

Prevalence of epilepsy in Hawler City; a household survey

Received: 7/11/2010

Accepted: 2/3/2011

Azad Hasan Khidr *

Aso Sabir Sheikh-Bzeni**

Abstract

Background and objectives: Epilepsy is a common neurological disorder and in spite of that, its prevalence was not studied in Hawler city before. The objective of this study is to know the prevalence of epilepsy in Hawler city.

Methods: A house hold survey was carried out in Hawler city, Iraq 4623 persons selected as clustered random sample of the city population during period of April 2007 to June 2008.

Results: Out of the 4623 persons studied, only 45 patients (23 female and 22 male) were found to be epileptic, with a life time prevalence of 9.7/1000 population.

The commonest age group affected was childhood age (1st and 2nd decade). This study showed that partial epilepsy was more common than generalized epilepsy. There is no marked difference between genders in the disease pattern (51.1% were females, 48.9% were males).

Conclusion: Epilepsy is a common disorder in Hawler city. There was no significant difference between genders in the disease pattern. In our locality children were more affected with epilepsy than other age groups.

Key words: Epilepsy, Hawler city, Prevalence.

Introduction

Seizures are the hallmark symptom of epilepsy. An epileptic seizure is "a sudden transient occurrence of symptoms and /or signs due to abnormal excessive synchronous neuronal activity in the cerebral cortex¹. The seizure discharge may result in almost instantaneous loss of consciousness, convulsive movements, disturbance of sensation or some combination thereof, alteration of perception or impairment of psychic function².

Epilepsy is defined as recurrent (two or more) unprovoked seizures³. Unprovoked seizures: are seizures that arise without an obvious precipitant. Provoked seizures are seizures that arise as a response to an acute, transient pathologic state such as hypoglycemia, alcohol withdrawal, or concussive injury⁴.

Prevalence of epilepsy is defined as the proportion of a population affected with epilepsy at a point of time, prevalence is expressed as numerator consisting of all cases of epilepsy old and new and a denominator representing the total population⁵.

Despite this, incidence and prevalence figures have varied considerably in different studies⁶. This is mainly due to differences in inclusion criteria, age group studied, and location of the study, classification, and diagnosis and case ascertainment methods⁷.

Methodological differences in case ascertainment are also important, and retrospective surveys based on hospital records may significantly underestimate the number of cases in a community⁸.

*Department of Internal Medicine, Rizgaree Teaching Hospital, Directorate of Health, Erbil, Iraq.

**Department of Internal Medicine, College of Medicine, Hawler Medical University, Erbil, Iraq.

Epilepsy is associated with poor academic achievement, unemployment and low income⁹⁻¹¹.

It has been shown that often, the social stigma attached to epilepsy is a greater handicap to persons with epilepsy compared with the disability associated with seizures or the side-effects from medications¹². The prevalence of depression as well as epilepsy increases with age, and depression is strongly associated with quality of life and function in persons with epilepsy¹³. Many studies have attempted to assess the social issues faced by epileptic patients. In a Britain-based study, epileptic adolescents were shown to have higher levels of depression and social anxiety and higher numbers of obsessive symptoms than adolescents without epilepsy¹⁴.

Patients with epilepsy have a high risk of death that is roughly two to three times greater than expected in a matched population without epilepsy. Most of the increased mortality is due to the underlying etiology of epilepsy, for example, tumors or strokes in older adults. A significant number of patients die from accidents, status epilepticus, and a syndrome known as sudden unexpected death in epileptic patients (SUDEP), which usually affects young people with convulsive seizures and tends to occur at night. The cause of SUDEP is unknown; it may result from brainstem-mediated effects of seizures on cardiac rhythms or pulmonary function¹⁵.

The aims of this study were determination of prevalence of epilepsy in Hawler city and studying age and gender distribution of epileptic patients

Methods

This household survey was conducted in Hawler (Erbil) city, Iraq with general population estimated to be 796951 Persons (Hawler Governorate+ Habitat study of strengthening of housing in Hawler city 2007), from period April 2007 to June 2008.

The sample size was calculated by STATS program V1 and it was estimated to be 4623 persons. The prevalence of epilepsy in the developing countries is around 8/1000. The acceptance of error 5%, confidence interval 95%. The questionnaire form was designed by researchers to collect data information by face to face interview. Hawler city is divided into 6 Sectors (6 Municipalities) excluding surrounding districts (Kurdistan Region Government/ Ministry of Municipality /Hawler, 2005).

