Section 1
Research articles

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A DESCRIPTIVE STUDY OF EPILEPTIC PATIENTS IN HERAT CITY OF AFGHANISTAN

Epilepsy is one of the most common and serious neurological disorders which is characterized by recurrent unprovoked seizures. Its prevalence ranges from 0.5% to 1% of the population in developed countries, and even higher in developing countries. Around 70 million people worldwide have epilepsy.

This research aims to perform a descriptive study on epileptic children 7-18 years old in Herat city of Afghanistan.

This descriptive study was performed on 7-18 years old children with epilepsy, which was conducted from in 2021 in Herat city of Afghanistan. The study included 100 patients with epileptic disorders, in this study Encephalography, Magnetic resonance imaging, Computed tomography, and Sociodemographic information were used to describe the patients.

The main group of this study included 100 epileptic children. The age of study participants ranged from 7- 18 years and the mean age was 9.21 ± 2.64 years. 46 (51.1%) were males and 44 (48.9%) were females. More often Epilepsy cases were observed in patients with focal seizures. Hereditary predisposition was found as a risk factor and it was statistically significant, the p-value was less than 0.0007. Having status epilepsy was also found a risk factor for epilepsy and the p-value was 0.001. Also, prognostic factors for refractory epilepsy were determined in this study.

The risk factors that were found in epileptic patients, were high and comparable with other studies in the world literature. More often epilepsy cases were determined in patients with focal seizures, hereditary predisposition, and having status epilepsy also found as prevalent risk factors for refractory epilepsy. Also, prognostic factors for epilepsy were identified. Negative factors were a high number of seizures, abnormal electroencephalography findings, and early onset of seizures in epileptic patients.

Keywords: Epilepsy, Seizure, Children.

Introduction

A seizure is a paroxysmal alteration of neurologic function caused by the excessive, hypersynchronous discharge of neurons in the brain. “Epilepsy” is the condition of recurrent, unprovoked seizures. Epilepsy has numerous causes, each reflecting underlying brain dysfunction [1]. The outward effects can vary from wild thrashing movements (tonic-clonic) seizures to milder types with a brief loss of awareness Petidmal seizure [2]. Epilepsy previously has been defined as at least two unprovoked seizures >24 h apart [3].

Epilepsy is a prevalent problem in the world, around 70 million people worldwide have epilepsy, mostly among children and adolescents. (WHO, 2019) [4,5]. Epilepsy is one of the most common neurological disorders, Its prevalence ranges from 0.5% to 1% of the population in developed countries and even higher in developing countries [6].

In a study which was done in Iran, the point prevalence of active epilepsy was 7.87 per 1000 individuals [7]. And in Canada, the prevalence of epilepsy in children in a national survey was 5.26/1000 [8]. The preferred initial management approach in epilepsy treatment as antiepileptic drug monotherapy is generally accepted. Even though, up to 30% of patients with epilepsy do not respond well to conventional antiepileptic medication, either due to recurrent seizures despite optimized antiepileptic drug therapy or due to adverse effects [9]. And juvenile myoclonic epilepsy is known to be subject to an elevated risk of seizures for several decades [10]. Structural brain lesions, such as malformations of cortical development are factors in the recurrence

of seizures as well [11]. Also, Kim JH, and his colleagues found a relationship between seizures and some triggers, the age of seizure onset commonly ranges among stimuli such as insomnia, fatigue, and stress [12]. In addition, epilepsy is associated with increased risk for morbidity and mortality, and can severely decrease the quality of life of a person with epilepsy. [13]. Furthermore, mental disorders including depression and anxiety in these patients and their families are more common compared to the general population [14]. For a more detailed account of the definitions and classification of epileptiform EEG abnormalities, the reader is referred to Seneviratne et al [15]. Also, there has been a recent explosion of new information regarding the genetic basis of epilepsy syndromes. Both monogenic and polygenic mutations can lead to epilepsy [16]. Also computed tomography (CT) and magnetic resonance imaging (MRI) scans are positive adjuncts to the clinical examination and EEG in the evaluation of a patient with seizures. Neuroimaging techniques are especially sensitive for central nervous system (CNS) structural lesions [17].

Aim of the research:

The aim of this research is to perform a descriptive study on epileptic children 7-18 years old in Herat city of Afghanistan.

