



Prevalence and clinical characteristics of active epilepsy in southern Han Chinese



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ABSTRACT

Purpose: To investigate the prevalence and clinical characteristics of active epilepsy in southern Han Chinese.

Method: A door-to-door survey about epilepsy was conducted in communities identified by random cluster sampling among 20 villages and 3 communities of Yueyang city. A questionnaire for epilepsy based on the World Health Organization screening questionnaire was used. A final diagnosis of epilepsy was made by neurology specialists with the support of head magnetic resonance imaging (MRI), computed tomography (CT), and electroencephalography (EEG) if available. The prevalence, clinical characteristics, and treatment gap were analyzed in patients with active epilepsy within the past year and the past 5 years.

Results: Active epilepsy was identified in 91 patients within the past year and 117 patients within the past 5 years. The one-year prevalence was 2.8‰, and the five-year prevalence was 3.7‰. The prevalence for epilepsy active within the last year and the last five years was significantly higher in rural areas than in urban areas ($P < 0.05$). Secondary generalized tonic-clonic seizures (53.8%) were the most common seizure type in patients whose epilepsy had been active in the last year. 34.1% of patients were diagnosed with structural or metabolic epilepsy. The most common cause for epilepsy was cerebrovascular disease (32.3%), followed by traumatic brain injury (29.0%). The treatment gap was 93.4%.

Conclusion: The prevalence of epilepsy active within the last one and five years was higher in rural areas than in urban areas of Yueyang city. A large treatment gap exists in this area and a rational intervention strategy is needed.

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1. Introduction

Epilepsy has been recognized since the earliest medical writings and is one of the most commonly diagnosed neurological conditions. However, the epidemiology of epilepsy is still not fully understood due to its heterogeneous nature and complex etiologies.^{1,2} In addition, regional differences in the etiologies and

epidemiological features of epilepsy have been widely reported in literature.^{3,4} Numerous studies have identified genetic risk factors for epilepsy.⁵ Therefore, studies focusing on isolated geographic areas with unique genetic and environmental factors may be important for understanding the etiology and epidemiology of epilepsy.

Previous studies of epilepsy in China revealed regional differences in prevalence. For example, Li et al. reported a 4.4% lifetime prevalence of epilepsy in the urban areas of six cities in China.⁶ Wang et al. reported a 7.04% lifetime prevalence of epilepsy in the rural areas of five provinces in China. Regional differences in the prevalence of active epilepsy have also been reported. For instance, the 5-year prevalence of active epilepsy is

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5.4% in five provinces of China,⁷ 3.9% in Hong Kong,⁸ 4.4% in a rural area of Vietnam⁹ and 2.9% in a rural area of Tanzania.¹⁰ Yueyang is a medium-sized city located in southern China and has the lowest percentage of ethnic minorities in the country. 99.84% of the population of Yueyang city are Han Chinese and only 0.16% are ethnic minorities. Thus, people living in this area represent the typical genetic background of southern Han Chinese.

Patients with active epilepsy are the main group of interest in current epidemiological studies. Reports on prevalence and clinical characteristics of active epilepsy, especially on 1-year active epilepsy are few. Only a handful of studies on the prevalence and clinical characteristics of active epilepsy in Han Chinese available in literature are reported in English. In this study, we conducted a well-controlled epidemiological survey of epilepsy in both the urban and rural populations of Yueyang city and analyzed the prevalence and clinical characteristics of cases with 1-year and 5-year active epilepsy.

2. Materials and methods

2.1. Population

Yueyang city has jurisdiction over three districts and six counties with a total population of 5.5 million. Random cluster sampling was performed at 23 survey points and 4 survey units in 20 villages and 3 communities. These villages and communities were selected because all residents are Han Chinese. The inclusion criterion was that residents must be currently living in the surveyed area with household registration and have temporarily left the area for no more than 1 month.

