

## Childhood Focal Epilepsies

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### Abstract

**Objective:** The present study was done in order to obtain a baseline profile of childhood focal epilepsies

**Patient and methods:** Subjects included in this study were children suffering from focal epilepsy with age above 2 y. They were attending pediatric neurology clinic in Queen Rania Hospital for children in Jordan . The study included 112 children with ages ranging from 2-14 years. The following data were obtained: age, sex, detailed of seizures type, age at first unprovoked seizure, family history of seizure disorders, history and type of febrile seizures, etiological factors, socioeconomic class, history of consanguinity, additional neuro -impairment, Electroencephalography and brain imaging finding and the use of antiepileptic drugs, the results were recorded for further study.

**Results:** A total of 112 consecutive cases of focal epilepsy were enrolled , 59 were male. The commonest partial seizure recorded was simple partial type 52 (46.4%) while simple partial with secondary generalization had 17 (16.9%) and complex partial seizure formed 36.8 % . , In partial onset seizures the peak age was between 11-14 years and complex partial seizures plateau was seen between ages 6-10 years. Twenty six (23.2%) patients reported a family history of epilepsy, 91% of low socioeconomic class .11.5 % of cases have history of febrile seizures, idiopathic epilepsy was 53.5 % . In most of epileptic patients have accessory neurological impairment, the most common were learning difficulties Electroencephalography was normal in 20.4 % , mono-therapy was used in 68.8 %

**Conclusion:** the pattern of focal epilepsies in our country do not differ from that of developed countries, further population –based epidemiological research is indicated to confirm the prevalence of seizure disorders in this locality

**Keywords:** partial seizure, complex partial seizure

### Introduction:

Epilepsy is a worldwide health problem ( *Medina et al ., 2005* ). Study of the prevalence of epilepsy from the developing world have shown prevalence rates of 2-25 times higher than the prevalence rate of 5-6 per 1000 in developed countries (

*Radhakrishnan et al., 2000* ) , Epilepsy has a special place among long term illnesses, the highest prevalence is between birth and puberty (*Cowan,2008* ) , it is potentially impeding education , employment , social relationships and development of a sense of self –worth ( *Blume , 2003* ) .

The etiology of localization-related epilepsy is highly dependent on the age of onset. In all age groups, the etiology cannot be determined in more than half (55%–89%) of all individuals with epilepsy ( *Banerjee et al ., 2008* ) .

Fundamentally, there are two types of epilepsy, primary (idiopathic) generalized epilepsy and localization-related epilepsy. Partial epilepsy constitutes between 37 % and 66% of childhood epilepsies, depending on the considered age-range and the modality of recruiting ( *Dalla , 1983* ) . Focal childhood epilepsies are either idiopathic or symptomatic. It was reported the important criteria for diagnosing idiopathic partial epilepsies in childhood which include absence of neurological or intellectual deficit, family history of epilepsy, onset after 18 months of life and seizures are usually brief with a good response to treatment ( *Della, 1992* ) . On the other hand, etiologically symptomatic partial epilepsy in children include diverse causes which may be congenital malformation, disorders of neuronal migration, , vascular, inflammatory, tumors or may occur without any obvious definable causes ( *David , 1993* ) .

The present study was done to obtain a baseline profile of focal epilepsies in children who are of regular visit at pediatric neurology clinic or admitted to neurological Department of Queen Rania AL-Abdullah hospital for children , Focused on age of onset, associated neurological deficits electroencephalography findings, and various therapeutic aspects.

Key words: ***Focal Epilepsies,childhood***

### **Patients and Methods:**

Subjects included in this study were children suffering from active focal epilepsy with age above 2 years. They were attending pediatric neurology clinic or from the in-patient services of neurology Department Queen Rania Hospital for Children in Jordan. The

study included children with ages ranging from 2-14 years. the following data were obtained by pediatric specialist : age , sex ,detailed of seizures type , frequency (number of seizures in the last month), type (focal or focal with 2ry generalization), aura, ictus description, post-ictus state., age at first unprovoked seizure , family history of seizure disorders, history of febrile seizures , etiological factors , socioeconomic class , history of consanguinity , additional neuro-impairment, the type of Antiepileptic drugs used (monotherapy versus polytherapy), and the degree of control on treatment. According to the degree of control on AED(s), seizures are divided into controlled if there is no seizures for  $\geq 1$ year and uncontrolled if there is decrease in the frequency or change in the character of seizure from wild picture to mild presentation

Patients had their Electroencephalography (EEG ) which was Carried out at the Neurophysiologic Department. and the neuroimaging , the results were recorded for further study .

