

## Research Article

# Comparison of serum zinc in children younger than 5 years old with febrile convulsion, children with seizures without fever and normal children

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## ABSTRACT

**Background:** Febrile seizures are the most common seizure disorder in children and have a good prognosis. Many theories about the role of neurotransmitters and trace elements in serum and cerebrospinal fluid are introduced as the pathogenesis of febrile seizures. Among these elements, the element can be noted. The purpose of this study to comparison of serum zinc in children younger than 5 years old with febrile convulsion, children with seizures without febrile and normal children.

**Methods:** In this study, 180 children were studied in three groups. 60 children with seizures without fever and 60 children with febrile convulsions admitted to hospital and 60 healthy children without a history of seizures. Afzalipour who were referred to health centers in the city of Kerman. Serum zinc levels in all three groups were measured by atomic absorption spectrophotometry.

**Results:** The mean serum zinc levels in children with febrile seizures in this investigation was 48.4 µg/dl, compared with the other two tense children without fever (64.61 µg/dl) and healthy children (67.33 µg/dl) was significantly lower.

**Conclusion:** Results of this study showed reduced serum zinc levels during febrile seizure. The need for continued research on surface tension in febrile children over several months is recommended.

**Keywords:** Epilepsy, Febrile seizure, Zinc

## INTRODUCTION

The febrile seizure is one of the most common neurologic problems in childhood. Approximately 2 percent of the children before the five turn a seizure during high fever disease experience. The prevalence of febrile seizure between 2 to 4 percent.<sup>1,2</sup>

This type of seizure is mainly observed in the age range of 6 month to 6 years. The etiology of febrile seizure is

still unknown. But electrolyte imbalance, hereditary metabolic disorder, genetic factor; neurologic problem, and iron deficiency, immunologic problem and zinc deficiency may play a role in febrile seizure.<sup>3-5</sup>

Zinc one of the most important elements in the body that is necessary to abundance in central brain system can be found on the division and distinction between cells that is effective will eventually lead to a brain system will be natural. More on cheap in the brain are connected to that

role very important construction and functional .it is also an important cofactor for different enzyme such as DNA and RNA polymerases.<sup>5-9</sup> Some authors have reported that the serum zinc level in children with febrile seizure is lower than control group and concluded that this trace element may have a role in febrile seizure.<sup>6-10</sup> the aim of this study was to compared serum zinc level in children with febrile seizure and seizure without fever.

**METHODS**

This study is a cross-sectional view. A random sampling of children 5 years of age admitted to entering the Afzalipour hospital design was used for the sampling. Including factors are children less than 5 years, I have referred the seizure.

Excluding factors are children older than 5 years, children who used the supplement, the children who have already been treated with anticonvulsants, children who already have a fever also have a seizure without turns, and infants and children with the following abnormal growth of 3 percent. And any time you do not have an interest in continuing cooperation of parents of children could study abroad.

In this study, 180 children five years old ago were studied in 120 patients with a chief complaint of seizure movements tonic-clonic or focal and leaving the floor of the mouth or other symptoms seizures refer to Hospitalet, have a total of 60 children with febrile seizure, followed by a febrile illness without a brain infection occurring in 60 children with epilepsy without a history of febrile been studied and 60 healthy children without a history of seizures or specific disease evolves normal and no history of syrup on in the last two weeks in a control group of children referred to health centers in the city were.

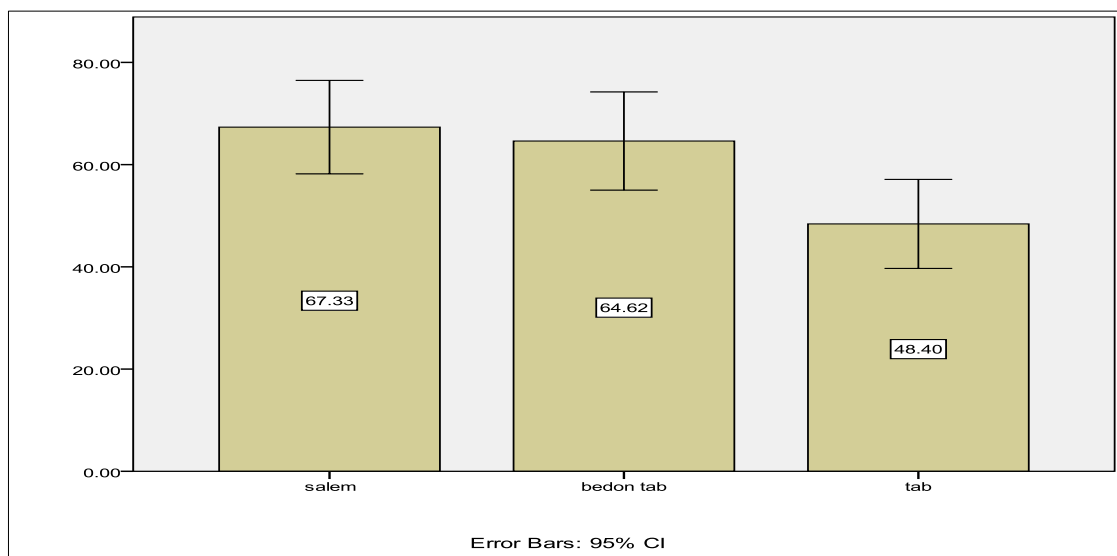
After obtaining informed consent from the parents, questionnaires filled out by the parents of these children then blood samples for determination of serum zinc concentration on the rate of 3 cc by a nurse, was performed in acid washed glass tubes were immediately centrifuged.

