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Original Article

The relationship between menstrual disorders and education in women with intractable epilepsy

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Abstract: Objective: The study aimed to investigate the relationship between menstrual disorders and education in women with intractable epilepsy. Method: This was a descriptive-analytical study. Statistical population consisted of all female patients with intractable epilepsy in 15-45 age group who visited the third department of epilepsy in Ayatollah Kashani Hospital. The sample size was 380. They were selected using simple random sampling. A questionnaire was distributed among the patients to collect information on education, incidence and type of current menstrual disorder (each type of menstrual disorder was explained to the participants). Then, the relationship between education and prevalence of menstrual disorders in these women was investigated. Findings: Analysis of Spearman correlation coefficient showed a significant and negative correlation between education and menstrual disorder ($P \leq 0.05$). Analysis of multivariate logistic regression also showed a significant relationship between education and types of menstrual disorders. There was also a significant relationship between education and regular and irregular menstruation ($P \leq 0.05$). Conclusion: There is a significant relationship between education and menstrual disorders in women with intractable epilepsy, and the higher education level indicates less prevalent menstrual irregularities.

Keywords: Menstrual disorders, education, intractable epilepsy

Introduction

Epilepsy is a central nervous system disorder that has been known since ancient times. It is one of the most common neurological diseases with annual incidence of 50 per 100000 [1-5]. Statistics show that 800000 to 1.1 million of American epileptic women are of childbearing age [6]. Throughout the reproductive life cycle of women, fluctuating levels of sex hormones during the menstrual period, pregnancy and menopause may affect the onset of seizures [7-11]. Estrogen and progesterone activate specific intracellular receptors, affect neuronal excitability, and have a direct effect on the seizure threshold [12-18]. Generally, estrogen increases the risk of seizures while progesterone has a potential anticonvulsant activity. Therefore, there is a significant relationship between epileptic seizures and women's menstruation [19-22].

The most common menstrual disorders are hypomenorrhea, hypermenorrhea, oligomenorrhea, and polymenorrhea [23-26]. Many factors are involved in prevalence of menstrual disorders. Socioeconomic and nutritional factors as well as lifestyle could be mentioned as the most important factors. Education is also one of the effective factors in lifestyle of people [13, 27]. People with higher education were found to demonstrate higher health literacy skills in comparison to people with lower education. Health literacy enables individuals to access, process, and understand basic health information and services needed to make wise health decisions [28]. People with lower health literacy are prone to a higher risk of illness than people with higher levels. In addition, menstrual disorders are more common in the former [28]. Since menstrual disorders are common in most of epileptic women of childbearing age, there seems to be a significant relationship

Table 1. Analysis of Spearman correlation coefficient for investigating the relationship between education and menstrual disorder

Variable			
Education	Correlation Coefficient	1	-0/039
	P Value		0/048*
	Number	380	380
menstrual disorder	Correlation Coefficient	-0/039	1
	P Value	0/048*	
	Number	380	380

**P*-value is the significant threshold.

between menstrual disorders and education in women with epilepsy. Adopting an effective measure to identify and resolve these issues might help physicians to achieve a better control of menstrual diseases in these patients. Moreover, due to significant relationship between epileptic seizures and menstrual cycle [19], treatment of menstrual disorders might help to control epileptic seizures [29].

The effect of education on menstrual disorders in epileptic women and the importance of effective factors in menstrual disorders in women with epilepsy were not investigated in previous studies. Therefore, the present study aimed to investigate the relationship between menstrual disorders and education in women with intractable epilepsy.

Materials and methods

This cross-sectional study was done on 380 patients with intractable epilepsy who were referred to epilepsy department of Kashani hospital, Isfahan, Iran. The Protocol of current study was approved in Isfahan University of Medical Sciences, Isfahan, Iran (IR.MUI.MED.REC.1398.292). Also, patients have informed consent to be enrolled in study. Inclusion criteria included all female patients with intractable epilepsy (the patients with uncontrolled seizure for years that has not responded to medication) [2] and aged between 15 to 45 years old age. These patients, diagnosed based on clinical signs, physical examinations, paraclinical results, EEG findings, and MRI findings. Exclusion criteria included the patients with intractable epilepsy less than one year, patients who were not willing to participate into study and those with incomplete accessible information. After consideration of inclusion criteria, 380 patients were selected using simple random sampling. A checklist was prepared for patients, including demographical (age, education, marital status) and clinical (incidence and type of current menstrual disorders, and type of epilepsy) information. The relationship between education and the prevalence of menstrual disorders was investigated. Collected data was analyzed using SPSS v. 24. In addition, qualitative data were shown based on mean and SD and quantitative were shown based on frequency and percentage. Spearman's correlation coefficient and multiple logistic regression were also used as statistical tests in this study. $P \leq 0.05$ was considered significant.

