



Original Research Article

Prevalence of iron deficiency in simple febrile seizures in children at different age group in Maharashtra

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ABSTRACT

Background: Prevalence of iron deficiency anaemia and febrile convulsions was observed in children at different age groups. Hence haematological profile has to be correlated with simple seizures.

Materials and Methods: 130 Iron deficiency children below 5 years were compared with same number of healthy children (controlled group). Blood examination included Hb% HCT, MCV, MCH, MCHS, RDW, PS. Serum Ferritin was ruled out and compared in both groups.

Results: The Haematological profile and serum Ferritin study was compared in both groups and p value was highly significant ($p < 0.00$) in all parameters.

Conclusion: The result suggests that, Iron deficiency is the main root cause for febrile seizures in children below 5 years of age. This pragmatic study will help paediatrician to treat such patients efficiently to avoid morbidity and mortality.

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1. Introduction

The word seizure is derived from the Greek language which means to seize upon to lay hold of, to overtake, references to seizures are to be found earliest in Greek literature of 5th century B.C. Simple febrile seizure is defined as a short (< minutes) generalised seizure, not recurring within 24 hours, in children at different age groups.^{1,2} Iron deficiency reduces the metabolism of some neuro-transmitters such as monoamine and aldehyde oxidase ID can be protective mechanism that causes onset of convulsion.^{3,4} Although febrile seizure (FS) is benign and rarely leads to brain damage it causes emotional, physical and mental damages which are stressful worry same for parents as it affects the quality of family life.

Hence attempt is made to evaluate the haematological profile and compared with healthy children (controlled) so

that variations in the both profile can be reviewed to find out the aetiology.

2. Materials and Methods

130 children admitted at paediatric ward of Prakash Institute of Medical Sciences and research centre hospital Islampur-415409, Maharashtra were studied.

2.1. Inclusive criteria

Children below 5 years having simple febrile convulsion and presence of short duration of fever (< 4 days) with simple febrile seizures selected for study.

2.2. Exclusion criteria

Children with complex seizures and having history of epilepsy or mentally retarded, severe mal nutritious were excluded from study.

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2.3. Method

130 children having iron deficiency with simple febrile seizures were compared with 130 healthy children of same age group (controlled group). Blood examination included Haemoglobin%, Hct, MCV, MCH, MCHC, RDW, PS Study, serum ferritin, Red blood cell indices (RBC indices) and Red blood cell distribution by using automated haematology analyzer (sysmex KX-21) and serum Ferritin estimation by using chemi-luminescence Immune assay (Advia centur).

The febrile seizures were diagnosed as per the guide lines for iron deficiency anaemia by WHO.⁵ The patients were treated according to haematological reports.

The duration of study was from June-2019 to July-2021

2.4. Statistical analysis

Parameters both groups, seizures and controlled group were compared by z test and significant values were noted. The statistical analysis was carried out in SPSS software. The ratio of male female children was 2:1.

3. Observation and Results

Table 1 Comparison of haematological profile in febrile and controlled group. In Hb% Mean value 9.56 (\pm 1.49) in febrile group 10.82 (\pm 1.45) in controlled t test 6.91 and $p < 0.00$

1. Hct (%) – Mean value 28.33 (\pm 4.06) in febrile, 32.11 (\pm 3.48) in controlled and t test value 8.06 and $p < 0.00$.
2. PDW (fl) – Mean value 44.28 (\pm 2.52) in febrile group, 42.11 (\pm 3.12) in controlled group, t test value 6.16 and $p < 0.00$.
3. MCV (fl) – mean value 68.55 (\pm 5.82) in febrile group, 74.23 (\pm 6.28) t test 7.56 and $p < 0.00$.
4. MCH (pg) – Mean value 68.55 (\pm 5.82) in febrile cases, 74.23 (\pm 6.28) in controlled group, t test value 4.74 and $p < 0.00$.
5. MCHC (gm/dl) Mean value 30.24 (\pm 2.18) in febrile cases, 31.42 (\pm 1.26), t test was 5.34 and $p < 0.00$.

