ORIGINAL RESEARCH PAPER
Volume - 12 | Issue - 03 | March - 2023 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

THE STUDY OF FEBRILE SEIZURES IN CHILDREN AND ITS ASSOCIATION WITH IRON DEFICIENCY ANAEMIA

Paediatrics

Dr Bodepudi Swapna* Post Graduate, Department of Pediatrics, Dr. Pinnamaneni Siddhartha Institute of medical Sciences *Corresponding Author

Dr. Pawan Kalyan Pinnamaneni Professor, Department of Pediatrics, Dr. Pinnamaneni Siddhartha Institute of medical Sciences

Dr. Sandhya D Associate Professor, Department of Pediatrics, Dr. Pinnamaneni Siddhartha Institute of medical sciences

ABSTRACT

Background: Febrile seizures occur in 2% to 5% of neurologically healthy children. It is estimated that 30% of the global population suffers from iron deficiency anaemia. Considering the high prevalence of iron deficiency in children under 5 years and conflicting results from previous studies, we planned this research to study the role of iron deficiency as a risk factor for febrile seizures in children. **Methods:** A Hospital-based case-control study was conducted at, GANNAVARAM from April 2021 to September 2022. A total of 100 infants and children aged between 6 months to 5 years were included in the present study and are further divided into 2 groups of 50 each. Estimation of haemoglobin, mean corpuscular volume and mean corpuscular haemoglobin was done. **Results:** In the present study 48% cases and 44% controls were in the age group in 12 to 23 months. There were 29 males among cases and 27 males among controls. Among cases 20 females were present as compared to 23 females in control group. There were 38 cases who had first febrile seizure and 12 cases had past history of febrile seizure. There were 29 cases with hemoglobin less than 10.5 gm% and 14 controls with hemoglobin less than 10.5 gm% in the age group 6 months to 23 months. Hemoglobin was more than 10.5 gm% among 10 cases and 20 among controls. Among the age group 2years and above 7 case and 4 controls had hemoglobin less than 11.5 gm% and 13 controls had hemoglobin more than 11.5 gm%. 29 cases had MCV less than 70 and 15 in control group had MCV less than 70. 32 cases had MCH less than 25 and 18 cases had MCH more than 25. **Conclusion:** Iron deficiency, common in the age group of less than 5 years, is a risk factor for febrile seizure. Early detection and timely correction of iron deficiency may be helpful for the prevention of febrile seizures in children of this age group.

KEYWORDS

INTRODUCTION

Febrile seizure is one of the most common neurologic disorders among children less than five years of age with an incidence of 2 to 5%[1]. In approximately one-third of cases, the recurrence occurs in early childhood.[2] Simple febrile seizures are generally benign diseases, however, there is a risk of associated epilepsy in the future.

During infancy and childhood, usually between the ages of 9 and 24 months, iron deficiency, a preventable and treatable nutritional deficiency, occurs. This time period also happens to be when febrile seizures are most common. The majority of CNS enzymes require iron to perform properly. Normal cellular and organ functions become dysregulated as a result of iron deficiency.[3-5] The most evident effect of iron deficiency is anaemia, which affects all of the organs and causes cognitive and behavioural disorders as well as physical growth impairment and immunological dysfunction. Iron deficiency cause neurological symptoms such as learning disabilities, memory impairments, delayed motor development, reduced attention span, and behavioural disorders.[6]

There is a 2-5% probability of having an episode of febrile seizures between the ages of 3 months and 5 years, with the peak incidence occurring at 18 months. According to the review of the literature, previous investigations provided conflicting evidence about the association between iron deficiency anaemia and simple febrile seizures. As a result, we intended to look into the relationship between iron deficiency anaemia and simple febrile seizures in my research.[7-10]

OBJECTIVES:

To study the role of iron deficiency as a risk factor for febrile seizures in children 6 to 60 months of age and to identify the peak age group of febrile seizures

METHODS:

A Hospital based case-control study with a total of 100 cases, admitted in our hospital DRPSIMS & RF, GANNAVARAM from April 2021 to September 2022.

Inclusion criteria:

Children with febrile seizures between 6 months and 6 years of age.

Exclusion criteria:

Children with Developmental delay or neurologic deficit, Central nervous infections and on iron therapy

Ethical Consideration:

Institutional Ethical committee permission was taken prior to the commencement of the study.

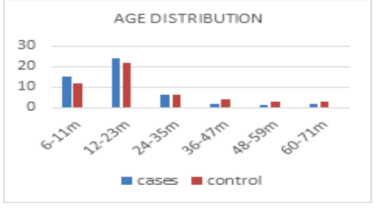
METHODOLOGY:

A total of 100 infants and children aged between 6 months to 5 years were included in the present study and are further divided into 2 groups of 50 each. Estimation of hemoglobin, mean corpuscular volume, and mean corpuscular haemoglobin was done.