Materials and Methods

This study is an observational study that describes the status, not the intervention. This study design is as descriptive and analytic, in that the data was analyzed and the group and categories were compared in this study. This study was held prospectively in the neurological center in Herat-Afghanistan. This research aims to study epilepsy in epileptic children 7-18 years old in Herat city of Afghanistan. And the study has objectives which are explained in the introduction part. For the achievement of the mentioned aim and objectives, the following steps were done. Patients who meet the inclusion criteria, regardless from which district of the Herat providence were randomly selected and recruited for this study. For the participation patients or their companions should sign the informed consent for the present study.

Criteria of inclusion:

- Patients with epilepsy.
- Children aged 7-18 years
- All patients and their legally authorized representatives who have given consent for participation.

Criteria of exclusion:

- Patient didn't have epilepsy
- Patients, age older 7 years & Age younger 18 years.
- All patients who did not agree to participate.
- Patients with epilepsy who had severe mental retardation.

Categorical data were presented as a percentage, and comparisons between groups were performed using the chi-square test or Fisher's exact test. The probability of an error of the first kind (the probability of an erroneous conclusion about the existence of differences between groups) was <5%, which is considered acceptable in medical research. Moreover, for all data types, a P-value less than 0.05 was designated as statistically significant.

Data processing was carried out using the data analysis package for the spreadsheet processor «Excel 2018» Microsoft® Office, «IBM-SPSS Statistics version 26» for Windows presented as mean ± SD or median, All patients participated voluntarily and informed consent was signed by children and their caregivers.

Results

In this study, 100 epileptic patients were included, whose characteristic was studied and described here.

Patients were included at an average age of 9.21 ± 2.64 ranging from (7 to 18 years old), with 46 men and 44 women (50 % and 49 %, respectively). In this investigation, a hereditary propensity was discovered in 50 (55.5%) cases, more than other risk factors ($P < 0.05$). Patients' average age at the start of their seizures was 4.1± 3. Also in this study, the average duration of illness in children was found 5.9 ± 3.21 years.

When patients were analyzed based on the frequency of their seizures, (31%) of them were recognized to have frequent seizures, with (14.2%) was experiencing numerous seizures virtually every day.

Generalized seizures were shown to be the most common type of seizure in epilepsy patients and 51 (56.7%) had primary generalized seizures the test was significant ($P<0.003$).

During MRI, pathogenic alterations in the form of mild cortical-subcortical atrophy were found in 23 patients. 32 individuals had symptoms of ventriculomegaly, while 26 patients exhibited small local atrophy.

48 patients (53.3%) in this study underwent effective therapy. Additionally, 42 (46.7%) kids and teenagers lacked remission. Drug-resistant epilepsy affected 26 patients (28.9%).

As there is shown in (Table 2) 66.7% of epileptic children experienced refractory epilepsy during

their illness. Secondary and primary generalized seizures both were with status epilepsy, but the two other groups were not and the test was statistically significant (P-value < 0.0001).

(Table 1) shows that hereditary predisposition was the most common risk factor of epilepsy, especially in boys (71.4%). Consequently, was perinatal pathology and this difference was statistically significant (P<0.05).

The average age of epileptic children at the time of the last visit was 9.21 ± 2.64 years and (male 50 % and female 49 %), gender difference with a predominance of male patients was significant (P <0.05) as there are demonstrated by (Figure 1).

