Epilepsy Research (2015) 113, 68–75

journal homepage: www.elsevier.com/locate/epilepsyres

Community-based epidemiological study of epilepsy in the Qena governorate in Upper Egypt, a door-to-door survey

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Received 8 October 2014; received in revised form 15 March 2015; accepted 28 March 2015
Available online 7 April 2015

KEYWORDS
Epilepsy;
Epidemiology;
Egypt;
Arab countries;
Africa

Summary
Background: The aim of this study is to estimate the epidemiological features of epilepsy in a representative governorate of Upper Egypt.
Materials and methods: A door-to-door community-based survey study was performed using a sample of 10 areas among various districts of the Qena governorate in Upper Egypt. Six were classified as rural areas, and the remaining four were classified as urban areas, with a total population of 8027 inhabitants. The population was screened using an epilepsy-screening questionnaire. Positive cases with suspected epilepsy were referred to Qena University Hospital to be further evaluated by a qualified neurologist and for further investigations, such as neuroimaging and electroencephalography.
Results: One hundred patients had a confirmed diagnosis of epilepsy, with a lifetime prevalence of 12.46/1000. The active prevalence rate of epilepsy was 2.12/1000, while the incidence rate was 123/100000. Seventy-six percent of the patients had idiopathic epilepsies, while 24% had symptomatic epilepsy. Generalized epilepsies were more common (70.1%) than partial epilepsy (26.3%), meanwhile epilepsies with mixed seizure types were 2.6%. The most common seizure type was generalized tonic clonic seizures (51.8%). The age-specific prevalence rate of epilepsy was much higher in infancy and early childhood (62.5 and 37.04/1000, respectively), which regressed steadily with age. Idiopathic epilepsies were significantly more common in urban areas than in rural areas ($P = 0.01$), while symptomatic epilepsies were more common in rural areas than in urban areas ($P < 0.005$).

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http://dx.doi.org/10.1016/j.eplepsyres.2015.03.010

Conclusion: Upper Egypt is characterized by a relatively high incidence and prevalence of epilepsy and epilepsy-related medical service, and more cultural education should be directed to those areas in Egypt.

Introduction

Epilepsy is considered one of the oldest conditions known to mankind and is still the most common neurological disorder affecting all age groups, as it is estimated that up to 70 million patients worldwide have a diagnosis of epilepsy at a given time. The WHO estimates that 8 persons/1000 worldwide have a diagnosis of epilepsy (Banerjee et al., 2009; El-Tallawy et al., 2013; Farghaly et al., 2013; Ngugi et al., 2010). The reported incidence, prevalence, and burden of the disease worldwide showed many disparities in the reported studies (Banerjee et al., 2009). The prevalence of epilepsy is higher in developing countries compared to developed countries (Perucca et al., 2001; Preux and Druet-Cabanac, 2005). It is estimated that 90% of patients with epilepsy live in developing countries in Africa, Asia, and Latin America (Houinato et al., 2013). At the clinical level, epilepsy is similar in developing and developed countries, but the extent to which patients with epilepsy are recognized, investigated, and managed is different. Epidemiology, aetiology, socio-cultural, and economic factors all contribute to these differences (Bharucha, 2003).

Epilepsy does not distinguish between geographic, racial, or social boundaries; however, the aetiology of seizures is multi-factorial in any given individual and is best thought of as an interaction between the genetically determined seizure threshold, underlying predisposing pathologies or metabolic abnormalities, and acute precipitating factors (Guberman, 1999).

Epidemiologic studies are necessary to define the health burden of epilepsy; to establish public health and health care priorities; to identify education and service needs; to provide information needed for prevention, early detection, and treatment; and finally to promote effective health care and support programmes for people with epilepsy (Thurman et al., 2011). In developed countries, researchers easily find epidemiology-related information due to the availability of universal health care systems, routine medical registration, and medical records in various database systems. However, in developing countries the availability of health care systems and medical registration is still lagging. Accordingly door-to-door personal interviews are the main source of data needed for epidemiological studies (El-Tallawy et al., 2013).

