



Impact of epilepsy on employment in Malaysia

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ABSTRACT

Introduction: Studies on the impact of epilepsy on employment have been extensively performed in European and some Asian countries but not in Southeast Asia such as Malaysia, a country with a robust economy, low unemployment rate, and minimal social security benefits for the unemployed. This study aims to determine the impact of epilepsy on employment in Malaysia.

Methods: Two hundred fifty subjects (52.4% male) with a mean age of 35.2 years were recruited from a tertiary neurology clinic in Malaysia.

Results: Of the 250 subjects, 69.6% were employed full-time, 10.4% employed part-time, and 20.0% unemployed. Furthermore, 42.8% had a monthly income below poverty line, i.e., RM1000 (USD 320). Unemployment was associated with female gender, lower education level, younger age of seizure onset, less responsiveness to first antiepileptic drug (AED), higher seizure frequency and less seizure freedom, and higher total score in seizure severity scale. The age of onset ($p=0.017$), total score in the seizure severity scale ($p=0.018$), and the responsiveness to first AED ($p=0.045$) were the significant predictors of unemployment. Patients with part-time employment had similar education level with those who were unemployed, but they are more likely to be male and married, with intermediate age of seizure onset and seizure severity but with higher seizure frequency. As compared to their age-matched siblings, the patients were more likely to be unemployed (OR 13.1), to be single, and to have lower education level and lower monthly income.

Conclusion: Patients with epilepsy have high unemployment rate in Malaysia despite a robust economy and minimal social security. Besides those who were unemployed, many were in part-time or low-income employment.

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1. Introduction

Epilepsy is one of the common chronic serious neurological diseases present worldwide affecting approximately 50 million individuals. However, epilepsy is often an underappreciated health problem, especially in Asia. People with epilepsy (PWE) suffer from stigmatization and are burdened by a multitude of social, psychological, and economic consequences, which leads to poor quality of life, Malaysian patients with epilepsy not being an exception. Understanding and minimizing the socioeconomic and psychological impacts of epilepsy are therefore important in addition to controlling the seizures.

A prospective study on childhood-onset epilepsy in UK, where participants were followed up from childhood until the mean age of 48, showed that the employment rate was 71% at the mean age of 23 and 59% at the mean age of 48 [1]. Comparatively, in India and Korea, the unemployment rate of PWE was reported as 31–58% [2,3]. However, a multicentered study in Spain on employment in people with epilepsy showed that the employment rate was 58% and the unemployment rate was only 11%, which is similar to the general population [4].

Medical factors play an important role in the employability of PWE. Unemployment was shown to be associated with refractory epilepsy, occurrence of a seizure in the past 12 months, and polytherapy [4]. Antiepileptic drug-related side effects were also part of the reasons for unemployment [2]. Those patients whose seizures were well controlled or in remission, generally, did not report problems with employment [5]. The positive predictive factors of employment were normal intelligence, uninterrupted seizure remission for 5 years, and no history of status epilepticus [1]. Seizure severity, assessed with scales such as the Liverpool Seizure Severity Scale [6], has been shown to affect the quality of life [7–9] and psychological variables, e.g., self-esteem, locus of control, and anxiety [10], but the correlation between seizure severity and socioeconomic status in epilepsy is not known.

Besides medical factors, e.g., seizure frequency and severity, social and cultural factors also limit the employability of people with epilepsy. Malaysia is a newly industrialized country with emerging middle-income economy having a gross domestic product per capita of USD 9700 [11] and good economic growth rate. The unemployment rate is as low as 3%. There are many labor-intensive manufacturing industries and large migrant labor forces from neighboring countries. In addition, the disability allowance in Malaysia is only RM150 (USD 47.60) per month [12], significantly lower compared to that in the West, which

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should result in increased motivation for people with epilepsy to seek employment. However, social stigma and workplace prejudice, which are prevalent in Asia [13] and are affected by the cultural misconception of epilepsy, often prevent a person with epilepsy from being employed despite the Persons with Disabilities Act in Malaysia which was recently established in 2008, with a subsection stating that persons with disabilities shall have the right to access to employment on equal basis with persons without disabilities [14]. Therefore, our aim was to study the medical as well as social factors affecting positively or negatively the employability of PWE in Malaysia, a country with emerging middle-income economy, low unemployment, and a different sociocultural background from the West.

Comparing PWE to the general population may involve too many socioeconomic variables. As we know, there are local factors that might influence the employability of PWE such as the location of the center where the study is performed, the types of patients treated in the specific clinical setting, the urban–rural residency with variation in employment rate and types of employment available, and family background. Taking into account the impact of these local socioeconomic factors, we thought that a direct comparison of the employment status between the patients and their siblings will be more likely to reflect the actual impact of epilepsy on employment. As far as it is known, there has been no previous study comparing the employment status of patients with epilepsy with that of their siblings.

This study aimed to determine the impact of epilepsy in general on employment in PWE, as well as investigate their individual socioeconomic background and how it affected their employment status, using a paired age-matched patient–sibling comparison.

2. Methodology

This was a sub-analysis of a cross-sectional, prospective, questionnaire-driven, hospital-based psychosocial pilot study correlating the clinical and social factors with the employment status in PWE.

