



Personality profiles and clinical syndromes of patients with tonic-clonic seizures

Ali Reza Shafiee-Kandjani^{*1}, Mohammad Yahyavimazraeh-Shadi², Asghar Arfaie²,
Salman Safikhanlou², Mohsen Jafarzadeh-Gharehzaaddin²

¹ Social Determinants of Health Research Center, AND Department of Psychiatry, Tabriz University of Medical Sciences, Tabriz, Iran

² Research Center of Psychiatry and Behavioral Sciences, Tabriz University of Medical Sciences, Tabriz, Iran

Article info

Article History:

Received: 14 Nov. 2017

Accepted: 15 Jan. 2018

ePublished: 10 Mar. 2018

Keywords:

Epilepsy,
Tonic-Clonic,
Personality,
Personality Disorder

Abstract

Introduction: Epilepsy is one of the chronic neurological disorders with an incidence rate of 3% in the normal population. Epilepsy may render behavioral changes so that affected people are prone to prolonged interpersonal difficulties. In order to evaluate co-morbidities and potential personality changes, the study was conducted among the patients with epilepsy in an Iranian population.

Methods: The study was a cross-sectional one with a convenience sampling method. The data of 74 patients with epilepsy and 74 non-epileptic patients were collected by clinical interview and Millon clinical multi-axial inventory (MCMI-III) and were analyzed by SPSS software.

Results: The average age was 31.70. The highest scores gained in epileptic patients were in narcissistic 14.04 (4.53%), obsessive 14.26 (4.30%), and negativistic domains 14.15 (5.24%), while histrionic 76.38 (28.54%) and obsessive 61.74 (24.03%) patterns were obtained in non-epileptic people. There were significant differences between the two groups in all areas except for the debasement index (Z score) and the negativistic personality disorder. There was a significant positive correlation between narcissistic and obsessive personality patterns and post-traumatic stress disorder with education, as well as between sex and drug dependency. Economic and marital status showed correlations with schizoid personality and sadistic personality, respectively.

Conclusion: Patients with tonic-clonic seizures have although difficulties in personality (negativistic) and clinical syndrome areas but the results showed lower scores in subscales except for disclosure (X index) compared with non-epileptic individuals. They are more inclined to disclose the problems with worse mental health conditions than non-epileptic people.

Citation: Shafiee-Kandjani AR, Yahyavimazraeh-Shadi M, Arfaie A, Safikhanlou S, Jafarzadeh-Gharehzaaddin M. **Personality profiles and clinical syndromes of patients with tonic-clonic seizures.** J Anal Res Clin Med 2018; 6(1): 13-21. Doi: 10.15171/jarcm.2018.003

Introduction

Epilepsy is one of the common chronic neurological disorders with an incidence rate of 3% in the normal population. The term epilepsy refers to recurrent attacks, which means sudden and alternating over-discharge of the brain neurons.^{1,2} Evaluation of the neurobiological, psychological and social variables has proven that out of the seven predictive psychopathologic determinants in patients with epilepsy, six factors are

psycho-social (e.g., perceived stigma, attitude toward illness, and family factors) in nature.¹ Personality is a consistent set of characteristics and trends that identify those similarities and differences in the psychological behavior of individuals (thoughts, emotions, and actions), which are continuous in time and may not be recognized or easily understood by the social and biological pressures of the immediate situations.³ Personality traits of the

* Corresponding Author: Ali Reza Shafiee-Kandjani, Email: shafieear@yahoo.com



individuals act as factors in determining their behavior.⁴ Epilepsy can be clinically accompanied by a change in the feelings, behavior, perception, and level of consciousness.⁵ The studies have shown that the prevalence of psychiatric disorders such as depression in patients with epilepsy is higher than normal people.⁶

