Prevalence and Determinants of Epilepsy among School Children in Aseer Region- KSA

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Abstract
Epilepsy is a heterogeneous collection of neurological conditions and syndromes characterized by recurrent, unprovoked, paroxysmal seizure activity. It is estimated that 10.5 million children under 15 years have active epilepsy, representing about 25% of the global epilepsy population.2 Of the 3.5 million people who develop epilepsy annually, 40% are younger than 15 years, and more than 80% live in developing countries. Epilepsy is an important cause of neurological morbidity in .children. Family history of epilepsy, neonatal complications, perinatal brain damage, congenital cerebral malformations, intracranial infection, neonatal seizures, febrile seizure were found as predictors of childhood seizure disorder in many of the studies. In early onset epilepsy perinatal asphyxia, neonatal meningitis and neonatal seizure was found to be the important predictors little research has been done on childhood epilepsy in Aseer region. Greater knowledge on risk factors of epilepsy in the early years of life could help to improve understanding of epilepsy, can tell us about its prognosis and allow early intervention. <u>Objectives:</u> This research aimed to determine the prevalence of epilepsy among the school children and determine the risk factors associated with epilepsy <u>Methodology:</u> A case control study was conducted among school students aged 6 up to 18 years. Primary , preparatory and secondary schools was randomly selected in Abha and Khamis Mushait. <u>Results:</u> 20 cases of epilepsy was detected among the studied group. The identified major etiologic factors of the epilepsies were cerebral trauma , febrile convulsions, A family history of epilepsy was a risk factor of the cases, and the consanguinity rate among the parents was high. <u>Conclusion</u> :The most important risk factors for epilepsy in this study only head trauma, febrile convulsions, consanguinity and family history of epilepsy were significant
Keywords: Prevalence, Determinants, Epilepsy, children, school

1. Introduction

Epilepsy is one of the most common neurological disorders worldwide, contributing one percent to the global burden of disease 1, 2. About 69 million people worldwide are affected by this disorder with 90 percent of these individuals living in low- and middle-income countries 3. The cumulative lifetime incidence of epilepsy is 3% and more than half of the cases begin in childhood.[4] Epilepsy is a common neurological disorder in children and can have a major impact on a child's development. Epilepsy starts in childhood in 60% of cases and most of the clinically significant aspects of the disease occur during childhood. 5

Prevalence is defined as the proportion of a population with a given disease at a specified time, most studies have found the point prevalence of epilepsy to lie between 4 to 10/1000 (the lower figure in developed countries, while the higher in developing countries)6.
The prevalence of epilepsy is higher in developing countries when compared with developed ones. The incidence of epilepsy is 3 per 1000 in Italy,[7] 8 per 1000 in Turkey,8and 22.2 per 1000 in India.[8] However, the incidence is 9 per 1000 in Japan, a developed country. The degree of development of a country is therefore not the only determinant of epilepsy incidence. The incidence of epilepsy is directly related to the incidence of epilepsy risk factors.9 . Prevalence is defined as the proportion of a population with a given disease at a specified time, most studies have found the point prevalence of epilepsy to lie between 4 to 10/1000 (the lower figure in developed countries, while the higher in developing countries)10.

only one third of the patients with newly diagnosed unprovoked seizures receive an etiological diagnosis. Etiological factors for childhood epilepsy are different from those for epilepsy occurring later in life.11 In children, perinatal insults, developmental deficits, genetic factors, degenerative CNS or other malformations and perinatal events (i.e., asphyxia and CNS hemorrhage) are all often identified as possible causes of epilepsy 12,13 whereas cerebro vascular and degenerative causes have become recognized as possible causes in older age groups. CNS infection and head trauma may occur at any age.14,15 Different seizure types can have different impacts on a child's school performance. For example, a child's memory may be adversely affected by a generalized tonic-clonic (grand mal) seizure or a complex partial seizure. Absence seizures, which are

characterized by a brief loss of consciousness, may prevent a student from hearing and seeing what is happening in his class while he is having seizures. This loss of contact with his surroundings can therefore impede his learning. Children may also fall behind from missing school for doctor's appointments, tests, or while recovering from a major seizure. 16

2. Objectives:
The aim of the present study is to estimate the prevalence of epilepsy among school children in Aseer Region, to identify the risk factors associated with epilepsy

Subjects and methods:

A case control study was conducted among school students aged 6 up to 18 years. Primary , preparatory and secondary schools was randomly selected in Abha and Khamis Mushait in Aseer Region – Kingdom of Saudi Arabia..   Calculation of the sample size was performed using computer software(EPI-INFO), the sample size was 2500 when the confidence level was 99%. A multistage, systemic random sample was followed to choose the study sample, which was subdivided into three groups according to the site and social level of the school to represent the three socio-economic classes. The age of children ranged from 6 to 18 years.
 Screening of school students was done using a special simplified questionnaire representing all possible forms of epilepsy, each child in the study sample was asked to return it after being answered by his parents. Retrospective part of the study included collection of data about epileptic children from school doctor and the school health visitor. A child was considered epileptic if he had 2 or more unprovoked seizures. Epileptic children were subjected to Detailed history including perinatal, developmental, family and past history of febrile convulsions and detailed history of seizures. To study risk factors a group of 250 normal children within the same age range were randomly selected and a detailed history of potential risk factors was obtained to be compared to the children with epilepsy. All the statistical analyses were carried out with the Statistical Package for Social Science version 20 computer program for windows. Univariate analysis and their corresponding 95% confidence intervals (CI) were used to evaluate associations between epilepsy and the potential risk factors.
The study protocol was approved by the ethical committee in the College of Medicine, King Khalid University. The purpose of the study was discussed to the director and the teachers to gain their cooperation.