Serum of blood disposable plastic tubes and in negative temperature 20°C frozen. Then zinc levels were measured by flam atomic absorption spectrometry. Data were collected and analyzed by SPSS.

**RESULTS**

In this study 180 children were examined in three healthy children group, seizure without a fever and febrile seizure division. In this study 96 (53. 3%) of children were girls and 84 (46. 7%) of children were boy. With an average age of children 2. 5 years with standard deviation 1.5 and minima 1 year were present. The average age of boys study 2.4 with standard deviation 1.4, and the average age of girl in study 2. 6 with standard deviation 1.6. Meaningful difference between two groups in statistics not (P >0.05). The average level of zinc in the participants in the study 60. 11 µg/dl standard deviation with 36.23.

The average level of zinc in the boys study the means above girls (P = 0.0007). A comparing the average level of zinc in the three group study shows meaningful febrile group children with two groups in study. Level of zinc in healthy group 67.33 µg/dl with standard deviation 35.64 and in the convulsive children without fever 64.61 µg/dl with standard deviation 37.16 is meaningful difference between children with febrile convulsive group has Serum zinc 48.4 µg/dl and standard deviation 33.70.



**Figure 1: Level of zinc in the three groups studied.**

## DISCUSSION

The etiopathogenesis of febrile seizure is unknown. However, a variety of factors are considered to be involved in pathogenesis of febrile seizure such as genetic factors,<sup>1</sup> family backgrounds,<sup>2</sup> iron deficiency<sup>3,4</sup> immunologic disorders<sup>7</sup> and zinc deficiency.<sup>5,6</sup>

Limited numbers of studies have been conducted regarding the role of zinc in occurrence of febrile seizures. Burhanoglu et al. reported that the average level of serum zinc in children afflicted with febrile seizure was less than control group.<sup>5</sup> Another study carried out on 34 children with febrile seizure and 58 healthy children revealed that the serum zinc level in children with febrile seizure was lower than those in control group and the difference was significant, statistically.<sup>7-10</sup> Drlee et al. reported that the serum zinc level among children with febrile seizure was considerably lower than those in control group.<sup>11</sup> In a study by Mollah and assistances it was shown that the trace elements such as zinc have crucial role in pathogenesis of seizures.<sup>13</sup> The study of Ganesh et al. On 67 children with febrile seizures indicated that the serum zinc level in the group afflicted with febrile seizures was significantly lower than those in control group.<sup>14</sup> In a very latest study by Mishra et al. on 20 children with febrile seizures and 48 children as control group, it was reported that the serum zinc level in children afflicted with febrile seizure was lower than those in control group, and the difference was significant. The reason(s) for reduction of serum zinc level inpatients afflicted with febrile seizure is not clear. However, fever and acute infection may have some roles in developing such condition. It is believed that the release of Tumor Necrosis Factor (TNF) and Interleukin (IL) during fever or tissue injury may result in reduction of serum zinc level. Izumi et al. proposed that the hypozincemia during fever trigger the NDMA receptor, one of the members of trigger the NDMA receptor, one of the members of glutamate family of receptors, which may play an important role in the initiation of epileptic discharge during febrile seizures. Although our study also implies that the hypozincemia occurs during febrile seizure, nevertheless, we are not fully sure that the hypozincemia is involved in epileptic discharge, as our control group was healthy children without fever.

The role of zinc in nervous system function has been broadly discussed in literature. Brain contains an abundant value of zinc, especially in hippocampus region. Five to fifteen percent of zinc is concentrated as vesicle zinc in glutamatergic glutamate family of receptors, which may play an important role in the initiation of epileptic discharge during febrile seizures. Although our study also implies that the hypozincemia occurs during febrile seizure, nevertheless, we are not fully sure that the hypozincemia is involved in epileptic discharge, as our control group was healthy children

without fever. The role of zinc in nervous system function has been broadly discussed in literature. Brain contains an abundant value of zinc, especially in hippocampus region. Five to fifteen percent of zinc is concentrated as vesicle zinc in glutamatergic synapses. Zinc acts as a improves the communicating and locomotive function, and also evolution of neurological system. Zinc deficiency diminishes hippocampal zinc and leads to seizure discharge. Regarding the findings of the studies carried out by different researchers; noticeable prevalence of febrile seizures; the risk of recurrent seizures, epilepsy and brain damage; and also the crucial role of zinc in central nervous system,<sup>3-9</sup> the question is to what extent the zinc plays a role in the pathophysiology of febrile seizures and how much the prophylactic prescription of zinc could be capable of preventing febrile seizure. More studies are required to address these questions. In conclusion, this study revealed that the serum zinc level in children afflicted with their first febrile seizure is lower than in healthy children and seizure without fever the difference is statistically significant.

## CONCLUSION

This study shows that serum zinc level reduced in febrile convulsion. But more study on zinc level in febrile convulsion recommended.

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