile seizures, which constitute the remaining 30%, may last longer than 15 minutes, recur within a single febrile illness, or present with focal features.

Febrile seizures affect approximately 2-5% of the at-risk paediatric population,² making them one of the most common neurological emergencies in children and a frequent cause of emergency medical evaluation. Ensuring that clinical practice aligns with standard guidelines is critical in maintaining high-quality pediatric care. Despite being usually benign, febrile seizures often induce considerable anxiety among caregivers, leading to emergency visits and extensive evaluations. Local studies suggest persistent parental misconceptions regarding the nature and management of febrile seizures.³ This highlights the importance of comprehensive discharge education to ease fears and provide practical home management strategies.

The aim of this audit was to evaluate the current clinical management of febrile seizures at the Primary Care Unit (PCU) of the leading paediatric hospital in the country, assess adherence to national and international guidelines, and identify key areas for improvement in order to enhance the quality of care provided.

Audit standards

The PCU primarily adheres to “The National Guidelines for Management of Seizures” and evidence from the “Management of Simple Febrile Seizures; *Sri Lanka Journal of Child Health*, 2017.” Acute seizure management

is guided by the Advanced Paediatric Life Support (APLS) protocols. These sources provided the standard for comparison with existing practices.

METHODS

A prospective audit was conducted on a convenient sample of children presenting with febrile seizures to the PCU at Lady Ridgeway Hospital for Children over a one-month period, from 1st to 31st August 2023. Ethical clearance was granted by the Ethics Review Committee, Faculty of Medicine, University of Colombo. The audit was observational, with no patient or parental interviews conducted. Management practices were assessed through direct observation by auditors using a structured checklist. Parental advice was evaluated qualitatively with the aid of an expert-validated eight-point assessment guide.

RESULTS

A total of 25 children were assessed during this month, comprising 14 males (56%) and 11 females (44%), with a mean age of 2.63 years (SD: 2.22). One child was an outlier, being outside the typical 6 months to 6 years age range.

Regarding seizure characteristics, 68% (17 children) experienced simple febrile seizures, while balance 8 children had complex seizures. Among the latter, two cases met the criteria for febrile status epilepticus, with seizures lasting over 30 minutes. First-time seizure episodes were more common (64%) compared to recurrent seizures (36%).

These demographic and clinical characteristics are summarized in Table 1.

TABLE 1 Demographics and clinical presentation of febrile seizures

Variable	Category	Number (n)	Percentage (%)
Age Group	<1 year	6	24.0
	1-2 years	9	36.0
	2-5 years	9	36.0
	>5 years	1	4.0
Mean Age (SD)	-	2.63 years	(±2.22 years)
Gender	Male	14	56.0
	Female	11	44.0
Seizure Type	Simple	17	68.0
	Complex	8	32.0
Episode	First Presentation	16	64.0
	Recurrent	9	36.0

Upper respiratory tract infections (URTI) were the most frequently identified cause of fever in 14 (56%), followed by viral fever (20%) and gastroenteritis (8%). One episode occurred following OPV and DTP (4th dose) vaccination. In 12% of cases, no clear cause was identified. Complications were recorded in two children: one developed aspiration pneumonia, while another showed transient unilateral weakness post-seizure.

Table 2 summarizes the causes of fever and the investigations performed according to seizure type.

In terms of investigations, all children with complex febrile seizures were investigated while only 65% of children with simple febrile seizures had blood or urine examined. Notably, none of the children were subjected to lumbar puncture, EEG, or neuroimaging (Table 2).

For ongoing seizures (5 cases), oxygen was administered, and all received basic life support in line with APLS guidance. Seizure termination was attempted with midazolam as the first-line antiepileptic in all five cases. Of these, 40% received it intravenously, and 60% via the buccal route. Due to the absence of buccal midazolam preparations, the intravenous formulation was repurposed and administered buccally using a syringe without a needle at a dose of 0.3 mg/kg.

Paracetamol was administered in all patients (100%) as the sole antipyretic. Doses were appropriately calculated based on documented weight, and mothers were educated to avoid double dosing in all cases. Paracetamol suppositories were used in 63% of cases (7 out of 11), and oral syrup in 36% (4 out of 11). Temperature was documented prior to administration in all cases. While 40% had undergone tepid

sponging and 24% had been fanned by caregivers before arrival, none of these methods were encouraged in the PCU.

Following seizure resolution, the most common reason for admission to the ward was first-time seizure presentation (14 out of 21 admissions). Complex febrile seizures accounted for 14.3% (3 out of 21), and parental concern for 9.5% (2 out of 21). However, two children who experienced their first simple febrile seizure were discharged without admission, contrary to standard recommendations. For recurrent simple febrile seizures, observation in the PCU for six hours was implemented in 4 out of 9 cases, as per protocol.

A significant finding of the audit was the inadequacy of parental education. Only 32% of cases (8 out of 25) received verbal instructions on febrile seizure management, while written advice was documented in merely 16% (4 out of 25). Information delivery was inconsistent, lacking structure and uniform timing. Among those with recurrent seizures, only 22% (2 out of 9) received any counseling, compared to 50% (8 out of 16) of first-time cases, (Table 3). Eight key points identified as essential in febrile seizure education were assessed during caregiver interactions. While some aspects, such as seizure safety practices and recurrence risks, were mentioned in 50-75% of cases, others, especially the reassurance that febrile seizures do not significantly increase the risk of epilepsy, were never discussed.

