

Review

Epidemiological profile of epilepsy in low income populations

Camilo Espinosa-Jovel^{a,b,*}, Rafael Toledano^{b,c}, Ángel Aledo-Serrano^b,
Irene García-Morales^{b,d}, Antonio Gil-Nagel^b

^aHospital Occidente de Kennedy, Servicio de Neurología, Bogotá, Colombia

^bHospital Ruber Internacional, Servicio de Neurología, Programa de Epilepsia, Madrid, Spain

^cHospital Universitario Ramón y Cajal, Servicio de Neurología, Madrid, Spain

^dHospital Universitario Clínico San Carlos, Servicio de Neurología, Madrid, Spain



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ABSTRACT

Epilepsy is a global disease with an unequal distribution. About 80% of the affected individuals reside in low and middle income countries. The incidence and prevalence of epilepsy in low income populations is higher than in the rest of the world, this is partly explained by some risk factors such as head trauma, perinatal injury and CNS infections, which are more common in poor regions, especially in rural areas. Epilepsy is considered a treatable condition with high rates of therapeutic response. About three fourths of patients achieve control of the disease with the use of antiepileptic drugs, however, despite this benign prognosis, over 75% of patients from low income populations do not receive treatment at all. The cultural beliefs, the inequity in the distribution of public health services, the inadequate supply of antiepileptic drugs, the low number of neurologists involved in the attention of epilepsy, and the social stigma, are the main reasons that increase the treatment gap and the burden of disease in low income populations with epilepsy. We conducted a narrative review regarding the epidemiology of epilepsy in low income populations by searching PubMed, EMBASE, Google Scholar and thoroughly examining relevant bibliographies. This review aims to summarize the main epidemiological aspects of epilepsy in LMIC, emphasizing on incidence, prevalence, socio-demographic profile, TG, social stigma and QoL.

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1. Introduction and global perspective

Epilepsy is one of the most common chronic neurologic disorders, affecting almost 70 million people worldwide [1]. Although epilepsy is a global disease, it has an unequal distribution, and about 80% of the affected individuals reside in low and middle income countries (LMIC) [1]. Epilepsy is considered a treatable condition with high rates of therapeutic response. About 70% of patients with epilepsy are controlled with antiepileptic drugs (AED) [2]. However, despite this apparently “benign” prognosis, 73.3% of patients with active epilepsy in rural areas of LMIC do not receive treatment or receive it inappropriately [3]. This concept is known as epilepsy treatment gap (TG), and is associated with several psychosocial complications such as impaired quality of life (QoL), social stigma and labor discrimination [3]. The TG is also associated with higher rates of mortality,

and in some LMIC of Africa, the standardized mortality ratio can be up to six times higher than in developed countries [4]. The TG seems to depend on the per capita income, with a significant trend towards larger epilepsy treatment gaps in countries with lower incomes [3].

According to the *global burden of disease study* (GBD) published in 2010, which intended to describe the collective disease burden produced by all diseases around the world, epilepsy represents around 0.7% of the overall global burden of diseases measured in disability adjusted life years (DALYs) [5]. DALYs are an indicator of burden of disease, and are composed by the measurement of years of life lost due to premature mortality (YLL) and years lived with disability (YLD). Epilepsy ranks as the 36th leading cause of DALYs globally, and in some LMIC of Latin-America and western Sub-Saharan Africa, ranks as the 21th and 14th leading cause of DALYs respectively [5]. Among neurological disorders, epilepsy represents the second most disabling disease as measured in YLD only surpassed by migraine, and in some LMIC of Latin America, ranks as the 9th leading cause of YLD [6]. The World Bank ranks epilepsy in the top five of all non-communicable diseases for cost-effectiveness in treatment. One study found that in some regions of sub-Saharan Africa and South East Asia, the availability in primary care

* Corresponding author at: Universidad de la Sabana, Medical School, Neurology Postgraduate Department, Bogotá, Colombia.

E-mail address: camilo_jovel@hotmail.com (C. Espinosa-Jovel).

¹ Permanent address: Avenida 1 De Mayo # 40b-54, Bogotá, Colombia.

of older AED (phenytoin and phenobarbital) with a coverage of 50%, could save 1360 annual DALYs per each million population [7]. Even though epilepsy is a treatable condition with a highly cost-effective treatment, there are several circumstances in LMIC that can perpetuate the TG and increase the burden of disease.

For all these reasons, epilepsy must be promoted as a “treatable disease without stigma”, especially in LMIC. This initiative has been implemented for more than a decade through the “Global Campaign against Epilepsy”, with the combined collaboration of the International League against Epilepsy (ILAE), the International Bureau for Epilepsy (IBE), and the World Health Organization (WHO). We conducted a narrative review regarding the epidemiology of epilepsy in low income populations by searching PubMed, EMBASE, Google Scholar and thoroughly examining relevant bibliographies. This review aims to summarize the main epidemiological aspects of epilepsy in LMIC, emphasizing on incidence, prevalence, socio-demographic profile, TG, social stigma and QoL.