Jolfaei et al. reported that epileptic patients suffer from personality disorders. Depressive personality disorder was the most common personality disorder (19%); in general, 36% of patients suffered from at least one personality disorder.⁷ Sato et al. stated that epileptic patients suffer from personality disorders.⁸ Sondergaard et al. reported that avoidant and dependent personality disorders are the most common illnesses diagnosed in these patients.⁹ Namazi et al. concluded that personality characteristics of extroversion and failure-tolerance are partial predictors of the seizures.¹⁰ Also, Doldan et al. reported that irritability, aggression, and feeling of guiltiness are some of the hallmarks of patients with frontal lobe epilepsy.¹¹ Wichowicz et al. suggested that antisocial personality factors, sensitivity, quirky behavior, and histrionic behavior are seen among epileptic patients.¹²

As the epileptic patients are suffering from co-morbidities or negative outcomes, as well as the gap of knowledge in the fields of personality aspects and also existing paradoxical results in some research studies caused to this study to evaluate the profiles and clinical syndromes in epileptic patients in Tabriz, Iran.

Methods

The study population included patients with tonic-clonic seizures registered in Tabriz Epilepsy Association in 2015. According to the statistics issued by the mentioned association, 320 patients lived in Tabriz. The patients were recruited through a convenience sampling method. To determine the sample size, Cochran's sample size formula, as well as PASS 11 software (Jerry Hintze, Kayville, Utah, USA) were used, in which the sample

sizes were estimated to be 74 for both cases and controls, using the statistical population of 320. To examine the variables of the study, a demographic questionnaire and Millon multi-axial inventory (MCMI) were used. Control counterparts were selected from among non-epileptic people who were either the patients' relatives or referred for another medical condition, through clinical interviews.

MCMI-III (1994) is a self-assessment scale with 175 yes/no items, which measures 14 clinical personality patterns and is used for the adults of ≥ 18 years old. This test is a most widely used psychological test which has been translated into several languages and has been standardized in Iran for twice. The second and third versions of this test were standardized by Khwaja Mughli¹³ in Tehran, Iran, and Sharifi¹⁴ in Isfahan, Iran. The MCMI-III has the following scales: Scale 1 (schizoid personality), scale 2A (avoidant personality), scale 2B (depressive personality), scale 3 (dependent personality), scale 4 (histrionic personality), scale 5 (narcissistic personality), scale 6A (antisocial Personality), scale 6B (sadistic personality), scale 7 (obsessive personality), scale 8A (pessimistic personality), AB scale (masochism personality), severe personality damage scales, including scale S (schizotypal personality), Scale C (borderline personality), and scale P (paranoid personality), clinical syndrome scales A (anxiety), H (pseudo-physical), D (depression), N (maniac-bipolar), B (alcohol dependence), T (drug dependence), R [Posttraumatic stress disorder (PTSD)].

Data were obtained via interview, and questionnaires. If after the description of the study, the selected subjects agreed to participate in the project and signed the written consent, the MCMI-III questionnaire was implemented. If they did not accept to participate in the study, they were excluded from the study and another person was replaced.

The principles of anonymity and confidentiality of information were explained to the participants. Data from questionnaires

Table 1. Demographic characteristics

Variable		Group	
		Control	Epilepsy
Sex [n (%)]	Man	46 (62.16)	28 (37.84)
	Woman	46 (62.16)	28 (37.84)
Education [n (%)]	Guidance School	2 (2.70)	18 (34.32)
	High School	8 (10.81)	0 (0)
	High school diploma	39 (52.70)	33 (44.59)
	Associate degree	7 (4.46)	0 (0)
	Bachelor degree	16 (21.62)	16 (21.62)
	Master degree	2 (2.70)	4 (5.41)
	PhD	0 (0)	3 (4.05)
Marital status [n (%)]	Single	31 (41.89)	15 (20.27)
	Married	43 (58.11)	59 (79.73)
Type of referral [n (%)]	Outpatient	40 (54.05)	74 (100)
	Hospitalized	34 (45.95)	0 (0)
Duration of the disease [n (%)]	Less than a week	0 (0)	19 (25.68)
	1 to 4 weeks	3 (4.05)	27 (36.49)
	More than 4 weeks	71 (95.95)	28 (37.84)

were analyzed by SPSS software (version 18, SPSS Inc., Chicago, IL, USA) using descriptive statistics [(mean, frequency, percentage, standard deviation (SD))] and inferential statistics using the Student's independent t-test, Spearman correlation, and the results were considered statistically significant with P value < 0.05.