Results

In this study, 249 patients (65.35%) with regular and 132 (34.65%) patients with irregular menstruation were investigated. In the patients with regular menstruation, 165 (66.5%) cases suffered from focal seizures and 83 (33.5%) cases had generalized epilepsy and also in the patients with irregular menstruation, 85 (64.4%) cases suffered from focal seizures and 47 (35.6%) cases had generalized epilepsy. In the patients with irregular menstruation, menstruation disorders were included 83 (62.8%) cases with oligomenorrhea-hypomenorrhea (66 [50%] cases with oligomenorrhea and 17 [12.8%] with hypomenorrhea) and 49 (37.1%) with hypermenorrhea-polymenorrhea (12 [7.9%] with polymenorrhea and 37 [28%] with hypermenorrhea).

Educational status is presented as follows: 20 (5.3%) cases were illiterate, 45 (11.8%) cases were completed elementary school, 51 (13.4%) cases were completed guidance school, 150 (39.5%) cases were completed high school, and 114 (30%) cases were academic education.

Analysis of Spearman correlation coefficient showed a significant relationship between education and menstrual disorders in female patients with intractable epilepsy (**Table 1**). Also, there was a significant negative relationship between education and menstrual disorder or the higher the education was associated with

Table 2. Multivariate logistic regression for investigating the relationship of type of epilepsy and education with menstruation

Variable		Menstruation		*P* value	OR (upper-lower)
		Regular (248)	Irregular (132)		
Kind of Epilepsy	Focal (250)	165 (66.0%)	85 (34.0%)	0/00*	0/515 (0/669-0/397)
	Generalized (130)	83 (63.8%)	47 (36.2%)	0/002*	0/566 (0/810-0/396)
Education	Illiterate	15 (6/0)	5 (3/8)	0/014*	0.14 (0.68-0.035)
	Elementary school	25 (10/1)	20 (15/2)	0/866	0/94 (1/83-0/48)
	Guidance school	31 (5/12)	20 (15/2)	0/082	0/56 (1/07-0/29)
	High school	101 (40/7)	49 (37/1)	0/000*	0/44 (0/69-0/28)
	University	76 (30/6)	38 (28.7)	0/010*	0/52 (0/85-0/31)

**P*-value is the significant threshold.

Table 3. Analysis of multivariate logistic regression for investigating the relationship of type of menstrual disorder with education

Type of Menstrual disorder	Education	Number (%)	*P* Value	OR (upper-lower)
Hypomenorrhea	Illiterate	0	0/142	1/06 (2/05-0/054)
	Elementary school	2 (11/8)	0/531	1/52 (2/06-0/035)
	Guidance school	5 (29/4)	0/032*	2/250 (3/51-1/44)
	High school	6 (35/3)	0/046*	1/19 (3/140-1/170)
	University	4 (23/5)	0/041*	1.19 (2/260-1/130)
Hypermenorrhea	Illiterate	0	0/036*	1/76 (2/85-1/54)
	Elementary school	6 (15/8)	0/099	1.02 (1/06-0/005)
	Guidance school	6 (15/8)	0/142	1/450 (2/11-1/34)
	High school	14 (36/8)	0/009*	2/19 (3/24-1/670)
	University	12 (31/6)	0/006*	2/15 (2/36-1/16)
Oligomenorrhea	Illiterate	5 (7/6)	0/031*	2/05 (2/97-1/59)
	Elementary school	9 (13/6)	0/045*	2/32 (2/96-1/63)
	Guidance school	9 (13/6)	0/63	1.12 (1.20-1.04)
	High school	26 (39/4)	0/99	1.88 (2/13-1/87)
	University	17 (25/8)	0/010*	1.36 (3/76-1/17)
Polymenorrhea	Illiterate	0	0/00*	1.15 (2/46-0/074)
	Elementary school	3 (25/0)	0/021*	1/12 (2/96-0/085)
	Guidance school	1 (8/3)	0/36	1/62 (2/31-1/24)
	High school	2 (16/7)	0/45	2.39 (2/43-1/91)
	University	6 (50/0)	0/92	1.49 (2/34-1/43)

**P*-value is the significant threshold.

the lower the risk of menstrual disorders (P=0.04).

Multivariate logistic regression was used to investigate the relationship between type of epilepsy and education in women with regular and irregular menstruation. There were significant differences in two groups of regular and irregular menstruation based on educational status and type of epilepsy (P≤0.05) (**Table 2**).

The relationship of type of menstrual disorder with education was also investigated. Contents of **Table 3** show a significant relationship between education and type of menstrual disorder (P≤0.05).