Epilepsy was define as condition characterized by at least two or more seizures that were unprovoked by any immediate identifiable cause ( *Radhakrishnan et al., 2000* ) , diagnosis of epilepsy was made from the history, including the clinical description of epileptic events, neurological examination supplement with Electroencephalography findings. All patients have active epilepsy: that is all individual had at least one seizure in the last 5 year period before clinic day, regardless the anti epileptic drugs ( *Radhakrishnan et al., 2000* ) .

Definitions and principles of the ILAE Commission on Classification and Terminology and the Commission on Epidemiology and Prognosis were used ( *Commission on Epidemiology, 1993* ) : (a) Generalized epilepsy, (b) partial epilepsy, which included simple or complex partial

seizures, or secondarily generalized seizures; and (c) Unclassified seizures.

Idiopathic focal epilepsy patients were defined by age-related onset, particular clinical and Electroencephalography characteristics, and presumed genetic etiology (*Commission on Epidemiology, 1993*), while Remote symptomatic referred to epilepsy in the presence of a neurological abnormality, a history of brain insult, or a disorder associated with an increased risk of epilepsy that was presumed to be etiologically related to the child's epilepsy and Cryptogenic referred to epilepsy in which there was no identifiable underlying etiology and the form of epilepsy was not one of the specific idiopathic syndromes (*Blume, 2003*)

Socioeconomic status of families was defined as lower income if monthly earnings were less than 300 JD, middle income 300-500 JD and higher income if it was more than 1000 JD

## Results

A total of 112 consecutive cases of epilepsy with partial seizure were enrolled in the study of which 59 were male (male to female ratio was 1.1:1) with ages ranged from 2 year up to 14 years. The commonest partial seizure recorded was simple partial type 52 (46.4%) while simple partial with secondary generalization had 17 (16.9%) and complex partial seizure formed 36.8%. In partial onset seizures the peak age was between 11-14 years and complex partial seizures plateau was seen between ages 6-10 years. The distribution of age for different seizure types is given in Table 1.

In complex partial the frequency of auras was 90% and the epigastric aura was the commonest. In 23% of patients automatisms were detected, Automatisms were mostly orolimentary or facial.

Demographic distribution of studied cases were shown in table II, the age of onset is found to be 32.1% before the age of 1 year

, between 1-3 years for 16%, 4 to 5 years 13.3%, 6-10 years 30.3% and between 11-14 years 8%. The most vulnerable age for the onset of seizure ranged is less than one year. Twenty-six (23.2%) patients reported a family history of epilepsy and 40.1% of cases have first degree of consanguinity, most of our patients 91% of low socioeconomic class.

11.5% of cases have history of febrile seizures.

Regarding the etiology most of the cases are idiopathic 53.5% and symptomatic in 39.2%. Electroencephalography was done for 99 cases 20.4% of them were normal while 57.9% have abnormal Electroencephalography findings table 3

In most of epileptic patients at least one accessory neurological impairment, the most common were learning difficulties 35.7%, cerebral palsy 29.4% and mental retardation 28.7%. Table 4

Regarding response to treatment of patients receiving treatment (22.2%) had a good seizure control, (44.5 and (33.3%) had bad control (intractable),

Normal CT results were recorded 87 (77.8%) and abnormal CT was recorded 25 (22.2%). brain atrophy was the commonest 18 (20%), 15 (17%) had temporo-parietal post encephalitic 11(13%) had cerebral infarction.

Normal MRI results were recorded in 75 cases (67%) and abnormal results were recorded in 37 cases (33%). (14%) have cerebral infarction, (6%) have cerebral hemorrhage, 12% brain malformation

## Discussion

On the basis of records from pediatric neurology clinic and Department, this study has provided important baseline information on the types of focal epilepsies and associated developmental problems.

Epilepsy onset in our series occurs mainly in infancy (32.1%), the authors attributed this to the high percentage of brain immaturity

with poor ability of the brain to protect itself from abnormal electrical discharges and to the higher incidence of risk factors at that age including perinatal complications, CNS infections, head trauma and metabolic disorders

While childhood (30.3%), a finding clearly similar to what has been repeatedly reported everywhere (*Velez et al., 2006*).

