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Short Communication

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Febrile Convulsion, Its Clinical Characters and Risk Factors in Iranian Children, a Population-Based Study

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Abstract

Objective: *Febrile convulsion (FC) is a benign and self-limited disorder in children, most of the time; Despite it is a very worrisome condition for the parents. In this study the prevalence, clinical characters and risk factors of the FC were determined in Iranian children by a population-based study.*

Materials & Methods: *In this cross-sectional study, the prevalence, risk factors and the characteristics of FC were determined in 600 children in 3-month to 6-year-old group attended at health centers located in south of Tehran, capital of Iran, by interviewing to their mothers.*

Findings: *The prevalence of FC was 6.5% (39 cases). 8.1% of the females and 4.5% of the males had FC. The mean age of cases was 38.6 months with Standard deviation (SD) 15.8 months. The mean age of the first attack of FC was 23.3 months with SD 7.8 months. The mean duration of an attack was between 1-5 minutes. 92% of cases had simple FC. Recurrence of FC was seen in 1/3 of the cases. There was significant statistical relation between FC and the child's age, birth weight, positive family history of FC or epilepsy in the parents or the siblings, maternal job or education level.*

Conclusion: *The study has shown that the prevalence of FC was relatively high in the studied population. The FC characters and risk factors were very similar to the results of other studies.*

Keywords: Febrile Convulsion, Population, Child, Risk Factor, Prevalence

1. Introduction

Febrile convulsion is the most prevalent neurological disorder in childhood. Despite it is a benign condition, it is very petrifying for the parents which usually make them to seek medical emergency care and attending in the hospitals. Although its etiology is not clear, some of the common triggers for its occurrence is child involvement with viral infections or following vaccination [1-3]. The researches have shown the frequent age for FC occurrence is between 6-month till 6 year- of- age [1]. Besides, it contains two types: simple and complex. Simple form is a tonic clonic generalized seizure which takes less than 15 minutes without any recurrence in 24 hours. In complex form, it would be focal, takes more than 15 minutes or with recurrence [1,4]. Overall, FC is a self-limited condition mostly without a serious sequela in children abates by 5 years of age [5]. In spite of reporting lots of hospital-based studies about FC, its clinical characteristics and risk factors in Iran, there was no population based one. Therefore, this study was directed to determine the prevalence of FC, its clinical characteristics and risk factors in south of Tehran.

2. Material and Methods

This study was a cross-sectional one and was performed in south of Tehran, capital of Iran. This area has almost 2 million population mostly in low or medium socioeconomic condition. First of all, 6 health centers in the area were selected randomly. Then, the mothers of the children attended to the health centers for doing

their children's routine visits, vaccination or growth and development monitoring undertaken an interview by trained personnel. The sampling method was convenient and from each health centers 100 babies between 3- month to 6- year- old age included. For interviewing the mothers, a structured questionnaire was designed and the questions included babies' variables such as age, sex, birth weight, gestational age, type of baby's delivery, maternal age, educational level of the mothers, family relationship of the parents, maternal job, history of unprovoked seizure(epilepsy) in the parents or siblings, history of FC in the child, the parents or siblings, and the clinical characters of FC (includes the duration, its recurrence, age at onset, and type of FC). All the children with any neurological disorders including unprovoked seizure were withdrawn from the study. For differentiating seizure from pseudo seizures such as breath-holding spells, shaking, cough syncope, simple syncope, benign paroxysmal vertigo, etc.), we asked about the characters of the seizures in detail as well as the triggers of the seizure occurrence e g falling, imbalance, upsetting or scolding the baby, coughing paroxysm, loss of consciousness, postictal sleep, paleness, cyanosis or respiratory distress before seizure, rolling eyes to up, locking jaw, tonic and or clonic phase at the start of the convulsion.

3. Findings

In this population-based cross-sectional study 600 under 6- year-old children were included. Overall, the prevalence of FC was 6.5% (39 cases). FC was more occurred in Females than males (70% versus 30%). Despite the parents' consanguinity and vaginal delivery were more frequent in the cases with FC, no statistically significant relationship was found between these characteristics with FC. Moreover, the maternal educational level was low in the cases with FC (64% with under diploma level versus 36% with diploma or higher level), and a statistically significant relationship was shown between maternal educational level and FC. Besides, almost all the mothers of cases with FC were unemployed (38 cases versus 1 case) and there has shown a statistically significant relationship between FC and the maternal job. The frequency and percent distribution of categorical variables of the studied children by FC and their statistically significance relationship has been shown in the Table 1. Mean age of the children with FC was more than the children without FC (38.6 months versus 20.6 months) and statistically significant relationship was found between child's age and FC. Although the mean birthweight of the cases with FC was more than the children without FC (3700 gram versus 3295 gram), there was statistically significant relationship between FC and the child's birthweight.

