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Research Article

**SERUM ZINC LEVELS IN CHILDREN WITH SIMPLE AND  
COMPLEX FEBRILE SEIZURES**<sup>1\*</sup>Dr. Farzana Shaikh, <sup>2</sup>Dr. Ghulam Shabir Laghari, <sup>3</sup>Dr. Shabir Ahmed Lehri,<sup>4</sup>Hamid Nawaz Ali Memon, <sup>5</sup>Dr. Imran Karim and <sup>6</sup>Dr. Alveena Batool Syed<sup>1,2</sup>Department of Pediatrics, Liaquat University of Medical and Health Sciences (LUMHS)  
Jamshoro<sup>3</sup>Bolan Medical College, Quetta<sup>4</sup>Zulekha Hospital Dubai United Arab Emirates<sup>5,6</sup>Liaquat University of Medical and Health Sciences – LUMHS Jamshoro**Abstract:****Objective:** To determine the frequency of serum zinc levels in children with simple and complex febrile seizures.**Patients and Methods:** The cross study of one year was conducted at private hospital on children of aged 6 months to 6 years, either gender with simple as well as complex febrile seizures. Three milliliters of whole blood was collected under strict aseptic precautions and sent to biochemistry laboratory for assessment of serum zinc levels (the normal serum zinc level was 70 – 125 µg/dL while the frequency / percentages (%) and means ±SD computed for study variables.**Results:** During one year study period total fifty children of simple and complex febrile seizures were explored for zinc status. The frequency for male and female population was 30 (60%) and 20 (40%) with mean ± SD for age of male and female individuals was 2.92±1.52 and 2.21±1.93 whereas the mean ±sd for fever in overall population was 101.52±2.21 respectively. regarding the gender distribution male 30 (60%), female 20 (40%), type of febrile seizure as simple 27 (54%), complex 23 (46%), and hypozincemia was detected in 31 (62%).**Conclusion:** Serum zinc levels were found to be lower in simple febrile convulsions than complex febrile convulsions.**Keywords:** Zinc, Simple febrile and complex febrile.**Corresponding author:****\* Dr. Farzana Shaikh,**Email: [zulfikar229@hotmail.com](mailto:zulfikar229@hotmail.com)

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**INTRODUCTION:**

A Seizure is a paroxysmal time limited change in motor activity and or behavior that results from abnormal electrical activity in the brain. Seizures are common in pediatric age group and occur in approximately 10% of children [1]. Most seizure in children are provoked by somatic disorders originating outside the brain such as high fever, infection, syncope, head trauma, hypoxia, or toxins. Less than one third of seizures in children are caused by epilepsy, a condition defined as two or more unprovoked seizures occurring at an interval greater than 24 hours apart [2]. Febrile seizures are the most common type of seizures observed in pediatric age group. Febrile seizures is defined as an event in infancy or childhood usually occurring between six months to six years of age associated with fever but without evidence of intracranial infection or defined cause [3]. A simple febrile seizure is generalized, tonic clonic in nature, lasts for a few seconds and rarely up to 15 min is followed by a brief period of postictal drowsiness and occurs only once in 24 hrs. A febrile seizure is described a complex or complicated when the duration is > 15 min, when repeated convulsions occur within 24 hours, or when focal seizure activity or focal findings are present during the postictal period [4]. Zinc (Zn) acts as a co-factor of glutamic acid decarboxylase, an enzyme which maintains the production of GABA in central nervous system and decreased level of Zn in CSF has also been observed in febrile seizures. In CNS zinc acts as neurosecretory product or co – factor [5]. Zinc is highly concentrated in the synaptic vesicles of a specific contingent of neurons called zinc containing neurons [6]. Regard to importance of febrile seizure and its possible contributing factors including serum zinc level this study is been conducted to explore the

serum zinc levels in children with simple and complex febrile seizures.

**PATIENTS AND METHODS:**

The cross study of one year was conducted at private hospital on children of aged 6 months to 6 years, either gender with simple as well as complex febrile seizures while the children with cerebral palsy, seizure disorder, chronic illness, already on children on zinc supplements and the children on anticonvulsants therapy was excluded from the study. The informed consent of parents was obtained in a consent form. Prior to inclusion of the children in the study, a detailed history of presenting complaints was recorded and vital signs namely heart rate, respiratory rate, and blood pressure was recorded. Anthropometric measurements namely weight, height, mid-arm circumference and head circumference were recorded. Three milliliters of whole blood was collected under strict aseptic precautions and sent to biochemistry laboratory for assessment of serum zinc levels (the normal serum zinc level was 70 – 125 µg/dL). The data was analyzed in SPSS and the mean ±SD was calculated for numerical variables while the frequency and percentage (%) was calculated for categorical variables.

**RESULTS:**

During one year study period total fifty children of simple and complex febrile seizures were explored for zinc status. The frequency for male and female population was 30 (60%) and 20 (40%) with mean ± SD for age of male and female individuals was 2.92±1.52 and 2.21±1.93 whereas the mean ±SD for fever in overall population was 101.52±2.21 respectively. The demographical and clinical profile of study population is presented in Table 1.

**TABLE 1: THE DEMOGRAPHICAL AND CLINICAL PROFILE OF STUDY POPULATION**

Parameter	Frequency (N=50)	Percentage (%)
<b>AGE</b>		
06 months- 1 year	14	28
1 – 2 year	13	26
2 – 3 year	09	18
3 – 4 year	06	12
5 – 6 year	05	10
≥ 6 year	03	06
<b>GENDER</b>		
Male	30	60
Female	20	40
<b>TYPE OF FEBRILE SEIZURE</b>		
Simple	27	54
Complex	23	46
<b>HYPOZINCEMIA</b>		
Yes	31	62
No	19	38

**DISCUSSION:**

Febrile seizure is a common neurologic problem occurring in children aged between 6 months to 6 years. The etiology of febrile seizure is unknown but genetic factors or electrolyte disturbances may have a role in its occurrence or recurrence. The mean serum zinc levels in the present study in simple and complex febrile convulsions were  $47.91 \pm 6.72 \mu\text{g/dL}$  and  $50.96 \pm 5.83 \mu\text{g/dL}$  respectively. Children with febrile convulsions both simple and complex have statistically significant low serum zinc levels. Tarafdar DMR et al [7] comparing serum and CSF Zinc levels of febrile seizure children to their matched nonseizure febrile peers. Mean Zn concentration in febrile seizure children than in their matched nonseizure febrile peers ( $p < 0.001$ ). Lee JH et al [8] observed that mean serum zinc level was significantly lower in cases as compared to control ( $p < 0.05$ ) in children having febrile seizure. Ganesh R et al [1] compared serum zinc levels in cases of

simple febrile seizure with age matched controls with statistically significant results ( $p < 0.001$ ). Amiri M et al [9], Modarresi MR et al [10], Farhad H et al [11], Lee JH et al [8] and Talebian A et al [12] also gave similar results which are comparable with our study. However Garty BZ et al [13] observations did not support the hypothesis that febrile convulsions are related to reduce zinc concentration. All former studies have shown similar findings in this regards. As serum zinc concentration in any population is influenced by factors such as dietary pattern thus further studies are needed in this aspect to identify the probable etiology for this observation.

**CONCLUSION:**

Serum zinc levels were found to be lower in simple febrile convulsions than complex febrile convulsions. The role of zinc in febrile convulsions should be investigated by further studies. However considering the fact that zinc has multiple beneficial roles in body

system, zinc supplementation may still serve as a cost effective measure for prevention of febrile convulsions in the susceptible age group.

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