Epilepsy as Common Neurological Disorders in Childhood in Arar City, Saudi Arabia

Running title: Epilepsy as Common Neurological Disorders

Type: original article

Conflict of interest: No

Atheer Mutab Alanazi 1, Zahra Ali Al-Hussain 1, Kawthar Fawaz Aljoufi 1, Rahma Abdulhadi Alanazi 1, Marwah Khaled Altawyan 1, Jawaher Mohammed Alruwaili 1, Reem Hulayyl Alanazi 1, Badriah Helal Alazmi 1, Ahlam Hussein Alrwaili 1, Najah Dhafer Alanzi 1

1 Faculty of Medicine, Northern Border University, Arar, Saudi Arabia.

Correspondence to:

Atheer Muteb Alanazi

Faculty of Medicine, Northern Border University, Arar, Saudi Arabia

Email: Atheerk@hotmail.com
Abstract:

Introduction: Epilepsy is one of the most common neurological disorders in childhood. There are various risk factors that could lead to epilepsy. Seizures are the main symptom of epilepsy. Symptoms differ from person to person and according to the type of seizure. This study was conducted to determine the prevalence of epilepsy and its risk factors in children and early adolescents (1-12 years) in Arar city, Northern Saudi Arabia.

Methodology: A cross-sectional study was conducted among a sample of students aged 1-12 years in Arar city, Northern Saudi Arabia, Kingdom of Saudi Arabia (KSA). This study was conducted during the period from 1 October 2016 to 31 March 2017. Parents of the studied cases were given a predesigned and pretested questionnaire to collect the relevant data in the presence of physicians diagnosed epilepsy, and family history of epilepsy.

Results: Epilepsy was prevalent among 6.8% of the studied sample. There was no significant correlation between epilepsy and age or sex ($p=0.21$, $p=0.07$, respectively). Generalized seizures were found in 78.2% of the cases, and only 21.7% had localized seizure. There was a family history of epilepsy in 21.7% of the cases.

Conclusion: Epilepsy prevalence among school children (1-12 years) in Arar city is 6.8%. Decision makers should take effective steps to limit the causes and risk factors of the problem.

Key words: Epilepsy, Neurological Disorders, Childhood, Arar

Introduction:

Epilepsy is one of the most common neurological disorders worldwide, affecting about 69 million people, with 90 % living in low- and middle-income countries [1]. It contributes nearly one percent to the global burden of disease, and 20 percent of the global burden of epilepsy is in Africa [2]. World Bank identified epilepsy as a health priority for school-aged children because of its high psychosocial morbidity and the potential for control using low-cost interventions [3]. Epilepsy can influence a youngster's training, in this way prompting inconvenience learning and lower grades. While numerous youngsters are fit for working in an ordinary classroom condition, many wind up in a custom curriculum[4, 5, 6]. The incidence of epilepsy studies in children has usually been restricted to new-onset epilepsy before 16 years of age[7, 8]. The incidence of epilepsy in children in developed countries in population-based studies has ranged from 33.3 to 82 cases per 100,000 persons per year [9-12].

A recent survey carried out in Jeddah [13], a major city in western Saudi Arabia, showed that the residents of Jeddah seemed to accept patients with epilepsy, but are unaware of what epilepsy means. The Jeddah survey, and another survey carried out
in Riyadh [14] the capital of Saudi Arabia, revealed that there is a misunderstanding of the disorder, and that epilepsy education programs for the general population in Saudi Arabia are needed and highly recommended to improve the understanding of epilepsy, and therefore improve quality of life of epileptic patients.

A study in Turkey found that among 1625 primary-school students aged 6-14 years, twenty-two children were diagnosed as epileptic. The point prevalence of active epilepsy in males was 4.9/1000 and 12.4/1000 in females, representing a total of 8.6/1000. The cumulative prevalence in males was 11.0/1000, and 16.1/1000 in females, representing a total of 13.5/1000 [15].