Table 2 Comparative study of serum Ferritin profile in both groups. Mean value 40.76 (\pm 16.8) in febrile cases, 66.92 (\pm 24.8) in controlled group, t test 9.95 and $p < 0.00$

4. Discussion

Present study, prevalence of Iron deficiency and simple febrile seizures in children below five years age groups in Maharashtra. The haematological profile was compared in Iron deficiency simple febrile children and controlled children Hb% was 9.56 (\pm 1.49) in iron deficient febrile group, 10.82 (\pm 1.43) t test was 6.91 and $p < 0.001$. Hct% mean value 28.3 (\pm 4.06) in febrile group, 32.11 (\pm 3.48) in controlled group t test was 8.06 and $p < 0.00$. RDW (fl)

mean value 44.28 (\pm 2.52) in febrile group, 42.11 (\pm 3.12) in controlled group, t test was 6.16 and $p < 0.00$. MCV (fl) mean value 68.55 (\pm 5.82) in febrile group, 74.23 (\pm 6.28) in controlled group, t test was 7.56 and $p < 0.00$. MCH (pg) mean value 22.22 (\pm 3.16) in febrile group, 24.14 (\pm 3.03) in controlled group, t test was 4.74 and $p < 0.00$. MCHC (gm/dl) 30.24 (\pm 2.18) in febrile group, 31.42 (\pm 1.26) in controlled group, t test 5.34 and $p < 0.00$ (Table-1). In comparison of serum ferritin in Iron deficiency febrile group was 40.76 (\pm 16.8) and controlled group had 66.92 (\pm 24.8), t test was 9.95 and $p < 0.00$ (Table-2). These findings are more or less agreement with previous studies.^{6,7}

Such type of cases was also reported in developing countries, the percentage is 44-60 % of children under the age of 5 years.⁸ Iron deficiency interferes with the function of many organs, leading to anaemia, abnormal growth and behaviour cognitive deficits, altered thermo regulation, impaired physical performance and immune dysfunction.⁹ Iron is important for catecholamine metabolism, and for the various enzymes and neuro transmitters present in central nervous system. It increases extra cellular dopamine and nor epinephrine levels in the caudate putamen and decreases the levels of dopamine D₁ and D₂ receptors and monoamine transmitters.¹⁰ Furthermore Iron deficiency (ID) in early life alters metabolism and neuro-transmission in major brain structures such as basal ganglia, and hippocampus and disrupts myelination. ID is associated with several neurological disorders such as restless leg syndrome, breath holding spells and attention deficit hyperactivity disorders which are associated with increased brain excitability. ID leads to febrile seizures was also experimented in mice¹¹ and were also prone to infection also.

5. Summary and Conclusion

The present study of association between ID and FS by low serum Iron is associated with increased risk of febrile seizures. It suggests that, paediatrician / clinician should be concerned for Iron status even at little reduced haemoglobin level in children because growing age (body) needs adequate iron in their diet. The present study demands further interventional studies of nutritional, pathophysiological, pharmacological, genetic studies because exact pathogenesis, factors and mechanism of febrile seizures is still-unclear.

6. Limitation of Study

Owing to tertiary location of present hospital small number of patients we have limited findings.

This research paper was approved by Ethical committee of Prakash Institute of medical Sciences and research centre Islampur-415409, Maharashtra

Table 1: Comparison of haematological profile in both febrile seizures and controlled group

S.No.	Haematological profile	Iron deficiency 130 cases mean value	Controlled (Healthy) 130 cases mean value	t test	p value
1	Hb% (gm/dl)	9.56(± 1.49)	10.82(± 1.45)	6.91	P<0.00
2	HCT %	28.33(± 4.06)	32.11(± 3.48)	8.06	P<0.00
3	RDW (f1)	44.28(± 2.52)	42.11(± 3.12)	6.16	P<0.00
4	MCV (f1)	68.55(± 5.82)	74.23(± 6.28)	7.56	P<0.00
5	MCH (pg)	22.32(± 3.16)	24.14(± 3.03)	4.74	P<0.00
6	MCHC gm (dl)	30.24(± 2.18)	31.42(± 1.26)	5.34	P<0.00

Table 2: Comparative study of serum Ferritin profile in both groups

S.No.	Profile	Iron deficiency 130 cases	Controlled 130 cases	t test	p value
1	Serum Ferritin mg/dl	40.76(± 16.8)	66.92(± 24.8)	9.95	P<0.00

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8. Conflict of Interest

None.

9. Source of Funding

None.

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