

# THE INCIDENCE OF FEBRILE CONVULSION IN EXCLUSIVELY BREAST-FED CHILDREN

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## ABSTRACT

**Background:** Febrile convulsion (FC) is one of the most common emergency diseases in childhood that has an incidence of 3-4%. The most common causes of FC are gastroenteritis and respiratory infections. We know that exclusive breast-feeding in the first 6 months of life decreases this disorder.

**Methods:** In this study we evaluated the frequency of exclusive breast-feeding on children who had FC and were admitted in the pediatric emergency department of Imam Reza hospital. Control group was 100 children, who were matched with the case group.

**Results:** 65.5% of the case group had exclusive breast-feeding in the first 6 months of life, compared with 75% in the control group. It was not significantly different ( $p>0.05$ ). However, 55% of children with complex FC had been exclusively breast-fed compared to 75% in the control group ( $p<0.05$ ).

**Conclusion:** Exclusive breast-feeding in the first 6 months of life does not have a significant effect on FC, but it may protect children from complex FC which is a predisposing factor for epilepsy.

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**Keywords:** Seizure, Febrile Convulsion, Exclusive Breast-Feeding.

## INTRODUCTION

Febrile convulsion (FC) is one of the most common problems referred to pediatric emergencies. It has been shown that 3-4% of children encounter this problem.<sup>1,2</sup> The risk of epilepsy in these children is 2%.<sup>1,3,4</sup>

This study was performed to evaluate the frequency of exclusive breast-feeding in the first 6 months of life, which is strongly recommended,<sup>5,6</sup> on the incidence of FC.

## PATIENTS AND METHODS

This study was performed in Imam Reza Hospital of

Mashhad Medical University in Khorasan province in the year 2000 and the aim was to compare the rate of exclusive breast-feeding in children with FC and those without it. By using statistical methods, we chose 148 patients (who had FC) as the case group and 100 children with FC as the control group. The sampling method was simple probability. Entrance criteria to the study were:

- a) age between 6 months to 6 years
- b) convulsion which occurred after fever and was confirmed by emergency physicians and then the pediatric neurologist.

Patients were excluded from the study if they had the following problems: electrolyte disorders, hypoglycemia, meningismus, confirmation of meningial infection by CSF smear or culture, history of epilepsy or seizure without fever and underlying neurological disorder like cerebral

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palsy, encephalopathy and mental retardation.

After confirmation of FC a questionnaire was completed according to the report of mothers or caretakers, which included questions about:

- personal identifications
- type of feeding in the first 6 months of life:
  - a) breast-feeding
  - b) powdered milk or cow's milk
  - c) a mixture of both
- type of seizures: simple or complex
- family characteristics: parent's job, economical level

The control group consisted of children brought to health care centers for routine check up who did not have FC. Data was analyzed by SPSS software and statistical formulas of chi-square and Odds ratio.  $p < 0.05$  was considered significant.

### RESULTS

148 children had been admitted due to FC (70 in the summer and 78 in the winter).

97 (65.5%) were exclusively breast-fed in the first 6 months of life compared to 75 (75%) in the control group. This difference is not statistically significant.

The odds ratio was 1.5, in other words, the probability of FC in non breast-fed children is 1.5 times higher than those with exclusive breast-feeding. Out of the 148 children with FC, 47 cases (31.7%) were of a complex type, including 28 cases with two or more convulsions longer than 15 minutes, 4 cases that had both long and recurrent convulsions, one that had both focal and long convulsions. No one had all the three markers of complexity.

Out of 47 patients with complex FC, 26 (55%) were exclusively breast-fed in the first 6 months of life compared to 65.5% in the total FC group and 75% in the control group. This shows that type of feeding affects the complexity of FC ( $p < 0.02$ ), (Table I).

116 of our cases had FC for the first time, and we evaluated the age range of these cases. The average age was found to be 24.8 months.

Is family history of FC associated with its complexity? In this study 47.5% of the children with a family history of FC had complex FC compared to 26% of the children without such a family history ( $p < 0.02$ ). In fact a family history of FC has a remarkable effect on its complexity. In this study family history had no effect on the recurrence of FC. Causative factors of FC were: respiratory infections (48%), gastroenteritis (33%), urinary infections (6%), vaccination (3.3%) and roseola infantum (0.7%). In 9% of cases no definite reason could be found.