The distribution of mean, standard deviation, minimum and maximum of numerical variables of the studied children by the children' FC and statistically significance relationship have been shown in Table 2. In the interview, some questions were asked about history of FC or unprovoked seizure in the children's family. In spite of a few numbers of children with FC had positive history of FC in their mothers, fathers or siblings, a statistically significant relationship was found between FC and positive history of FC in the children's family. Furthermore, positive history of unprovoked seizure in the mother, father or siblings of the cases was low, however, a statistically significant relationship was found between FC and positive history of unprovoked seizure in the children's family. The frequency and percent of the parental and siblings' history of FC or unprovoked seizure by the children' FC and statistically significant relationship were summarized in the Table 3. Generally, almost 80% of the FC cases had 1-3 years old. 90% of the FC type was simple (generalized tonic- clonic seizure, less than 15 minutes and without recurrence in 24 hours). Just in 3 cases, FC have taken more than 15 minutes (97.7%) and these group has made our complex type of FC. Recurrence of FC mentioned by the mother in 14 cases (36%) which included 1 time in 12 cases and 2 times in 2 cases. In detail, 2 cases with 2 times recurrence had the first FC onset under 1 year of age, 8 cases and 4 cases with one time recurrence had the first FC onset between 12-23 months of age or 24-35 months of age respectively. In summary, clinical characteristics of Fc in the cases have shown in the Table 4.

FC in the child / Categorical variables	Yes		No		Sum		p value
	No*	%	No	%	No	%	
Sex							
Male	12	4.5	255	95.5	267	44.5	
Female	27	8.1	306	91.9	333	55.5	<0.001
Parents consanguinity							
Yes	24	13.5	315	86.5	339	56.5	
No	15	5.7	246	94.3	261	43.5	no significant
Delivery type							

Vaginal	25	6.3	374	93.7	399	66.5	
Cesarean Section	14	7	187	93	201	33.5	no significant
Maternal education level							
Under diploma	25	12.7	172	87.3	197	32.8	
Diploma & higher	14	3.5	389	96.5	403	67.2	<0.001
Maternal job							
Household	38	8.5	410	91.5	448	74.7	
employed	1	0.7	151	99.3	152	25.3	<0.001

No*: Number

Table 1: The Frequency and Percent of the Categorical Variables of the Studied Children by the Cases' FC and their Statistically Significant Relationship

FC in the child / Numerical variables	Mean		SD*		Minimum		Maximum		p value
	Yes	No	Yes	No	Yes	No	Yes	No	
Child's age(month)	38.6	20.6	13.2	15.8	9	3	60	65	<0.001
Maternal age at the child's birth(year)	26.41	26.33	3.78	3.85	16	39	36	45	no significant
Child's gestational age(week)	39.2	39.5	0.9	0.5	36.5	37.7	40	40.5	no significant
Child's birth weight(gram)	3700	3295	528	475	2600	2500	4350	4500	<0.001

SD*: Standard deviation

Table 2: The Distribution of Mean, Standard Deviation, Minimum and Maximum of Numerical Variables of the Studied Children by the Children' FC and Statistically Significance Relationship

FC in the child / History of FC or unprovoked seizure in the children's family	Yes		No		Sum		p value
	No*	%	No	%	No	%	
FC in the mother							
Yes	6	14.3	33	85.7	39	7	
NO	33	5.9	528	94.1	558	93	<0.03
FC in the father							
Yes	8	27.6	21	72.4	29	4.8	
NO	31	5.4	540	94.6	571	95.2	<0.001
FC in the sibling							
Yes	7	23.3	23	76.7	30	5	
NO	32	5.6	538	94.4	570	95	<0.001
Unprovoked seizure in the mother							
Yes	7	63.6	3	36.4	10	1.7	
No	32	5.4	558	94.6	590	98.3	<0.001

Unprovoked seizure in the father							
Yes	6	33.3	12	66.7	18	3	
No	33	5.7	549	94.3	582	97	<0.001
Unprovoked seizure in the siblings							
Yes	8	80	2	20	10	1.7	
NO	31	5.3	559	94.7	590	98.3	<0.001

No*: Number

Table 3: The Frequency and Percent of the Parental and Siblings' History of FC or Unprovoked Seizure by the Children' FC and Statistically Significant Relationship

The FC clinical manifestations	Number	percent
Child's age at the FC onset(month)		
6-11	2	5.1
12-23	16	41.1
24-35	15	38.5
36-47	5	12.8
48-60	1	2.5
Type of FC		
Simple	36	92.3
Complex	3	7.7
Duration of FC (minute)		
<1	7	17.9
1-4	25	64.1
5-15	4	10.3
>15	3	7.7
Recurrence of FC		
Yes	14	35.9
No	25	64.1
Frequency of recurrence		
0 time	25	64.1
1 time	12	30.8
2 time	2	5.1