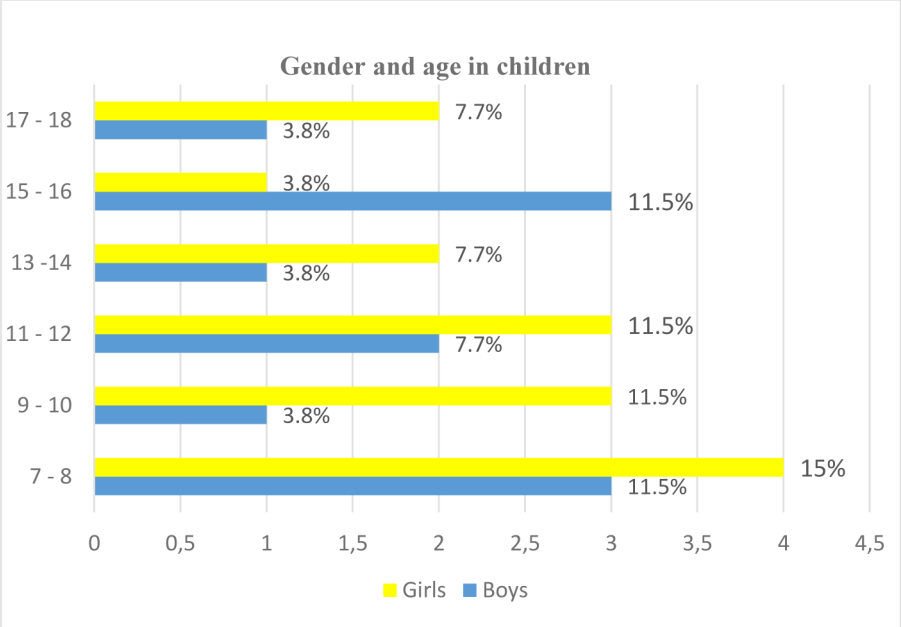

Figure 1 – Children with epilepsy by gender and age

As there is shown in (Table 1) hereditary predisposition was the most prevalent risk factor. The second step was perinatal pathology and this difference was statistically significant (P<0.05).

Table 1 – The risk factors in epileptic patients.

Risk factor	Male		Female		
	Frequency	%	Frequency	%	
Perinatal pathology, including traumatic brain injury	16	38.1	23	47.9	
Hereditary predisposition for epilepsy	30	71.4	30	62.5	
Febrile seizures	16	38.1	11	22.9	
No risk factors identified	1	2.4	0	0.0	
Early neuro-infections in children	0	0.0	0	0.0	
Pathology of pregnancy	0	0.0	0	0.0	
Somatic pathology	0	0.0	0	0.0	P<0.004

As presented in (Figure 2) severe seizures were observed in (12%) of all patients, but daily attacks were seen in (12.3%) of epileptic patients.

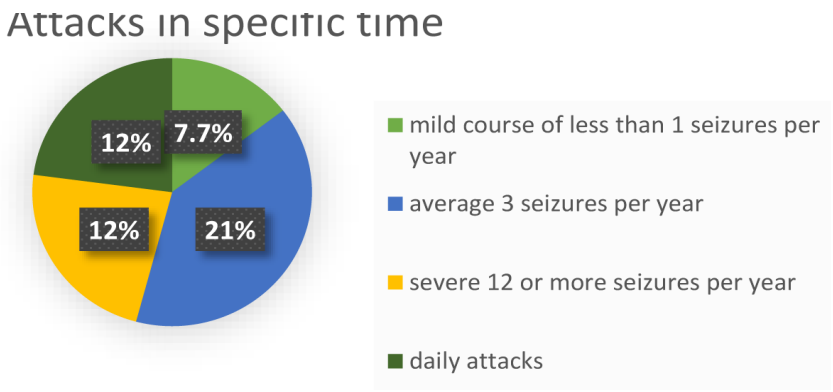

Figure 2 – Seizure's numbers in this study patients

In 23.6% of patients, simple or complex partial seizures were noted at the onset of the disease and in 28.5% of patients were marked by the appearance of secondary generalized tonic-clonic seizures. And 57% had primary generalized seizures as presented in (Figure 3). And the result of the test was found statistically significant (P<0.003).

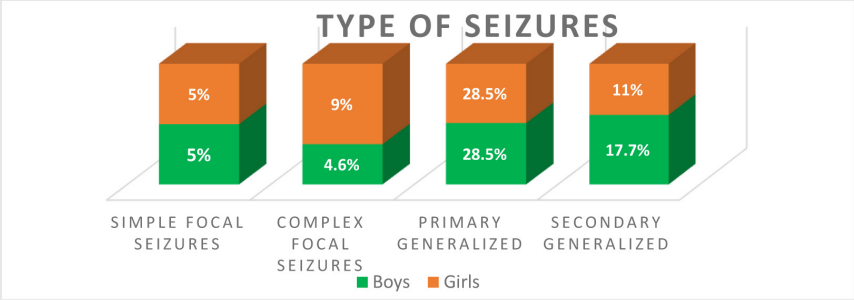

Figure 3 – Type of seizures in this study patients

Diffuse changes in the electrical activity of the brain in the interictal EEG were observed in (25.5%) of patients, but local paroxysmal activities were seen in (14%) of patients. Hippocampal theta rhythm detected in (32%) of epileptic children, as demonstrated in (Figure 4).