**Objective:**

This study was conducted to determine the prevalence of epilepsy and its risk factors in children and early adolescents (1-12 years) in Arar city, Northern Saudi Arabia.

**Participants and Methods:**

**Study type and duration:** A cross-sectional study was conducted among a sample of 339 students aged 1–12 years in Arar city, Northern Saudi Arabia, KSA. The study was conducted during the period from October 1st 2016 March 31, 2017.

**Data collection:** Parents of the studied cases were given a predesigned and pretested questionnaire to collect the relevant data on the presence of physicians diagnosed epilepsy, and family history of epilepsy.

**Statistical analysis:**

Collected data were coded and analyzed using the statistical package for the social sciences (SPSS, version 15). Descriptive statistics for the prevalence and quantitative variables were used. The relation between a squint and sociodemographic characters was determined using a 2-sided test, and p-value of less than 0.05 was considered statistically significant.

**Ethical considerations:**

This study was reviewed and approved by the Research Ethics Committee of Faculty of Medicine, Northern Border University. Participants were informed that participation is completely voluntary and data collectors introduced and explained the research to participants. No names were recorded on the questionnaires, and all questionnaires were kept confidential.

**Results:**

Epilepsy was prevalent among 6.8% of the studied sample. There was no significant correlation between epilepsy and age or sex (P=0.21, P=0.07, respectively). Generalized
seizures was found in 78.2% of the cases, and only 21.7% have localized seizure. There was a family history of epilepsy in 21.7% of the cases. In regards to the cause of epilepsy; 73.9% of the respondents reported unknown, 21.7% hereditary cause and 4.3% reported head trauma. Most (82.6%) of the cases lose their consciousness during the seizure, and 60.9% have strong involuntary movements. All the studied cases had compliance with the prescribed anti-epileptic drugs. About one-third of the cases (34.8%) started symptoms at the age between 3-5 years, while 21.7% of them started it at age of less than three years.

Table (1): age, sex, and prevalence of epilepsy in studied children, Arar, KSA, 2017 (N=339).

<table>
<thead>
<tr>
<th>Age group (in years)</th>
<th>Number</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4</td>
<td>108</td>
<td>31.9</td>
</tr>
<tr>
<td>5-8</td>
<td>111</td>
<td>32.7</td>
</tr>
<tr>
<td>9-12</td>
<td>120</td>
<td>35.4</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>230</td>
<td>67.8</td>
</tr>
<tr>
<td>Male</td>
<td>109</td>
<td>32.2</td>
</tr>
<tr>
<td>Previously diagnosed with epilepsy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>23</td>
<td>6.8</td>
</tr>
<tr>
<td>No</td>
<td>316</td>
<td>93.2</td>
</tr>
</tbody>
</table>

Figure (1): Prevalence of epilepsy among the studied children in Arar, Northern Saudi Arabia, 2017

Table (2): Relationship between epilepsy and child age and sex in the studied children, Arar, KSA, 2017 (N=339)

<table>
<thead>
<tr>
<th>Child age group (in years)</th>
<th>Previously diagnosed epilepsy</th>
<th>Total (n=339)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes (n=23)</td>
<td>No (n=316)</td>
<td></td>
</tr>
<tr>
<td>1-4</td>
<td>5</td>
<td>103</td>
<td>108</td>
</tr>
</tbody>
</table>
Table (3): epilepsy characteristics in the studied cases, Arar, KSA, 2017

<table>
<thead>
<tr>
<th>Type of fits</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Generalized</td>
<td>18</td>
<td>78.2</td>
</tr>
<tr>
<td>• Localized (in a certain area of the body)</td>
<td>5</td>
<td>21.7</td>
</tr>
</tbody>
</table>

The family history of epilepsy

<table>
<thead>
<tr>
<th>The family history of epilepsy</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• No</td>
<td>18</td>
</tr>
<tr>
<td>• Yes</td>
<td>5</td>
</tr>
</tbody>
</table>

