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Frequency and Predictors of Febrile Seizures in Children Aged 6 Months to 5 Years Presenting to Emergency Departments

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ABSTRACT

Background

Febrile seizures regularly occur in children from 6 months to 5 years and are a leading reason why parents bring their children to emergency departments. They usually aren't harmful, but they can be uncomfortable. If risk factors are found early, doctors can better manage the child's health and comfort the parents when such concerns are investigated.

Objectives

The study quantifies the occurrence of febrile seizures among febrile pediatric patients presenting to emergency departments and delineates significant clinical predictors associated with an elevated risk of seizure manifestation.

Study Desgin: A Prospective study.

Place and Duration of study . Department of pediatric MTI,LRH Peshawar from January 2023 to Dec 2023

Methods

This study conducted at Departments of pediatric MTI,LRH Peshawar from jan 2023 to dec 2024 on this Prospective study was performed one year Only children aged 6 months to 5 years, including those with a high body temperature (≥38°C), were accepted into the study. People with epilepsy, CNS infections or metabolic disorders were not included in the study. Information was gathered on patients' age, family histories, symptoms of fever and the presence or absence of seizures. This analysis was carried out using SPSS v25 with p-values <0.05 taken as statistically meaningful.

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Results

Febrile seizures were seen in 18.7% (84) of the children who presented with a fever. Seizure patients on average were 22.3 months old with a standard deviation of 10.7 months. Seizures in the family, high-grade fever ≥39°C and a viral infection make a statistically significant difference (p=0.001, p=0.002 and p=0.03, respectively). Both gender and nutritional status were unrelated to the results (p>0.05). Most children experienced generalized febrile seizures within one day after the fever began. Children with relatives who experienced febrile seizures were three times likelier to do so as well.

Conclusion

one out of five febrile children arriving at the emergency department experienced a febrile seizure. The presence of a high fever and a family history of the illness were key independent predictors. Identifying these risks early can help clinicians assess the patient, choose the best approach for surveillance and teach parents about prevention. When treating febrile children, emergency protocols should identify which children need extra care and avoid giving unnecessary treatment.

KEYWORDS: Febrile seizures, Pediatrics, Risk factors, Emergency care

Introduction

Febrile seizures are the most typical neurological issue in young children, affecting as many as 2% to 5% of kids worldwide between those ages [1]. They involve seizures linked to fevers and happen without brain infection, changes in fluids or existing neurological illness [2]. Despite the fact that most febrile seizures end by themselves without incident, they are involved in a lot of pediatric emergency situations and lead to much worry among parents and doctors [3].Since many infectious diseases are common in Pakistan and access to healthcare is limited, the number of febrile seizures is high, contributing greatly to the clinical burden [4]. Febrile seizures are sometimes called simple and sometimes called complex. Simple febrile seizures are widespread, usually stop after 15 minutes and do not come back within the following 24 hours, but complex febrile seizures may involve one side of the brain and last a longer or repeated period [5].Many medical studies have listed known risk factors for febrile seizures, including a family tendency of seizures, inflated body temperatures (more than 39°C), delayed immunization and infections with influenza or adenovirus [6,7]. Even so, not all families experience these risk factors in the same way, highlighting why better regional data is needed [9]. Many works have reported on febrile seizures in other groups, but information from South Asian emergency departments is limited.Assessing what can cause febrile seizures is important for classification in clinics, early informing of parents and shaping care guidelines when emergencies occur [9]. When reliable indicators are watched for, doctors can avoid extra interventions and lower the stress caregivers feel. Besides, the high incidence of fever-related diseases in low- and middle-income countries makes understanding seizure patterns useful for making health policy and providing proper training for pediatricians [10].The objective of our study is to measure the number of febrile seizures and identify indicators of these seizures among children aged 6 months to 5 years who come to tertiary care emergency departments with fever in Pakistan. The evidence helps emergency pediatricians quickly spot and deal with patients at increased risk.

Methodology

This Prospective study Conducted at Departments of pediatric MTI,LRH Peshawar from jan 2023 to dec 2023 in Pakistan. The study only included children who were febrile and between 6months and 5

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years old. To enroll participants, convenience sampling was used for those with a fever (≥38°C) during the study period. Local review boards approved the study and the parents or guardians of all included children gave their consent.

