

Frequency of Neurological Diseases in a Rural Region of Brazil

Prevalência de Doenças Neurológicas em Uma Região Rural do Brasil

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Abstract

The World Health Organization recommends identifying the most prevalent diseases in each developing country or region to promote the optimal use of health services. Few studies have analysed the prevalence of neurological diseases in developing countries, especially in tropical regions. This study aims to describe neurological syndromes and tropical neurological diseases encountered in the mid-northern Mato Grosso region of Brazil. This study represents a retrospective, descriptive evaluation of the demographic and clinical data of patients 15 years old and above living in the region and analyzing information regarding neurological diagnoses identified in the sample. In 2008, 1,402 patients were referred to neurological consultations. The mean age of the adults was 38 years; the study included slightly more women (52.2%) than men. The most common syndromes were headaches (32.2%) and epilepsy (16.3%). No tropical disease was found in our sample, and according to sanitary authorities, the number of related notifications was lower than the expected for a tropical region. The present study is the only study conducted to date in a rural region of Brazil using outpatient evaluations to define the frequency of neurological diseases. The prevalence of tropical diseases in this region is lower than the expected.

Keywords: Health Services. Headache. Epilepsy.

Resumo

A Organização Mundial de Saúde - OMS recomenda a identificação das doenças mais prevalentes nos países ou regiões em desenvolvimento, a fim de promover melhorias direcionadas nos serviços de saúde locais. Poucos estudos analisam prevalência de doenças neurológicas em países em desenvolvimento, especialmente em regiões tropicais. Este artigo descreve síndromes neurológicas e doenças neurológicas tropicais identificadas na região do Médio Norte de Mato Grosso, Brasil. Trata-se de estudo retrospectivo descritivo, analisando dados clínicos e demográficos de pacientes com mais de 15 anos de idade que moram na região, assim como os diagnósticos neurológicos identificadas na amostra. Em 2008, 1.402 pacientes foram encaminhados a consulta neurológica, sendo a média de idade de 38 anos com leve predomínio do sexo feminino (52.2%). Síndromes neurológicas mais frequentes foram cefaleia (32.2%) e epilepsia (16.3%). Nenhuma doença neurológica tropical foi identificada na amostra e, de acordo com dados oficiais da vigilância sanitária local, a notificação destas foi abaixo do esperado para uma área de clima tropical. O presente estudo é a única publicação brasileira com dados coletados em área rural no Brasil, utilizando pacientes acompanhados em ambulatório de neurologia, para definir a frequência de doenças neurológicas, que estão abaixo das taxas esperadas para a região.

Palavras-chave: Serviços de Saúde. Cefaleia. Epilepsia.

1 Introduction

The World Health Organization - WHO recommends identifying the most prevalent diseases in each developing country or region to promote the optimal use of health services and implement prevention and treatment policies with the aim of reducing socioeconomic impacts¹.

The designation by the WHO of “tropical diseases” refers to infectious diseases that proliferate in hot and humid climatic conditions². Tropical diseases are also described as diseases occurring in colonised, exploited and poor populations, principally in the tropics, or diseases that occur in unhealthy, unhygienic regions of the world, where all forms of infectious diseases proliferate³. According to

Camargo 2008, biogeographical fate and underdevelopment are the causes of tropical diseases³. Tropical neurology focuses on neurologic disorders, most of them infectious, that are endemic in developing countries but most frequently are being recognized specially in developed countries as a result of foreign travel and migration⁴. Thereby, we intend to list the neurological diseases that are more prevalent in a tropical region.

Neurological diseases are believed to represent between 6 and 15% of all healthcare consultations irrespective of geographical area or ethnic group^{5,6}. Possible questions to be investigated concern the existence of differences in the distribution of neurological diseases in tropical countries,

the frequency of neurological diseases in industrialised and developing countries, and the effect of the environmental, biological, and socioeconomic conditions on the different populations.

Brazil is a developing country situated predominantly in the tropics. The mid-northern region of the state of Mato Grosso is located in the central region of the country. The predominant vegetation in the region is the savannah, and the climate is tropical with high temperatures and abundant rainfall. The aim of this study was to describe neurological syndromes and tropical neurological diseases encountered in the mid-northern Mato Grosso region of Brazil.

2 Material and Methods

A descriptive, retrospective study was conducted to analyse outpatients series over 15 years of age between January and December 2008 at the Maracanã Centre for Integrated Healthcare (MCIH), which is under contract to the Barra de Bugres city council in Mato Grosso state, Brazil. This study was approved by the ethics committee of the University of Cuiabá under number 2009/10.

Patients lived in the towns of Barra do Bugres, Denise, Campo Novo dos Parecis, Porto Estrela, Brasnorte, Sapezal and Nova Olímpia, which are part of the healthcare consortium of the mid-northern region of Mato Grosso. Geographical, demographic, and socioeconomic data of these cities are similar and show high levels of human development and *per capita* income and as well as low illiteracy rates across the region.