Results

The demographic characteristics of the participants are shown in table 1 by the groups and variables.

The age of participants ranged from 18 to 64 years old with a mean of 29.82 ± 9.98. In the control group, the mean age was 33.57 ± 9.56.

The mean and SD of the MCMI scores are shown in table 2 based on group separations.

Figures 1 and 2 illustrate the psychological profiles of the participants by the group.

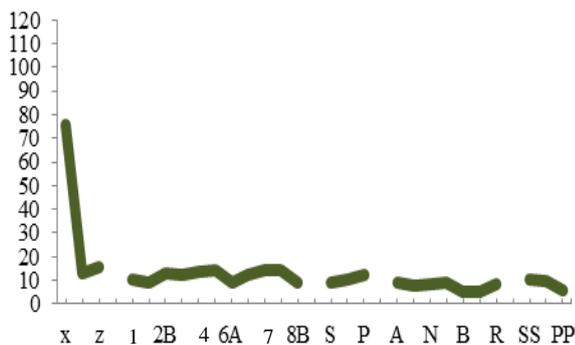


Figure 1. Average personality characteristics in patients with tonic-clonic epilepsy

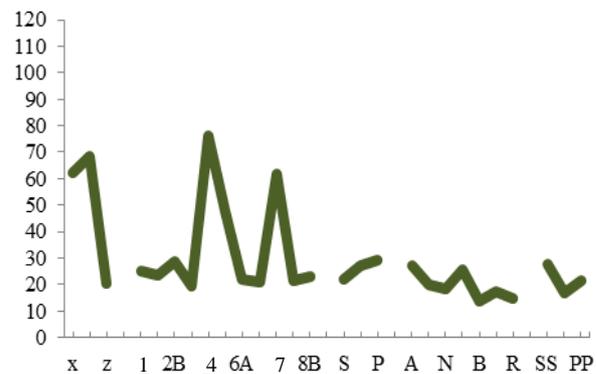


Figure 2. Average personality characteristics of the non-epileptic people

Table 3 shows the results of a significant difference of MCMI between two sexes.

The data in table 3 show that people with epilepsy had a significant difference in comparison with non-epileptic individuals, except in debasement index scales and negativistic personality patterns.

Histrionic and obsessive personality scales had relatively high elevations in the control subjects, which these two scales generally did not indicate a disorder. According to the results of empirical research, these two scales have positive and negative correlations with mental health and mental disorders scales, respectively. The histrionic scale was the most elevated scale among the non-clinical population, especially among women, so that these individuals have sociable and extrovert character, lacking the histrionic personality disorders.

Table 2. Mean \pm standard deviation (SD) of scales and subscales of the Millon multi-axial personality inventory (MCMI)