We conducted this community-based door-to-door study to assess the main epidemiological parameters of epilepsy in the Qena governorate as a representative of Upper Egypt.

Subjects and methods

This study was a part of a cross-sectional community-based epidemiology programme for neurological diseases (namely stroke and epilepsy) implemented in the south Upper Egypt, Qena governorate. The study protocol was approved by the local ethics committee of Qena University.

Study area

The Qena governorate is characterized as the narrowest part of the Nile river valley. It forms a green land strip of only 1—2 km on either sides of the river, bordered by the west and east deserts on both sides. The total surface area of the Qena governorate is estimated to be 10,798 km^2, which represents approximately 1.1% of Egypt's total surface area. Qena has an estimated population of approximately 3 million people according to the national Egyptian census, 21.4% of them live in urban areas and 78.6% in rural areas. The Qena governorate consists of 2 cities and 11 districts. Qena and Nag Hammadi are considered as urban areas. Qena city is the capital of Qena governorate. It is situated on the east bank of the Nile. It is most famous for its proximity to the ruins of Dendera. The population is 230,392. Nag Hammadi is located on the west bank of the Nile in the Qena governorate. It is an industrial city that produces sugar and aluminium. It has a population of approximately 30,000. The 11 districts are considered rural areas, which are distributed around the Nile and where most of the people are farmers.

Study timing

The study was conducted over a 2-year period from September 1, 2011 to August 31, 2013. August 31, 2013 was considered the prevalence day. Thus, any positive subject fulfilling the diagnostic criteria of epilepsy before the prevalence day at any time of their lives was considered as a prevalent case, and any subject who gave a history suggestive of epilepsy that began during the survey period was considered an incident case of epilepsy.

Sampling methodology

First stage: selection of the study sites

A random sample of 10 study areas was selected randomly from the Qena governorate. First, we randomly selected 3 of the 11 districts according to their geographic location. Then, we selected two villages (areas) from each district, including Nagada (in the west bank of Nile), Qift (in the east of Nile), and Dishenna (in the north bank of the Nile), with a total of six villages considered as rural populations. Second, we randomly selected two areas each from Qena and Nagh Hammadi for a total of four urban areas according to local security safety.

Second stage

An initial diagnosis was based on a screening questionnaire (discussed next). The survey team comprised 10 social workers (education level of at least 10 years) who used the screening questionnaire, two neurologists, and a psychiatrist (master's degree with at least 5 years of experience).

In families with several members with suspected epilepsy, we picked only one member for further assessment in the third stage. If this patient was proven to have epilepsy, he or she was considered to have a positive family history. The suspected cases were referred to Qena University Hospital for further assessment and confirmation of the diagnosis. This team received 3 weeks of training on how to perform the protocol before starting the study.

Third stage

The patients referred for final assessment at Qena University Hospital were subjected to a full neurological history and examination in the Neuropsychiatry department at Qena University Hospital. Electroencephalography, CT and/or MRI were performed for various cases for further assessment and confirmation of the epilepsy diagnosis.

Instruments

A previously used Arabic translated screening questionnaire (Khedr et al., 2013) was used in this study, with the same methodology adapted from Khedr et al. (2013). The initial diagnosis was based upon a general two-part screening questionnaire translated into Arabic with Part I recording socio-demographic details and Part II involving a modified epilepsy screening questionnaire (Haerer et al., 1986) with exclusion of the last question of febrile convulsion. The screening questionnaire was pretested in the outpatient clinic of Assiut University Hospital on a sample of 25 patients with epilepsy and 25 age- and sex-matched control patients who had joint arthritis without manifestations of epilepsy. The sensitivity and specificity of the questionnaire were 95% and 88%, respectively. The screening questionnaire consisted of 12 questions requiring yes or no answers. Each question was related to the presence or absence of a specific symptom in the last year (active cases) or prior years. Questions asked about the occurrence of (1) repeated abnormal movement in one part of the body; (2) paroxysms of rhythmic, bilateral synchronous movements of both upper and lower limbs associated with disturbance of conscious level; (3) a noticeable march, course, and speed of abnormal movement or sensation; (4) bouts of abdominal pain; (5) repeated spells of unexplained abnormal or violent behaviour or screaming attacks; (6) sleep-walking; (7) abnormal tossing or tonicity in sleep, repeated swallowing motion or smacking of lips, bed wetting, or spots of moisture, perhaps tinged with blood on the pillow; (8) falling-out spells; (9) repeated spells of blackouts with fainting; (10) repeated spells of absentmindedness, drooling or unusual body movements or jerks; (11) repeated spells in which they missed something of what was being said or taking place (repeated spells when they would stare, be confused, or unable to respond to any one for a few moments); or (12) paroxysms of strange speech, delusion or hallucinations. Subjects who screened positive were selected for the present study.