The sample size was divided according to the proportion of population of each sector from the total population of Hawler city. The sample of each sector was distributed according to the population of each location area and randomly from each location street number chosen, then in each street several families were selected randomly (by a sort of lottery) to complete the sample size needed for each sector { sample size composed of 4623 individuals: sector 1 (637 individuals), sector 2 (683 individuals), sector 3 (574 individuals), sector 4 (1003 individuals), sector 5 (563 individuals) and sector 6 (1163 individuals).

After taking permission from each family and explaining nature of the study, an interview was made with the family asking about any case of epilepsy and any attack of loss of consciousness, dissociated consciousness, and abnormal movement of one part of the body or whole body. Any attack of sudden interruption of consciousness in which the patient stares & briefly stops to talk or cease to respond especially in children. Then any suspected epileptic case was completely evaluated, all the cases were evaluated at home and then at Neurology department of Rizgary Teaching

Hospital by Senior Neurologists; those with febrile convulsions, single seizure and provoked seizures were excluded from the study. For every patient a detailed history taking and a thorough neurological examinations were done¹.

Statistical analysis: Data were entered into a computer using Microsoft Office Excel 2003 computer program. EP1 info. Version 6...2001 used to find out association between variables by calculating Chi square. P value ≤ 0.05 was regarded as significant.

RESULT:

Over all life time prevalence rate of epilepsy for Hawler city was 9.7/1000 persons. Results showed that 45 individuals have been diagnosed as epileptic patients {6patients (sector 1), 7patients (sector2), 5patients (sector3), 11patients (sector4), 4patients (sector5) and 12 patients (sector6)} (Table 1). The prevalence among high socioeconomic persons was 8.7/1000, and 10.2/1000 among low socioeconomic state population (P=0.261).

Table (2) demonstrates the relation between age groups and types of seizure; partial seizure was most common in the fourth decade while generalized seizure in the first and second decade of life.

Mean age (\pm Standard deviation) was 20.9 \pm 16.1 year.

Association between age and type of seizure the P value=0.111. Chi square is not valid (Expected count < 5).

Regarding the gender, from total 45 epileptic patients, 23 patients (51.1%) were females, from those patients 11cases (24.4%) were partial epilepsy types and 12 patients (26.7%) were generalized epilepsy types.

While 22 patients (48.9%) were males, from those patients 12(26.7%) patients had partial epilepsy and 10 patients (22.2%) had generalized epilepsy. (P=0.652) (Table 3). Out of total epileptic patients, 23 patients (51.1%) were partial type of seizure and 22 patients (48.9%) were generalized type of seizure.

Regarding partial seizure subtypes: Out of 23 patients, 20 patients were PSGTCS (Partial with Secondary Generalized Tonic Clonic Seizure) and 2 patients were partial complex seizure and only 1 patient was simple partial motor seizure.

Regarding generalized seizure sub- types: 14 patients were GTCS (Generalized Tonic Clonic Seizure), 4 patients were myoclonus, 2 patients were absence seizure, 1 patient was LGS (Lennox Gastaut Syndrome) and 1 patient (2.2%) was atonia. Regarding investigations: 9 patients (20%) had EEG (Electro Encephalo Graphy) (4 patients that had generalized seizure were with abnormal EEG while the 5 other patients had normal EEG).

Cranial CT scanning and MRI imaging were done before interview for 18 patients (40%) from those only 4 patients had abnormal imaging (2 hydrocephalus, 1brain tumour, other had frontal lobe infarction).

Table 1:Life time prevalence of epilepsy according to sectors and socioeconomic status

sectors	Number of individuals	Epileptic patients	Prevalence of epilepsy %
1	637	6	0.94
2	683	7	1.02
3	574	5	0.87
4	1003	11	1.09
5	563	4	0.7
6	1163	12	1.03
Total	4623	45	
		Epilepsy	
Patients with High socioeconomic status	+ 13	- 1481	1494
Patients with low socioeconomic status	32 3129	3097	

$$X^2=0.24 \quad P= 0.621$$

Table 2: Relation of age group and type of seizure

Age in year	Total		Partial	Generalized
	No.	%	No.	No.
<9	13	28.89	5	8
10—19	12	26.67	4	8
20—29	8	17.78	4	4
30—39	8	17.78	7	1
≥ 40	4	8.89	3	1
	45	100%	23	22

