Preventive Medicine and Community Health

Research Article ISSN: 2516-7073

Epidemiology of epilepsy: Data from a small city in the northwest of São Paulo state – Brazil

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Abstract

Purpose: Epilepsy is a public health problem. The aim of this study was to investigate incidence, prevalence and risk factors of epilepsy in a small city in the northwest of São Paulo state - Brazil.

Methods: This was a population-based cross-sectional study involving urban and rural environments. The study included two phases. In phase I, 20 health care agents conducted a door-to-door survey to screen cases using an 8-item questionnaire on epilepsy. Records on dispensing of antiepileptic drugs by the Municipal Health Secretary were also used. In phase II, a senior neurologist confirmed the diagnostic of all positive cases.

Results: Eighty (80) cases of epilepsy were identified, of which 40 (50%) were males. The crude incidence of epilepsy was 54.7/100000 inhabitants/year, amounting to 41.6 for males and 67.7 for females. The crude prevalence of active epilepsy was 16.1/1000 inhabitants, of which 14.0/1000 inhabitants for men and 16.8/1000 inhabitants for women. In this study, prevalence was 22.33/1000 inhabitants in the rural area. Also, main risk factors for epilepsy and the incidence profile considering the age groups were also studied.

Conclusion: This is a pioneer study conducted in small cities and plays an important role for confirming high incidence and prevalence similar to developing countries.

Introduction

The epidemiology of epilepsy is variable among countries and regions, amounting to about 60/100000 inhabitants per year in developed countries and over 100 in developing countries. Prevalence rate is generally between 3.5 and 10.7/1000 in developed countries [1]. In developing countries in Asia, Africa and Latin America, prevalence ranges from 9 to 74.4/1000 [2]. There are few studies in Brazil on prevalence and of incidence, especially in small cities, with less than 50,000 inhabitants, according to the IBGE (Brazilian Institute of Geography and Statistics) [3]. A master thesis (UNESP/Botucatu), grounded on a study on medical files in a medium-sized city in the northwest of São Paulo state, an incidence of 77/100,000 inhabitant/year, which 86.2 were males and 67 were females [4]. Therefore, this study was designed to investigate the epidemiology of epilepsy in a small city in the northwest of São Paulo state, Brazil.

Methods

A population-based study with a cross-sectional design was conducted in a small city in the northwest of São Paulo state as well as in a rural district with 8405 inhabitants according to the IBGE-20103. This study was carried out from October 2017 to June 2018.

In phase I (Screening), 20 previously trained health care agents conducted a door-to-door survey to screen cases using an 8-item questionnaire on epilepsy validated by Borges *et.al* [5], with the objective of determining positive cases (questionnaire with at least one positive response) among the residents of these urban and rural areas.

Phase II (Neurological Examination) took place at the Family Health Centres. All the instruments applied were analysed by the neurology researcher. The positive cases (at least one positive response) for epilepsy were assessed by the neurology researcher in charge who determined true positives. For didactic purposes, the patients were allocated into 8 different age groups.

Exclusion criteria were: uncertain clinical cases; respondents with incorrect home address; patients with febrile seizures; seizures in newborns; provoked seizures; and isolated seizures without associated relevant risk factors.

Pearson χ^2 tests, paired t-tests with a 95% confidence interval (95% CI) and Fisher's exact tests (small samples) were used to analyse the results. Differences with *p-values* ≤ 0.05 were considered significant. This study was approved by the Medical Ethics Committee of FAMERP (No./ CAAE of the project: 77219517.1000.5415).

Results

A total of 5300 residents were surveyed, of whom 2304 (43.4%) were men and 2996 (56.5%) were women, amounting to 63.5% of the

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Key words: *epidemiology, epilepsy, incidence, prevalence, risk factors*

Received: May 01, 2019; **Accepted:** May 13, 2019; **Published:** May 17, 2019

city's total population. The mean age of individuals with epilepsy was 38.4 (0.8-87.2 yo; SD =22.1), where 44.1 was for males (0.8 to 87.2 years; SD =21.9) and 40.8 for females (1 to 92.3 years; SD =22.5), SD = 22.1 ($p = 0.508$). The number of Caucasian individuals with epilepsy was 71 (88.7%), 35 of them (43.7%) were women and 36 (45%) were men, similar to the sample studied ($p = 0.23$). Among the respondents, 80 positive cases for epilepsy could be found, 41 (51.25%) of them were women. Mean incidence considering age groups and sex is summarized in Figure 1

Discussion

This study was conducted in a small city in the interior of the state of São Paulo. Its economy is mainly based on agriculture, such as beef cattle breeding, milk farming, soya plantation, and more recently sugar cane plantation, which has assumed a leading role in all northwest region of the state of São Paulo. This city has also followed this regional trend.