Definitions

Prevalence

The lifetime prevalence rate of epilepsy was defined as a diagnosis of epilepsy (recurrent unprovoked seizures) at some point prior to the prevalence period or date. The active prevalence rate included patients who were still experiencing the burden of epilepsy and were either continuing to have seizures or using antiepileptic medications within one year prior to the interview day (Banerjee et al., 2009; Birbeck and Kalichi, 2004; Edwards et al., 2008; Longe and Osuntokun, 1989). Point prevalence reflects the number of cases of active epilepsy on the prevalence day, divided by the total population in the study on the prevalence day. In this study, prevalence is expressed as active cases per 1000 people.

Incidence

The incidence of epilepsy is defined as the number of new cases of epilepsy over a specified time period. In this study, the new epilepsy cases that developed during survey period were considered incident cases. The incidence rate is the number of new cases per year divided by the average susceptible population in the study during the above specified time period and was expressed as new cases per 100,000 persons per year (Banerjee et al., 2009).

Definition of epilepsy

We used the International League Against Epilepsy (ILAE) definition of epilepsy (Commission on Classification and Terminology of the International League Against Epilepsy, 1989). A participant was considered to have epilepsy if he or she had had at least two epileptic seizures unprovoked by any immediate identified cause.

Seizure typing

Seizure types were then clinically classified according to the classification of the ILAE (Commission on Classification and Terminology of the International League Against Epilepsy, 1981), and aetiologic categories included idiopathic (presumably genetic), symptomatic, and cryptogenic (of unknown cause), according to the ILAE (Commission on Classification and Terminology of the International League Against Epilepsy (ILAE), 1993). The two major categories of seizure type classified by the International League Against Epilepsy (Commission on Classification and Terminology of the International League Against Epilepsy, 1981) are epilepsy characterized by partial seizures and epilepsy characterized by generalized seizures. Epilepsy characterized by partial (focal) seizures is that in which seizures begin in a local area of the brain. This seizure type is further subdivided into simple partial (no alteration in consciousness) and complex partial seizures (alteration of consciousness). Epilepsy characterized by generalized seizures may also be categorized as partial with secondary generalization if a clinical description of an antecedent symptom (aura), or a clear electroencephalographic signature of focality is indicated. Epilepsy characterized by generalized onset seizures conceptually involves the entire brain simultaneously. Individual generalized seizure types include absence, myoclonic, tonic-clonic, atonic, tonic, and clonic symptoms.

Statistical analyses

A descriptive analysis was used to assess frequencies and distributions. As appropriate, a comparison was made with

Table 1 Epidemiology of epilepsy in the Qena governorate.