Groups, scales and sub-scales	Group					
	Epilepsy (mean \pm SD)			Control (mean \pm SD)		
	All	Man	Woman	All	Man	Woman
Disclosure index	75.50 \pm 11.74	8.65 \pm 12.31	77.14 \pm 10.75	62.46 \pm 10.80	60.24 \pm 8.93	66.11 \pm 12.67
Desirability index	12.76 \pm 4.03	12.96 \pm 4.26	12.89 \pm 3.69	68.34 \pm 15.96	70.96 \pm 12.41	64.04 \pm 20.04
Debasement index	15.45 \pm 7.44	12.13 \pm 7.79	15.46 \pm 6.95	20.49 \pm 24.35	18.50 \pm 19.78	23.75 \pm 30.55
The schizoid personality pattern	10.27 \pm 3.47	13.37 \pm 3.53	9.04 \pm 3.06	25.12 \pm 21.29	23.07 \pm 19.36	28.50 \pm 24.12
Avoidant personality pattern	8.84 \pm 4.22	14.35 \pm 4.64	9.14 \pm 3.47	23.54 \pm 19.88	24.00 \pm 17.61	22.79 \pm 23.47
Depressive personality pattern	12.93 \pm 5.60	9.90 \pm 5.34	12.89 \pm 5.81	28.92 \pm 23.61	25.04 \pm 17.99	35.29 \pm 30.00
Dependent personality pattern	12.43 \pm 3.39	12.99 \pm 4.46	12.93 \pm 2.93	19.39 \pm 15.90	18.22 \pm 10.93	21.32 \pm 21.86
Histrionic personality pattern	13.66 \pm 3.34	14.33 \pm 3.68	14.14 \pm 2.69	76.38 \pm 28.54	79.28 \pm 26.71	71.61 \pm 31.22
Narcissistic personality pattern	14.04 \pm 4.53	14.33 \pm 4.80	13.54 \pm 4.09	47.65 \pm 17.55	46.24 \pm 15.45	49.96 \pm 20.63
Anti-social personality pattern	8.95 \pm 3.82	9.04 \pm 3.78	7.39 \pm 3.39	22.12 \pm 18.64	19.59 \pm 18.84	26.29 \pm 17.86
Sadistic personality pattern	12.34 \pm 4.90	9.90 \pm 5.31	11.29 \pm 3.39	20.81 \pm 17.88	19.15 \pm 16.54	23.54 \pm 19.89
Obsessive personality pattern	14.26 \pm 4.30	10.26 \pm 4.29	14.14 \pm 4.37	61.74 \pm 24.03	65.11 \pm 20.92	56.21 \pm 27.95
Negativistic personality pattern	14.15 \pm 5.24	12.07 \pm 4.95	13.86 \pm 6.44	21.26 \pm 22.23	17.50 \pm 19.13	27.43 \pm 25.75
Masochistic personality disorder	9.11 \pm 3.30	9.61 \pm 3.55	9.21 \pm 2.90	22.96 \pm 19.27	21.04 \pm 15.58	26.11 \pm 24.15
Schizotypal personality disorder	9.11 \pm 6.14	7.78 \pm 6.37	7.82 \pm 5.60	21.86 \pm 15.80	20.17 \pm 13.94	24.64 \pm 18.38
Borderline personality disorder	10.49 \pm 4.41	8.54 \pm 4.60	80.86 \pm 4.13	27.14 \pm 18.44	25.46 \pm 18.45	29.89 \pm 18.42
Paranoid personality disorder	12.31 \pm 3.40	8.70 \pm 3.70	12.71 \pm 2.85	29.05 \pm 21.63	23.83 \pm 19.57	37.64 \pm 22.45
Clinical pattern of anxiety	9.30 \pm 4.34	5.61 \pm 3.35	8.79 \pm 4.60	27.26 \pm 21.35	27.02 \pm 19.03	27.64 \pm 25.08
Clinical pattern of somatoform	7.88 \pm 4.68	5.52 \pm 4.89	8.04 \pm 4.40	19.80 \pm 18.00	18.43 \pm 16.43	22.04 \pm 20.43
Clinical pattern of mania	8.18 \pm 3.53	8.59 \pm 4.46	7.57 \pm 3.63	18.34 \pm 22.48	15.39 \pm 20.14	23.18 \pm 25.52
Clinical pattern of dysthymia	8.78 \pm 5.02	10.57 \pm 5.22	8.93 \pm 4.76	25.69 \pm 18.05	25.39 \pm 16.02	26.18 \pm 21.27
Clinical pattern of alcohol dependence	5.31 \pm 2.53	9.50 \pm 2.49	4.82 \pm 2.56	13.58 \pm 13.12	11.13 \pm 12.45	17.61 \pm 13.42
Clinical pattern of drug dependence	4.97 \pm 2.62	5.93 \pm 2.37	4.07 \pm 2.80	17.15 \pm 13.27	16.70 \pm 15.48	17.89 \pm 8.73
Clinical pattern of post-traumatic stress	8.69 \pm 5.37	8.59 \pm 5.29	8.86 \pm 5.59	14.88 \pm 21.81	11.61 \pm 18.69	20.25 \pm 25.62
Thought disorder	10.20 \pm 4.63	10.57 \pm 4.98	9.61 \pm 4.07	27.51 \pm 23.01	26.13 \pm 20.69	29.79 \pm 26.65
Major depression	9.85 \pm 5.69	9.50 \pm 5.79	10.43 \pm 5.57	17.01 \pm 21.45	13.89 \pm 17.96	22.14 \pm 25.74
Delusional disorder	5.74 \pm 2.96	5.93 \pm 3.14	5.43 \pm 2.66	21.43 \pm 19.53	18.28 \pm 16.84	26.61 \pm 22.67

