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Education in patients with psychogenic nonepileptic seizures

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ABSTRACT

Purpose: The aim of this study was to investigate any possible association between education and psychogenic nonepileptic seizures (PNES) and any potential effects education might have on clinical characteristics of patients with PNES.

Methods: In this retrospective study, all patients with PNES, who were studied at Shiraz Comprehensive Epilepsy Center at Shiraz University of Medical Sciences, from 2008 until 2018, were recruited. We categorized the patients as 1. Less than 6 years of education; 2. With some college education.

Results: Sixty-two patients (19%) had some college education and 38 patients (12%) had less than 6 years of education [22 patients (6.8%) were illiterate]. Age at onset of PNES was earlier in those with some college education ($p = 0.0001$) and they more often reported a history of sexual abuse ($p = 0.02$). Other demographic variables, seizure-related variables, PNES associated factors, and use of antiepileptic drugs were not significantly associated with education in the patients (all p values were > 0.05).

Conclusions: It seems that the level of education has no significant effects on the clinical picture of PNES (other than its association with age at onset and history of sex abuse). While the above observations are important, they should be investigated in cross-cultural comparisons in future studies to depict a full picture of PNES related factors across borders and cultures.

1. Introduction

Psychogenic nonepileptic seizures (PNES) consist of paroxysmal changes in responsiveness, movements, or behavior that seemingly resemble epileptic seizures, but lack a neurobiological origin similar to epileptic seizures and are not associated with electrophysiological epileptic changes [1]. Learning problems are common among patients with PNES; however, they are often undiagnosed and untreated [2,3]. Intrinsic brain connectivity abnormalities and dysfunctions are being suggested in the pathophysiology of PNES [4], therefore, it is not irrational to presume that education and PNES may have associations. For example, people with learning disability and low education may have limitations of problem-solving and communication skills or the ability to verbalize emotional distress and therefore, may present with PNES [5].

In a previous study [6], we observed that different religion and culture in Iran do not affect the manifestations and most associated factors of PNES significantly (compared with those from the Western studies). This observation implies cross-cultural similarities in the clinical expression of PNES [6]. To the best of our knowledge, no study has ever investigated the association of education and PNES. The aim of this study was to investigate this possible association and any potential effects education might have on clinical characteristics of patients with PNES. We hypothesized that people with low education have different PNES characteristics (e.g., demography, semiology, associated factors, etc.) compared with those who have higher educations.

2. Methods and materials

In this retrospective study, all patients with PNES, who were diagnosed at Shiraz Comprehensive Epilepsy Center at Shiraz University of Medical Sciences, from 2008 until 2018, were recruited. The diagnosis of PNES was made by clinical assessment and documented by ictal recording during video-EEG monitoring by the epileptologist.

The epileptologist interviewed all the patients in their hospital room and if they consented to share their information in the database, it was used. We routinely take the history on associated factors of PNES (e.g., history of sexual abuse, etc.) privately (while a nurse is present in case of women). All the data were kept confidential through codes. Age, gender, age at seizure onset, seizure semiology, seizure frequency, historical factors potentially predisposing to PNES [history of physical abuse (history of corporal punishment or any physical injury resulted

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from aggressive behavior towards the patient), sexual abuse, dysfunctional family (i.e., divorce, single parent, significant family disputes, etc.), severe head injury [i.e., depressed skull fracture, dural penetration, intracranial hematoma, prolonged coma or amnesia (> 24 h), and contusion], medical comorbidities (e.g., diabetes, heart disease, etc.) and family history of seizures], and video-EEG recording of all patients were registered routinely. We categorized the patients as 1. Less than 6 years of education (considered as low education in Iran); 2. With some college education (Associate, Bachelor, Master, Doctorate; considered as well-educated). We excluded other patients, who had 6–12 years of education, in order to have a clear educational gap between the two groups (arbitrarily). Demographic variables and relevant clinical variables were summarized descriptively to characterize the study population. Pearson Chi-square, Mann-Whitney, Kolmogorov-Smirnov, and *t*-test were used for statistical analyses. P value less than 0.05 was considered as significant. This study was conducted with the approval by Shiraz University of Medical Sciences Review Board.

3. Results

During the study period, 325 patients with PNES were registered in our database. Sixty-two patients (19%) had some college education and 38 patients (12%) had less than 6 years of education [22 patients (6.8%) were illiterate]. Other patients had 6–12 years of education and were not included in this study. Table 1 shows the demographic and clinical characteristics of these two groups of patients.

Age at onset of PNES was 9 years earlier in those with some college education (p = 0.0001) and they more often reported a history of sexual abuse (15% vs. 0; p = 0.02). Other demographic variables (i.e., gender and duration of the condition), seizure-related variables (i.e., aura, loss of responsiveness, seizure semiology, seizure frequency, incontinence, seizure-related injury), PNES associated factors (i.e., comorbid epilepsy, history of head trauma, history of physical abuse, dysfunctional family, and medical comorbidities), and use of antiepileptic drugs were not significantly associated with education in the patients (all p values were > 0.05).

