

# RESEARCH ARTICLE

## MOTHERS' EXPERIENCE REGARDING THE RELATIONSHIP BETWEEN DAIRY PRODUCTS AND THEIR CHILDREN'S SEIZURES

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### Abstract

#### Objective

Epilepsy is one of the most important problems in neurology. The purpose of this study was to evaluate the relationship between dairy products and seizures of the epileptic children based on their mothers' experience.

#### Materials & Methods

In a descriptive- analytic study, mothers' experience regarding the relationship between dairy products and seizures of their children was evaluated via a questionnaire. This research was done in the pediatric neurology clinic of Shaheed Sadoughi Medical Sciences University- Yazd- Iran in 2007.

#### Results

One hundred and forty eight mothers with an age range of 17-52 years (mean  $\pm$  SD:  $31.6 \pm 6.6$  years) were evaluated. Their children were 58.5% boys and 41.5% girls with an age range of 1-18 years (mean  $\pm$  SD:  $6.6 \pm 4.2$  years). The most common dairy products which provoked seizure based on mothers' experience, were milk and ice cream. The effect of different kinds of dairy products was not different between males and female children. Mothers who experienced the effect of dried whey (kashk in Persian) on seizure were younger than others. Lack of correlation between milk and ice cream on seizures was reported in educated mothers.

#### Conclusion

Parent education on the diet of their epileptic children is necessary. On the other hand, extracting of suspicious food ingredients and testing them on animal models, should be done by other researches.

**Keywords:** Seizure, Dairy products, Epilepsy

### Introduction

The prevalence of epilepsy which is defined as two or more unprovoked seizures in intervals of more than 24 hours is 4.3 to 9.3 in 1000 children (1). The occurrence of seizure in a child is coincided with fear and anxiety of the parents and they like to obtain information for helping their children. Mothers have the main role in feeding their children and one of the questions they frequently ask is regarding what their child should or should not eat. Sometimes, parents may obtain the required information regarding dietary restrictions of their children from unreliable sources. The relationship between food and seizure has been long discussed. About a thousand years ago, Avicenna, the great Iranian scientist, in his book named Cannon wrote that epileptic patients should avoid excessive consumption of some foods such as beef,

lamb, fish, onion, garlic, celery, cauliflower and carrot(2). The great physician of the sixth century, Jorjani, believed that the environmental factors such as excessive heat and cold, long baths and certain foods such as sweet foods, celery, goat meat, mustard and pepper exacerbate seizure, while pheasant meat, partridge, sparrow, lamb, poultry, peas and coriander reduce symptoms in patients with epilepsy (3).

Foods may affect seizure by many mechanisms which include the following:

- 1- Food-drug interaction: bioavailability of Carbamazepine changes with grapefruit consumption (4)
- 2- Food allergy induced seizures (5 , 6)
- 3- Substance deficiency:
  - Carnitine deficiency in patients treated with Sodium Valporate (7)
  - Tryptophan deficiency in a low protein diet based on corn meal (8)
  - Dietary zinc deficiency (9)
- 5- Hyponatremia and water intoxication due to feeding a dilute formula(10), etc.

Dairy products are one of main groups in diet . The aim of this study was to evaluate relation between dairy products and seizures of epileptic children based on their mothers' experience.

## Materials & Methods

In a descriptive- analytic study, mothers' experience regarding the relationship between several dairy products and seizure of their epileptic children who were referred to the pediatric neurology clinic of Shaheed Sadoughi Medical Sciences University (Yazd, Iran) in year 2007 was evaluated.

The sample size based on Z formula and a confidence interval of 95% with an accuracy of 1% was assessed to be 120 persons and for a more accurate and better analysis, 150 mothers were recruited in this study. Care was taken to select:

1. Mothers who spoke Persian as their native language
2. Mothers whose epileptic children were older than one year and were fed with family diet
3. Mothers whose children used effective antiepileptic drugs with a sufficient dose
4. Mothers whose children did not have any metabolic disorders that required a special diet

Data such as age and education level of the mothers, sex and age of their epileptic children, and maternal experience regarding the effect of all kinds of dairy products on seizure (exacerbation, attenuation or without effect) were carefully recorded in a questionnaire via interview. The content validity and reliability of the questionnaire was approved by experts and care was taken for questions to be clear, comprehensive and understandable. For illiterate and low-literate mothers, questions were read by the researcher without inducing a specific response and the answers were recorded. An informed consent was obtained from mothers of the epileptic children. Chi-square test and T-test were used to compare qualitative variables and mean of the variable quantities, respectively. P values less than 0.05 were considered significant.

## Results

One hundred and forty eight mothers with an age range of 17-52 years (mean  $\pm$  SD: 31.6  $\pm$  6.6years) completed the questionnaires. Their children were 58.5% (87 patients) boys and 41.5% (61 patients) girls with an age range of 1-18 years (mean  $\pm$  SD: 6.6  $\pm$  4.2 years). Mothers were illiterate or had primary, secondary, high school and higher education in 3.4% (5/148), 34% (50/148), 14% (21/148), 28.4% (42/148) and 20.2 % (30/148) of the cases, respectively.

Mothers' experience regarding the relationship between different dairy products and seizure of their children is presented in Table 1 indicating that the most common dairy products which provoked seizure were milk, ice cream, dried black curds (gharah-ghoroot in Persian) and yogurt in order of importance.

Comparison between the mean age of the mothers who experienced or did not experience the effect of different dairy products on their children's seizure is presented in Table 2. Although mothers who believed that dairy products affected seizure were younger for all dairy products, a significant difference in age was seen only in dried whey (kashk in Persian).

Mothers's educational level did not have a significant impact in considering relation between milk and ice cream and their children's seizure (Table.3, P-value = 0.009 and 0.02, respectively).

