



Review

A comprehensive review of epilepsy in the Arab world



Devender Bhalla^{a,b,c,*}, Elham Lotfalinezhad^{c,d}, Utsav Timalisina^e, Saloni Kapoor^f,
Kailash Suresh Kumar^g, Abdallah Abdelrahman^h, Brenda Giaganteⁱ,
Manjari Tripathi^f, Kavita Srivastava^j, Irmansyah Irmansyah^k

^a Nepal Interest Group of Epilepsy and Neurology, Kathmandu, Nepal

^b Faculté de Médecine, Université de Limoges, Limoges, France

^c Iranian Epilepsy Association, Tehran, Iran

^d University of Social Welfare and Rehabilitation Sciences, Tehran, Iran

^e Tribhuvan University, Kathmandu, Nepal

^f All India Institute of Medical Sciences, Delhi, India

^g Chettinad Health and Research Institute, Chennai, India

^h University of Khartoum, Khartoum, Sudan

ⁱ Department of Neurosciences, El Cruce Hospital, Buenos Aires, Argentina

^j Bharati Vidyapeeth Medical University, Pune, India

^k Marzoeeki Mahdi Hospital, Bogor, Indonesia

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ABSTRACT

Purpose: We conducted a comprehensive review of the epidemiology of epilepsy in the Arab world. **Methods:** Epidemiological literature about epilepsy from 22 countries of the Arab League was searched in French and English using several keywords (specific and wider) and combinations, individually for each country. The search was conducted on Google first and then on PubMed. The results are presented as counts, proportions, and medians along with 95% confidence intervals (CI). Unpaired *t*-test with unequal variance and regressions were performed, altogether and individually, for lifetime and active epilepsy prevalence as well as incidence. **Results:** Google provided 21 prevalence, four camp and nine incidence estimates while PubMed provided ten such estimates; none of them was identified by Google. No epidemiological data about epilepsy was found from 10/22 countries. Excluding pediatric studies, 13 prevalence estimates from six countries were identified. Including pediatric studies, 21 estimates from nine countries were found. Median lifetime and active epilepsy prevalence were 7.5/1000 (95% CI 2.6–12.3, range 1.9–12.9) and 4.4/1000 (95% CI 2.1–9.3, range 2.1–9.3), respectively, excluding pediatric studies (1984–2014, $N = 244081$). Median incidence was 56.0/100,000 ($n = 9$, $N = 122484$, 95% CI 13.7–147.9, range 10.4–190). **Conclusion:** The fact that no epidemiological data about epilepsy is available in the public domain for almost one half of all Arab countries offers opportunities for future research. This thorough review of existing literature demonstrates a prevalence of epilepsy three times higher than previously reported for this region. The median incidence is similar to other regions of the world, e.g. North America. Google yielded additional valuable sources not indexed in PubMed and provided pertinent references more quickly.

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1. Introduction

Epilepsy is a major neurological disorder and is widely present across the world [1,2]. So far, studies on epilepsy have mostly been focused on the African nations although other regions are expected

to have similar or even greater epilepsy-related needs [1]. The Arab world is unique in terms of mixed ethnicity, varied religious practices (related to food and substances, marriage) and disease epidemiology [3,4]. A previous review on epilepsy from this region estimated the prevalence of epilepsy to be 2.3/1000 [5]. This is quite likely to be an underestimate for a region as complex and diverse as the Arab world, but more importantly for the reason that this review had not included French literature in spite of the fact that many countries of this region are native French speaking. Also, this review had used PubMed alone for literature search,

* Corresponding author at: Nepal Interest Group of Epilepsy and Neurology, PO Box 4240, Kathmandu, Nepal. Tel.: +33 785409113.

E-mail address: devenderbhalla@hotmail.com (D. Bhalla).

which may not be the most suitable tool for countries where English is not the native language, and where scientific capacity is underdeveloped in comparison to other more developed regions such as Europe or North America. Interestingly, they had also taken into account hospital-based studies, but despite this the median epilepsy prevalence proposed for this Arab region was merely 2.3/1000. In view of these shortcomings, we considered it necessary to conduct a more comprehensive review of both English and French literature, adapted to the regional particularities, in order to better elucidate the burden of epilepsy in this region.

2. Methods

2.1. Search strategy

We searched literature on epilepsy in the Arab world, published in both English and French. These were obtained via Google and PubMed, using specific keywords and their combinations: epilepsy, convulsive disorders, seizure disorder, Arab, epilepsie, crise épileptique, crise convulsive, Arabe, and the name of individual countries. The search was conducted principally on Google, followed by a similar search on PubMed. No restrictions were made pertaining to the year of publication. On Google, only the first five pages were taken into consideration while on PubMed, all the results were looked at (titles first, then abstracts, then full-text) for identifying suitable studies. Our target approach was to identify all formal and informal estimates of the prevalence and incidence of epilepsy by including studies that were population based, and had clearly defined methodological parameters. The bibliography of each of these articles was thoroughly looked into as well.