Table 3: Distribution of cases by gender and type of seizure

Gender	Partial seizure		Generalized seizure		Total		P
	No.	%	No.	%	No.	%	
Female	11	47.8	12	52.2	23	100	0.65 2
Male	12	54.5	10	45.5	22	100	
Total	23	51.1	22	48.9	45	100	

Table 4: Types of seizure

Partial seizure	No.	%	Generalized seizure	No.	%
Simple partial motor s.	1	4.3	GTCS	14	63.63
Partial complex s.	2	8.7	Myoclonus	4	18.2
PSGTCS	20	87	Abscense seizure	2	9.1
			Atonia	1	4.54
			LGS	1	4.54
Total	23	100		22	100

Discussion

Epilepsy is a common neurological disorder and is regarded as a troublesome disorder affecting the patient's life style and has a burden on the community, it is regarded as one of the main disorders encountered in neurological practice. Literature showed variation in the disease extent in different socioeconomic strata, the present study aimed to define the extent of the problem in Hawler city.

In Baghdad city the prevalence of epilepsy was 8.26/1000¹⁷

While in a Turkey the prevalence was 8/1000¹⁸, and in Pakistan it was 9.98/1000¹⁹.

The result of the present study was comparable to prevalence in most of developing countries and some time it is little bit higher than that some other studies conducted in developed countries, like in USA 5.7-6.8/1000²⁰, and in China 4.8/ 1000²¹.

This can be attributed to the higher socioeconomic status of these countries which has effect on prevalence of epilepsy as it is obvious from studies of different researchers²².

Many factors have been defined to have contribution to the etiology of epilepsy, which are affected by socioeconomic status²³, 57% of epilepsies have pre or perinatal encephalopathy which is more common in lower socioeconomic status population. Intra cranial infection also is more common in communities having low socioeconomic status, considered as a common etiology by the same author²³.

Birth trauma reasonably is more common in lower socioeconomic status communities also contributing to etiology of epilepsy²⁴. The incidence rate of epilepsy is high in children, and a larger proportion of children in the population (as in developing countries) would result in a high overall incidence of epilepsy. This may provide part of the explanation for a high overall incidence rate of epilepsy in these countries²⁵.

The total sample size was mostly located

or representative of low socioeconomic status population, so there will be higher rate of prevalence of epilepsy in our locality.

The prevalence of epilepsy either partial or generalized seizure is more common in younger age group (in the first and second decade) than the others, so here we have only childhood peak like of studies conducted in other Asian and developing countries^{19,21,26}, there is no second peak (old age) which is present in studies of most developed countries²⁷⁻²⁹, this may be due to the structure of our community (decrease life expectancy).

The commonest cause of epilepsy in elderly is stroke^{30,31} which is associated with high mortality in our locality, and Status epilepticus is common in elderly³² and has high mortality rate³³, which may reflect lower prevalence in our studied group. The generalized epilepsy is more common in children while with increasing age the partial epilepsy will be more common, this could be related to the causative factor like brain tumor which is more common in adults and stroke is commonest cause of epilepsy in elderly^{31,34}.

Regarding the gender, epilepsy in the present study is more common in female, but the difference is slight (female 23: male 22), this concides with other studies like in Baghdad¹⁷, London study²² and does not concide with other studies which had male predominance²³, this could be because of higher female percentage in our population.

In males, the type of seizure is mainly partial, and in females, cases mainly generalized like other studies^{27,35}.

In a study in Denmark³⁵ stressed that the reasons behind these gender differences are not clear, but men may have more CNS insults than women, possibly leading to a higher incidence rate of focal epilepsy, and women may be influenced by genetic factors or hormones, leading to a higher incidence of generalized epilepsy³⁵.

Regarding seizure type, partial seizure is more common (51.5%) than generalized seizure, which is going with other studies in Denmark and France^{36,37} and it is unlike the study conducted in Baghdad⁽¹⁷⁾ and other studies³⁸.

In the present study we have two female patients with absences were female and goes with other study²⁷ who showed that absences, which occur with many types of primary generalized epilepsy, were more frequent among women than men^{27,35}.

More than half of the patients of the present study (26 patients 57.8%) were not on AEDs (Anti Epileptic Drugs), from those patients, 23 patients were from low socioeconomic status and only 3 patients from high socioeconomic status. The majority of the remainder (19 patients) was on AEDs and was from high socioeconomic status.