In this study, no significant difference was observed between the effect of different kinds of dairy products and patients' sex, type of epilepsy (symptomatic,

idiopathic, cryptogenic) and the type of seizures (generalized, partial, mixed).

**Table 1.** Mothers' experience regarding the relationship between different dairy products and seizure

Dairy product \ Effect	Effect based on Mothers' experience (Total number = 148)					
	Exacerbation		Alleviation		Without effect	
	Number	Percent	Number	Percent	Number	Percent
Milk	45	30.4	15	10.1	88	59.5
Yogurt	35	23.6	11	7.4	102	70
Cream	15	10.1	11	7.4	122	82.5
Butter	20	13.5	11	7.4	117	79.1
Cheese	12	8	12	8	124	84
Ice cream	39	26.3	2	1.4	107	72.3
Dried whey	25	17	12	8	111	75
Dried black curds (ghara-ghoroot)	36	24.3	2	1.4	110	74.3

**Table 2.** Comparison between mean age of the mothers who experienced or did not experience the effect of different dairy products on seizure

Dairy product \ Effect	Mean age of the mothers who experienced the effect	Mean age of the mothers who did not experience the effect	P.value
Milk	31.35 ± 5.4	32.2 ± 7.3	0.44
Yogurt	31.8 ± 6.1	31.88 ± 6.8	0.94
Cream	30.5 ± 6.1	32.1 ± 6.6	0.25
Butter	30.8 ± 5.9	32.12 ± 6.8	0.35
Cheese	30 ± 5.9	32.2 ± 6.6	0.13
Ice cream	30.9 ± 6.1	32.2 ± 6.7	0.28
Dried whey	29.9 ± 5.8	32.5 ± 6.7	0.03
Dried black curds (ghara-ghoroot)	31 ± 6.1	32.1 ± 6.7	0.38

**Table 3.** Educational level of mothers and relation between dairy product kinds and children seizures

Dairy product \ Mother's educational level	Less than high school		High school and more		P.Value
	Effective	Without effect	Effective	Without effect	
Milk	23	53	37	35	0.009
Yogurt	26	50	20	52	0.39
Cream	8	68	18	54	0.02
Butter	15	61	16	56	0.71
Cheese	10	66	14	58	0.3
Ice Cream	20	56	21	51	0.67
Dried whey	18	58	19	53	0.7
Dried black curds	18	58	20	52	0.67

## Discussion

In counseling epileptic patients, identification of seizure-precipitating factors is necessary and nutrition and diet are two important issues in public health .

In studies carried out in Norway (11), London (12) and Austria (13), 53%, 90% and 71% of the epileptic patients experienced at least one seizure-triggering factor such as emotional stress, sleep deprivation, tiredness, depression, menstrual cycle and change of weather, respectively. Food was reported as a seizure-precipitating factor in 55% and 5.7% of the patients in two studies in Shiraz-Iran (2) and Philadelphia-USA (14), respectively.

High fat, low protein and carbohydrate diets such as ketogenic and Atkins are used for the treatment of intractable epilepsy (15).

In this study, dairy products caused seizure in 8 -30 percent of the patients and in another Iranian study, 31.2% of the families experienced seizures attacks after specific foods among which dairy products were a cause in 41% (2). Differences in cultural beliefs or food habits may be possible explanation for this discrepancy.

In the present research, milk was the most common dairy product which induced seizure.

In other studies, the seizure-inducing effect of milk has been proposed to be due to gastrointestinal side effects of milk and a decrease in phenytoin bioavailability (16), cow's milk allergy (5,6), feeding of infants with unfortified formula and nutritional rickets (17).

In one study, milk alkali syndrome and hypercalcemia of calcium carbonate overuse caused status epilepticus and mesial temporal sclerosis in two patients (18).

Taurine is a non-protein amino acid with a high concentration in brain which regulates intracellular concentration of calcium, neuronal excitability and membrane stabilization (19). Its endogenous production is insufficient for the human organism, so taurine has to be delivered with food (19). Although animal products are good sources of taurine, cow's milk does not contain sufficient taurine. Therefore, the seizure - precipitating effect of cow's milk may be due to taurine insufficiency; however, further studies are needed to evaluate this relationship.

In the present study, high educated mothers believed that milk and ice cream did not exacerbate seizure which is in agreement with another study (2) in which low educated families believed more in a relationship between consumption of specific foods and occurrence of seizure. Therefore, knowledge of epileptic patients and their parents regarding dietary restrictions may be promoted through education.

The idea of seizure-triggering effect of a specific kind of dairy product may be the result of a mixture of physiological grounds, health condition of patient, seizure control and beliefs of the patient regarding such a relationship. So, seizure might be wrongly related to

irrelevant factors because of an underlying psychological background (13, 20).

Identifying foods that exacerbate or alleviate seizure is the first step for further scientific researches. Extraction of the effective ingredients of these foods and assessment of their effects on laboratory animals can reveal their role in inducing or reducing seizure. Evaluation of role of milk allergy in inducing convulsions and assessment of antiepileptic drugs bioavailability and serum levels after consumption of dairy products should also be done. Educating epileptic patients and their parents and promoting their knowledge on diet in epilepsy and correction of habitual diets are necessary as well.

In conclusion, since diet and nutritional habits have a considerable role in personal and public health, paying attention to habitual diets and assessment of the beliefs regarding the effect of foods on seizure is helpful. Based on results of this study, the most common dairy products which provoked seizure based on mothers' experience were milk and ice cream. Therefore, food allergy, especially to milk, should be considered in epileptic patients. Also, elimination of milk from their diet may reduce the need for high doses of antiepileptic agents as useful, time saving and cost effective option.

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