2.2. Definitions

The Arab world was defined as the 22 member states of the Arab League. According to the International League against Epilepsy (ILAE), active epilepsy is defined as “at least one epileptic seizure in the last five years, irrespective of treatment”. Treatment gap is generally defined as “the difference between the number of people with active epilepsy and the number being appropriately treated.”

2.3. Statistical analyses

We performed statistical analysis by using Stata, 2009. *t*-Test (unpaired, unequal variance) was used to determine statistical significance of differences, if any, between groups or estimates. Regression results were derived for population size, age group, year of study, gross domestic product (GDP) in the year of survey, and treatment gap, together and individually. A scatter plot with error margins was plotted by using Microsoft Excel. The results

were derived separately for lifetime and active epilepsy prevalence, and incidence of epilepsy. The results have been presented in terms of counts, proportions, and medians along with respective 95% confidence intervals (CI).

3. Results

Overall, no prevalence or incidence estimates on epilepsy were available from the following ten countries; namely Bahrain, Comoros, Djibouti, Jordan, Kuwait, Lebanon, Mauritania, Oman, Qatar, Yemen. We obtained 13 prevalence estimates (excluding pediatric studies) from six countries and if pediatric studies were included; it summed up to 21 prevalence estimates from nine countries. In addition, four estimates of the prevalence of epilepsy consultations (per 1000) were identified that were based on extremely large United Nations' refugee (Syria, Somalia) camp population. Further, nine incidence estimates were identified from three countries, namely Algeria, Egypt and Palestine. On PubMed, 1285 titles were looked at from 22 countries but only 10 studies (pertaining to Algeria, Egypt, Libya, Saudi Arabia, Sudan and Tunisia) were obtained. Each of these had already been identified during our primary search on Google.

3.1. Prevalence (lifetime and active)

Excluding pediatric (Table 1) and camp population studies, the lifetime prevalence of epilepsy (1984–2014, $N = 244081$) was reported by 12 studies and the median lifetime prevalence of epilepsy was estimated to be 7.5/1000 (95% CI 2.6–12.3, range 1.9–12.9). After including pediatric studies, the median lifetime prevalence of epilepsy increased to 7.8 ($n = 19$, 95% CI 5.6–10.9, range 0.9–133.3), (Fig. 1).

Excluding pediatric (Table 1) and camp population studies, the prevalence of active epilepsy was reported by only four studies (Table 2) excluding children and camp studies, and the median prevalence of active epilepsy was estimated to be 4.4/1000 (95% CI 2.1–9.3, range 2.1–9.3). No active epilepsy estimates were available from pediatric studies. Uni- and multivariate regression of lifetime epilepsy for population size, age group, year of study and GDP was not significant ($p > 0.05$).

Among children, eight epilepsy prevalence estimates were identified ($N = 28,990$, 1979–2013) from four countries, namely Egypt, Iraq, Morocco and Sudan. The median lifetime prevalence of epilepsy was estimated to be 8.1 (95% CI 0.96–50.7, range 0.9–133.3). Treatment gap varied from 20.0% in Sudan to 84.5% in Egypt. The frequency of generalized epilepsy varied from 62.0% to 93.8%, and that of partial epilepsy varied from 6.3% to 58.7%; these data were available from Egypt alone. Only two studies (from Egypt) [6,33] reported gender-specific prevalence of

Table 1
Studies of lifetime prevalence of epilepsy in children in the Arab world.

Country	R/U	Year	N	P/1000	Additional comments
Egypt [24]	U	2012	12093	9.0	DTD among children; neurologist-diagnosis and EEG + Scan
Egypt [25]	U	2009	8750	7.2	Random sample of conventional schools, health insurance system, school doctor records, school health visitor records, filling of questionnaire by parents and parent's interview neurologist-diagnosis and EEG
Egypt [25]	U	2009	120	133.3	Random sample of schools for mentally retarded, health insurance system, school doctor records, school health visitor records, filling of questionnaire by parents and parent's interview; neurologist-diagnosis and EEG
Egypt [20]	U	1992	–	10.0	Random sample of school children <15 years age
Egypt [35]	Both	2013	8027	7.3	DTD; neurologist-diagnosis; Psychiatrist, and EEG + Scan; children 0–14 years;
Iraq [26]*	–	2005	–	1.0	Refer footnote
Morocco [27]	U	1998	–	11.0	–
Sudan [19]	U	1979	–	0.9	Entire school population, hospital and private clinics

DTD, door-to-door; EEG, electroencephalogram; P, prevalence; R, rural; U, urban; N, population size; *government estimate.

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