	Number of cases/number of population	Rate/1000	95%CI
Prevalence and incidence of epilepsy in the Qena governorate			
Lifetime prevalence of epilepsy	100/8027	12.46	10.02–14.90
Prevalence of active epilepsy	17/8027	2.12	1.11–3.12
Incidence rate of epilepsy	22/8027	123[a]	80.6–175.74
Prevalence in relation to epilepsy typing			
Idiopathic epilepsies	76/8027	9.47	7.34–11.6
1 – Generalized epilepsies (71.1%)	54/8027	6.73	4.93–8.52
Absence (5.5%)	3/8027	0.37	0–0.80
Myoclonic (7.4%)	4/8027	0.5	0.01–0.99
Tonic-clonic (51.8%)	28/8027	3.49	2.2–4.78
Tonic (11.1%)	6/8027	0.75	0.15–1.35
Atonic (24.1%)	13/8027	1.62	0.74–2.5
2 – Partial seizure (26.3%)	20/8027	2.49	1.4–3.58
Simple partial (55%)	11/8027	1.37	0.56–2.18
Complex partial seizure (15%)	3/8027	0.37	0–0.80
Partial seizure evolving to secondary generalized seizure (30%)	6/8027	0.57	0.15–1.35
Simple partial seizure evolving to secondary generalized seizure (25%)	5/8027	0.62	0.08–1.17
Complex partial seizure evolving to secondary generalized seizure (5%)	1/8027	0.12	0–0.37
Unclassified (2.6%)	2/8027	0.25	0.0–0.59
Symptomatic epilepsy (24%)	24/8027	2.99	1.79–4.19

[a] Incidence is taken as the number of per 100,000 people.

either Student's *t*-test or Fisher's exact test. Data were considered to be significant if the *P*-value ≤ 0.05. SPSS version 16 was used for statistical analysis.

Results

On survey, we found 130 cases with suspected epilepsy using the screening questionnaire, which were referred to a senior neurologist at Qena University Hospital to confirm the diagnosis and clinical assessment. We confirmed only 100 (77%) subjects who fulfilled the case definition of epilepsy and had recurrent unprovoked seizures during any point in their lifetime. The remaining 30 (23%) subjects were false positive as their clinical evaluation revealed that 20 subjects had conversion disorders, 6 subjects were diagnosed with TIA, 1 subject was diagnosed with dystonia, and the last 4 subjects showed drug-induced extrapyramidal symptoms that were secondary to antipsychotic medication.

Epidemiology of epilepsy in the Qena governorate

The lifetime prevalence rate, active prevalence rate, incidence rate of epilepsy, and the prevalence rates of epilepsy types were presented in Table 1.

Age-specific prevalence of epilepsy in the Qena governorate

The age-specific prevalence rate of epilepsy was presented in Table 2.

Relation to socio-demographic data, treatment, seizure timing, and aetiology

The total lifetime prevalence of epilepsy was nearly equal in rural (12.8/1000) and urban communities (12.2/1000), without statistically significant differences ($X^2 = 0.02$; $P = 0.89$). With regard to sex, the lifetime prevalence was slightly higher in males (14.1/1000) compared to females (10.6/1000), with no significant difference ($X^2 = 1.73$; $P = 0.188$). Among the total confirmed epilepsy cases, only 59% of them were receiving antiepileptic medications. Moreover, 16% of those cases were preceded by prodromal/aura symptoms and 74% were followed by postictal symptoms. Most seizures occurred both diurnally and nocturnally (71%), while only 19% only occurred during the daytime, 8% occurred during sleep, and, finally, 2% occurred on awakening from sleep. Symptomatic epilepsy cases were found to have various aetiologies, as presented in Table 3

Consanguinity, family history, and precipitating factors

Consanguinity (''the marriage between two blood relatives descending from the same ancestor''), family history, and precipitating factors of seizures were presented in Table 4. Comparisons of those factors among rural and urban areas were performed and revealed significant differences only in the typing of epilepsy (either idiopathic or symptomatic), whereas there were no significant differences between rural and urban areas in all other variables (Table 4)

Table 2 Age-specific prevalence rate.

Age group	Number of cases/number of inhabitants (population at risk)	% of studied population ($n = 8027$)	CPR/1000	95%CI
0–4 years	20/320	4	62.5	35.11–89.89
5–9 years	20/540	6.7	37.04	20.8–53.27
10–14 years	19/676	8.4	28.11	15.47–40.74
15–19 years	11/863	10.8	12.75	5.21–20.28
20–29 years	9/2319	28.9	3.88	1.35–6.42
30–39 years	5/1300	16.2	3.85	0.47–7.22
40–49 years	7/628	7.8	11.15	2.89–19.40
50–59 years	5/690	8.6	7.25	0.89–13.60
≥60	4/691	8.6	5.79	0.12–11.46

Table 3 Aetiology of symptomatic epilepsy.