### DISCUSSION

Mankind is becoming aware that human milk is a divine blessing as we continue to learn more and more about its benefits. It is an advanced biologic mixture used as food and drink and also provides enzymes, hormones, growth factors and immunologic factors, so it is called comforting feeding.<sup>7,8,9</sup>

Studies have shown that the incidence of gastroenteritis and respiratory infections is much lower in breast-fed children<sup>5,10,11,12</sup> as are febrile diseases and FC.

Reports show that some neurological diseases such as seizure due to late hypoglycemia, meningitis, multiple sclerosis, brain neoplasia, SIDS (sudden infant death syndrome) and botulism are fewer in breast-fed children.<sup>7</sup> In addition to NGF (nerve growth factor), lactose, cholesterol, copper, unsaturated fatty acids and DHA (Docosahexaenoic Acid) in human milk can help in better growth of the brain and its myelination and also frequent contact of mother and baby and their affectionate relation can improve developmental skills.<sup>13,14</sup> In this study we tried to evaluate exclusive breast-feeding in children with FC and its relation to the type of convulsions. We could not find a similar discussion of this topic in the literature.

In this study 65.5% of the children with FC were exclusively breast-fed in the first 6 months of life. This figure was 75% in the control group. According to the latest official statistics 47% of children in Khorasan province have exclusive breast-feeding.<sup>15</sup> Type of feeding in children with FC showed no significant difference in comparison with the case group (chi-square  $p > 0.05$ ). However, the odds ratio is 1.5 which means the probability of FC in non breast-fed children is 1.5 times higher than those with exclusive breast-feeding. According to the data of our study, the rate of breast-feeding in Khorasan province is higher, which indicates an increase in this practice; although this might not mirror the figures for the whole society.

In our study there were 148 children with FC, 68.3% of whom had simple and 31.7% had the complex type. Complex seizure has one of these three characteristics: more than once in 24 hours, longer than 15 minutes, or focal signs.<sup>3</sup> However, it must be mentioned that some simple seizures may not be referred to the hospital.

According to this study, type of feeding affects the complexity rate of the seizure ( $p < 0.02$ ) and it can be concluded that exclusive breast-feeding may decrease complex FC, which is one of the risk factors of epilepsy.<sup>16,17</sup> Risk of bacterial meningitis in children with convulsions and fever is 3% but in complex convulsions this figure increases to 9%.<sup>18,19,20</sup>

This study shows that family history of FC is an as-

**Table I.** Type of feeding in the first 6 months of life in both control and case groups and number of simple FC (SFC) and complex FC (CFC).

Type of feeding		Breast-feeding		Cows milk or Powdered milk		Mixture of the two		Total	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
Case Group	SFC	71		9		21		101	
	CFC	26		6		15		47	
	Total	97	65.5%	15	10%	36	24.5%	148	100%
Control Group		75	75%	5	5%	20	20%	100	100%

sociated factor for complexity of FC ( $p < 0.02$ ) but has no effect on its recurrence. In another study family history of FC has been understood to be one of the most important factors for recurrence.<sup>1</sup> Febrile convulsions tend to occur in families, although the exact mode of inheritance is not known and varies between families. In large families, the FC susceptibility trait is inherited by autosomal dominant pattern with reduced penetrance. It has long been recognized that there is a significant genetic component for susceptibility to this type of seizure and this may be caused by a mutation in several genes.

There is no strong evidence concerning the relation between FC and breast-feeding in other references but in a study on children with FC that was done in Mashhad in 1996, 64.4% of children with FC were deprived of breast-feeding.<sup>23</sup> This study also shows that breast-feeding can protect the neurological system in addition to other benefits. In this study the length of breast-feeding affected the incidence of FC. In fact, if children have a longer duration of breast-feeding, the incidence of FC will be lower. Hence, we recommend exclusive breast-feeding in the first 6 months of life, and along with other foods up to the end of the second year.

Finally it was shown that exclusive breast-feeding in the first 6 months of life might reduce the occurrence of FC but not to such a significant degree. However breast-feeding can reduce complex FC significantly.

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