Table 4: The Distribution of Frequency and Percent of the FC Clinical Characteristics in Studied Cases

4. Discussion

Because, as far as we know, there was not any population-based study for reporting prevalence of FC and its risk factors among under 6- year-old children in Iran, we should compare our results with the other countries' studies. In this study, according to the maternal answers, the prevalence of FC was 6.5% among under 6- year- old children. Our Figure is more than the FC prevalence in USA (2-5%), Brazil (<1%), Denmark (4.9%), Singapore (4.47%), Turkey (4.8%), Korea (5.49%) and Western countries (2–5%) [1,4,6-11]. It sounds that differences in population genetics, geographical locations and prevalence of infectious diseases in different areas result in these discrepancies in FC prevalence rates. Furthermore, our figures might be an overestimation of the FC prevalence, because as far as we know, there is no medical thermometer accessible at most of the homes, and most of the cases' mothers just mentioned that they felt their babies' body is warmer than normal, therefore, it is probable that some of the seizures would be really unprovoked seizure. In contrary to other reports in this study FC has occurred in females (27,70%) more than males (12, 30%) and there was a statistically significant relationship between FC and sex like other studies [10-17]. It is probably because of unequal distribution of the males and females in our study (44.5 versus 55.5 respectively) as the result of the convenient method of sampling. The median age of FC onset in

the cases was 28 months which is higher than other studies' results [5,10,14-18].

The peak of FC onset age in the cases were in the range of 12-36 months (31 cases, 80%) similar to a study in Korea, however, higher than the other studies' findings [10,11,14,15]. Although the children's birth weight or gestational age in the FC cases were more than the other children, yet, the other reports had shown more frequent FC occurrence in the children with low birth weight or low gestational age [18-20]. It sounds that this difference is because of low number of Low birth weight or premature babies in our study. Similar to other reports, cases of FC have reported in the babies' mothers with low level of education (almost twice times) or unemployed ones more than among the mothers with diploma and higher educational level or employed ones [21,22]. It is noteworthy, that almost all of the cases' mothers in this study was unemployed (38 out of 39). As expected, the unemployed mothers spending more time with their children, therefore, it sounds they are more considerate about their children and detect their brief symptoms and signs more carefully. A statistically significant relationship has shown in our study between FC and the positive history of FC or unprovoked seizure in the children's parents or siblings which has been confirmed with the other studies, therefore, it seems genetics and hereditary play an important role as the predisposing factor for occurring FC in the babies [7,14,15,18,23-26]. Similar to other reports, FC in the cases, mostly happened as a simple type (92%), less than 10 minutes (80%) and without any recurrence in 24 hours [10,17,25,26]. Like other studies' results recurrence of the FC was high among our cases (>35%) in early childhood (between 12-36 months of age) and beyond this age range the occurrence of recurrence hasn't reported in our cases, probably because of the more development of the brain [5,10,11,23-26].

5. Conclusion

In this populational- based cross-sectional study, the prevalence of FC was more frequent in our babies than the other reports, however, our results were very similar to other studies all over the world with regard to cases characteristics, clinical manifestations or risk factors. Anyway, this study based on the maternal answers and very dependent to their recall. In order to find the exact data due to FC and their clinical manifestations in detail, it is recommended perspective cohort studies designed and performed for obtaining the more accurate of incidence rate, clinical characteristics, and probable complications of FC in the babies.

Patient Consent for Publication

Written informed consent for publication of the babies, without any potential identifying information, was provided by the parents of the patient.

Conflicts of Interest

The author declares no conflict of interest.