Causes of epilepsy

<table>
<thead>
<tr>
<th>Causes of epilepsy</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Head trauma</td>
<td>1</td>
</tr>
<tr>
<td>• Unknown</td>
<td>17</td>
</tr>
<tr>
<td>• Hereditary</td>
<td>5</td>
</tr>
</tbody>
</table>

Loss of consciousness during fits

<table>
<thead>
<tr>
<th>Loss of consciousness during fits</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• No</td>
<td>4</td>
</tr>
<tr>
<td>• Yes</td>
<td>19</td>
</tr>
</tbody>
</table>

Strong involuntary movements

<table>
<thead>
<tr>
<th>Strong involuntary movements</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• No</td>
<td>9</td>
</tr>
<tr>
<td>• Yes</td>
<td>14</td>
</tr>
</tbody>
</table>

Compliance with anti-epileptic drugs

<table>
<thead>
<tr>
<th>Compliance with anti-epileptic drugs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Yes</td>
<td>23</td>
</tr>
</tbody>
</table>

Age (in years) of beginning of symptoms

<table>
<thead>
<tr>
<th>Age (in years) of beginning of symptoms</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• &lt; 3</td>
<td>5</td>
</tr>
<tr>
<td>• 3 -</td>
<td>8</td>
</tr>
<tr>
<td>• 5 +</td>
<td>3</td>
</tr>
<tr>
<td>• Don’t remember</td>
<td>7</td>
</tr>
</tbody>
</table>

Discussion:

Epilepsy is one of the most common serious neurological disorders prevalent in childhood, and more than 50% of seizures have their onset in childhood [16]. This study was conducted among a sample of students aged 1–12 years in Arar city,
Northern Saudi Arabia, KSA, and aimed to determine the prevalence of epilepsy and to show some of its risk factors in children and early adolescents.. Our study reported that epilepsy was prevalent among 6.8% of the studied sample, a prevalence which is considered very high compared to a study in Aser Region- KSA, which was conducted among 2500 of school students aged six up to 18 years, and showed a prevalence of 0.8 % [17]. In Turaif city, Northern Saudi Arabia, a population-based cross-sectional study was conducted among 1,230 school children; and it was found that 66 (5.5%) had epilepsy, a prevalence which is considered near to what our study reported [18]. On the other hand; a study from Taif Region KSA another study conducted among 800 patients with different neurological problems, reported that;310 patients aged 3 months to 12 years had epilepsy; this represents 38.75% frequency rate for epilepsy among children who presented to pediatric neurology clinic in Children hospital Taif [19]. In Egypt, a cross-sectional descriptive epidemiological study took place in primary schools in El-Minia City among 8750 children, the prevalence of epilepsy was 7.2/1000 (63 cases) [20]. In Kerala, India another study carried out among 1172 children aged 8–12 y, 26 had diagnosed with epilepsy giving a prevalence of 22. 2/1000 [22].In Khartoum State, Sudan a study conducted among school children reported that the prevalence of epilepsy was (4/1000) [24].In Trabzon, Turkey a cross-sectional field study was carried out among children (4288), epilepsy prevalence in the study was 8.6 per 1000 [25]. The prevalence of epilepsy (per 1000 population) was reported to be 9.8 in Pakistan [26], 4.8 in the Peoples’ Republic of China [27] and 3.6 in Tunisia [28].

