

# Epidemiology of Epilepsy in Pakistan: review of literature

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## Abstract

**Objective:** To review literature pertinent to the epidemiology of epilepsy in developing countries with special reference to Pakistan.

**Methods:** All the studies published in medical journals related to epilepsy in Pakistan were systematically reviewed. Important findings from various studies are summarized.

**Results:** Overall prevalence of epilepsy in Pakistan is estimated to be 9.99 per 1000 population. Highest prevalence is seen in people younger than 30 years of age. A slight decrease in prevalence is noted between the ages of 40 and 59. Higher prevalence is observed in rural population. Etiology of epilepsy is more commonly identified in pediatric population. Epilepsy was considered idiopathic in 21 to 76% cases. Only 27.5% epileptic persons in urban areas and 1.9% in the rural areas were treated with AEDs. The burden of epilepsy is not fully evaluated and understood. Generalized seizures were the most common seizure type noted. Knowledge about epilepsy and its care is extremely low.

**Conclusion:** Epilepsy is a common medical problem in Paksitan, more prevalent is rural population. The majority of people with epilepsy are treated inadequately or inappropriately (JPMA 53:594;2003).

## Introduction

Epilepsy is amongst the most common serious neurological conditions. The global prevalence of epilepsy is generally taken as between 5 and 10 cases per 1000 persons.] ,. Studies have shown various differences in epidemiological patterns of epilepsy around the world. | Few epidemiological studies of epilepsy are available from Pakistan.3-5. This subject has not been thoroughly investigated. The recent estimates of population of Pakistan exceed 140 million, whereas the total number of trained neurologists in Pakistan is estimated to be less than 30 (verbal communication at the annual meeting of Pakistan International Neuroscience Society (PINS) 2001. There are approximately 350 neurologists of Pakistani origin in North America (Data collected by PINS from various directories of neurologists 2001). Based on the available data, it is estimated that 1.38 million people are suffering from epilepsy in Pakistan, which makes it one neurologist available for every 46200 sufferers of epilepsy.

## Methods

Literature search was done using internet resources in the first week of August, 2003. 'Epilepsy in Pakistan' and 'Epilepsy in developing world' were used as search terms on [www.ncbi.nlm.nih.gov/entrez/au](http://www.ncbi.nlm.nih.gov/entrez/au) e-y fcgi, "whereas Tpilepsy' tias used as watch tenn oaa wWw.pakmedinet.co.in. All the articles with reference to epidemiological aspects of epilepsy in Pakistan published until June 2003 were obtained for review. Additional relevant literature about epidemiology of epilepsy in developing world was also reviewed.

## Results

Eight papers were identified that addressed the epidemiology of epilepsy in Pakistan. These papers are briefly summarized in the table.

### Incidence and Prevalence

To the best of our knowledge no incidence studies on epilepsy are available from Pakistan. However, information on prevalence from various studies gives good insight into the seriousness of this disorder as a public health and social issue. Prevalence of epilepsy in general population is estimated to be 9.99 in 1,000 population. *In* rural areas of Pakistan the burden of epilepsy is twice of what is observed in urban areas (14.8/1000 Vs 7.4/1000).<sup>6</sup> Prevalence of epilepsy *in* childhood varied from 15.5 to 23 per 1000 children. Epilepsy was diagnosed in 9% of the attendees of the faith healers.'

### Age and Sex Distribution

One population-based study including all age groups and one pediatric study did not show any significant gender difference.e-10 However, two studies showed high male to female ratio, 2.4 to 3:1.34 Epilepsy was most prevalent in younger population (<30 years of age). Highest prevalence rates were noted between the ages of 20-403. <sup>6</sup> The prevalence between the ages of 40-60 was the lowest. A slight increase in prevalence was noted in the group aged >b0 years. The mean age of onset was 13.3 years.