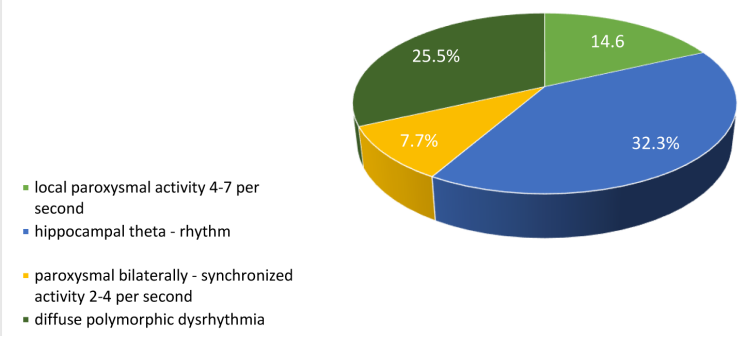

Figure 4 – Electroencephalographic findings in epileptic children.

The epileptic children who participated in this research, were studied by the difference between the type of seizures and having status epilepsy. As there is shown in (Table 2) it's statistically significant (p-value was less than 0.0001) type of seizures was different by having status epilepsy. Primary generalized seizure and secondary generalized had status epilepsy but two other categories didn't have status attacks.

Table 2 – Distribution of seizure types by having status epilepsy in patients

Type of seizure	Status Epilepsy attacks				
	Yes		No		
	Numbers	%	Numbers	%	
Complex focal seizure	0	0.0	8	25.8	P Value <0.0001
Simple focal seizure	0	0.0	8	25.8	
Primary Generalized	44	74.6	8	25.8	
Secondary Generalized	15	25.4	7	22.6	

Discussion

In this research, the characteristic of epilepsy is studied and described in epileptic patients.

The average age of patients at the time of inclusion was 9.21 ± 2.64 (from 7 to 18 years old) and 46 males (50 %) and 44 females (49 %). But in a study which was conducted by Lauren Conway and her colleagues, the gender difference found was (56.5% male and 43.5 female) [18] was near to this study's result.

Hereditary predisposition was found in 50 (55.5%) in this study. But in a study which was done by Kourosh and his colleagues in Iran, they found the proportion of hereditary predisposition in epileptic patients was 26% [19]. This proportion is almost half of our findings. And maybe this is because in Afghanistan relative marriage is more custom than in Iran. And this issue increased the proportion of family epilepsy. The average age at the onset of seizures in patients was 4.11 ± 3.06. A review of 10 studies reported age at onset of epilepsy as a risk factor. The pooled ORs for age at onset of epilepsy were 7.03 (95% CI 3.30-14.98) and 5.49 (95% CI 2.99-10.06) [20]. In this study, there was a negative correlation between the onset of seizure and age, younger aged epileptic children's percentage was more than older categories of age.

The average duration of the disease in children in this study was 5.9 ± 2.21 years. In a study done in Toronto Canada, the average duration of epilepsy was 5.5 ± 3.9 years [18]. Their finding shows younger age than our study.

Patients were studied by the number of attacks, frequent seizures were observed in 41 (45.6%) of all patients, with 11 (12.2%) boys and 2 (2.2%) girls suffering from multiple seizures almost daily. As was found in a study which was done in Egypt, a higher number of males had frequent seizures [21].

When analyzing the types of seizures in patients with epilepsy, generalized seizures prevailed in frequency. 51 (56.7%) had primary generalized seizures (absences, myoclonic, atonic, infantile spasms) and in the study which was done in Spain, the percentage of generalized seizures was 52% which is near to our finding [22]. Also in a study which was done in Iran, the proportion of generalized seizures was found 72% in children [23], this percentage is more than our finding.

In 23 patients pathological changes were revealed during neuroimaging in the form of moderate cortical-subcortical atrophies. 26 patients had small local atrophy and 32 patients had signs of ventriculomegaly (unilateral or bilateral) but 6 patients had developmental anomalies. Also in a study that was done by Berna s and her colleagues in 2013, they reported that there was a significant relation between MRI abnormality and epilepsy [24]. Of the patients who had successful therapy in this study were 48 (53.3%). But in a study, Linda kalilani and her colleagues found the percentage of epileptic children who had remission was estimated at 60-70% [25]. And 42 (46.7%) children and adolescents were without remission. As is seen in this study's results, it is different from their study finding. Also, a study which was done in Iran in 2013 reported that in that study the remission rate was 71% [14], this finding is different from our study finding. Maybe, it is because in Afghanistan the patients don't receive standard epileptic care. 28.9% (26) had drug resistance epilepsy and it was identified that 16.7% (15) of patients who were treated as resistant cases, were pseudo-resistant due to incorrect selection or incomplete dosage of antiepileptic drugs. Generally, childhood epilepsy studies showed lower incidence proportions (15%) for pharmaco-resistant compared to adult patients (30%) [25]. In a large cohort study