References

1. Sawires, R., Buttery, J., & Fahey, M. (2022). A review of febrile seizures: recent advances in understanding of febrile seizure pathophysiology and commonly implicated viral triggers. *Frontiers in pediatrics, 9*, 801321.
2. Francis, J. R., Richmond, P., Robins, C., Lindsay, K., Levy, A., Effler, P. V., ... & Blyth, C. C. (2016). An observational study of febrile seizures: the importance of viral infection and immunization. *BMC pediatrics, 16*(1), 202.
3. Carman, K. B., Calik, M., Karal, Y., Isikay, S., Kocak, O., Ozcelik, A., ... & Dinleyici, E. C. (2019). Viral etiological causes of febrile seizures for respiratory pathogens (EFES Study). *Human vaccines & immunotherapeutics, 15*(2), 496-502.
4. Shinnar, S., & Glauser, T. A. (2002). Febrile seizures. *Journal of child neurology, 17*(1_suppl), S44-S52.
5. Leung, A. K., Hon, K. L., & Leung, T. N. (2018). Febrile seizures: an overview. *Drugs in context, 7*, 212536.
6. Eilbert, W., & Chan, C. (2022). Febrile seizures: a review. *J Am Coll Emerg Physicians Open 3* (4): e12769.
7. Dalbem, J. S., Siqueira, H. H., Espinosa, M. M., & Alvarenga, R. P. (2015). Febrile seizures: a population-based study. *Jornal de pediatria, 91*(6), 529-534.
8. Vestergaard, M., Obel, C., Henriksen, T. B., Christensen, J., Madsen, K. M., Østergaard, J. R., & Olsen, J. (2006). The Danish National Hospital Register is a valuable study base for epidemiologic research in febrile seizures. *Journal of clinical epidemiology, 59*(1), 61-66.
9. Lee, W. L., Low, P. S., & Belinda, R. U. (1996). Epidemiology of febrile seizure in Singapore children. *Neurol J Southeast Asia, 1*, 53-55.
10. Ateşoğlu, M., İnce, T., Lüleci, D., Ergör, A., & Aydın, A. (2019). Prevalence of febrile seizures in school-aged children: A community based survey in İzmir, Turkey. *The Journal of Pediatric Research*.
11. Shang, J., Yamashita, T., Fukui, Y., Song, D., Li, X., Zhai, Y., ... & Eun, B. L. (2018). Prevalence, incidence, and recurrence of febrile seizures in Korean children based on national registry data. *Journal of clinical neurology, 14*(1), 43-47.
12. Nishiyama, M., Yamaguchi, H., Ishida, Y., Tomioka, K., Takeda, H., Nishimura, N., ... & Nagase, H. (2020). Seizure prevalence in children aged up to 3 years: a longitudinal population-based cohort study in Japan. *BMJ open, 10(9), e035977.*
13. Shujaat, M. B. (2017). Febrile Seizures. *Texila International Journal of Clinical Research, 4*(1).
14. Sharawat, I. K., Singh, J., Dawman, L., & Singh, A. (2016). Evaluation of risk factors associated with first episode febrile seizure. *Journal of clinical and diagnostic research: JCDR, 10*(5), SC10.
15. Renda, R., Yüksel, D., & Gürer, Y. Y. (2020). Evaluation of patients with febrile seizure: Risk factors, reccurence, treatment and prognosis. *Pediatric emergency care, 36*(4), 173-177.
16. Tiwari, A., Meshram, R. J., Singh, R. K., & Singh IV, R. K. (2022). Febrile seizures in children: a review. *Cureus, 14*(11).
17. Rahman, M. Z., Salim, A. F. M., Ghosh, N. K., et al. (2025). Patterns of febrile seizures: analysing seasonal, diurnal and socioeconomic correlations in Bangladesh. *Int J Contemp*

Pediatr, 12(2), 159-164.
18. Christensen, K. J., Dreier, J. W., Skotte, L., Feenstra, B., Grove, J., Børglum, A., ... & Christensen, J. (2021). Birth characteristics and risk of febrile seizures. *Acta Neurologica Scandinavica, 144*(1), 51-57.
19. Nirmala, S., Erogowda, A., Manjushree, R. (2022). A study of febrile seizures and birth characteristics. *International journal of Scientific research, 11*(11).
20. Kumari, P. L., Rajamohanan, K., & Krishnan, A. A. (2022). Risk factors of first episode simple febrile seizures in children aged 6 month to 5 year: a case control study. *Indian Pediatrics, 59*(11), 871-874.
21. Alawwadh, A., Alzahrani, D. A., Almallah, A. M., Alshabeeb, M. S., Alshahrani, W. A., Alshehri, S. A., ... & Tashari, T. (2024). The Knowledge, Concerns, and Beliefs of Mothers Towards Febrile Convulsions and Its Management in Aseer, Saudi Arabia. *Cureus, 16*(10).
22. Abd-Almuhsen, D. A., & Yassin, B. A. G. (2025). Knowledge of Mothers about Febrile Convulsion in Children, Children Welfare Teaching Hospital, Medical City Complex, Baghdad, 2024. *Iraqi Journal of Community Medicine, 3*8(1), 63-67.
23. Sadleir, L. G., & Scheffer, I. E. (2007). Febrile seizures. *Bmj, 334*(7588), 307-311.
24. Berg, A. T., Shinnar, S., Shapiro, E. D., Salomon, M. E., Crain, E. F., & Hauser, W. A. (1995). Risk factors for a first febrile seizure: a matched case-control study. *Epilepsia, 36*(4), 334-341.
25. Biltz, S., Speltz, L. (2023). Febrile seizure. *Pediatr Ann, 52*(10), e388-e393.
26. Abuhaimed, A. A., Alghamdi, N. A., Alhussin, G. I., Alduhaimi, G. S., Othman, F., Baarmah, D. M., & Alkhalaf, H. A. (2025). Characteristics of pediatric patients with febrile convulsions admitted to a tertiary care hospital in Riyadh, Saudi Arabia. *Journal of Family and Community Medicine, 32*(1), 21-27.