

Prevalence of febrile seizures in children

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Abstract

Background: Febrile seizures is the most common seizure disorder in childhood, the prevalence and incidence of Febrile seizures varies by geographic location we aim to determine the prevalence of febrile seizure in childhood. **Materials and methods:** This cross-sectional study was performed from January 2018 to January 2019. Children between 1 to 14 yrs of age with seizures were included in the study. Of the 956 invited children total 30 cases had febrile seizure. **Results:** The prevalence of Febrile seizures was calculated to be 3.1%. The ratio of male to female was 1:1. It was found that attendance to day care center affects the prevalence of febrile seizure, with the risk of febrile seizure being 18.4 times higher if child attends to day care. Also familial history of febrile seizure and consanguinity of parents increase the risk that their children will have Febrile seizures 7.3 and 12.4 times higher. **Conclusions:** Febrile seizures is still a frequent problem in pediatric practice. Although the prevalence of Febrile seizures might vary according to the methodology of study, this present study found that the prevalence of Febrile seizures was 3.1% among children in our area.

Key words: Prevalence, Febrile seizure, familial history,

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INTRODUCTION

A seizure is a brief change in normal electrical brain activity resulting in alterations in awareness, perception, behaviour, or movement. Seizures affect persons of all ages, but are particularly common in childhood. There are many causes of seizures in children, including epilepsy; high fever (febrile seizures); head injuries; infections (e.g., malaria, meningitis, and gastrointestinal illness); metabolic, neurodevelopmental, and cardiovascular conditions; and complications associated with birth. Outcomes associated with single or recurring seizures in children vary by seizure type (febrile compared with nonfebrile) and multiple risk factors (age, illness, family history, and family context). Outcomes range from no complications to increased risk for behavioural problems, epilepsy, or sudden unexpected death. The most common

type of seizures seen in children are febrile seizures. They occur in around 2%–5% of all children and recurrence is seen in about one-third.¹ In a study from Yelandur in rural South India, the prevalence of febrile seizures was found to be 3.28–5.71/1000. Another study from Uttarakhand estimated the prevalence of 2.27/1000 population.² Overall, 0.7% of children and adolescents were reported to have had at least one seizure during the preceding year. Compared with children and adolescents without seizures, a higher percentage of those with seizures were socially and economically disadvantaged. Children and adolescents with seizures had higher prevalence's of various mental, developmental, physical, and functional co-occurring conditions than those without seizures; however, only 65.6% of those with seizures had visited a medical specialist (defined as a medical doctor who specializes in a particular medical disease or problem, other than an obstetrician/gynaecologist, psychiatrist, or ophthalmologist) during the preceding 12 months. Public health agencies can work with other health and human service agencies to raise awareness about childhood seizures, implement strategies to prevent known causes and risk factors for seizures, study the associations between sociodemographic characteristics and seizure incidence, and ensure linkages for children with seizures to appropriate clinical and community providers. The higher observed prevalence of co-occurring conditions is consistent with previous research that has shown a higher

prevalence of neurodevelopmental conditions and behaviour problems among some children with seizures.^{3,4} In this analysis, approximately two in five children and adolescents with seizures were reported to have a learning disability and 20%–30% of them had an intellectual disability, attention deficit hyperactivity disorder/attention deficit disorder, or other developmental disorder.⁵ Associations between seizures and these conditions might be bidirectional, sharing some common pathophysiological mechanisms. Febrile seizures may run in families. Febrile seizures may run in families.¹ Several genetic associations have been identified. An association with iron deficiency has also been reported, particularly in the developing world. The aim of the present study is to search the prevalence of febrile seizures and accompanying factors among children.

MATERIALS AND METHODS

This cross-sectional study was performed in the department of paediatrics. We undertook this study at the epilepsy clinic of a tertiary level teaching hospital from January 2018 to January 2019. Children between 1 to 14 yrs. of age with seizures and other rare epilepsy syndromes were included in the study. Of the 956 invited children total 30 cases had febrile seizure.

Inclusion Criteria: Children between 1-14 yrs of age, Two or more unprovoked seizures 24 hrs apart, Idiopathic and cryptogenic epilepsy and Well-defined symptomatic epilepsy syndrome, irrespective of the underlying brain lesions.

Exclusion Criteria: Single time seizures for one or more epileptic seizures occurring in 24 hrs period, Provoked seizures occurring in close temporal association with an acute systemic, metabolic or toxic insults or in association with an acute CNS disorder e.g. infection, Trauma, haemorrhage etc. or patients has only febrile seizures. with CNS granulomas, mass or any other obvious lesions like large infarct, cyst or gliosis etc. Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS). The research looked at the prevalence of febrile seizures among the children and any familial factors. Student's *t* test and Fisher's exact test were used, as well as the Chi square test and backward stepwise logistic regression tests. $P < 0.05$ was considered statistically significant.

RESULTS

Of the 956 invited children, total cases had febrile seizure participated and all of them remained through to final analysis. Their genders were equally distributed (48% males and 52% females). The mean age of the study group was 33.78 ± 17.1 month. The ratio of male to female was

1:1. Thirty children had febrile seizures. Its prevalence was calculated to be 3.1 %.