of newly diagnosed epilepsy patients followed in Glasgow, Scotland, for a minimum of two years, 36% were not free of seizures at the last year of follow-up [26-29] As it is compared with other studies this study finding show more resistant epilepsy in epileptic children in Afghanistan. Maybe because of low awareness of patients and society from DRE risk factors, and low access to equipped hospitals for mothers for delivery.

Complete cessation of seizures was observed as a result of optimization of monotherapy with the first-line AED. In a longitudinal cohort study, the seizure freedom rate was 45.7% in patients who used first-line antiepileptic which was much more than with other regimens [30,31]. In the study that was done in Italy, the researcher reported that almost half of patients with epilepsy were controlled by rational use of AED [27].

In the subgroup of patients with a true pharmaco-resistant course of epilepsy 28.9% (N = 26), the average age of children at the time of the last visit was 11.15 ± 4.11 years. And the average age of children was 11.8 + 3 years in the study which was done by Lauryn Conway and her colleague in Toronto – Canada in 2016 [18], which was almost the same.

The epileptic children who participated in this research were studied by the difference between the type of seizures and having status epilepsy. This difference was found statistically significant (P-value < 0.0001). Primary generalized and secondary generalized seizures were with status epilepsy but two other categories were not. As there is shown in (Table 2) 66.7% of epileptic children experienced status epilepsy during their epilepsy, so the finding of this study is concordant with other studies. Also, Xue ping and colleagues reported in their study that having status epilepsy is a risk factor for refractory epilepsy and the relation was significantly positive [28].

The relationship between seizure types was studied with risk factors, the seizure types show a difference in risk factors. As it is illustrated, the p-value is less than 0.05 and shows significance. The difference between types of seizures and perinatal pathology, including traumatic brain injury, hereditary predisposition for epilepsy, and febrile seizures is statistically significant. Also, a study done in China in 2019 reported significant relation between primary generalized seizure and febrile seizure as well [28]. And in the study done in Sydney, Australia in 2014, there was a significant difference between seizure tapes by hereditary and genetic predispositions [29]. So, it is almost the same as this study's findings.

We have some recommendations and some limitations to doing this research.

Increasing the awareness of society of risk factors of epilepsy. Educating the health workers about the development of drug-resistant epilepsy in epileptic patients. Encouraging the policymakers to establish a supporting organization for epileptic patients in Afghanistan. There is a need for more research in this area, especially cohort studies in Afghanistan. The limitation of this study was, that our patient didn't have access to mobile and serial Electroencephalography so we used inter-ictal EEG of epileptic children.

Conclusion

A comprehensive clinical and neurophysiological examination of epileptic children made it possible to draw the following conclusions:

This research will contribute to expanding knowledge about epilepsy. This indeed is the first study to evaluate epileptic patients in the Herat city of Afghanistan. The knowledge related to epilepsy is low in Afghanistan, such as information about the risk factors of epilepsy. This study will help and highlight to all (policymakers, health workers, epileptic patients, and their families) to increase their knowledge about epilepsy and its risk factors. To the finding of this study and other pieces of evidence, the public health of Afghanistan can organize activities to decrease the prevalence and incidence of epilepsy. If the risk factors like perinatal trauma and injuries that were identified as one the important risk factors in the west zone of Afghanistan reduces by equipped hospitals for women's delivery, it will help much and will decrease the epilepsy incidence. Also, in this study, another risk factor was found which was more prevalent among the study participant was hereditary predisposition, by educating and increasing the awareness of society the risk of genetic diseases can be reduced.

This study also helps to identify the early prognostic factors that can be used as preventive factors. These factors are mentioned in world literature as well, as the number of seizures in epileptic children, epilepsy with high frequency, abnormal electroencephalography findings, and early onset of epilepsy can be risk factors for refractory epilepsy. Which were evaluated in this study and their result are shown.

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