3. Results:
The study included 2500 Primary , preparatory and secondary school children from conventional schools. Among conventional school children (20 cases) of epilepsy was detected. The prevalence of epilepsy was 0.8 %. Prevalence of epilepsy was higher among middle class children and significantly higher among low social class children (Table 1)

Table 1. Socioeconomic status of epileptic children

SES	NO. & %	
High	2	(10%)
Middle	8	(40 %)
Low	10	(50 %)*

*P= 0.0036
From the study of potential risk factors among children of conventional schools; 12 epileptic children had prenatal risk factors; the commonest were maternal drug intake and renal illness. Natal risk factors were found in 8 children including prolonged labor, cesarean section or forceps delivery. The commonest postnatal risk factors were low birth weight and anoxia. Head trauma was present in 21.8 of epileptic children with significant difference between the epileptic and control group.
CNS infection was present in 7.2 of the epileptic children compared to 3.6 of non epileptic with no significant difference.

  History of febrile convulsions was found in 16.4% of epileptic children in our study. 19.4% of children had positive consanguineous marriage between their parents and 28.2% had positive family history of epilepsy. On analyzing risk factors using Odds Ratio only head trauma, febrile convulsions, consanguinity and family history of epilepsy were significant (Table 2).

Table 2**. Prevalence of some risk factors in children with epilepsy compared to their controls**

	Prevalence (%)		Odds ratio	Confidence interval	Significance
	Epileptic	Control			
Head trauma No Yes	78.2 21.8	91.5 8.4	5.27	0.606-1.678	0.038
CNS infection No Yes	92.8 7.2	96.4 3.6	0.769	0.695- 0.874	0.187
Febrile conv. No Yes	83.6 16.4	94.7 5.3	1.645	0.247- 0.618	0.003
Consanguinity No Yes	80.6 19.4	93.9 6.1	3.547	0.468 - 0.839	0.016
Family history No Yes	71.8 28.2	96.1 3.9	7.842	0.462 - 0.751	0.008
Perinatal risk No Yes	88.4 11.6	94.7 5.3	0.543	0.326 – 0.873	0.071
Neonatal jaundice No Yes	86.4 13.6	89.7 10.3	0.639	0.976—1.359	0.154

4. Discussion:

In this study the prevalence of epilepsy among school children was 8/1000 which is in agreement with previous study conducted in developing countries as Aziz et al(17) and Alrajeh(16), who found the prevalence to be 7/1000 in Turkey and 7.5/1000 in Saudi Arabia respectively. Egypt by **Nermin &** Elmotayam (18,19), who reported a prevalence of 7-10/1000 among school children below the age of 15 years. Also our results are similar to the prevalence of a study conducted in Turky (20). However our prevalence is lower than that reported by Shawki (21) as they included all ages in the population and Afify (22) as their study was hospital based. Prevalence of epilepsy was higher among middle class and much higher among low socioeconomic class children which is in agreement Nermin (18) and Turky studies (20)

A positive febrile convulsion history is a recognized epilepsy risk factor (23). In this study, a past history of febrile convulsions in 16.4% of epileptic children which is not far from rates reported by ADEM (24) and Ali Cansu (25);12.6% and 19.2.8% respectively. Febrile convulsion prevalence is reported to be between 1–4% in western countries (26). Since this risk factor is more

common in developing countries, this might contribute to the higher prevalence rates found in our study compared to those in developed countries (27, 28) Genetic factors are known to play a role in the development of both epilepsy and febrile seizures.(29). Childhood epilepsy is increased when risk factors such as febrile seizures, head trauma, central nervous system infections, mental retardation and cerebral palsy are present (30).

The incidence of epilepsy after head trauma has been extensively studied in the children.31,32,33 These studies show a high risk of epilepsy after head trauma. Similarly in our study, children with a significant history of head trauma had a 5.27 fold risk of developing epilepsy compared to the control group.

There was a history of CNS infection in 7% of our epilepsy patients and 3.6% of the control group. But there was no significant difference between the two groups as regard CNS infection. Other studies in Pakistan reported that it was present in almost 10% of the patients.17 and 4% reported by Al. Rajeh et al.16

The percentage of consanguineous marriage in parents of epileptic children in our study was 19.4 among parents of epileptic children

 similar to Nermin's study (18), but lower than Shawki's study (21) (64.9%) who attributed this high percent to the prevalent habit of consanguineous marriage in upper Egypt, especially in rural areas and the nature of field study.

The presence of family history of epilepsy in 28.2% of children in our study was nearly similar to the studies of Nermin (18) and Ali (25), (24%, and 22.5%) respectively.

In this study , there was no significant difference between epileptic children and non epileptic as regard perinatal risk or neonatal jaundice. Study of perinatal risk factors revealed that

maternal renal illness, drug intake, prolonged labor, low birth weight and anoxia were present in our patients which are in agreement with Nermin and Cansu (18, 25).

5. Conclusion

The prevalence of epilepsy was 0.8% mostly among low socioeconomic standard children. The most important risk factors for epilepsy in this study were, head Trauma, febrile convulsions, consanguinity and family history of epilepsy.

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