Regional neurological healthcare is provided by periodical outpatient consultations at MCIH, and appointments scheduled locally by the Consortium. All patients in this study were referred for treatment at MCIH. The Municipal Health Department guarantees access to the following supplementary tests: blood tests, electroencephalogram, X-ray, ultrasonography and computed tomography, while the State Health Department provides more expensive drugs and magnetic resonance imaging.

All patients were evaluated by the principal investigator (HHS), which has more than ten years' experience in providing follow-up care for this population. Patients are referred to the service by local physicians of various specialties: gynaecologists, paediatricians, general practitioners, cardiologists, occupational health specialists and healthcare agents employed by the Family Health Programme (FHP), which provides coverage for approximately 75% of the resident population.

Demographic and clinical data were obtained by reviewing the patients' medical charts. Diagnoses were defined in accordance with the International Classification of Diseases (ICD-10) and classified as migraines and other headaches (G43-44), epilepsy (G40), degenerative diseases (G30-32), movement disorders (G20, G24-25), cerebrovascular diseases (CVD) (I60-I69), dorsopathies (M40-M54), peripheral

neuropathies (G50, 51, 52, 56, 57, 62), syncope (R55), dizziness and giddiness (R42) and injuries to the head (S00-09). Psychiatric diseases or diseases involving other systems were classified as "others". Cases under investigation or with non-conclusive diagnoses were classified as being "under investigation".

The incidence of tropical diseases, such as tuberculosis, malaria, leprosis, leishmaniosis, dengue and syphilis, and some of neurological tropical disease, was extracted from the local sanitary authorities' annual report.

3 Results and Discussion

In 2008, there were 1,402 neurological consultations, including 663 (47.2%) adults and 739 (52%) children, which corresponded to 4.2% of all the 33,291 medical consultations carried out at MCIH. The mean age of adult patients was 38 years (range 16-98 years), and there were slightly more women (52.2%) than men. Stratification according to gender and age showed that prior to 60 years of age, the male-to-female ratio was 1:1, whereas after 60 years of age, the proportion was 1:2. Distribution according to age group and gender is shown in Figure 1.

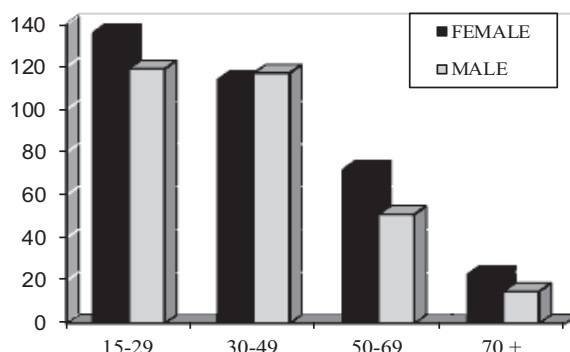


Figure 1: Distribution of the sample population according to age in years and gender.

The most common groups of diseases were headache (32.2%) and epilepsy (16.3%). Table 1 lists and differentiates the principal groups of neurological diseases by age.

Table 1: Principal neurological diseases according to age group (in years).

Classification	16-29	30-49	50+	Total
Headache	111	72	31	214
Epilepsy	49	43	17	109
Vertebral column diseases	16	24	6	46
Peripheral neuropathies	12	7	13	32
Traumatic brain injuries	19	15	2	36
Cerebrovascular diseases	3	10	16	29
Mental retardation	26	1	0	27
Dementias	0	0	22	22
Parkinson's disease	0	0	20	20

The incidences of “tropical diseases” were as follows in the local sanitary authorities’ annual report: tuberculosis (0.5/1,000), malaria (0.02/1,000), leprosy (0.72/1,000), leishmaniasis (0.6/1,000), dengue (2.91/1,000) and syphilis (0.14/1,000).

According to the WHO, Brazil is one of the countries in which new cases of the majority of the 17 listed tropical diseases were registered in 2010². Although the mid-northern region of Mato Grosso is a rural region with a tropical climate, no case of acute infectious disease or neurological complications of tropical disease was found in this series. When comparing local sanitary agency data with publications from other tropical regions of Latin America and Asia⁷⁻⁹, the incidence of tropical diseases in this region of Mato Grosso is indeed low, ranging from 36 to 240/100,000.

The authors decided not to mix the analysis of paediatric and adult results to ensure that the data could be properly interpreted for each clinical population. The results obtained in the paediatric population will be presented in another publication.

The Mato Grosso economy is based on agriculture and cattle. The region is considered the granary of Brazil because of its extensive production of soya beans, cotton and sugar. Mato Grosso is also a major ethanol supplier. The socioeconomic level, human development index (HDI), and per capita income are all above the national average, justifying the similarity between the profile of neurological diseases in this tropical region and that of developed countries. Headache, cognitive disorders/dementias, peripheral neuropathies and epilepsy were the principal motives behind neurological consultations, as reported in studies conducted in Europe⁹⁻¹³. However, in Bolivia, Mozambique, India and Ethiopia studies, epilepsy, disorders resulting from injury or infection, polymyositis/tropical myositis, mental retardation and poliomyelitis were the most prevalent diseases^{8,9,14-16}. Poliomyelitis, for example, was eradicated in Brazil more than thirty years ago. Thus, this series resembling the prevalence of developed countries more than that of undeveloped countries.