Table-1: Risk Factors for Febrile Seizure

Risk Factors	Febrile seizures	No febrile seizures	P-Value
Prematurity	7(23.3%)	89(9.3%)	<0.05
Positive family history of seizure	8(26.6%)	53(5.5%)	<0.05
Mean age in months	37.8+15.2	36.5+16.2	>0.05
Average number of siblings	2.1+1.0	1.8+1.1	>0.05
birth weight in grm	3.023+432	3.012+532	>0.05
maternal age	28.3+4.9	29.4_5.7	>0.05
literacy of mother			
Illiterate	5(16.6%)	84(8.7%)	<0.05
primary school	10(33.3%)	479(50%)	>0.05
High school	14(46.6%)	293(30.6%)	>0.05
University	1(3.3%)	100(10.4%)	>0.05
Mean day of ICU	15+11.2	6+3.8	<0.05

Prematurity, family history of febrile seizures, attendance to day care center, consanguinity of their parents and the educational status of the mothers significantly affected the frequency of febrile seizures. Factors that were to be non-significant included the mean age of children, average number of brothers/sisters, birth weight, mean day of stay in ICU, the mean ages of mother.

Table-2: The relationships between a positive history of febrile seizures and study variables were analysed

	Odd ratio	95% CI	P-Value
Prematurity	9.2	0.83-101	<0.05
Day care	18.4	5.45-62.2	<0.05
Family history of febrile seizures	7.3	2.6-22.5	<0.01
Consanguinity	12.4	4.14-43.3	<0.01
Neonatal ICU	1.62	0.5-5.21	<0.01

The study reveals that attendance to day care center affects the prevalence of febrile seizures, with the risk of febrile seizures being 18.4 times higher if child attends to day care. Also, familial history of febrile seizures and consanguinity of parents increase the risk of their children whose febrile seizures is 7.3 and 12.4 times higher, respectively.

DISCUSSION

In the present study conducted in our area, the prevalence of febrile seizures was found to be 3.1%. The incidence of febrile seizures varies by geographic location: incidences up to 8.8% and 14% have been reported.⁶ The assessment of prevalence is much practical than incidence. Epidemiologic studies of febrile seizures provide a wide spectrum of the prevalence of febrile seizures (0.1-15%).⁷ Few studies reported the prevalence rate adjusted for standard population, while Pal *et al.*⁸, provided the

prevalence rate adjusted for survey sensitivity.⁸ Gourie-Devi *et al.*⁹, reported a prevalence of 5.6 per 1,000 for rural and 2.5 per 1,000 for urban area (overall - 4.6 per 1,000) from a mixed population of Gowribidanur in Karnataka, while Koul *et al.*, reported a prevalence of 2.5 from the rural population of Kuthar valley in Kashmir.¹⁰ Radhakrishnan *et al.*, reported a prevalence of 4.9 per 1,000 from the urban population in Kerala.¹¹ Gourie-Devi *et al.*⁹, provided a prevalence rate of 5.8 per 1,000 for urban and 11.9 per 1,000 for rural (overall - 8.82 per 1,000), while Das *et al.*, reported a prevalence of 5.7 per 1,000 for the urban population of Kolkata.¹² Interestingly, the prevalence rate within a defined region (Karnataka) as shown by two studies at an interval of 20 years has shown a rising trend from 5.6 to 11.9 per 1,000 for rural population and 2.5 to 5.7 per 1,000 for urban population (an overall prevalence varying from 4.6 to 8.8 per 1,000). In this cross-sectional study conducted by family physicians, a specific questionnaire was administered to the parents during face to face sessions. It has been stated that the most reliable method is ascertainment by clinical examination of all subjects to be investigated by a physician.¹³ We believe that the strategy used in the present study comes closest to this ideal. The accuracy of research might be affected by type of study whether it was conducted prospectively or retrospectively. Sillanpaa *et al* reported that the incidences of Febrile seizures in prospectively and retrospectively were 7.1% and 5.6%¹⁴, respectively. The retrospectively achieved rate of Febrile seizures in the current study (3.1%) is comparable with rates from retrospective studies in industrialized countries. A number of factors have been known to increase a child's risk of having a first Febrile seizure. Using multivariate analysis, Bethune *et al* identified several important predictors of first Febrile seizures, including family history, attendance at day care and a neonatal discharge time of 28 days or more. The result of present study also showed that family history of Febrile seizures, consanguinity and attendance at day care are factors that increase risk for Febrile seizures, 7.3, 12.4, 18.4 times, respectively. Although Mahyar *et al* reported similar to us prematurity is not a risk factor.¹⁵ Vestrgaard and Christensen revealed that children born prematurely had an increased risk of Febrile seizures compared with children born at term, and the adjusted RR was 1.4.¹⁶ The Febrile seizures was more common in children of illiterate mothers. Forsgren *et al* revealed that mother's educational status was a risk factor.¹⁷ If parents do not have proper knowledge on fever management, they would take incorrect steps to control fever. Generalized seizure more associated with susceptibility to epilepsy.¹⁸ As epilepsy is most likely due to genetic predisposition rather than structural damage to the brain caused by recurrent simple

Febrile seizures, there is no evidence that prophylactic treatment of children with simple Febrile seizures would reduce the risk. However, no study has shown that successful treatment of simple Febrile seizures can prevent the later development of epilepsy. Further, there is no evidence to date that simple febrile seizures can cause structural damage to the brain.¹⁹ Some limitations in the present study need to be addressed. It was an observational study and patients were not randomly selected. Therefore, selection bias and confounding seems to be expected. Meanwhile, the authors' ability to assess the quality of studies was limited by the fact that many studies failed to offer detailed information of selected subjects or valid data on important factors. Our analysis also suggests the need for large population-based incidence studies of febrile seizure, particularly in children under six year age, to generate more accurate estimates.

CONCLUSION

Febrile seizures are still a frequent problem in paediatric practice. Although the prevalence of Febrile seizures might vary according to the methodology of study, this present study found that the prevalence of Febrile seizures was 3.1% among children. The attendance to day care center, familial history of Febrile seizures and consanguinity of parents were risk factors of Febrile seizures on multivariate analysis.

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