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Original Article

The Life Time Prevalence of Childhood Seizure

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Abstract

Background: Seizure is the most common pediatric neurologic disorder. Epidemiological studies of childhood epilepsy are of importance to compare incidence and prevalence rates, age distribution, inheritance, seizure types, epilepsy syndromes and treatment strategies. Since there is little information about prevalence of childhood seizure in Iran, this study was aimed to determine the life time prevalence of childhood seizure and some of its determining factors in Tehran, Iran.

Methods: In this cross sectional study, 2500 male and female students, aged 12 years or younger, studying in fifth grade of primary schools in district one of Ministry of Education were assessed by filling a preliminary questionnaire. Those who were categorized by the author as having a history of any form of seizure were assessed by a second questionnaire. The clinical form of seizure, the presumptive cause, positive family history and use of anti-convulsant drugs were recorded.

Results: The life time prevalence of seizure was 32/1000 population which was more prevalent in boys .Generalized seizure was the most common clinical form. Approximately 60% of cases reported febrile convulsion as the presumptive cause stated by the physician. Positive family history was reported in 29.6% of cases. Anti epileptic drugs were taken by 54% of students with a positive history of seizure.

Conclusion: The results of this study show that the life time prevalence of seizure is relatively high in Iranian community, although the other factors were in concordance with other communities.

Keywords: *Childhood seizure, Epilepsy, Prevalence, Iran*

Introduction

Seizure is the most common pediatric neurologic disorder, with 4-10% of children suffering at least one attack of seizure in the first 16 yr of life (1). Childhood seizure is one of the most important causes of attending medical centers, especially emergency departments, and can be a cause of morbidity and disability in childhood (2).

Cognitive function, quality of life, educational problems, psychiatric morbidity and side effects of anti epileptic drugs in addition to childrens' and parents' concerns about social stigma of epilepsy are some of the factors that make childhood seizure a crucial subject in pediatrics (3).

Seizure is defined as sudden and simultaneous discharge of brain neurons which leads to alteration of conciousness, motor activity, behavior, sensation and autonomic function. Epilepsy describes a condition of susceptibility to recurrent seizure. Active epilepsy is a term describing those who are on anti epileptic drugs at the time of the study or those who have had their last seizure in the past 5 yr (1, 4).

Life time Prevalence of Seizure (LPS) in children is a proportion of children's population who have had a history of any type of seizure (single seizure, febrile convulsion, epilepsy) up to the end of childhood period. The same definition applies to Lifetime Prevalence of Epilepsy (LPE). Thus, it can be concluded that LPE is a subgroup of LPS. These two terms are used interchangably in medical literature.

Approximately 85% of the global burden of epilepsy resides in the developing world, where most people with epilepsy receive no medical attention at all (5). Consequently, although diag-

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nostic and therapeutic innovations remain important goals, the greatest challenge for world health lies in adequately identifying people with epilepsy and providing cost-effective epilepsy care (6).

According to neurology textbooks, prevalence of childhood seizures varies between 5.2-8.1/1000 (7). In a study in Peru, prevalence of epilepsy in children younger than 15 was reported as 2016/ 100000(8).

Febrile convulsion is the most common subtype of seizure in children. In a study in India, life time prevalence of febrile convulsion was estimated to be 10.1% (9). Epidemiological studies of childhood seizure are of importance primarily to compare incidence and prevalence rates, age distribution, inheritance, seizure types, epilepsy syndromes and treatment strategies in different populations. A study in Turkey showed an increased risk for epilepsy with a history of atypical febrile seizure (21.97-fold), severe and moderate head injury (27.76- and 7.09-fold respectively), CNS infection (4.76-fold), history of epilepsy in first-, second- or third-degree relatives (6.42- 3.09- and 2.66-fold, respectively) (10).

Since there is no valid data of prevalence of childhood seizure in Iran, in the present cross sectional study we attempted to assess the LPS in Iranian children and its possible determining factors.

Material and Methods

Two thousand five hundred fifth grade students, 1225 boys and 1275 girls, were selected by simple random sampling. The authors visited 14 boys primary schools and 19 girls primary schools by permission of Ministry of Education.

Inclusion criteria

All students aged 12 yr old or younger, who studied in primary schools of, district one of ministry of education in Tehran; from November 2003 to October 2004.

Exclusion criteria

Since the age 13 is the beginning of the adolescence phase, the above age group was selected because we planned to measure the LPS in children. Consequently, children older than 12 yr were not included in the study. Students who studied at special educational schools and those with special needs were also excluded from the study.

The sample size was estimated according to the LPS mentioned in valid pediatric and neurologic textbooks (7) which are 8/1000, with a confidence interval of 95%. Age, clinical form of seizure, probable etiology stated by the physician, use of anti epileptic drugs and positive family history were recorded by two successive questionnaires. Children and their parents were informed that the questionnaires were highly confidential. Informed consent was obtained from all children.

The first questionnaire was handed to the students to be filled by their parents. It included a comprehensive and simple definition of seizure and its clinical subtypes so that parents would be able to state definitely whether their child has ever had an attack of seizure. Repetitive occurrence of seizure, presence of fever at the time of seizure and child's age at the first and last attack were also assessed. Those who were suspected to have a history of any kind of seizure were privately given the second questionnaire, which was more detailed than the first one. It included questions about probable etiology stated by the physician, use of anti epileptic drugs and positive family history. Any question or doubt about the diagnosis was met by talking to the parents and asking for medical records of the children. We encountered no missing data.

To establish whether a child can be considered as having a history of seizure; history, the physician's diagnosis, child's medical record and parent's answers were all taken into account.

The collected data were coded and entered into SPSS software for windows, version 11.5.