Table 1
Demographic and clinical characteristics of patients with PNES[a].

	Less than 6 years of education (N = 38)	Some college education (N = 62)	P value
Sex ratio (Female: Male)	32: 6	42: 20	0.1
Age at onset (years)	**31 ± 15**	**22 ± 8**	**0.0001**
Duration of PNES (years)	4 ± 8	4 ± 4	0.8
Seizure frequency (per month)	45 ± 77	37 ± 90	0.6
Reporting an aura	21	40	0.5
Loss of responsiveness	29	53	0.4
Urinary incontinence	4	4	0.4
Nocturnal seizures	11	21	1
History of ictal injury	7	17	0.4
Generalized motor seizures	34	52	0.6
Akinetic seizures	3	7	0.7
History of head injury	3	3	0.6
Family history of seizures	10	19	0.8
History of physical abuse	4	4	0.4
History of sexual abuse	**0**	**9**	**0.02**
History of dysfunctional family	8	19	0.4
History of medical comorbidities	18	18	0.08
Comorbid epilepsy	10	14	0.8
Taking antiepileptic drugs	18	42	0.059

[a] Significant differences are in bold. The numbers are number of patients (not percents).

4. Discussion

In this study, we observed that about one-fifths of the patients with PNES had some college education, while one-eights had a low education of less than 6 years. The rate of illiteracy was consistent with that in the general population in Iran [7]. We observed that age at onset of PNES was earlier in those with some college education and they more often reported a history of sexual abuse. We cannot provide any explanation for the earlier age at onset in those with a higher education. With respect to the higher reported rate of sexual abuse in those with a higher education, we can contemplate two possible explanations. Extramarital sex is forbidden by law and religion in Iran and people, especially those who are not aware of their rights (such as illiterate people), might deny being sexually abused due to family considerations and fear of the consequences [6]. On the other hand, people with higher education may more openly talk about their conflicts and problems. Another plausible explanation for this observation is the possibility of existence of different defense mechanisms in people with a high education compared with those who have a low education. It is possible that, intrapsychic (e.g., sex abuse) trauma is more often associated with defense mechanisms such as somatization, dissociation, and conversion in people with a high education, while different defense mechanisms (e.g., repression) are more common in those who have a low education [8]. A previous study compared patients with PNES and learning disability (n = 25) with patients with PNES and no learning disability (n = 263). Fewer patients with PNES and learning disability had a history of sexual abuse (P = 0.036) [9]. This is consistent with our finding and reinforces the second possible explanation (i.e., existence of different defense mechanisms).

The relationship between sexual abuse and PNES has received significant attention in the literature. In a study comparing childhood abuse in patients who had PNES (71 patients) and those who had epilepsy (140 patients), significantly higher rates of sexual abuse (24.0% versus 7.1%) were found in those who had PNES (P < 0.001) [10]. In another study of comparison of patients with PNES only (324 patients) with those who had epilepsy only (281 patients), history of abuse (physical or sexual) was more frequent among those with PNES [Odds ratio: 3.35 (95% confidence interval: 1.23–9.10); p = 0.018] [11]. In one recent review study [12], the authors focused on neurological associations in brain structures among individuals with a history of childhood sexual abuse. They concluded that a history of childhood sexual abuse was associated with irregularities in the cortical and subcortical regions of the brain and these irregularities may contribute to various cognitive, behavioral, and psychological health outcomes later in life [10]. History of physical abuse and sexual abuse were not that common among our patients compared with that in the Western studies [6]. There could be real differences between our series and the Western series. However, we think that, these differences have probably cultural or religious reasons; as explained above, extramarital sex is forbidden by law and religion in our region and people might deny being physically or sexually abused due to family considerations [6]. This is an interesting and potentially important observation and should be explored more in future international cross-cultural studies.

Interestingly, we observed that most demographic variables, seizure-related variables, and PNES associated factors were not significantly associated with education in patients with PNES. In other words, it seems that the level of education has no significant effects on the clinical picture of PNES (other than its association with age at onset and history of sexual abuse). While the above observations are important, they should be investigated in cross-cultural comparisons in future studies to depict a full picture of PNES related factors across borders and between cultures.

This study has some limitations including its retrospective design and lack of some important data such as cognitive function, psychiatric comorbidities of the patients, and other childhood life adversities that patients with PNES may report including important losses, war, natural

disasters, etc. Besides, we excluded patients with an education of 6–12 years. In addition, we do not know why the participants achieved the level of education that they did.

Conflict of interest

Ali A. Asadi-Pooya, M.D.: Honoraria from Cobel Daruo; Royalty: Oxford University Press (Book publication).

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