SD: Standard deviation

Table 3. Analysis of Millon multi-axial personality inventory (MCMI) scores in two sex groups

Variable		F	Obtained T	df	P*
X	Disclosure index	46.80	7.03	146	< 0.001
Y	Desirability index	32.74	29.40	146	< 0.001
Z	Debasement index	36.34	1.70	146	0.090
1	The schizoid personality pattern	109.08	5.92	146	< 0.001
2a	Avoidant personality pattern	88.49	6.22	146	< 0.001
2b	Depressive personality pattern	77.93	5.67	146	< 0.001
3	Dependent personality pattern	25.38	3.66	146	< 0.001
4	Histrionic Personality pattern	117.74	18.78	146	< 0.001
5	Narcissistic personality pattern	64.80	15.96	146	< 0.001
6a	Anti-social personality pattern	70.43	5.96	146	< 0.001
6b	Sadistic personality pattern	42.48	3.93	146	< 0.001
7	Obsessive personality pattern	108.62	16.73	146	< 0.001
8a	Negativistic personality pattern	47.00	2.67	146	0.070
8b	Masochistic Personality pattern	64.59	6.09	146	< 0.001
S	Schizotypal personality disorder	34.33	6.48	146	< 0.001
C	Borderline personality disorder	69.10	7.55	146	< 0.001
P	Paranoid personality disorder	138.05	6.58	146	< 0.001
A	Clinical pattern of anxiety	89.10	7.09	146	< 0.001
H	Clinical pattern of somatoform	42.57	5.51	146	< 0.001
N	Clinical pattern of mania	67.28	3.84	146	< 0.001
D	Clinical pattern of dysthymia	51.28	7.76	146	< 0.001
B	Clinical pattern of alcohol dependence	41.39	5.32	146	< 0.001
T	Clinical pattern of drug dependence	37.94	7.74	146	< 0.001
R	Clinical pattern of post-traumatic stress	41.80	2.37	146	0.020
Ss	Thought disorder	138.96	6.34	146	< 0.001
Cc	Major depression	43.96	2.78	146	0.010
Pp	Delusional disorder	87.21	6.83	146	< 0.001

*Student's independent t-test, df: Degree of freedom

The obsession scale had more elevation among the non-clinical population who underwent tests. The individuals with high scores in obsessive scales were duty-regulated, rule-obedient, and disciplined, having an obsessive personality, not an obsessive personality disorder.

No significant difference was found between age and personality scales. There was a significant positive correlation between narcissistic personality pattern, obsessive personality pattern, and clinical pattern of post-traumatic stress with education. Moreover, there was a significant negative correlation between the pattern of sadistic personality disorder, schizotypal personality disorder, borderline personality disorder, somatoform clinical pattern, mania, and thought disorder with education. There was a significant negative relationship between sex and schizoid and antisocial personality pattern. Furthermore, there was a positive relationship between sex and drug

dependence. A significant positive relationship was found between marriage and masochistic personality, and also between the economy and the schizoid personality pattern.