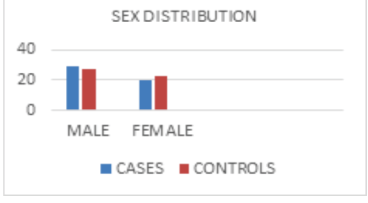
Statistical Analysis:

Percentages, the arithmetic mean, the standard deviation, Chi-square test were employed using SPSS for Windows software (version 20). p-value <0.05 was considered statistically significant. The frequencies procedure was used for graphical displays that were useful for describing many types of variables. The cross-tabs procedure was used to measure the association for two-way tables. The Independent samples 't' test procedure was used to compare two groups of children.

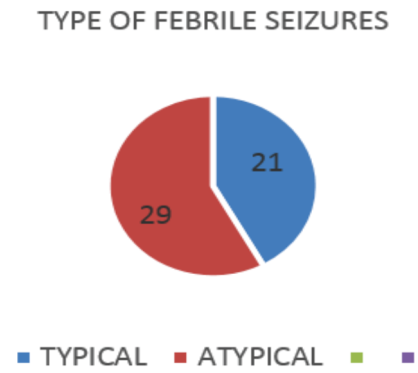
RESULTS:



Age Distribution



Sex Distribution



Type Of Febrile Seizures

There were 38 cases who had first febrile seizure and 12 cases had past history of febrile seizure. Out of 50 cases, 41 of them had their seizure lasting for <5 min and 9 of them had their seizure lasting for >5 min. There were 4 cases who had family history of febrile seizure and 46 cases had no history of febrile seizure. There were 29 cases with hemoglobin less than 10.5 gm% and 14 controls with hemoglobin less than 10.5 gm% in the age group 6 months to 23 months. Hemoglobin was more than 10.5 gm% among 10 cases and 20 among controls.Among the age group 2years and above 7 case and 4 controls had hemoglobin less than 11.5 gm% and 13 controls had hemoglobin more than 11.5 gm%. There was statistically significant difference between the hemoglobin between cases and controls. 29 cases had MCV less than 70 and 15 in control group had MCV less than 70. 21 cases had MCV more than 70 and in 35 of controls MCV was more than 70. 32 cases had MCH less than 25 and 18 cases had MCH more than 25. In the control group, 16 had MCH less than 25 and 18 cases had MCH more than 25. There was statistically significance of MCH between cases and controls in the study. In the present study, there is no statistically significant relationship of MCV and MCH with first and past history of febrile seizures.

DISCUSSION:

Haemoglobin, mean corpuscular volume and mean corpuscular haemoglobin were measured and compared using statistical methods. In the present study, 48% of patients in cases were in the age group of 12 to 23 months. The study done by Hartfield et al. reported maximum cases were in the age group less than 24 months and the mean age was 17.9 months.[11] The study done by Leela Kumara et al. found that 55.8% of cases and 56.5% of controls were in the age group of less than 17 months.[12] Alberto Romero Guzman et al., in their study found 55% prevalence among 6 months to 24 months.[13]

In the present study, there was male preponderance, Out of 100 cases 58% were male and 42% were female This could be because generally, for any illness males are brought to medical attention more when compared to females because of the male dominant societal pattern. The study done by Leelakumari et al, (2011) found males at 50.65% [12] and a study done by Hartfield et al.(2009) found males at 57.35%.[11]

Family history is important while evaluating epilepsy patients because many epileptic syndromes have a familial predisposition and some may possibly have an autosomal dominant pattern of inheritance in the present study, 4(8%) cases had a family history of febrile seizure. The study done by Leelakumari et al.(2011) found 26% of cases[12] and a study done by Alberto Romero Guzman et al.(2005) found 10% of cases.[13]

India being a developing country has the largest number of people living under poor socioeconomic classes. In the present study, 66% belonged to class IV and V socioeconomic status. The study done by Leelakumari et al.(2011) found 74.7% of cases.[12]

In the present study, MCV was below 70 in 46% of cases and 44% of controls which is not statistically significant. Azhar S Daoud et al. in their study also found MCV was not statistically significant.[14]

In the present study, MCH was below 27 in 44% of cases and 28% of controls which is statistically significant. In Azhar S Daoud et al. in their study 33% of cases and 24% of controls.[14]

Serum ferritin is an indicator of body stores of iron. Bone marrow aspiration is the gold standard for determining body stores. But bone marrow is painful and cannot be done in all patients. Serum ferritin is a reliable indicator which can be used to determine body stores of iron and can be repeated whenever required.

CONCLUSIONS

There was a significant association between iron deficiency and febrile seizure among children. Children with febrile seizures should be screened for iron deficiency. It is concluded that iron deficiency is common in age group less than 5 years is a risk factor for febrile seizures. So follow up with the children with these risk factors for recurrent febrile seizures and also educate the parents or caregivers on how to manage the febrile seizures at their home in an emergency situation. The percentage of children with febrile seizures was more in the age group 1 to 2 years. Iron deficiency as a modifiable risk factor for febrile seizures in Indian children of age group 6 months to 5 years. Larger studies are needed to formulate guidelines for assessing the role of Iron supplementation in preventing the occurrence rof simple febrile seizures in susceptible individuals.

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