Three hundred forty-four subjects with epilepsy for more than 1 year and aged 16 years and above were recruited from the Neurology Clinic and Ward at the University of Malaya Medical Centre, Malaysia. Excluding 48 students, 18 full-time housewives, and 28 retired subjects, 250 subjects were included in this sub-analysis. For each subject in the sub-analysis, demographic profile, socioeconomic background, details of epilepsy, and frequency of seizures over the past one year were recorded. A further subgroup of 64 subjects who have a sibling with age difference not more than 10 years were recruited for patient–sibling comparison. The socioeconomic information of their siblings was obtained using the same demographic questionnaire. This study was approved by a local ethics committee (MEC Ref No: 872.5). Informed consent from patients and their caregivers was obtained.

The Liverpool Seizure Severity Scale [6] was used to determine the seizure severity. This scale is a 12-item questionnaire assessing the ictal and postictal seizure occurrences, e.g., presence of loss of consciousness, drop attacks, sleepiness, and length of postictal confusion. It was initially developed to assess the outcome of antiepileptic medications in clinical trials, but the scale has now been shown to have a strong correlation with quality of life [7–9] and certain psychological variables [10].

Statistical analysis was performed using SPSS version 19.0. The chi-square tests and odds ratios were used to determine the significance and degree of differences in the socioeconomic status between the patients and their siblings. All independent variables were analyzed according to the status of employment, categorized as employed full-time, employed part-time, or unemployed. The chi-square tests were used for univariate analysis of categorical variables. Student's T-tests were used to evaluate the following continuous variables: age, age of seizure onset, seizure frequency, and seizure severity score. Logistic regression was performed on variables that were significant in the univariate analysis. Non-parametric correlation analyses

were performed among the social and clinical factors to determine how the variables correlated with others. Spearman's rho >0.5 was considered a strong correlation, 0.3–0.5 moderate, and <0.3 weak. A hierarchical cluster analysis of the social factors, i.e., the employment, marital, and education status, was performed to demonstrate their relationship in clusters. A *p*-value of less than 0.05 was set as significant unless stated otherwise.

3. Results

Two hundred fifty subjects (52.4% male) aged 16 to 77 years old, with a mean age of 35.2 years, were included in this sub-analysis. The mean age of onset was 19.0 years with a standard deviation of 10.8 years. Of the 250 subjects, 47.6% were Chinese, 27.2% Malay, 22.8% Indian, and 2.4% other races. A total of 56.0% were single and 65.6% had secondary education level or below. One hundred seventy-four of the subjects (69.6%) were employed full-time, 26 (10.4%) employed part-time, and 50 (20.0%) unemployed. One hundred seven of the subjects (42.8%) had a monthly income below the poverty line, i.e., RM1000 (USD 320), and 21 were receiving disability allowance.

3.1. Demographic and medical profiles

As shown in Table 1, the patients employed full-time were predominantly male, married, and more educated compared to the patients who were unemployed. The patients who were unemployed had significantly younger age of seizure onset during their childhood or adolescence compared to those with full-time employment. They were more likely to be symptomatic in etiology and had seizures that failed to improve with at least one antiepileptic drug (AED). In addition, they had higher seizure frequency with less seizure freedom and higher score in the seizure severity scale (Table 2).

The patients with part-time employment had similar education level with those who were unemployed but were more likely to be male (*p*, not significant) and married (*p*<0.05). A total of 76.9% had a monthly income of RM1000 and below. They had a similar clinical profile with the unemployed patients, except with non-significantly younger age of onset and significantly higher likelihood to respond to the first AED (*p*<0.01).

Logistic regression was performed to determine the impact of gender, education level, age of seizure onset, seizure freedom, responsiveness to first AED, and total score in the seizure severity scale on the likelihood of being employed full-time compared to being unemployed. The full model containing all predictors was statistically significant; χ^2 (6, *n*=224) was 36.42, *p*<0.001. The predictors were responsiveness to first AED (odds ratio, OR 2.19;

Table 1

Demographic profile of people with epilepsy according to the status of employment (*n*=250).

Demographic profile	Employed full-time (<i>n</i> = 174)	Employed part-time (<i>n</i> = 26)	Unemployed (<i>n</i> = 50)	Total (<i>n</i> = 250)
Age, mean ± SD	35.9 ± 9.9	35.3 ± 8.5	32.7 ± 11.6	35.2 ± 10.2
Gender: female, <i>n</i> (%)	76 (43.7)*	12 (46.2)	31 (62.0)	119 (47.6)
Ethnicity: Malay:Chinese: Indian	45:83:41	7:19:2	16:19:14	68:119:57 ^a
Marital status: single, <i>n</i> (%)	86 (49.4)***	15 (57.7)*	39 (78.0)	140 (56)
Education level: secondary and below, <i>n</i> (%)	106 (60.9)*	20 (76.9)	38 (76.0)	164 (65.6)
Income: RM1000 and below, <i>n</i> (%)	40 (23.0)***	20 (76.9)*	47 (94.0)	107 (42.8)

SD, standard deviation; AED, antiepileptic drug.

* *p*<0.05 as compared to those who were unemployed.

*** *p*<0.001 as compared to those who were unemployed.

^a Ethnic groups other than Malay, Chinese and Indian were not included.

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