

## Local Epidemiological Survey of Epilepsy

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### ABSTRACT

**Objective:** To study different variables relevant to epidemiology of epilepsy in a tertiary care hospital.

**Study design:** Descriptive cross sectional study.

**Place and duration:** Fatima Memorial Hospital Lahore from February 2010 to August 2011.

**Methods:** History, physical examination and EEG were done in 304 epileptics who walked in Neurology outpatient clinic and some inpatients who presented to the hospital with chief complaint other than a history of seizure.

**Results:** The mean age of occurrence of an epileptic fit was 7 years of age in pediatric age group and the age was 27 years in the adult age group. Gender predominance was same among both groups. History of fall was more common 25% and 14% in both pediatric and adult groups respectively. The common triggering factor was lack of sleep among both groups. Drug taking patterns of monotherapy and polytherapy were also noted among both groups. Number of noncompliant patients was found to be 9.5% and 29.5% in pediatric and adult age groups, respectively. The witnessed seizure frequency was the same among both groups (97.6% in pediatric group and 96.4% in adult group). Breakthrough seizures were 39.3% and 44.1% in pediatric and adult age groups respectively. Frequency of treatment gap was found to be 50% in pediatric age group and 45.8% in adult age group followed by sleep deprivation.

**Conclusion:** Epilepsy is a neurological disorder of great concern. Its burden is increasing in our country and this study is an effort to emphasize magnitude of this disorder and all the important aspects associated with it.

**Key words:** Epilepsy, seizures, EEG, noncompliance, breakthrough seizures.

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### INTRODUCTION

Epilepsy is a common but a serious and often an overlooked disorder. In a densely populated country like Pakistan, epilepsy sufferers are reported to be about 1.38 million, but this is not based upon any formal data collection<sup>1</sup>. This study was conducted at a local private hospital over a period of one and a half years. A total of 304 epileptic patients were interviewed and examined to study different epidemiological aspects of epilepsy. In addition the causes of breakthrough seizures were also inquired from patients. This was a hospital based, cross-sectional study, with a majority of the sufferers (n=240) belonging to Lahore and a small number of the patients (n=64) were from smaller cities surrounding Lahore. The patients were divided into two broad age groups ranging from newborn to 13 years of age (pediatric group) and those from 14 years to 70 years of age (adult group). Neuroimaging and EEG were done or asked for in all the patients

and the patients were advised medication according to the individual requirements and type of epilepsy identified in both age groups.

This study is a small contribution from the city of Lahore as most of the previous studies have been done in cities other than Lahore (Karachi, Southern Punjab<sup>2</sup>.) The objective was to find the frequency, any secondary cause of epilepsy, presenting in a local tertiary care setup, the type of epilepsy whether partial, primarily generalized or secondarily generalized, and the EEG patterns in such individuals. With this effort patients were treated and told to follow seizure precautions in their daily activities, thus emphasizing that tertiary care setups have an important role to play in the lives of epilepsy patients regarding awareness, treatment and social issues related to epilepsy.

### MATERIAL & METHODS

A total of 304 patients were examined after gathering data according to a predesigned questionnaire. All patients who had solitary or multiple types of seizures presenting to neurology outpatient department were included in the study. Similarly, those patients who

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had witnessed seizures in the past or had a seizure in hospital while being treated for other complaints, were also included. The patients were excluded from the study if they did not have witnessed seizures or were suspected of having pseudoseizures. The questionnaire included age, sex, area to which the patient belonged to, history of seizure, age at which the patient had a first seizure, family history of seizures, presence or absence of accompanying features of partial or generalized seizures, post-ictal symptoms, neuroimaging studies, EEG, history of any medical treatment for seizures, whether patient was on any therapy or not, any treatment gap, monotherapy or polytherapy, history of breakthrough seizures and any identifiable cause for breakthrough seizures.

## RESULTS

The patients were divided into two groups on the basis of their age. The pediatric group included 84 patients and the adult group included 220 patients. The paediatric age group included patients up to the age of 13 and the adult age group included people between ages of 14 and 70 years. It was noted that majority of the patients in the paediatric category had epilepsy around age of 8 years and among the adults the mean age for epilepsy was 27 years. The gender predisposition was the same among both groups. Out of 84 pediatric patients, 50 were males and 34 patients were females. Similarly, in adult category 115 patients were males and 105 were females. The age at which first seizure was experienced was 5 years among pediatric group and 19 years amongst the adult group. Family history for seizures was obtained and was positive in 16 patients in pediatric and 40 patients in adult age group. History of any preceding event was also noted which included head injury, sleep deprivation and stroke. Previous stroke contributed to seizures in 5 patients in adult age group. Head injury was the preceding event in 19 patients among the adults and 2 patients in the pediatric age group. History of fall was the major contributor to the preceding event before seizure onset and it was positive in 21 paediatric and 31 adult patients respectively.