Aetiology in symptomatic epilepsy	Number of cases (percent of cases)
Cerebral palsy	3 (12.5)
Chemical toxins (insecticides).	1 (4.2)
Encephalitis	1 (4.2)
Meningoencephalitis	1 (4.2)
Febrile	8 (33.3)
Drug addiction	3 (12.3)
Post traumatic epilepsy	2 (8.4)
Post-stoke epilepsy	4 (16.7)
Brain tumour (Glioma)	1 (4.2)

Discussion

We conducted this door-to-door epidemiological study to illuminate the state of epilepsy in Upper Egypt, which is considered to be a less industrialized part of Egypt and is less equipped with modern centres of neurological diagnosis and out of the reach of international authorities such as the WHO. We found that the lifetime prevalence of epilepsy in the Upper Egyptian governorate (Qena), where the study was undertaken, was more than that estimated by the WHO in 2001 (World Health Organization, 2001).

The majority of patients with epilepsy may have a favourable prognosis if they could be accurately diagnosed and efficiently treated (Sander, 2003). Such epidemiological

Table 4 Consanguinity, family history, and other precipitating factors among patients with epilepsy in relation to their residence.

Variable	Total patient ($N = 100$) number (%)	Urban ($N = 54$) number (%)	Rural ($N = 46$) number (%)	Difference
Consanguinity				
Positive consanguinity	70 (70%)	34 (62.9%)	36 (78.3%)	Not significant
2nd degree	38 (38%)	20 (37%)	18 (39.1%)	Not significant
3rd degree	32 (32%)	14 (25.9%)	18 (39.1%)	Not significant
Negative consanguinity	30 (30%)	20 (37.1%)	10 (21.7%)	Not significant
Family history				
Epilepsy	22 (22%)	11 (20.4%)	11 (23.9%)	Not significant
Febrile convulsion	6 (6%)	2 (3.7%)	4 (8.7%)	Not significant
Precipitating factors				
Positive precipitating factors	31 (31%)	16 (29.6%)	15 (32.6%)	Not significant
Stress	15 (15%)	7 (12.96%)	8 (17.4%)	Not significant
Fatigue	3 (3%)	1 (1.8%)	2 (4.3%)	Not significant
Trauma	3 (3%)	3 (5.5%)	0 (0%)	Not significant
Fever	10 (10%)	5 (9.25%)	5 (10.9%)	Not significant
No definite precipitating factor	69 (69%)	38 (70.4%)	31 (67.4%)	Not significant
Type of epilepsy				
Idiopathic epilepsy	76 (76%)	47 (87%)	29 (63%)	$P = 0.01$[a]
Symptomatic epilepsy	24 (24%)	7 (12.9%)	17 (36.9%)	$P = 0.005$[b]

[a] $P = 0.01$: comparison between the prevalence of idiopathic epilepsy in rural versus urban areas.
[b] $P < 0.01$: comparison between the prevalence of symptomatic epilepsy in rural versus urban areas.

Table 5 Epidemiology data from other studies.

Reference	Prevalence/1000	95% CI	Incidence/100,000	95% CI
Developing African and South American countries				
Kaiser et al. (1996)	12.9	–	–	–
Birbeck and Kalichi (2004)	14.5	–	–	–
Rwiza et al. (1992)	10.2	–	73	–
Attia-Romdhane et al. (1993)	4	–	–	–
Snow et al. (1994)	4	–	–	–
Osuntokun et al. (1987)	5.3	–	–	–
Tekle-Haimanot et al. (1990)	5.2	–	–	–
Tekle-Haimanot et al. (1997)	–	–	64	44–84
Prischich et al. (2008)	134.5	90–178	–	–
Basch et al. (1997)	22.6	–	–	–
Khedr et al. (2013)	12.6	9.8–15.5	150	53–251
Lavados et al. (1992)	17.7	–	113	–
Placencia et al. (1992)	8	–	190	–
El-Tallawy et al. (2013)	6.76	–	43.14	–
Developed North American and European countries				
Hauser et al. (1993)	–	–	112	–
Kelvin et al. (2007)	5.2	–	–	–
Reggio et al. (1996)	2.7	–	–	–
Haerer et al. (1986)	6.8	–	–	–