Intermittent oral clobazam was prescribed in one case (4%), although there is no evidence supporting its use as a prophylactic medication. No prehospital use of buccal or nasal antiepileptics by caregivers or paramedics was noted in any case.

TABLE 2 Investigations performed according to seizure type

Seizure Type	Total Cases (n) Cases, n (%)	Investigated	Common Investigations	No Investigations, n (%)
Simple Febrile Seizure	17	11 (65%)	CBS (11), FBC (4), VBG (1), UFR (1), Urine ketones (1)	6 (35%)
Complex Febrile Seizure	8	8 (100%)	CBS (6), FBC (5), VBG (3)	0 (0%)

Abbreviations: CBS – Capillary Blood Sugar; FBC – Full Blood Count; VBG – Venous Blood Gas; UFR – Urine Full Report

TABLE 3 Overview of parental education on febrile seizures

Education Type	Number (n)	Percentage (%)
Overall Cases (n=25)		
Verbal Education Provided	8	32.0
Written Education Provided	4	16.0
Subgroup Analysis		
Education in First Febrile Seizure Cases (n=16)	8	50.0
Education in Recurrent Seizure Cases (n=9)	2	22.2
Content of Education Among Counseled Cases (N = 8)		
What is a febrile seizure and how to recognize	8	100
Common and benign condition	8	100
Not due to CNS infection	4	50
No increased epilepsy risk	0	0
Age-dependent, child outgrows it	4	50
Risk factors for recurrence	5	62.5
What to do during future seizures	6	75
What not to do during seizures	5	62.5

DISCUSSION

The demographic distribution of febrile seizures in our audit aligns with established literature, showing slight male predominance,³ and a peak incidence between 12 and 18 months.⁴ The observed ratio of simple to complex febrile seizures (72% vs 28%) reflects global trends.⁵

URTIs emerged as the leading cause of febrile seizures,⁶ consistent with international findings suggesting viruses, particularly those with neurotropic properties,⁷ are often involved. The single vaccine-associated case is likely due to the fever-inducing potential of the whole-cell pertussis component in DTP,⁸ reinforcing the importance of addressing vaccine-related parental fears.⁹

Over-investigation was noted in simple febrile seizures, despite guidelines discouraging routine labs, EEG, or imaging unless atypical features exist.¹⁰ This likely reflects cautious but unnecessary practice.¹¹ In contrast, investigations in complex seizures were appropriate to exclude metabolic or infectious causes.¹² Avoiding lumbar puncture, EEG, and imaging in the absence of red flags was consistent with guidelines.

Paracetamol use in the PCU was appropriate in terms of dosage and timing for fever management and child comfort.¹³ While intermittent antipyretic use is justified, routine regular use in all febrile children remains controversial,¹⁴ as evidence shows it does not reduce seizure recurrence.¹⁵ Additionally, non-conventional methods like tepid sponging and fanning were not encouraged in the PCU, reflecting evidence-based practice.¹⁶

Use of midazolam adhered to APLS guidelines¹⁷ Current unit practice prioritizes IV midazolam; IM is used if IV access is unavailable, with buccal as a last resort. Though the off-label buccal administration of IV midazolam presents concerns. While effective and resourceful, such practices carry risks, including mucosal irritation, dosing errors, and poor palatability, and underscore the need for proper drug formulations.¹⁸

Under-admission was observed in the unit, deviating from guidelines, as first simple febrile seizures require admission to exclude causes like CNS infections or metabolic disorders, failure to do so may compromise diagnostic safety. The observation in the PCU for several hours after the seizure probably was the reason since this facilitates observation

for possible features of CNS infection. However, observation periods for recurrent seizures adhered to guidelines.

Parental education remains a critical shortcoming, with crucial information often omitted. One important area relates to misconception of febrile seizures developing into epilepsy, believed by 65% of parents in Sri Lanka.¹⁹ Failure to address these misconceptions may contribute to parental anxiety. A study at LRH found no link between prior febrile seizures and parental knowledge, supporting the need for re-education at every visit including during recurrences.²⁰ PCU had a pre-formed leaflet, but distribution was limited by the country's economy.

The single observed case of intermittent clobazam use is reassuring and suggests overall guideline adherence.¹⁴ However, it still reflects residual non-recommended practice, likely driven by caregiver anxiety, limited rural healthcare access, and low parental confidence.

RECOMMENDATIONS

To improve the quality of care, over-investigation and under-admission should be addressed through implementation of a standardized PCU protocol. Ensuring availability of appropriate formulations, especially buccal midazolam, would enhance safety and compliance. Parental education should be standardized using structured protocols and multilingual materials, supported by routine caregiver feedback, to enhance understanding and confidence. Ongoing staff training and periodic re-auditing will further reinforce adherence to guidelines and foster sustainable quality improvements.

CONCLUSION

While the PCU at Lady Ridgeway Hospital demonstrates overall good performance in clinical management of febrile seizures, several inconsistencies were identified. With targeted interventions and structured re-evaluation, the unit can elevate its standard of care related to management of febrile seizures.

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