Witnessed seizures were present in 82 paediatric patients, while 212 patients gave history of seizures witnessed by the attendants in the adult age group. Associated triggering factors for seizures

were sleep deprivation in 59 and strong emotions in 57 adult patients. Similarly in pediatric age group, sleep deprivation was noted in 15 patients and strong emotions among 12 children as triggering factors for a seizure. The triggering factors like exercise, loud music, flashing lights and fever were reported in a small number of patients. The results are shown in the table.

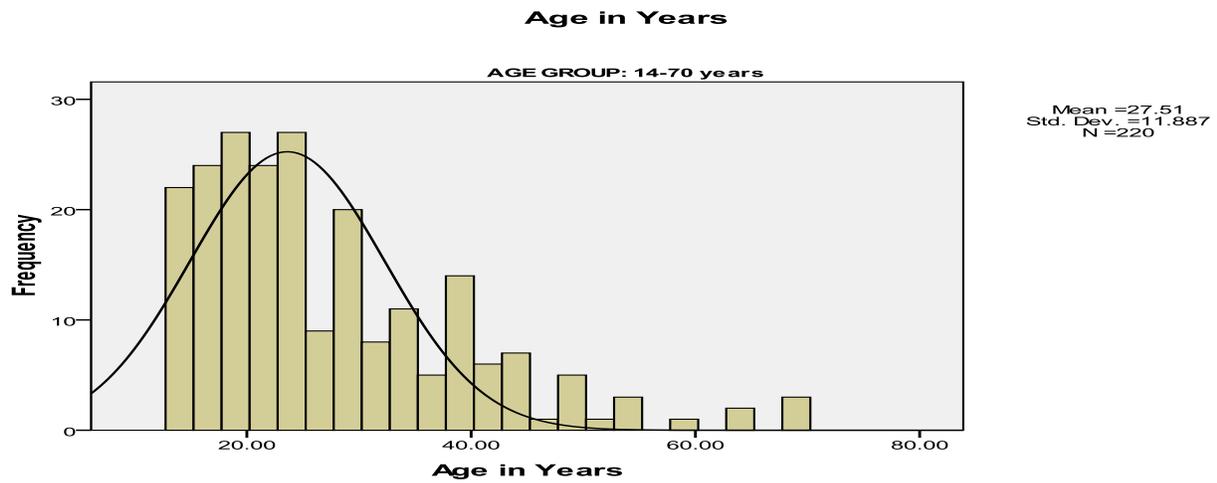
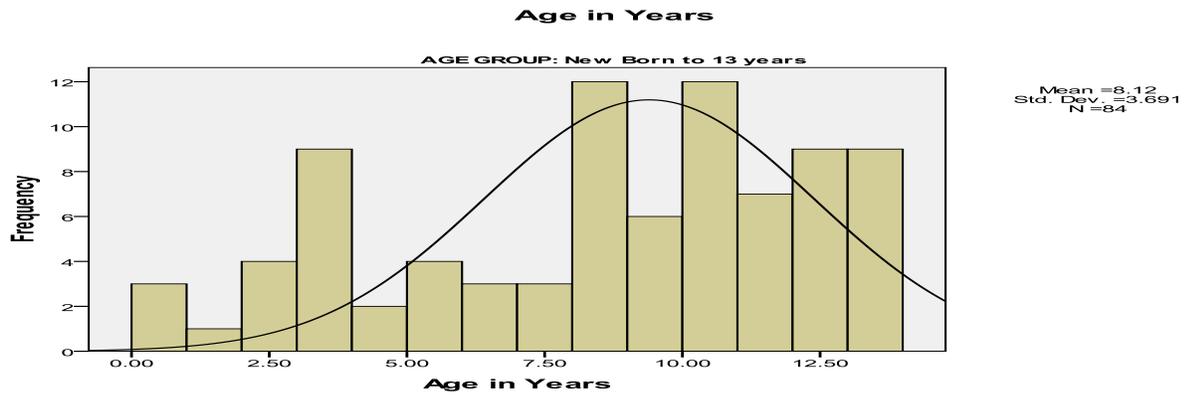
Investigations included, EEG which was done in 45 pediatric and 73 adult patients. The remaining patients did not have an EEG done, even once, despite being advised to do so.

Drug history for antiepileptic medications was also obtained. Majority of the patients including 63 pediatric and 173 adult patients were found to be on antiepileptic drugs. The remaining patients were not on any antiepileptic medications. 34 patients in pediatric age group and 100 patients in the adult group were on a single antiepileptic medicine. Polytherapy followers were greater in number including 29 in the pediatric age group and 73 in the adult group.