Analysis of the outpatient medical records showed that 4.2% of all consultations in 2008 by all physicians that serves at MCIH had been referred to neurological consultations. Headache was the most common diagnosis in the adult population, representing approximately one-third of all consultations. This finding is in agreement with the population-based studies published over the past 10 years with the exception of hospital-based series, in which the principal cause of admission to the hospital was cerebrovascular disease^{17,18}. In the present series, cases of CVD represented 4.3% of all inpatients cases studied and involved follow-up consultations.

All patients with acute cases or sequelae that required neurological assistance were referred to the author (HHS) as the only neurologist in this region at the time. With respect to other groups of diseases, the distribution according to

age group was similar to that reported in other series, with headache and epilepsy being the most common disorders up to 60 years of age, and dementia and Parkinson’s disease being most common in patients over 60.

The epidemiological studies conducted in different regions of Latin America have involved different designs. Studies conducted in hospital-based samples, in which the reason for hospitalisation was analysed^{14,17,19}, do not reflect the actual situation of the local population, since more than 90% of neurological diseases can be treated on an outpatient basis with no requirement for hospitalisation, thus there is a bias in these studies^{13,20}.

In Bolivia, a study conducted with a population in Chiquitanos²¹ revealed a high incidence of tropical diseases in an isolated region with severe economic and sociocultural problems. These findings were notably similar to the results found in a study conducted in Ethiopia⁸. These data support the thesis defended by Camargo³ that “sanitary conditions and not just climate are responsible for the dissemination of tropical diseases”. The profile of the neurological diseases identified in the mid-northern region of the state of Mato Grosso does not fit the expected profile for a tropical region. In fact, this region is one in which the human development index (IDH) is well above the average for Brazil, per capita income is high when compared to the Brazilian average, and there is a low percentage of individuals with less than one year of schooling living in the region.

In 1994, in another province of Bolivia (Cordillera), Nicoletti *et al.*²² trained healthcare agents to conduct the initial phase of a door-to-door survey by applying the modified screening criteria of the WHO to identify potential cases of nervous system disorders, which were later referred for neurological evaluation. The principal symptoms identified by the authors were impaired consciousness followed by sensory changes in limbs, uncontrolled movements of the limbs, and paralysis or weakness of the limbs. Based on those symptoms, we infer that epilepsy and syncope may be prevalent in that population.

In Colombia, three prospective door-to-door studies were conducted in accordance with the methodology suggested by the WHO neuroepidemiology team, and adapted by a regional group of neuroepidemiologists. These studies indicated headache as a principal diagnosis followed by peripheral neuropathy and epilepsy in decreasing order of prevalence²³⁻²⁵.

In Libya, a literature review evaluated data from previous publications on the prevalence and incidence of neurological diseases¹⁰. The study identified cerebrovascular disease followed by Bell’s palsy, infections of the central nervous system and epilepsy as the most prevalent pathologies, thereby describing the hospital profile of the sample populations, and the characteristics of diseases prevalent in developing countries. This finding is in contrast to the present series, in which no neurological infection or sequela resulting from infection was identified.

A strong similarity was found between this sample and the results of the studies conducted in developed countries, such as Spain, for example, or even Chile, one of the most highly developed countries in South America. In addition to the data already presented, it is noteworthy that according to the 2008 census, 77.1% residents in the state of Mato Grosso evaluated their own state of health as very good or good²⁶. This fact may be attributable to the high schooling index, HDI, and per capita income of the region, which also resemble those of developed countries and are higher than those of most of the other Brazilian states.

Door-to-door studies are required to identify patients who have not yet been referred for neurological consultation, as well as to evaluate the effect of environmental, socio-cultural and health conditions. Considering the design of this study, we cannot analyze neurocysticercosis, despite the high frequency of headache and epilepsy cases in this sample. Therefore, we believe that a second phase will require a case-control study, as well as incorporating radiologists on staff, to better evaluate cases of neurocysticercosis.

We must also investigate neurological complications of systemic and/or chronic diseases. Therefore, we believe that this is the beginning of a process of community-based research to be implemented in this region.

4 Conclusion

The present study is the only study conducted to date in a rural area using outpatient evaluations to define the frequency of neurological diseases in Brazil, and this series resembling the prevalence of developed countries more than that of undeveloped/developing countries. The identification of the prevalence of neurological diseases allows for the healthcare sector planning. A curriculum could be elaborated for courses, focusing on local healthcare that pinpoint the actual needs of the population based on statistical data.

Nevertheless, door-to-door studies are required to identify patients who have not yet been referred for neurological consultations, in order to analyse the interference of other conditions, such as family, sanitation, environmental and sociocultural factors, as well as neurological complications of any systemic or chronic diseases that may be present but have not yet been identified.

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