ARTICLE IN PRESS

International Journal of Epilepsy xxx (2016) xxx-xxx



Contents lists available at ScienceDirect

International Journal of Epilepsy



journal homepage: http://www.journals.elsevier.com/ international-journal-of-epilepsy

Review article

A first-ever dedicated comprehensive review of incidence of epilepsy in South America and Caribbean

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ARTICLE INFO

Article history: Received 18 September 2016 Received in revised form 8 March 2017 Accepted 14 March 2017 Available online xxx

Keywords: Epilepsy Epidemiology Incidence Latin America South America Caribbean

ABSTRACT

In order to understand true incident burden of epilepsy in South America and Caribbean, several sources were searched in multiple languages using keywords and combinations. The results were presented as counts, proportions, means, and/or medians along with their 95% confidence intervals (CI). No information was found from Caribbean and no information was available from six South American countries. Based on 14 estimates, annual median incidence (N = 185319, 1984-2010, 7 in rural area) of epilepsy for South America was 115.2/100,000 (95% CI 61.0-133.4, range 0.0-410.0). Random-effect pooled annual epilepsy incidence was 84.8/100,000 (95% CI 65.2-104.5). The 25th and 75th percentile of annual epilepsy incidence were 62.2/100,000 and 130.9/100,000 respectively with an interquartile range (IQR) of 68.7. Between-study variance attributable to each explanatory factor was estimated to be: 38.8% from study year, 18.1% from urban-rural milieu, 15.4% from case size, and 0.6% from study size. Descriptively, on average, 445824 (between 236070 and 516258) new cases of epilepsy are possibly occurring every year in South America. In conclusion, Caribbean needs to come forward for its own epilepsy incidence data especially when risk from numerous factors such as substance abuse, mental health, etc. deems high. Epilepsy incidence in South America is likely to be slightly lower than previously reported although this varies considerably for each country. Inter-population differences are in-part (more than 50%) related to urban-rural differences and variations over time. Our work is especially important to monitor secular trends of epilepsy incidence especially when new data would emerge and countries continue to undergo transitions.

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	Funding	00

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http://dx.doi.org/10.1016/j.ijep.2017.03.001

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Please cite this article in press as: D. Bhalla, et al., A first-ever dedicated comprehensive review of incidence of epilepsy in South America and Caribbean, Int J Epilepsy. (2017), http://dx.doi.org/10.1016/j.jjep.2017.03.001

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References

1. Introduction

Epilepsy is a major neurological disorder with considerable but differing burden worldover^{1,2}; which is yet to be fully understood and estimated.^{3,4} For this reason, among others, agencies recommend the need for promotion of research and education on epilepsy, publication of detailed public health assessments, and development of national plans.⁵ One of the ways by which we aimed to address these recommendations and determine true burden of epilepsy is through incidence, a parameter which is independent of disease-specific mortality, is particularly enriching and may provide better assessment of disease burden. A previous review conducted 10 years ago reported an annual incidence of epilepsy between 77.7–190/100,000 for Latin America.⁶ Thus, with a view to bring its own reliable regional estimates, conclusions, and interpretations, we conducted a first-ever comprehensive review of epilepsy for South America and Caribbean (reported seperately) in order to help understand the true incident burden of epilepsy in these two supposedly unique regions.

2. Methods

We seperately searched for estimates of epilepsy incidence from South America and Caribbean, published in French, English, and Spanish at PubMed and LILACS. For this, we used specific keywords and their combinations: epilepsy, epilepsia, alongwith the name of individual countries to obtain maximum possible titles during result. For reducing extraneous titles from Brazil and Argentina which otherwise yielded 2016 and 407 titles respectively, an additional keyword epidemiology was used. The search was conducted principally on PubMed (English): followed by a similar search on other database in English and Spanish. All searches were independent of each other. No restrictions were made pertaining to the year of publication and definition of active epilepsy. All individual results were aimed to be filtered from the title itself. If title seemed appropriate then only abstract and/or full-text were read to identify studies that were population-based and had other basic methodological details. Those titles that had no abstract; were not population-based; didn't provide required estimate; addressed status epilepticus; particular syndromes; sudden unexpected death or single unprovoked seizure; specific

populations; out-of-topic; clinical trials; case report were simply excluded. Our target was to identify all possible population-based estimates of the incidence of epilepsy from these two regions; Fig. 1.

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In addition, a free search on Google was carried-out by using similar keywords and combinations in English, Spanish, and French, i.e. epilepsy, epilepsie, epilepsia, incidence, incidencia, Ministerio, frecuencia, along with the name of individual countries. Each time ten pages were looked-at for relevant studies or estimates.

Bibliography of articles was looked as well to search for additional studies or estimates. Each search was independent of each other.

2.1. Definitions

For this work, South America was defined as "twelve sovereign member states including Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela". For this work, Caribbean was defined as "six sovereign member states including Bahamas, Cuba, Dominica, Dominican Republic, Haiti, and Trinidad and Tobago". According to International League against Epilepsy (ILAE), active epilepsy is defined as "at least one epileptic seizure in last five years, irrespective of antiepileptic drug treatment".⁷

2.2. Statistical analyses

Both regions were considered separate entities. We performed statistical analysis by using Stata, 2009. All results are described separately for each country. We initially tabulated crude incidence estimates alongwith their 95% confidence intervals (CIs). To estimate pooled incidence and test for heterogeneity, we fitted random-effects model to log-transformed crude incidence. We obtained median incidence and 25th and 75th percentile of the distribution of true incidence by back-transforming the log estimates to the original incidence scale. We used the Cochrane χ^2 test to calculate the degree of heterogeneity. To determine the influence of study-level factors i.e. study year, case numbers, urban-rural milieu, and sample size, we used random-effects meta regression. By estimating the coefficient of determination (r^2) we



Fig. 1. Geographic location of Caribbean and South America.

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