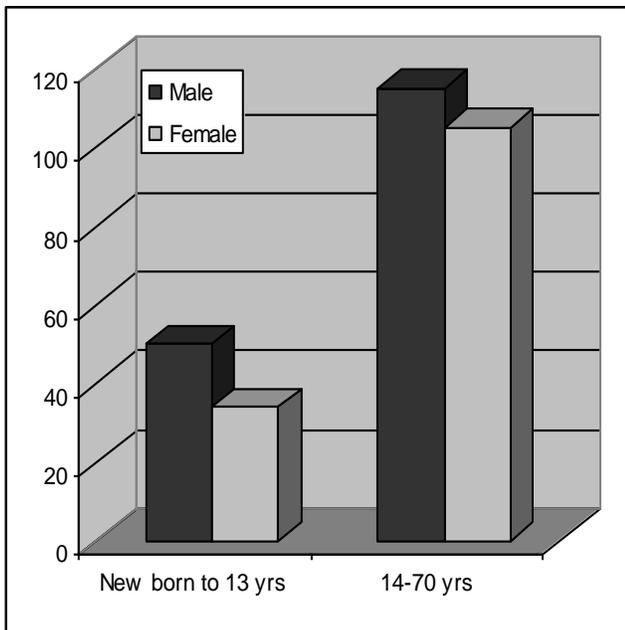
Compliance with therapy was reported in 57 patients in pediatric group and 122 patients in adult group. Treatment gap (noncompliance with medications) was reported in 6 patients in pediatric and 51 patients in adult group. As a result of noncompliance with medications, breakthrough seizures, whether major or minor were also noted. Among the pediatric group 33 patients and in the adult group, 97 patients were reported to have breakthrough seizures. Various contributory factors for breakthrough seizures are as shown in the table

A total of 85 patients from adult age group were reported to have aura. The pediatric age group patients were excluded as aura could not be reported reliably due to younger age group.

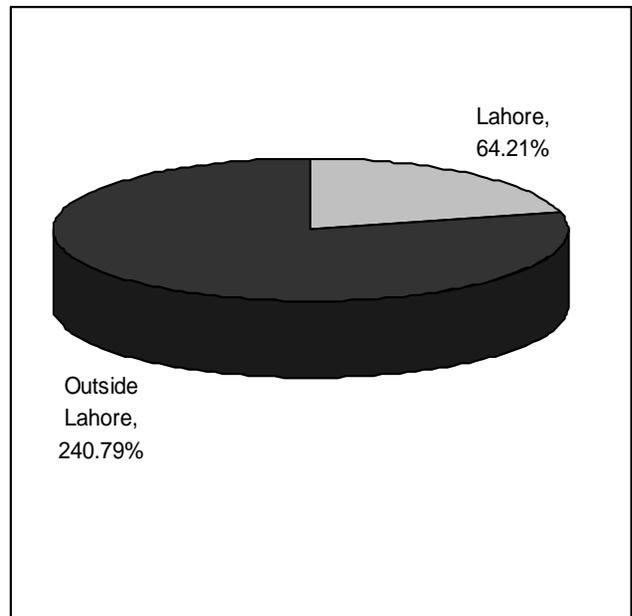
The adult category reporting yes to aura were further asked for features suggesting partial and generalized onset of seizure. The patients with aura were labeled to have partial seizures (the tabulated description is shown). A subset of patients had features of generalized seizure after having aura and they were labeled to have partial seizures with secondary generalization. The remaining did not have aura. The EEG correlation of all such seizure types among patients will be discussed in a subsequent study.



Gender of patients



Area wise distribution of the patients



Family History of seizures

	AGE GROUP			
	New Born to 13 yrs		14-70 years	
	Count	Column	Count	Column
Yes	16	19.5%	40	18.5%
No	66	80.5%	176	81.5%
Total	82	100.0%	216	100.0%

Does the patient have any history of break through seizures

	AGE GROUP			
	New Born-13 yrs		14-70 years	
	Count	Column	Count	Column
Yes	33	39.3%	97	44.1%
No	51	60.7%	123	55.9%
Total	84	100.0%	220	100.0%