Discussion

Intractable epilepsy particularity can have a devastating effect on all aspects of an individual's life. The patients with epilepsy are not threatened with the psychosocial outcomes of seizures, long-term medical care and treatment, however these patients have the negative attitudes for epilepsy, which can be more intolerable than seizures themselves [30]. In

the current study, relationship between the menstrual and educational information of 380 epileptic patients was investigated using a standardized questionnaire. Also, association between educational level and type of menstrual disorders were evaluated in patients with epilepsy. Our findings showed a significant negative relationship between education and menstrual disorders in women with intractable epilepsy or higher level of education was associated with lower the risk of menstrual disorders. Moreover, there were significant associations between the type of menstrual disorders and educational levels.

Epilepsy has profound effects on various aspects of personality, emotion, upbringing, behavior, occupation, education, family and society as the first seizure begins and continues throughout the life of the individuals [31, 32]. In the current study there was significant relationship between epilepsy with education and menstrual disorder.

These persistent attitudes and stigmas lead to behavioral, emotional, cognitive, familial, occupational, social, and academic abnormalities [33, 34]. Long-term treatments, surgical procedures, adverse events of antiepileptic drugs and frequent hospitalization carries a substantial economic burden on epileptic patients and their families. It disrupts academic career of patients and forces them into dropping either out of school or university [35]. This effect of psychosocial traumas of epilepsy on subjects' academic lifestyle, is caused independent from the neural junction and CNS impacts, since no difference has there been found between patients with non-epileptic psychosomatic and epileptic seizures, regarding the educational and lifestyle efficiency [36].

Patients with epilepsy also deal with more other central nervous system problems than normal people, including memory problems which are observed in approximately 20-50% of patients [37], and depression in nearly 60% of the patients [30]. In a study in 2003, Helmstaedter et al. showed that even in the absence of epileptic seizures, patients still suffer from difficulty in attention [38]. It is also suggested that epilepsy-related cognitive impairments differ in different types of seizure [39, 40]. Patients with longer durations of epilepsy have reportedly lower IQ scores, while this is explained by either their older age or the negative effect of epilepsy [40]. Lower education levels are also reportedly more frequent among patients with longer-lasting chronic epilepsies [41, 42]. Besides, there was negative significant relationship between education and epilepsy level in current study. Many studies have reported that children with epilepsy have poor performances at school and are in need of additional services. Additionally, 25-30% of children with epilepsy have comorbid intellectual disabilities [43-45]. Accordingly, the summation of all of the factors above in epileptic patients can withhold subject from achieving higher educational degrees, which will in turn reduce health literacy [46]. Health literacy includes skills such as reading and writing and the ability to make health-related decisions based on one's acquired knowledge [47]. It guarantees adequate personal skills for enhancing personal and social health through lifestyle changes and it also affects one's ability to reach out to healthcare providers [48]. Lifestyle (i.e. dietary habits, exercise and psychological state, etc.) is one of the important factors influencing women's menstruation [13].

Studies have found associations between epilepsy and menstrual irregularities. For instance, a study on 271 epileptic women which reported a 28.8% frequency of menstrual abnormalities among their study population [49, 50]. Furthermore, Planche *et al.* [51] showed that menstrual disorders are associated with a deteriorated cognitive status of epileptic subjects. Therefore, decreased levels of literacy and cognitive functions among epileptic women could be influencing the frequency of their menstrual irregularities. In the study by Herzog, menstrual disorder is more common in patients with epilepsy and this study suggested that reproductive function must be monitored in women with epilepsy during treatment [52]. In the study by Tidman, seizure was better controlled in the children with education than children without education [53]. Based on current study, low educational level and menstrual disorder are two risk factors for management of patients with epilepsy.

In conclusion, we strongly believe that even if higher education can be in association with higher prevalence of some sorts of menstrual dysfunctions, higher education itself can pre-

vent the patients from many psychosocial pitfalls of epilepsy. The higher the education of the subjects, the easier they are to follow and the higher their treatment compliance is.

Study limitations

This study could have been taken to another level by answering whether an intervention such as a close follow-up and high treatment compliance in epileptic patients can have a positive impact on their quality of lives and their menstruations. The authors, therefore, encourage future scholars to do so in order to answer the aforementioned research question.

Moreover, healthcare programs systematically designed for educating epileptic patients could be helpful in order to reduce cognitive deterioration and health-related issues in these patients, and prevent menstrual cycle disturbances which in turn can provoke more seizures, which can then cause the aforementioned psychosocial consequences in these patients, to complete this malefic loop.

Disclosure of conflict of interest

None.

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