2. Incidence, prevalence and socio-demographic profile of epilepsy in LMIC

The incidence and prevalence of epilepsy in LMIC is higher than in the rest of the world. Fig. 1. The median lifetime epilepsy prevalence for developed countries is 5.8 per 1,000, whereas in rural areas of developing countries is 15.4 per 1,000 [1]. The incidence of epilepsy is 45/100,000/year in high income countries, compared to 81.7/100,000/year in LMIC [8]. The difference of prevalence and incidence among high income countries and LMIC is partly explained by some risk factors such as head trauma, CNS infections and perinatal injuries, which are more common in poor regions, particularly in rural areas [9]. Traumatic brain injury (TBI)

is a common cause of epilepsy. Some studies have shown an incidence of 180–250/100,000/year with higher values in individuals living in poor regions and in some LMIC such as South Africa [10]. The high incidence of TBI in those regions, could be the result of a poor transport infrastructure. It could also be the consequence of violent attacks related with armed conflicts [10]. Central nervous system infections are one of the main risk factors for seizure disorders, and in LMIC represents the second leading cause of epilepsy [11]. Among CNS infections, neurocysticercosis represents one of the most common causes of epilepsy in LMIC, particularly in rural areas where hygiene and sanitary conditions are precarious. For instance, a study performed in a rural area of Ecuador, showed that 33% of patients with epilepsy had serological and imagenological evidence of neurocysticercosis [11]. Some studies conducted in Mexico and Guatemala have found similar results [12,13]. Besides TBI and CNS infections, perinatal brain damage related to poor prenatal care and injuries during the labour, is one of the main risk factors for epilepsy in LMIC [14]. A study performed in Tanzania showed that adverse perinatal events were strongly associated with epilepsy (OR 14.9, 95% CI 1.4–151.3). The authors of the study suggested that epilepsy can be prevented in a significant proportion of children with better antenatal and perinatal care [14]. Another study performed in Southern India found similar results [15].

Mortality in epilepsy is a cause of growing concern; compared to the general population, patients with epilepsy have up to a threefold increase in mortality. In these cases death frequently is unwitnessed and no other causes can be identified, a situation referred to as sudden unexpected death in epilepsy (SUDEP) [16,17]. It is clear that epilepsy is associated with premature mortality, especially in children and in LMIC, with values of

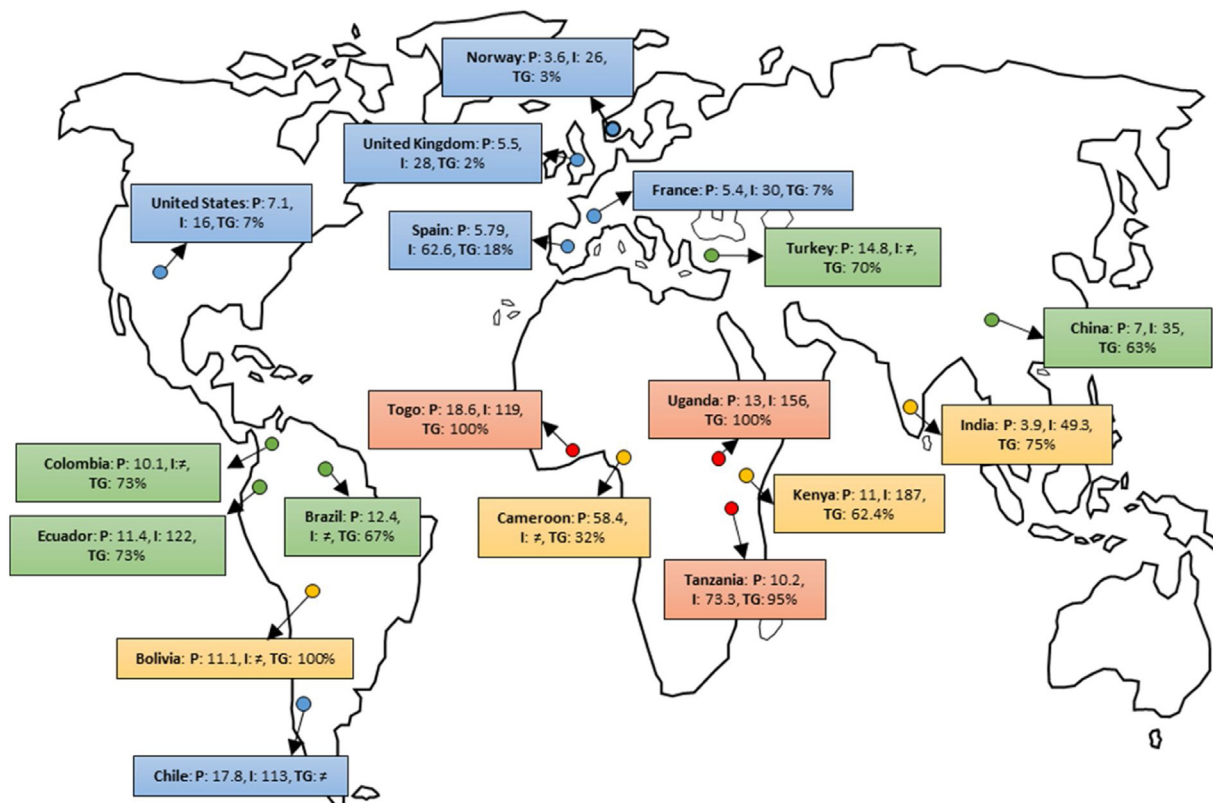


Fig. 1. Differences in prevalence, incidence and treatment gap in epilepsy among several countries. The information shown only includes data from some studies selected by the authors [3,24,32,58–66]. The color of the circles represents the World Bank country classification according to the gross national income per capita; red = low income, yellow = lower middle income, green = upper middle income, blue = high income. **P** = prevalence of active epilepsy, number of cases per 1000 people. **I** = Incidence of epilepsy, number of new cases per 100,000 people/year. **TG** = treatment gap expressed as a percentage. ≠ No data.

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