As in prevalence studies of epilepsy most incidence studies find the disorder to be more common in males than females (*Beilmann et al., 1999*), in the present study the relationship between incidence for boys and girls was 1.1: 1 which less than other figures (1.4) (*Waalder et al., 2000*), while other reported incidence higher in girls than boys (male: female ratio 1:1.4) (*Sidenvall et al., 1993*).

Generalized seizure were the most frequent pattern were seen (*Olafsson and Hauser, 1990*) and in contrast with other reports in whom partial seizures were the commonest (*Gallitto G et al., 2005*). Either partial or generalized seizures predominate in childhood epilepsy remains controversial (*Kwong KL et al., 2001*)

Recent several studies of new onset of seizures showed that the majority of childhood onset epilepsy is localization-related or partial, not generalized, as was not believed in the past. In general, it was postulated that partial epilepsies comprise slightly over 50% of all epilepsies and accounts for about 40-50% of childhood epilepsy and 90% of epilepsy in adults (*Haus, 1995*). In the present study, partial epilepsy with secondary generalization was the least frequent type of localization-related epilepsy (16.7%) compared to simple partial epilepsy (46.4%) and complex partial seizure was (36.6%). Symptomatic group represented 39.2% of our localization-related group of patients and this is consistent with many studies where it was formed 30% (*Braathen and Theroell, 1995*). We observed that the frontal and

temporal lobe epilepsies represented the most frequent types of localization-related epilepsies.

Familial occurrence of epilepsy ranged from 5-35% in several studies (*Callenbach et al., 1998*), it is considered a risk factors of epilepsy (*Daoud et al., 2003*), it has long been assumed that genetic factors play a role in epilepsy, although the exact modes of inheritance remain unclear in most cases (*Cowa, 2008*), in present study it showed to be 23.3% of cases had family history of epilepsy, while other reported that a great majority of patients did not have family history of epilepsy (*Chaves et al., 2001*), it has been suggestive that, if possible, family members should undergo Electroencephalography recording, thus a careful family history should be part of routine epilepsy evaluation (*Samuel, 2001*).

The importance of consanguinity and its association with epilepsy has been suggested in some studies, proved that the risk contributed to consanguinity for childhood epilepsy was not significant (*Ottman, 2001*), in our study 55.4% of cases give history of consanguinity, which is closed to other study in which 56% of cases have history of consanguinity, which signifies the importance of consanguinity as a potential risk factor for epilepsy (*Asadi, 2005*).

Febrile seizures precede epilepsy in 10 to 15% of children. Little is known about the specific types of epilepsy associated with febrile seizures (*Berg et al., 1999*). In the present study history of febrile seizure was presented in 11.6% of cases, most of which were simple febrile seizures which is closed to other reports in which Seventy-three children with epilepsy (13.9%) of children with epilepsy had a history of febrile seizures (*Berg et al., 1999, Waalder et al., 2000*)

Co morbid conditions are common in children with epilepsy; some may even overshadow epilepsy (*Berg et al., 1999*), the reported prevalence of these disabilities

in children with epilepsy varies depending on how the conditions are ascertained and defined and whether estimates are derived among incident or prevalence of epilepsy countries ( *Radhakrishnan et al., 2000* ), it is well known that mental retardation, speech disorders and specific learning disorders are more common in people with epilepsy than in general population ( *Sillanpaa, 1992* ), in recent study 29.4% of cases are epilepsy associated with cerebral palsy which is closed to other report countries ( *Radhakrishnan et al., 2000* ), several investigations including this report, have observed high frequencies of additional neurological deficits in children with epilepsy regard mental retardation and cerebral palsy ( *Waalder et al., 2000* )

Although the occurrence of educational underachievement in children with epilepsy is well documented, the factors underlying this academic vulnerability have not yet been clearly identified ( *Adewuya et al., 2006* ), In our study it was showed that 35.7 % of cases have learning disabilities, several epidemiologic studies have indicated that about half the children with epilepsy will have some schooling difficulty ( *Frank and Besag, 1995* ). It was reported the frequent occurrence of autistic behavior in children and adolescents with epilepsy (32 %) ( *Clarke et al., 2005* ). In our study the figure is less than this figure but it is closed to other report 7.1% ( *Waalder et al., 2000* ).