In the study in Bagdad city (17)51.9 % of patients had no treatment which is near to our results. However another study suggested that out of 50 million people affected by epilepsy world wide, 35 million (70%) remain untreated³⁹.

In a study conducted in Kenya⁴⁰ most children (89%) of the active epilepsy cases had not received any medical treatment.

In developing countries in sub-Saharan Africa and Latin America, up to 90% of people with epilepsy receive inadequate treatment or no treatment at all^{5,41}.

Conclusion

Epilepsy is a common disorder in Hawler city. Partial seizure is more common than generalized seizure. There is no marked difference in epileptic pattern between male and female. We recommend raising the education level of our population toward management of epilepsy. We recommend to have special epileptic center regarding diagnosis, treatment and follow up of patients by neurologists (epileptologists) that to be supported by government.

References

1. Fisher RS, van Emde Boas W, Blume W. Epileptic seizures and epilepsy: definitions proposed by the International League Against Epilepsy (ILAE) and the International Bureau for Epilepsy (IBE). *Epilepsia* 2005; 46(4): 470-472.
2. Chang BS, Lowenstein DH. *Epilepsy Engl J Med* 2003; 349:1257.
3. Commission on Classification and Terminology of the International League against Epilepsy. Proposal for revised classification of epilepsies and epileptic syndromes. *Epilepsia* 1989; 30(4):389–399.
4. Mosewich RK, So EL. A clinical approach to the classification of seizures and epileptic syndromes. *Mayo Clin proc* 1996;71:405-14.
5. Scott R A, Lhatoo S D. The treatment of epilepsy in developing countries: where do we go from here? *Bull. World Health Organ* 2001; 79(4):344-351.
6. Macdonald BK, Cockerell OC, Sander JW, Shorvon SD. The incidence and life time prevalence of neurological disorder in a prospective community-based study in the UK. *Brain* 2000; 23 (Pt 4): 665-676.
7. Bell GS, Sander JW. The epidemiology of epilepsy: the size of the problem. *Seizure* 2001; 10(4), 306-314.
8. Sander JWAS, Shorvon SD. Epidemiology of the epilepsies. *J Neurol Neurosurg Psychiatry* 1996; 61:433–43.
9. Lisle JR, Waldron HA. Employees with epilepsy in the NHS. *Br Med J* 1986; 292:305–6.
10. Hart YM, Shorvon SD. The nature of epilepsy in the general population ; Characteristics of patients receiving medication for epilepsy. *Epilepsy Res* 1995; 21:43–9.
11. Jacoby A, Buck D, Baker G, McNamee P, Graham JS, Chadwick DW. Uptake and costs of care for epilepsy: findings from a UK regional study. *Epilepsia* 1998; 39:776–86.
12. Aziz H, Akhtar SW, Hasan KZ. Epilepsy in Pakistan: stigma and Psychosocial problems. A population-based epidemiologic study. *Epilepsia* 1997; 38:1069–73.
13. Gilliam F. Optimizing health outcomes in active epilepsy. *Neurology* 2002; 58 (Suppl. 5): 59–520.
14. Baker GA, Spector S, McGrath Y, Soteriou H. Impact of epilepsy in adolescence: a UK controlled study. *Epilepsy Behav* 2005; 6:556–62.
15. Jorge G, Jose T, Samuel W. Understanding the burden of epilepsy in Latin America: A systematic review of its prevalence and incidence. *Epilepsy Research* 2005; 66:63–74
16. Jessica M U, Robert F H. *Mind on Statistics*. Thomson brooks /Cole 2007.
17. Al Atta F A. The prevalence of epilepsy in Baghdad –door to door study. F.I.C.M.S.dissertation . Iraqi commission for medical specializations 2001.