### Seizure 'type

Generalized seizures were the most common seizure type noted.3,5,6 The differentiation between primary generalized seizures and secondary generalized seizures was

| Ref. No. | Author        | Type of Study   | Setting              | Year of Publication | Number of patients                           | Age group  | Population         |
|----------|---------------|-----------------|----------------------|---------------------|--|------------|--------------------|
| 3        | Khan et al.   | Prospective     | Hospital based       | 2002                | 100 consecutive cases                        | Any        | Rural              |
| 4        | Afzal et al.  | Prospective     | Hospital based       | 1999                | 100 cases                                    | 1-12 years | Urban              |
| 5        | Aziz et al.   | Cross-sectional | Community based      | 1991                | 994 surveyed, 23 diagnosed with epilepsy     | 3-9 years  | Rural              |
| 6-8      | Aziz et al.   | Cross-sectional | Community based      | 1994                | 24,130 surveyed, 286 diagnosed with epilepsy | Any        | Rural and urban    |
| 9        | Saeed et al.  | Cohort          | Native faith healers | 2000                | 139 surveyed, 17 diagnosed with epilepsy     | Any        | Unknown catchments |
| 10       | Durkin et al. | Cross-sectional | Community based      | 1992                | 6365 screened, 15.5% diagnosed with epilepsy | 2-9 years  | Rural and Rural    |

somewhat difficult. Primary generalized seizures were reported in 52 to 70 percent cases. Secondly generalized seizures were reported in 15 to 25 percent cases. Simple partial seizures were reported in 5 to 9 percent cases. Complex partial seizures were reported in 5 to 12 percent cases.

#### Febrile Seizures

Cases with febrile seizures when clearly identified were excluded from the prevalence studies. However, at times it was difficult to differentiate from simple febrile seizure and epileptic seizures precipitated by fever or epileptic seizures occurring during the course of febrile illness. One hospital-based study reported 24% febrile seizures among all children evaluated for seizures.<sup>4</sup> In another study, prevalence of febrile seizures was reported 62.8 per 1000 persons.<sup>10</sup> Strong association between febrile seizures and subsequent epilepsy was found in Pakistan.<sup>10</sup>

#### Etiology

Epilepsy was considered idiopathic in 21 to 76% cases. The presumed etiology varied between different age groups. Khan et al.<sup>j</sup> reported history of perinatal complications in 76% of their sample. In the 100 patients studied by Afzal et al.<sup>a</sup> Twenty four patients had either meningitis or encephalitis, 24 patients had febrile seizures, 11 patients had hypoxic ischemic encephalopathy, 11 patients had mental retardation and chromosomal abnormalities, 21 patients were considered to have idiopathic epilepsy, whereas the rest had other metabolic or structural etiologies. Aziz et al.<sup>6,8</sup> have reported meningitis in 3.3% of cases; encephalitis in 6.6% of cases, neonatal jaundice in 7.5% cases, neonatal

convulsions in 14.3% cases, hypertension in 5.4% cases and ischemic heart disease in 1.3% cases. In their study, 61.6% of cases were considered to have idiopathic epilepsy.

#### Family History

A positive family history of non-febrile recurrent seizures was reported by 32% of epileptic persons, but this could not be confirmed.<sup>b</sup> In one pediatric study two families with involvement of multiple siblings were identified.<sup>c</sup>

#### Treatment

Only 27.5% epileptic persons in urban areas and 19.0% in the rural areas were treated with AEDs.<sup>11</sup> Another study showed a treatment rate of 38.4%.<sup>10</sup> It is estimated that >80% of individuals with epilepsy living in developing countries remain untreated.<sup>h,12</sup>

#### Disability and Mortality

Epilepsy appeared to disrupt housecleaning, washing clothes, cooking meals, and washing utensils to an equal extent. Epilepsy affected educational plans in 20.3% and grades in 19.6% subjects.<sup>c</sup> Employment ratios were not available. Durkin et al.,<sup>10</sup> estimated at least some level of disability from seizures in 66.6 percent cases. No data on mortality related to epilepsy were available.

#### Social Attitude and Stigmatization

Epilepsy was taken to be contagious by 6.4% patients whereas 8.1% thought that it could lead to other ailments and 20.7% felt that people with epilepsy should not marry. Interestingly only 3.1% attributed their epilepsy to supernatural causes.<sup>?</sup>

## Psychiatric Co-morbidity

Saeed et al., diagnosed 61% of the attendees of faith healers with a disease than can be classified according to DSM-III-R. Only 9% were diagnosed to have epilepsy.<sup>9</sup> Unfortunately no data is available for the co-morbid psychiatric conditions in those who suffer from epilepsy.