A high percentage of the present study are belong to low social economic class, which may be due to the nature coverage of health insurance, but it is well known that poverty and illiteracy promote disease ( *Preux et al., 2005* ) and Low socioeconomic status is associated with increased prevalence of epilepsy ( *Heaney et al., 2002* ) but it was reported that socioeconomic status is a risk factors for epilepsy in adults but not in children ( *Hesdorffer et al., 2005* )

We recorded idiopathic epilepsies as a commonest etiology in 53.5 % of children that is closed to other report ( *Freitag et al.,*

*2001* ), while other reported symptomatic epilepsy to be the commonest (61. %) ( *Banu et al., 2003* ).

The primary diagnosis of epilepsy is clinical but Electroencephalography plays major role in evaluating epilepsy, recognized that normal routine Electroencephalography does not exclude the diagnosis of epilepsy, routine Electroencephalography recording in patients with epilepsy may be normal with no epileptiform activity in about 50% of cases ( *Flink et al., 2002* ), in the present study, Electroencephalography were performed in 88.4 % of patients of these 20.4 % were normal while other reported to be 61 % ( *Velez et al., 2006* ), abnormal Electroencephalography which is either slow background found in 8.1% of cases while epileptic activity is found in 49.5 % , other reported 34.4 % of cases had abnormal background activity ( *Banu et al., 2003* ), while others reported be abnormal in 90.3 % . ( *Gallitto G et al., 2005* )

It was reported that the most reliable EEG abnormalities are the focal spikes or sharp wave discharges over the frontal or temporal lobes ( *AL-Suliman, 1999* ). The authors postulated that the frontal and temporal foci are highly epileptogenic in greater than 85% of individuals.

Our study showed that MRI detected abnormal findings in (67%). The incidence of abnormal MRI findings in this study correlates fairly with what had been mentioned in the literature ( *Abbashar and Ammar, 2007* ).

Once the seizure type and epilepsy syndrome have been determined, an antiepileptic drug can be appropriately selected ( *Sillanpaa, 1998* ). The main objective of the treatment of children with epilepsy is to improve quality of life by achieving complete seizure control without medication side effects. Although most children become seizure free after introduction of the first antiepileptic drug (AED), a substantial proportion continue to

## Childhood Focal Epilepsies

have seizures refractory to AED treatment (*M de Silva , 1996* ).

After the era of widespread of poly-therapy for treatment of epilepsy, it is now widely accepted that most of cases of newly diagnosed epilepsy in adult or children can be control with single antiepileptic drug (*Reynolds&Shorvon, 1981*), Although anticonvulsant poly-therapy has been widely and traditionally used in the treatment of epilepsy, there is little evidence of its advantages over mono-therapy and in the event of failure of optimum mono-therapy, the value of poly-therapy is not yet clear (*Carpay et al .,1998* ), mono-therapy is generally preferable to poly therapy (*Bassili et al .,2002*). It had been shown that mono-therapy appears to be the most frequent management strategy across cases (68.8%),

which is in agreement with recommended gaudiness and recent report (*Blume , 2003*)

### Conclusion and recommendations

The results of this study proposed the need for long-term population epidemiological outcome studies aimed to clarify the prevalence of seizure disorders. Preventive measures by raising the standard of health education system. the pattern of epilepsy in our country do not differ from that of developed countries, further population – based epidemiological research is indicated to confirm the prevalence of seizure disorders in this locality Furthermore, this knowledge will facilitate early educational intervention and multidisciplinary therapeutic and rehabilitation approaches

*Table 1 : Seizure type with age in childhood epilepsy*

Seizure type	2-5 years		6-10		11-14		Total	
	No	%	No	%	No	%	No	%
<b>1-Simple Part</b>	<b>16</b>	<b>13.1</b>	<b>12</b>	<b>10.7</b>	<b>24</b>	<b>21.4</b>	<b>52</b>	<b>46.4</b>
<b>2-Complex part</b>	<b>12</b>	<b>10.7</b>	<b>21</b>	<b>18.8</b>	<b>10</b>	<b>8.9</b>	<b>43</b>	<b>38.4</b>
<b>3-2end gene</b>	<b>4</b>	<b>3.8</b>	<b>6</b>	<b>5.4</b>	<b>7</b>	<b>6.3</b>	<b>17</b>	<b>15.1</b>
<b>Total</b>	<b>32</b>	<b>28.6</b>	<b>39</b>	<b>34.8</b>	<b>41</b>	<b>36.6</b>	<b>112</b>	<b>100</b>