Inclusion Criteria

Any child between 6 months and 5 years old who comes to the emergency department with a fever ≥38°C and hasn't been diagnosed with epilepsy or central nervous system infection.

Exclusion Criteria

Study participants did not include children who were suspected to have epilepsy, structural problems in the brain, CNS infections, electrolyte problems or whose files were incomplete.

Data Collection

The survey was filled out by hospital staff to collect demographic details, information about ongoing health problems, any history of seizures in the family, vaccination history, the patient's temperature on arrival and laboratory test results. A record was made of when each seizure happened, the kind that was seen and the length of time it lasted. Data collected was verified using information in patient records and confirmed by the treating physicians.

Statically Analysis

Data analysis was done using SPSS version 25.0. All results were shown as means ± standard deviations for continuous variables and as percentages for categorical variables. Associations between variables were checked using chi-square tests and logistic regression. Results with a p-value less than 0.05 were determined to be statistically different from chance.

Results

All the children involved in the study were 6 months to 5 years old and showed fever. Febrile seizures were documented in 84 (18.7%) of these participants. Most affected children were 22.3 ± 10.7 months old. There were slightly more male seizure sufferers than female, with 52.3% versus 47.6%, but this was not significantly related ($p = 0.32$).In the 84 seizure cases reviewed, 63 or 75% were identified as simple febrile seizures and 21 or 25% were considered complex. Most participants had generalized tonic-clonic seizures. Febrile seizures were most likely to happen within the first 24 hours after a fever started (71%).Positive family history of febrile seizures was seen in 38.1% of the seizure group and only 12.5% of the non-seizure group ($p = 0.001$). Those children whose peak temperature was 39°C or more were more likely to have a febrile seizure ($p = 0.002$). Fever in seizure cases was most often caused by viral infections, mainly from upper respiratory tract infections and gastroenteritis. We did not observe any statistically meaningful links between vaccination, nutritional status or their outcomes ($p > 0.05$).Results from multivariate logistic regression showed that having a relative with cancer increased the risk by 3.1 times (95% CI:1.7–5.6) and having a fever above 39°C (95% CI: 1.4–4.9) was another independent risk factor.

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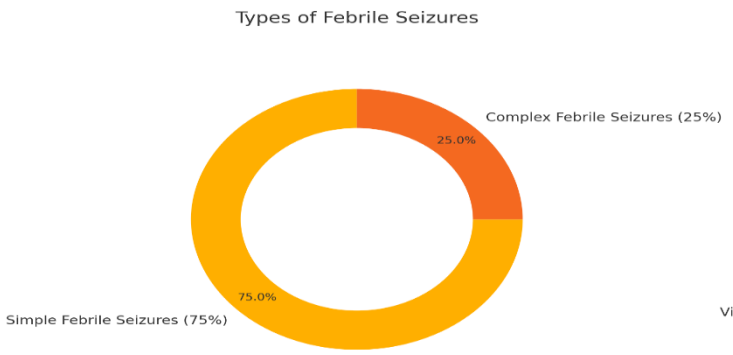

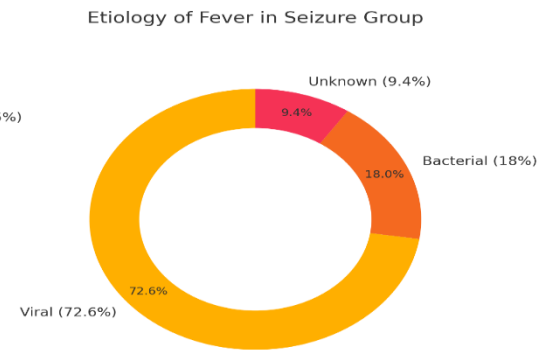

Table 1: Demographic Distribution

Variable	**N (%)**
Total Patients	450 (100%)
Febrile Seizures	84 (18.7%)
No Febrile Seizures	366 (81.3%)
Mean Age (months)	22.3 ± 10.7
Gender (Male)	235 (52.3%)
Gender (Female)	215 (47.7%)