studies may be very helpful in designing and directing epilepsy-related health services to areas where epilepsy is more prevalent than usual, as is the case in Upper Egypt shown in this study.

The lifetime prevalence of epilepsy in our study was 12.46/1000 which is more than was estimated by the WHO in 2001 (8/1000). The prevalence data of other studies are summarized in (Table 5). Taking developing countries into consideration, the lifetime prevalence of epilepsy in our study was similar to some African countries, including Uganda (12.9/1000) (Kaiser et al., 1996), Zambia (14.5/1000) (Birbeck and Kalichi, 2004), and Tanzania (10.2/1000) (Rwiza et al., 1992); however, it was much more than other African countries, including Tunisia (4/1000) (Attia-Romdhane et al., 1993), Kenya (4/1000) (Snow et al., 1994), Ethiopia (5.2/1000) (Osuntokun et al., 1987; Tekle-Haimanot et al., 1990, 1997), and Nigeria (5.3/1000) (Osuntokun et al., 1987). According to the literature (Banerjee et al., 2009) and with the exception of Cameroon (Prischich et al., 2008), the lifetime prevalence of epilepsy in Upper Egypt is considered one of the highest in Africa. In developed countries, the prevalence was much lower than in our study; in Mississippi, it was 6.8/1000 (Haerer et al., 1986), in New York, it was 5.2/1000 (Kelvin et al., 2007), and in Italy, it was 2.7/1000 (Reggio et al., 1996). Overall, there some countries that are characterized with much higher prevalence rate of epilepsy, such as Cameroon 134.5/1000 (Prischich et al., 2008) and Ecuador 22.6/1000 (Basch et al., 1997). The lifetime prevalence in a nearby, more industrialized Upper Egypt governorate was nearly identical to that found in our study (12.67/1000) (Khedr et al., 2013).

The incidence rate in our study is considered to be one of the highest in the world, as it was 123/100,000. Compared to other developing countries in Asia and Africa (Table 5), the incidence rate in our study was nearly double. For example, in Ethiopia, the incidence rate was 64/100,000 (Tekle-Haimanot et al., 1997), and in Tanzania it was 73/100,000 (Rwiza et al., 1992). It was similar to that in Chile (113/100,000) (Lavados et al., 1992) and in Minnesota (112/100,000) (Hauser et al., 1993); however, it was less than that in Ecuador (190/100,000) (Placencia et al., 1992).

In Egyptian studies, it was much more than those in Egyptian desert areas, such as the New Valley governorate (43.14/100,000) (El-Tallawy et al., 2013; Farghaly et al., 2013); however, it was nearly identical to that in the Assiut governorate in Upper Egypt (150/100,000) (Khedr et al., 2013). The explanation for the lower incidence rate of epilepsy in Egyptian desert areas may be due to the lower incidence of symptomatic epilepsies as CNS infections (El-Tallawy et al., 2013).

The age-specific prevalence in our study was highest in infancy and early childhood (62/1000), which steadily declined with age to approximately 37/1000 in mid-childhood, 28/1000 in late-childhood, and approximately 12/1000 in adolescence. This pattern of an age-specific incidence rate in our study appears to be similar to those recorded in most studies from developing countries, as most of the previously published studies recorded an increase in the prevalence of epilepsy during childhood and adolescence up to early adulthood, followed by a stable prevalence rate in the third and fourth decades, and a decline after the fifth decade of life (Banerjee et al., 2009; Basch et al., 1997; Birbeck and Kalichi, 2004; El-Tallawy et al., 2013; Khedr et al., 2013; Lavados et al., 1992; Olafsson and Hauser, 1999).