2.2. Epidemiological survey

This study was approved by the Human Research Committee of Yueyang City and Xiangya Hospital. The committees check studies for both scientific content and potential ethical issues. Written informed consent forms were obtained from all participants or their guardians. This study was conducted in two stages in accordance with the Declaration of Helsinki. In the first stage, well-trained local healthcare workers conducted a door-to-door screening of all residents. The questionnaire is a standard questionnaire for epidemiological studies of epilepsy developed from the WHO (World Health Organization) screening questionnaire that includes 13 questions.¹¹ When one or more positive signs of epilepsy were discovered, potential patients were further validated by interviewing the patient's family members and witnesses. In the second stage, patients were directly interviewed by experienced neurologists, and a final diagnosis of epilepsy was made with the support of available MRI, CT, or EEG data. Standardized treatments were given to patients who were diagnosed with epilepsy but did not previously receive standardized treatment. The standardized treatment was defined as treatment following the internationally accepted norms for the treatment of epilepsy.¹² All difficult-to-diagnose cases were discussed by experts from the Department of Neurology at Xiangya Hospital, Central South University.

2.3. Standard of diagnosis

Patients were recruited according to the ILAE recommended standard epilepsy diagnosis criteria.¹³ In this study, epileptic seizures and etiology of seizures were defined according to the International League Against Epilepsy (ILAE) classification and Nomenclature Committee Report, 2005–2009.¹⁴ A prevalent case of active epilepsy is defined as a person with epilepsy who had at least two epileptic seizures within the past year regardless of

antiepileptic drug (AED) treatment.^{15,16} People who experienced at least two seizures in the past 5 years were also included in this study. The seizure frequency is divided into low, moderate, and high seizure frequency.¹⁷ Treatment gap was defined as the percent of patients with active epilepsy that had not received optimal, regular AED treatment a week before the survey began.^{15,16} Regular AED treatment follows internationally accepted norms for the treatment of epilepsy.¹²

2.4. Data collection

The patients' gender, age, living area (rural or urban), onset age, frequency, and etiology of epilepsy, family history, and treatment information were collected. The total prevalence of active epilepsy was calculated by the number of cases that had 2 or more non-induced seizures per 1000 investigated individuals. The prevalence of active epilepsy for each variable or characteristic was the number of cases with active epilepsy per 1000 individuals with each variable or characteristic. The patient's data was included in the analysis only when: (1) the patient was Han Chinese with a clear family history indicating no marriage to ethnic minorities within the past 5 generations; (2) the patient had lived in southern China for over 3 generations. The patients with epilepsy that died were not included in this study because epilepsy is a clinical syndrome that is not commonly identified as a cause of death.

2.5. Statistical analysis

A database was established with EpiData 3.02 software, and data were analyzed using SPSS17.0 software. Two-sample χ^2 test was used to compare the prevalence of active epilepsy between different genders and age groups.

3. Results

3.1. General characteristics of the population

A total of 32,059 people (52.9% male, 47.1% female) participated in the door-to-door surveys. 786 (2.45%) individuals had a history of seizures, and 143 (4.46%) individuals were clinically diagnosed with epilepsy. 91 (2.83%) patients were found to have active epilepsy within the past 1 year. 117 (3.65%) patients were identified to have active epilepsy within the last 5 years. Among the 91 patients diagnosed with epilepsy, 60 underwent head MRI/CT scans (38 patients showed abnormalities), and 49 underwent electroencephalogram (EEG) examination (33 patients exhibited abnormal EEG).

3.2. Prevalence of active epilepsy

Table 1 shows the prevalence of active epilepsy within the past year in different genders, areas, and age groups. The prevalence of active epilepsy in the past year was 2.8%. The prevalence of active epilepsy was higher in males (3.12%) than in females (2.52%) but without significant difference ($P > 0.05$). The prevalence of active epilepsy was significantly higher in rural areas (3.7%) than in urban areas (2.0%) ($P < 0.05$). The prevalence of active epilepsy in different age groups was statistically significant ($P < 0.05$). The highest prevalence of active epilepsy was found in the 20–29 years old group (6.3%). 30 cases had an onset age before 9 years old (32.97%), 18 cases had an onset age between 10 and 19 years old (19.78%), and 17 cases had an onset age between 20 and 29 year old (18.68%).

Table 2 shows the prevalence of active epilepsy within the past 5 years. The prevalence of active epilepsy in the past 5 years was 3.6%. The prevalence of active epilepsy was higher in males (4.1%)

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