Results

According to the mentioned criteria, 81 students were categorized as having a history of seizure, 51.8% boys versus 48.2% girls. LPS in 12 yr old children was estimated to be 32.4/1000.

(34.3/1000 in boys and 30.6/1000 in girls). Of 81 positive cases, 11 (13.5%) were categorized as having epilepsy, 7 boys versus 4 girls. Life time prevalence of epilepsy (LPE) was to be 4.4/1000. (3.2/1000 in girls and 5.6/1000 in boys). Forty eight (59.2%) reported febrile illness as the presumptive underlying cause of seizure (26 boys and 22 girls). LPS in non febrile cases is estimated to be 13.2/1000 (21.2/1000 in boys and 17.2/1000 in girls).

The most common clinical type of seizure was the generalized form (either tonic, clonic, tonic-clonic or atonic).Table 1 shows the more detailed classification.

Febrile convulsion was the most common etiology mentioned by parents or in children's medical records. Other underlying causes such as head trauma, vaccination and drug poisoning were less frequent. Table 2 shows the probable etiologies in children with a history of seizure.

A positive family history was detected in 29.6% of seizure cases. History of seizure was more prevalent in distant relatives than first degree relatives (21% versus 8.6%).

Totally, 44 (54.3%) of positive cases were either on anti-epileptic medication or had taken them in the past. The most common drug prescribed by the physicians was Phenobarbital, taken by 34(77%) of patients. Seven students had a history of taking Carbamazepine, 4 Phenytoin, 4 Sodium Valporate, 1 Primidone and 1 Lamictal. Of 11 cases of epilepsy, 4 were resistant to long term barbiturate usage and were taking Sodium Valporate instead.

Table 1: Clinical forms of seizure in students with a history of seizure

Clinical forms of seizure	Number of cases	%
Generalized	79	97.5
Simple partial	-	-
Complex partial	1	1.25
unclassified	1	1.25
total	81	100

Table 2: The presumptive etiologies in students with a history of seizure

Etiology	Number of cases	%
CNS infection	2	2.5
Head trauma	2	2.5
Drug poisoning	2	2.5
Post vaccination	1	1.25
Simple Febrile convulsion	47	58
Complex febrile convulsion	1	1.25
Not specified	26	32
Total	81	100

Table 3: positive family history in students with a history of seizure

Type of seizure	First degree relatives (%)	Other relatives (%)	Total (%)
Febrile convulsion	10	23	33
Epilepsy	9	27	36
All positive cases	8.6	21	29.6

Discussion

As mentioned earlier, LPS in children estimated in other studies varies greatly throughout the world. Apart from differences in methodology and sample size, the variation is due to difference in definition of seizure, diagnostic criteria and inclusion criteria of participants. A population based study with a sample size of 2222 performed in Japan has reported a prevalence of 8.9/1000 in children younger than 13. The rate would be 5.5/1000 if simple and febrile seizures were excluded (11). Another study estimated the prevalence of seizure in 5 yr old Brazilian children as 45.2/1000(CI 2.9-6.8) (12).In our study LPS was 32.4/1000 which is comparable to the study in Brazil. The difference with other studies can

be explained as a result of different study settings, sample sizes, inclusion criteria and definition for seizure cases and methodologies. Life time prevalence of non-febrile seizure is estimated to be 13.2/1000 which is higher than Japan (5.5/1000) (11) but much lower than Chile (21.1/1000) (4) and Atlanta (16 /1000) (13).

In our study LPS was 1.2 times higher in boys than girls (34.3/1000 versus 30.6/1000). The same conclusion applies to life LPE (5.6/1000 versus 3.2/1000).Our results are consistent with most of other studies which report 1.29-1.8 male to female ratio (4, 14).

The overall prevalence of epilepsy, 4.4/1000 in children aged 12 yr and younger in this study, is similar to the prevalence of 3.89/1000 at 7 yr and 4.28/1000 at 11 yr reported from the British national child development study (15). Other studies in developed countries have produced prevalence for epilepsy in children varying between 4.4/1000 and 17/1000 (14, 16, 17).

The most common clinical form of seizure in children is either generalized or partial seizure (4, 7). In our study, the generalized form was the most prevalent (97.5%). As 59.5% of seizure cases had a history of febrile convulsion (which is a generalized seizure), the result would be less significant in non febrile seizures.

Although fever is not a direct cause of seizure, we categorized it among the probable causes stated by the physician. More than 50% of seizure cases reported a febrile convulsion attack in their history, 98% of which were simple febrile convulsion. This seems in concordance with the fact that febrile convulsions are the most common type of seizure in young children (1).

Almost one-third of positive cases had a positive family history. It is comparable with the results reported by Asadi-pooya (18). One hundred eighty one unrelated epileptic children were included in this study. Overall, 61 (33.7%) of the parents were first cousins (OR= 2.264, 95%-CI: 1.618–3.169 in comparison to the general population), 37 (20.4%) were second cousins (OR= 3.557, 95%-CI: 2.389–5.296), and 83 (45.9%) were not related. Cancu et al reported the same results (9).

Forty-four cases (54%) had a history of taking anti-epileptic medication. Among these, the most common anti-epileptic drug was Phenobarbital. This seems to be against some studies indicating the new anti-epileptic drugs such as Carbamazepine are more recommended (3).

Epilepsy and seizure, especially febrile convulsion are important neurological disorders in Iranian children. As primary, secondary and tertiary prevention, information about LPS, LPE, seizure risk factors and appropriate treatment are of major importance. The present article indicates that in spite of seizure frequency in Iranian children population, many parents are not still knowledgeable about its underlying risk factors; we couldn't determine the probable of seizure based on parents' information. The authors suggest that more comprehensive study be done to evaluate epilepsy and seizure risk factors in Iranian children. We also recommend educational programs for parents, especially those with epileptic children.

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