The higher incidence and prevalence rates of epilepsy in Upper Egypt in our study could be attributed to many factors, including the very high rate of consanguinity (70%) which plays an important role in genetically determined

idiopathic epilepsies, in addition to the very high incidence of the other diseases that may be associated with symptomatic epilepsy, such as trauma, CNS infections, stroke (results of the same project), and chronic renal failure.

Many of the reported differences among various studies can be attributed to various factors, not only the differences in the epidemiology of epilepsy alone, including study methodology (e.g., case definition, ascertainment) and population structure (e.g., age). Increased prevalence and incidence may be related to factors such as low socio-economic status, limited access to health care, and environmental factors, such as trauma and CNS infections. The prevalence or incidence may be underestimated in areas where the condition is greatly stigmatized and cultural beliefs about the causes of epilepsy or negative attitudes towards those with epilepsy lead to concealing epilepsy symptoms or its diagnosis (Banerjee et al., 2009; Bharucha, 2003, 2012; El-Tallawy et al., 2013; Farghaly et al., 2013; Houinato et al., 2013; Khedr et al., 2013).

In our study, the most common type of epilepsy was the generalized type (71.1%), followed by the partial type (26.3%), and, last, the unclassified epilepsy (2.6%). The most common generalized epilepsies were the generalized tonic—clonic type (51.8%). The above mentioned rates were similar to many previous studies (Basch et al., 1997; Cruz et al., 1985; Giuliani et al., 1992; Granieri et al., 1983; Haerer et al., 1986; Khedr et al., 2013; Koul et al., 1988; Rocca et al., 2001; Tekle-Haimanot et al., 1990). The higher proportion of generalized epilepsy (as in our study) was reported in nearly half of the studies reviewed in Banerjee et al. (2009). The explanation for this may be related to the fact that the diagnosis of partial epilepsy depends mainly on sophisticated methods of diagnosis not available in our centres. Moreover, the criteria for seizure type classification are seldom specified and, accordingly, the number of misclassifications by seizure type is difficult to estimate (Banerjee et al., 2009). Conversely, the high rate of generalized epilepsy could have a genetic explanation. In our study, there was a very high rate of parent consanguinity, reaching up to 70% of cases, which is a very popular traditional habit in many developing countries, such as Egypt. Consanguinity may play a role as a possible risk factor for epilepsy in developing countries, as suggested in some studies that also presented a similar percentage of generalized epilepsies (71%) (al-Rajeh et al., 1990; Asadi-Pooya, 2005). Although its precise role has not been determined, consanguinity of the parents may play a role in the genetic aetiology of generalized epilepsies in our environment, or it may have potentiated the tendency of familial aggregation of convulsive disorders in this community.

In our study, 76% of cases were idiopathic epilepsies, and 24% were symptomatic epilepsy. Those results were similar to other studies from African and other developing countries (Attia-Romdhane et al., 1993; Bharucha, 2012; Dent et al., 2005; Karaagac et al., 1999; Khedr et al., 2013; Lavados et al., 1992; Nicoletti et al., 1999; Osuntokun et al., 1987; Rwiza et al., 1992). The rate of diagnosed idiopathic epilepsy cases in studies from developing countries, as in our study, was higher than those originating in developed countries (Giuliani et al., 1992; Granieri et al., 1983; Haerer et al., 1986). This may be explained by the greater likelihood of having sophisticated diagnostic tools and/or the greater likelihood of getting appropriate patient history information to clarify a possible aetiology.

Conclusion

The lifetime prevalence and the incidence rates of epilepsy are high in Upper Egypt. This suggests that this part of Egypt should receive appropriate and sufficient health care services to be able to limit their current epilepsy problem. Moreover, more education and culturally directed programmes are needed to limit consanguinity, which is distinguishably high in our study, to decrease the incidence of genetically determined epilepsies.

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