Associated Triggers

Strong emotions		AGE GROUP			
		New Born 13 yrs		14-70 years	
		Count	Column	Count	Column
	Yes	12	14.3%	57	25.9%
	No	72	85.7%	163	74.1%
	Total	84	100%	220	100%
Exercise	Yes	5	6%	5	2.3%
	No	79	94%	215	97.7%
	Total	84	100%	220	100%
Loud music	Yes	4	4.8%	4	1.8%
	No	80	95.2%	216	98.2%
	Total	84	100%	220	100%
Flashing lights	Yes	5	6%	14	6.4%
	No	79	94%	206	93.6%
	Total	84	100%	220	100%
Lack of sleep	Yes	15	17.9%	59	26.8%
	No	69	82.1%	161	73.2%
	Total	84	100%	220	100%
Medicine	Yes	2	2.4%	13	5.9%
	No	82	97.6%	207	94.1%
	Total	84	100%	220	100%
Fever	Yes	2	2.4%	1	.5%
	No	82	97.6%	219	99.5%
	Total	84	100%	220	100%

If yes, then what are the factors associated

	AGE GROUP	
	New Born to 13 years	
	Count	Column N %
Non compliance	12	50.0%
Sleep deprivation	9	37.5%
Both	0	.0%
Fever	1	4.2%
Fever and Sleep deprivation	0	.0%
None	2	8.3%
Total	24	100.0%

If yes, then what are the factors associated

	AGE GROUP	
	14-70 years	
	Count	Column N %
Non compliance	38	45.8%
Sleep deprivation	32	38.6%
Both	8	9.6%
Fever	0	.0%
Fever and Sleep deprivation	1	1.2%
None	4	4.8%
Total	83	100.0%

If yes, on which therapy

	AGE GROUP			
	New Born -13 years		14-70 years	
	Count	Column	Count	Column
Monotherapy	34	54%	100	57.8%
Polytherapy	29	46%	73	42.2%
Total	63	100%	173	100%

What is the compliance of the patient with related therapy

	AGE GROUP			
	New Born-13 yrs		14-70 years	
	Count	Column	Count	Column
Compliant	57	90.5%	122	70.5%
Non-complaint	6	9.5%	51	29.5%
Total	63	100%	173	100%

**DISCUSSION**

The global prevalence of epilepsy is said to be 3-9 per 1000 population<sup>3</sup>. However data from Pakistan suggests prevalence of epilepsy to be 9.98 per 1000, in a study conducted in collaboration with Turkey<sup>4</sup>.

The prevalence is variable in regions of South East Asia. The prevalence rates have been reported from China (4.4), Japan (1.7), India (4.7) and Pakistan (9.85) per thousand population, being the highest<sup>5</sup>.

In our study, 304 patients were enrolled with 84 patients in the pediatric age group and 220 were included in the adult age group.

The studies conducted previously in our country included both hospital and community based studies. There were three pediatric population based studies and three studies focused on adult population<sup>6</sup>. The

main areas of focus were Southern Punjab and Karachi. No data is available from our region of study. Lahore being a major city with a total population of 8,590,000 only about 11 trained neurologists.

Our study depicts patients in a tertiary care private hospital over a span of one and a half years. Fatima Memorial Hospital is a private public hospital located at a central location in Lahore. The peak age of presentation of an epileptic patient is approximately 8 years and 19 years in pediatric and adult age groups respectively. This is comparable to data available from previous studies. Highest prevalence is reported in the younger population and lowest between ages of 40-60 years.

Family history of seizures was positive with cumulative percentage of 37% (19.5 % in pediatric and 18.5% in adult age group). This was reported to be 32% in the previous studies. Sleep deprivation was found to be the major triggering factor in both the pediatric and the adult age groups.

Data regarding investigations done among epileptics have also not been reviewed in the previous literature<sup>7</sup>. The patients were advised to have Neuroimaging studies done, like CT and MRI of brain. EEG study was also recommended. Approximately half of the patients in the pediatric age group were on monotherapy while others were on more than one antiepileptic medicine. In the adult age group in our study, 100 patients out of 220 were on monotherapy and 73 patients were taking more than one antiepileptic medicine.

Data regarding assessment of compliance to drug therapy has not been addressed in previous studies, while our study has focused on this major aspect of therapy. Noncompliance with antiepileptic medication was 9.5% and 29.5% in the pediatric and adult age groups respectively.

Breakthrough seizure occurrence was found to be 39.3% and 44.1% in pediatric and adult age groups respectively.

Noncompliance with medicines was the major reason for breakthrough seizures in both age groups. No comparable data to these above mentioned factors is available from previous studies.

## CONCLUSION

Epilepsy is an important neurological disorder with social stigmatization and is often overlooked therefore its recognition and treatment are often delayed. This article is written in an attempt to highlight important epidemiological aspects of epilepsy like age, gender, witnessed and un-witnessed seizures, family history for seizures, drug history and treatment gap among patients. The occurrence of breakthrough seizures due to noncompliance to therapy and presence of aura prior to seizure and primarily and secondary generalized seizures were also assessed. All these aspects have not been reviewed in previous studies.

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