*Table II: demographic distributions of studied cases*

<b>Characters</b>	no	%
<b>Age of onset</b>		
< 1 year	<b>36</b>	<b>32.1</b>
1-3	<b>18</b>	<b>16</b>
4-5	<b>15</b>	<b>13.3</b>
6-10	<b>34</b>	<b>30.3</b>
11-14	<b>9</b>	<b>8</b>
<b>Sex</b>		
Male	<b>59</b>	<b>52.7</b>
Female	<b>53</b>	<b>47.3</b>
<b>+ History of febrile seizures</b>	<b>13</b>	<b>11.6</b>
Simple	<b>11</b>	<b>9.8</b>
Complex	<b>2</b>	<b>1.7</b>
<b>+ Consanguinity</b>	<b>62</b>	<b>55.4</b>
First	<b>45</b>	<b>40.1</b>
Second	<b>17</b>	<b>15.1</b>
<b>+ Family history of epilepsy</b>	<b>26</b>	<b>23.2</b>
<b>Socioeconomic class</b>		
Low	<b>102</b>	<b>91</b>
Middle	<b>10</b>	<b>9</b>
<b>Etiology</b>		
Idiopathic	<b>60</b>	<b>53.5</b>
Cryptogenic	<b>7</b>	<b>6.2</b>
Remote symptomatic	<b>45</b>	<b>39.2</b>

## Childhood Focal Epilepsies

*Table III Type of EEG abnormality in partial seizure groups.*

EEG recorded	percent
Asymmetrical background	7.9
Multifocal sharp waves	9.2
Abnormal background with sharp wave	8.3
Sharp wave alone and location :	18.9
Frontal	4.3
Temporal	8.6
Occipital	2.9
Partial	3.1
Generalized slow wave	9.6
Partial with secondary generalization	4%
<b>Total</b>	<b>57.9</b>

*Table IV: neurological deficit in childhood epilepsy*

Epilepsy Associated neurological deficit	No	%
Learning difficulties	33	35.7
CP	32	29.4
MR	6	28.7
Speech disorders	7	23.2
Development delay	6	20.5
Visual	1	6.2
Autistic	23	5.3
ADHD	40	5.3

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## Childhood Focal Epilepsies

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## الصرع البؤري الطفولي

وائل هايل خريسات

أعصاب الأطفال مستشفى الملكة رانيا للأطفال الخدمات الطبية الملكية عمان الأردن

### الهدف :

تمت هذه الدراسة من أجل الحصول على لمحة الصرع البؤري في الأطفال

### المرضى وطرق الدراسة:

شملت الموضوعات المدرجة في هذه الدراسة الأطفال الذين يعانون من الصرع وكانوا من مرضى عيادة الأمراض العصبية في مستشفى الملكة رانيا للأطفال في الأردن. وشملت الدراسة 112 طفلا تتراوح أعمارهم من 2-14 سنوات.

تم الحصول على البيانات التالية : العمر ، الجنس ، مفصلة من نوع تشنج ، و تشنج غير المبرر في سن الأولى ، تاريخ العائلة من اضطرابات تشنج والتاريخ ونوع من النوبات الحموية، والعوامل المسببة، والطبقة الاجتماعية والاقتصادية، والتاريخ العائلي ، ضعف تخطيط كهربية الدماغ، التصوير الدماغ واستخدام العقاقير المضادة للصرع، وسجلت النتائج لمزيد من الدراسة.

### النتائج:

تم تسجيل 112 حالة صرع جزئية ، 59 من الذكور. وكان أشيع نوع النوبات الجزئية البسيطة سجلت 52 (46.4%) في حين بسيطة مع التعميم الثانوية كان 17 شخصا (16.9%) والنوبات الجزئية المعقدة شكلت 36.8% ، وفي بداية النوبات الجزئية كانت ذروة سن ما بين 11-14 عاما ، وكان ينظر هضبة النوبات الجزئية المعقدة تتراوح أعمارهم بين 10-60 عاما. وكان مجهول السبب الصرع ستا وعشرين (23.2%) من المرضى عن تاريخ عائلي من مرض الصرع، و 91% من الطبقة الاجتماعية والاقتصادية المنخفضة. 11.5% من الحالات يكون تاريخ المضبوطات الحموية، 53.5%. وكان في معظم مرضى الصرع ضعف العصبية ، وأكثرها شيوعا صعوبات في التعلم وتخطيط كهربية الدماغ العادي في 20.4%، وتستخدم في علاج أحادي 68.8%

### استنتاج :

نمط الصرع في بلادنا لا تختلف عن تلك في البلدان المتقدمة، ويفضل المزيد من البحوث للتأكد من مدى انتشار الصرع في هذا المكان