## Discussion

Epidemiological studies of epilepsy are affected by methodology. Major limitations are differences between the definition and classification of epilepsy, inclusion criteria, case ascertainment methods, selection bias, underreporting, small portions of populations studied, descriptive rather than analytic nature of the studies, high cost of studies, limited resources, geographic and cultural differences, political and social atmosphere and variant public health priorities.<sup>1,2-6,10-15,16</sup> More than 20 epidemiological studies have been reported from India<sup>5,17</sup> whereas we could identify 5 papers from Pakistan which described the epidemiology of epilepsy. The literature is also scant from Bangladeshis

The global prevalence of epilepsy is estimated at 5 to 10 cases per 1000 persons, with ranges from 1.5 to 57 per 1000.<sup>1,2,10,13-15</sup> Lifetime prevalence rates are much higher than prevalence rates of active epilepsy, and it is generally agreed that up to 5% of a population will experience non-febrile seizures at some point of life.<sup>1,2</sup> The prevalence of epilepsy in Pakistan was found to be higher compared to India.<sup>6,12,17,19</sup> A higher prevalence was found in rural populations of Pakistan and Turkey, whereas no statistically significant difference was found between rural and urban populations in India.<sup>6,12-17,19</sup> This is somewhat a surprising finding as the demographics of the two countries with respect to rural and urban distribution does not vary a lot. In both countries, more than two-thirds of the people live in rural communities.

Global incidence is estimated between 28.9 to 70 per 100,000 person-years.<sup>13</sup> Overall the incidence studies are too rare in developing countries.<sup>14</sup> Higher incidence have been reported from developing countries, ranging from 100-190 per 100,000/year.<sup>1,2,11,16</sup> One study from India found incidence of 49.3 per 100,000 population in one year.<sup>19</sup> No incidence studies are available from Pakistan.

The recent estimates of population of Pakistan exceed 140 million, whereas the total number of trained neurologists is estimated to be less than 30 (verbal communication at the annual meeting of Pakistan International Neuroscience Society (PINS), 2001. This makes a ratio of one neurologist for approximately 4.6 million people. The current strength of neurologists in India is 650.<sup>10</sup> It is of interest that there is a far greater number of Pakistani and Indian born neurologists in North America and Europe. An estimate suggests that there

are approximately 350 neurologists of Pakistani origin in North America. (PINS meeting 2001). This high disparity between the supply and demand of neurologists also puts great pressure on the neurologists in Pakistan and it directly and indirectly affects patients with epilepsy.

To deliver better care to the population suffering from epilepsy, drastic measures will be required. However, with limited personnel and resources, practical and efficient programs will be necessary. In his recent review of epidemiology of epilepsy, Sander<sup>1</sup> suggested little justification for further cross-sectional studies of prevalence. He emphasized long-term prospective, population-based (rather than clinic-based) outcome studies, with special attention to diagnostic accuracy, and full case ascertainment. For nations with limited resources, some of the examples of epilepsy control programs are the district model<sup>10</sup> and sub-district model.<sup>19</sup> Both of these programs have demonstrated successful cost-effective ways of delivering long-term epilepsy care.

As declared in the Asian-Oceanian Declaration on Epilepsy,<sup>1-1</sup> there is a strong need to educate people with epilepsy, their families and the general public about epilepsy as a widespread, non-communicable, and treatable chronic brain disorder; educate and train health care and other relevant professionals about epilepsy, its prevention, and its treatment; promote and support research into the basic processes, clinical aspects, and psychosocial consequences of epilepsy; promote social integration and eliminate discrimination against people with epilepsy; include epilepsy in the national health plans; encourage cooperation between modern medical, traditional and other healing systems for the treatment of epilepsy; encourage regional and global cooperation in dealing with epilepsy. Given a very high number of Pakistani neuroscientists who live and practice in developed nations, the authors request their active participation in the care of patients with neurological problems in Pakistan.

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