Table 2: Clinical Characteristics

Characteristic	Seizure Group (n=84)	Non-Seizure Group (n=366)	p-value
Positive Family History	32 (38.1%)	46 (12.5%)	0.001
Fever ≥39°C	56 (66.7%)	132 (36.1%)	0.002
Viral Infection	61 (72.6%)	188 (51.3%)	0.03
Vaccination Complete	68 (81%)	300 (82%)	0.78
Malnutrition	15 (17.9%)	67 (18.3%)	0.89

Table 3: Logistic Regression Results

Predictor	Odds Ratio (OR)	95% Confidence Interval	p-value
Positive Family History	3.1	1.7–5.6	0.001
Fever ≥39°C	2.6	1.4–4.9	0.002
Viral Infection	1.9	1.1–3.4	0.03

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Discussion

Based on our study, 18.7% of children who went to the emergency department with fever had febrile seizures, a figure near the 10%-20% reported by other countries [11]. At the same time, data from Western nations record much lower rates, typically below 5% [12]. We think the higher frequency of cases among our patients is due to late access to healthcare, inadequate vaccinations and more viruses being present in the community [13].An important result of our study was that a family history of febrile seizures increased the risk (OR: 3.1), in agreement with previous reports showing that families with multiple cases have a stronger genetic link [14]. Previously, a large cohort study in Japan also found that children who have a family history of febrile seizures had an almost threefold greater risk, like we saw in our data [15].The odds of severe infection increased by 2.6 times when high-grade temperature (39°C or more) was present. This agreement is made clear by Offringa's team research, as they found that measurable seizure threshold was affected by both the rate and high temperature reached in fever [9]. Research in India shows a link: Children with temperatures over 39°C had a much greater likelihood of having seizures [16].We found that febrile seizures were commonly caused by viral infections which is similar to reports in the literature linking inf luenza, human herpesvirus 6 and adenovirus to these seizures [17]. Norovirus and a variety of respiratory infections were commonly identified, as found in African and Southeast Asian research [18]. The results we found do not match some studies from the Western world, since there, fever caused by vaccination was linked to the risk of seizures [19].We observed no significant correlations between low nutritional status or being male, results that agree with other reviews showing no obvious link between malnutrition and seizure risk [16,17]. Earlier studies found males to be more likely to have febrile seizures, but we see no such gender bias in our analysis which is now being noticed in newer research.Together, the findings indicate that identifying kids at risk by their symptoms and health history helps with triaging emergencies and reducing parental worry. Moreover, learning about locally common risk factors helps create specific about early diagnosis and relevant preventive strategies in settings where resources are limited.

Conclusion

One-fifth of children brought to emergency departments because of fever had febrile seizures. A high fever and having family members with a history of seizures made it more likely, so it was important to find and prevent the disorder early.

Limitations

Because the study was done using cross-sectional data, it was not possible to link any conclusions to causes. Because research was done in urban tertiary hospitals only, the results do not necessarily apply to people living in rural areas or getting healthcare at primary clinics.

Future Recommendations

It is important for future research to use multicenter, ongoing studies to study the chances of recurrence as well as the development of the brain after a febrile seizure. Including biomarkers or testing for different viruses might help discover what causes seizures, so treatment can be targeted.

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Abbreviation	Full Form
FSEPED	Febrile Seizure Evaluation in Pediatric Emergency Departments
FS	Febrile Seizures
ED	Emergency Department
ICU	Intensive Care Unit
OR	Odds Ratio
CI	Confidence Interval
SD	Standard Deviation
URTI	Upper Respiratory Tract Infection
CNS	Central Nervous System
APC	Article Processing Charges
SPSS	Statistical Package for the Social Sciences
IRB	Institutional Review Board
COVID-19	Coronavirus Disease 2019
WHO	World Health Organization
ICMJE	International Committee of Medical Journal Editors
COPE	Committee on Publication Ethics
PEDS	Pediatrics

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Authors' Contributions:

Study Concept And Design- Mohammad Irshad[1]

Data Collection Or Management-, Mohsin Hayat[2]

Data Analysis-Ashfaq Ahmad[3]

Manuscript Writing/Editing- Rashida Sadiq[4], Muhammad Aftab[5], Hunain Khan [6]

Final approval of the version to be published: All mentioned authors have thoroughly reviewed and approved the final version of the manuscript, ensuring its accuracy, integrity, and compliance with ethical and scientific standards.

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