For the risk factors of epilepsy, our study revealed that family history of epilepsy and being hereditary were the main known reported risk factors of epilepsy (by 21.7% for each), while only 4.3% reported head trauma as a risk factor. In a study from Aseer region, it was found that 28.2% of cases with epilepsy had a positive family history of epilepsy, head trauma was present in 21.8% of epileptic children, 19.4% of children had positive consanguineous marriage between their parents, febrile convulsions was reported in 16.4% of epileptic children, 13.6% had neonatal jaundice and central nervous system (CNS) infection was in 7.2 of the epileptic children [17]. Results of another study revealed that parental consanguinity was reported in (69.35%) of the patients with epilepsy, and 20% of the patients had the family history of epilepsy in their first and second-degree relatives [18]. Another study reported that consanguinity between parents plays a significant role where 59.1% of cases with epilepsy had parents who were cousins and family history also had a significant effect as 68.2% of cases had epilepsy cases in their families [19]. In Egypt another study reported the history of febrile convulsions was found in 36.2% of epileptic children, 31% of children had positive consanguineous marriage between their parents and 25.8% had the positive family history of epilepsy [20]. Another study found that there was no measurably huge distinction between the epileptic gathering and the control assemble for a family ancestry of consanguineous marriage and severe head injury and atypical febrile seizures were observed to be exceptionally associated with epilepsy improvement [21]. In Jordan a case-control study for patients going to the outpatient nervous system science center of Princess Rahma Teaching Hospital in Irbid among
200 patients and controls each, the historical backdrop of febrile spasms raises the danger of creating epilepsy by 5 folds, kids with a noteworthy history of head injury had 4.6 occasions the danger of having epilepsy contrasted with the control gathering, family ancestry demonstrated a factually huge expanded hazard for creating epilepsy yet central sensory system diseases and parental consanguinity did not add to the danger of creating epilepsy [23]. Another study highlighted that 13.5% of epilepsy cases experienced baby blues eclampsia, with febrile spasm in 10.8%, head injury in 8.1%, a past filled with meningitis in 5.4%, and somebody with epilepsy in the family ancestry in 27.0% [25].

As regards the type of seizures, our study reported 78.2% of the cases have generalized seizures, A percentage which is considered high compared to another study in which generalized tonic-clonic were the most frequent at 61.29% [18]. In accordance with our study, another study reported that to the prevalence of partial seizures is 27% [20]. In contrast to our results, another study conducted among 805 patients with epilepsy found that (72.2%) of patients had partial seizures and (18.9%) with generalized seizures [21]. In line with our findings, a study from Jordon reported generalized seizures at 69.5%, and partial seizure at 22.5% [23]. In Turkey, generalized tonic-clonic seizures were determined in (64.9%) patients [25].

**Conclusion and recommendations:** Epilepsy prevalence among school children aged 1-12 years old in Arar city is 6.8%. Decision makers should take effective steps to limit the causes and risk factors of the problem.

**Conflict of interest:**

The authors declare that there is no conflict of interest regarding the publication of this article.

**Funding:**

None

**List of abbreviations:**

KSA: kingdom of Saudi Arabia

CNS: central nervous system

**Consent for publication:**

Informed consent was obtained from the participants

**Ethical approval** (For review articles, write, “Not applicable”)

[Author Query: Provide the name of the approving body, date and letter number.]
References:

   https://doi.org/10.1186/1742-7622-9-8

   https://doi.org/10.1016/S0140-6736(12)61689-4


   https://doi.org/10.1111/j.1528-1157.1996.tb00506.x
https://doi.org/10.1016/j.seizure.2007.11.028

https://doi.org/10.1111/j.1528-1157.1978.tb04500.x

https://doi.org/10.1016/j.ejpn.2006.02.005

https://doi.org/10.1016/j.eplepsyres.2007.06.012

https://doi.org/10.1111/j.1528-1167.2008.01726.x

https://doi.org/10.1186/1471-2164-15-S2-P61

https://doi.org/10.1016/j.seizure.2012.12.010
https://doi.org/10.1016/j.pediatrneurol.2012.04.007


https://doi.org/10.19082/5036


https://doi.org/10.1016/j.seizure.2007.02.003


https://doi.org/10.1016/S1059-1311(02)00194-2


https://doi.org/10.1080/20469047.2016.1278110


https://doi.org/10.1111/j.1528-1157.1994.tb02539.x


https://doi.org/10.1111/j.1528-1157.1985.tb05669.x