18. Onal AE, Tumerdem Y, Ozturk MK, Gurses C. Epilepsy prevalence in a rural area in Istanbul. *Seizure* 2002; 11:397-401.
19. Aziz H, Guvener A, Akhtar SWI. Comparative epidemiology of epilepsy in Pakistan and Turkey: population based studies using identical protocols. *Epilepsia* 1997; 38: 716-22.
20. Haerer A F, Anderson D W, Schoenberg B S. Prevalence and clinical features of epilepsy in a biracial United States population. *Epilepsia* 1986; 27: 66-75.
21. Li S, Schoenberg B S, Wang C, Cheng X, Zhou S, Bolis C L. Epidemiology of epilepsy in urban areas of the Peoples' Republic of China. *Epilepsia* 1985; 26: 391-394.
22. Heaney DC, Macdonald BK, Everitt A. Socioeconomic variation in incidence of epilepsy: prospective community based study in south east England. *Br Med J* 2002; 325(7371): 1013-1016.
23. AL Rajeh S., Awada A, Bademost O., Oguniyi A. The prevalence of epilepsy and other seizure disorders in an Arab population: a community-based study. *Seizure* 2001; 10: 410-414.
24. Mac T L, Tran D S, Fabrice Q, Peter O, Pierre M P, Tan C (2007). Epidemiology, aetiology, and clinical management of epilepsy in Asia: a systematic review *Lancet Neurol*; 6: 533-43.
25. Kotsopoulos I A, van M T, Kessels F G, de K M, Knottnerus J A. Systematic review and meta-analysis of incidence studies of epilepsy and unprovoked seizures. *Epilepsia* 2002; 43: 1402-1409.
26. Tran DS, Odermatt P, Le TO. Prevalence of epilepsy in a rural district of central Lao PDR. *Neuroepidemiology* 2006; 26: 199-206.
27. Hauser W A, Annegers, John F, Kurland L T. Incidence of epilepsy and unprovoked seizures in Rochester, Minnesota: 1935-1984. 1935-1984. *Epilepsia* 1993; 34: 453-468.
28. Annegers J F, Hauser W A, Lee J, Rocca W. Incidence of acute symptomatic seizures in Rochester, Minnesota, 1935-1984. *Epilepsia* 1995; 36: 327-333.
29. DeLorenzo R J, Hauser W A, Towne A R, Boggs J G, Pellock Penberthy L, Garnett L, Fortner C A. A prospective, population-based epidemiologic study of status epilepticus in Richmond, Virginia. *Neurology* 1996; 46: 1029-1035.
30. Loiseau J, Loiseau P, Duche B. A survey of epileptic disorders in Southwest France: seizures in elderly patients. *Ann Neurol* 1990; 27:232.
31. Stephen LJ, Brodie MJ. Epilepsy in elderly people. *Lancet* 2000; 355:1441.
32. Vignatelli L, Tonon C, D'Allessandro R, Bologna Group for the study of Status Epilepticus. Incidence and short-term prognosis of status epilepticus in adults in Bologna, Italy. *Epilepsia* 2003; 44:964-968.
33. Logroscino G, Hesdorffer D C, Cascino G, Annegers J F, Hauser WA. Time trends in incidence, mortality, and case-fatality after first episode of status epilepticus. *Epilepsia* 2001; 42, 1031-1035.
34. Cowan L D, Bodensteiner J B, Leviton A, Doherty L. Prevalence of the epilepsies in children and adolescents. *Epilepsia* 1989; 30: 94-106.
35. Christensen J, Kjeldsen M J, Andersen H, Friis M L, Sidenius. Gender differences in epilepsy. *Epilepsia* 2005; 46:956-960.
36. Christensen J, Mogens V, Marianne G P, Carsten B, Per Sidenius. Incidence and prevalence of epilepsy in Denmark *Epilepsy Research* 2007; 76:60-65.
37. Picot M C, Michel B M, Jean PD, Pierre D, Arielle C. The prevalence of epilepsy and macoresistant epilepsy in adults: A population-based study in a Western European country. *Epilepsia* 2008; 9(7):1230-1238.
38. Almu S, Zerihun T, Paul C, Richard H. The prevalence of epilepsy in the Zay Society, Ethiopia —an area of high prevalence. *Seizure* 2006; 15: 211-213.
39. Nyame PK, Biritwum RB. Epilepsy: knowledge, attitude and practice in literate urban population, Accra, Ghana. *West Afr J Med* 1997; 16:139-45.
40. Mung'ala-Odera V, White S, Meehan R, Otieno G O, Njuguna P, N Mturi T, Edwards B G, Neville, Newton C R J C (2008). Prevalence, incidence and risk factors of epilepsy in older children in rural Kenya. *Seizure* 2008; 66:396-404.
41. Shorvon SD, Farmer PJ. Epilepsy in developing countries: A review of epidemiological, sociocultural and treatment aspects. *Epilepsia* 1988; 29 (suppl 1): 536-545.