Typical for small cities, the youngest population (18years or older) tend to migrate to major urban centres to gain a professional qualification, pursue higher education or search for job opportunities. Therefore, there is a high rate of retired old adults, who do not perform any activity in the paid labour market.

In the present study, we have obtained easy access to people who use the Municipal Health Service and depend on this service for primary health care as well as to obtain antiepileptic drugs free of charge. Mostly, these are old and simple people living on very limited incomes. People with a better financial situation do not seek municipal health services as they look for health care in larger cities, such as Votuporanga and mainly São José do Rio Preto. Also, this part of the population does not depend on free drug prescription offered by the municipality as they are able to afford the medication.

It could be observed that the prevalence of epilepsy was higher among individuals in the rural area than in the urban area. This is strongly related with poor sanitation, which facilitates transmission of perinatal infections as well as cysticercosis and meningitis, also frequently observed. Furthermore, working conditions in rural areas tend to be difficult, hazardous and sometimes with little or no protection, leading to an increased risk of TBI that will eventually progress to epilepsy.

High incidence of epilepsy was found in children aged 0-9 years, which may be associated to an outbreak of the Zika virus in Brazil. In the Americas, the Zika virus was only identified on Easter Island, Chile's territory in the Pacific Ocean, 3500Km from the mainland, in 2014 [6]. Congenital microcephaly caused by Zika virus can be evidenced by several alterations, mainly as cerebral palsy, epilepsy, difficulty in swallowing, anomalies of the visual and auditory systems, as well as behavioural disorders (ADHD and autism)[7].

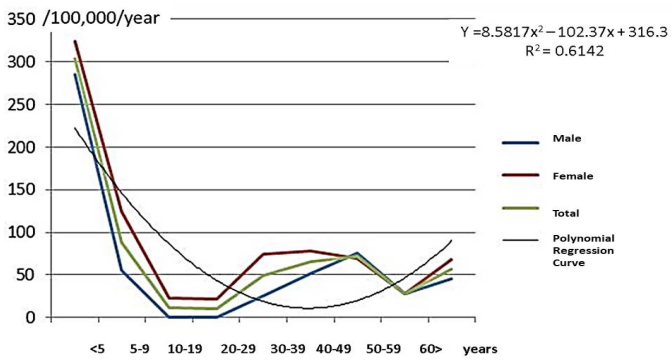

Figure 1. Profile of the incidence number of cases 100000 inhabitants/year/mean, in ten years, according to age group and sex

The prevalence is high, confirming the findings of the studies conducted by Borges et al. [5]. In Porto Alegre, Fernandes et al. [8] found prevalence of 16.5 for active epilepsy and Marino et al. [9] reported prevalence of 13.3 in the city of São Paulo. On the other hand, Noronha et al. [10] found prevalence of 9.2, with 5.4 for active epilepsy, which is low for Brazilian standards [9,11]. High prevalence of epilepsy, especially among adolescents and adults, is explained by several factors such as persistent meningitis, similar to other poor-resource countries, such as sub-Saharan and developing countries [11,12].

The incidence of epilepsy has been studied in several countries and in several subgroups of the population. However, due to the different study designs and criteria used, the data obtained are difficult to compare, as well as are the reported indices [13].

Our results agree with the literature, which reports incidence above 100,000 inhabitants/years and prevalence above 10/1000 inhabitants in developing countries Studies conducted in China in 2017 assessed 8 ethnic groups from the most remote regions of the capital. The prevalence found was low in relation to other studies; the highest incidence was of 8.4/1000 among men in the Nu region [14,15,18]; and the lower prevalence of surprisingly 1.5/1000 was recorded among women in the Hani region [14,16,18].

This Chinese study also reported a large proportion of patients with epilepsy who do not have access to antiepileptic drugs, which is a recurring issue in developing countries [11, 15,17,18].

Our study shows that the incidence and prevalence of epilepsy in small cities in Brazil is similar to those in other developing countries and that risk factors of epilepsy have not reduced by satisfactory sanitation strategies which should be implemented by governmental authorities.

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