Discussion

According to the results, there was no difference between demographic variables. Although previous studies had found most patients with low educational and economic levels, such findings were not obtained in our study. The average age of patients was 31.70 in our study. Also, in this study, the majority of patients were illiterate (40.0%); most patients were poor (59.3%) and their employment rate was 3.5%, that is, the majority of patients were in low socio-economic classes.

Psychiatric disorders are more common in the single men with low socioeconomic status who are dissociable and illiterate, while in our study, most patients had high school

diploma and a middle economic status. Later, 32.0% of patients had psychotic disorders similar to schizophrenia. Depressive disorders were the most common form of neuropsychological changes in epileptic patients, second to the behavioral disorders. Epileptic-related temperamental disorders were reported in 5 cases with maniac manifestations. From all patients, 25.3% of patients had a history of suicidal ideation, of which 13 committed suicides. In patients suffered from epilepsy for 15-20 years, especially from the temporal lobe type, the distribution of neuropsychiatric disorders is more common. While the final base rating (BR) grades of epileptic participants in our study did not reach diagnostic level which indicated no specific psychiatric disorder, in the histrionic scale had high-level elevation in the non-epileptic people, indicating no psychiatric disorders.¹⁵

In a study, Bahraynian and Karamad investigated the anxiety levels in patients with epilepsy. This study showed that 44.9% epileptic patients had anxiety disorder. The highest prevalence of anxiety was in patients with generalized seizure, single and unemployed women.¹⁶ Inconsistent with the above finding, our study showed that in the anxiety scale, the average score of all samples was 9.30, that is 9.71 in men and 8.79 in women, indicating the low level of anxiety in the epileptic people, but its high levels in the non-epileptic individuals.

Zahiroddin and Ghoreishi in a research study showed that 51.6% of epileptic patients (generalized tonic-clonic epilepsy) suffered from mild to moderate depression based on Beck test,¹⁷ but this feature was not obtained in our study. The scale of depression pattern, the clinical pattern of dysthymia, and the major depression of the Millon test among the participants was an indicator of the low level of depression among the epileptic patients, which was not enough to reach the diagnostic threshold.

Although Salehi et al. showed that the mental status of epileptic patients and normal people was different and the former is in

much worse condition,¹⁸ our study depicted that epileptic people have lower scores in the Millon scales than non-epileptic people, having a better mental health condition. Banihashemian and EtesamiPour in a study concluded that epileptic people had higher scores in obsessive disorder,¹⁹ but our study did not achieve such an outcome, though this scale has a high elevation in the normal people, not indicating a disorder. Unlike epileptic patients, normal individuals reported a higher level of obsession characteristics.

In the study by Noohi et al., primarily, the symptoms of depression and obsessive-compulsive disorder, and secondly, the symptoms of generalized anxiety and phobia symptoms were the causes of morbidity in the epileptic patients at the intervals between the epileptic seizures.²⁰ On the contrary, our findings did not find the symptoms of depression, obsessive-compulsive disorder generalized anxiety, and phobia at the higher levels.

In a study conducted by Najafi et al. on the epileptic patients through Minnesota multiphasic personality inventory (MMPI) test, they had higher scores in hypochondria (Hs), depression (D) and hysteria (Hy) scales compared with the control group. They also concluded that epileptic patients are more likely to suffer from psychiatric disorders than the general population.²¹ In our study, these cases were not confirmed, and a finding showed that the epileptic patients have significantly lower scores than the non-epileptic people.

Mokhber et al. showed that 74.0% of patients with temporal lobe epilepsy had at least one type of diseased personality trait, which it was estimated to be 31.5% in the control group. The prevalence of the prominent personality disorders was 27.2% among the epileptic patients, compared with 8.8% of the control group, which this difference was, statistically, significant. The most common personality disorders in these people were borderline and anti-social disorders, which were evaluated to be

significantly higher than the control group.²² Likewise, in our study, the schizoid, antisocial and drug dependence scores were higher than other scales, and there was a meaningful difference between the groups. But, in these two groups, normal people had higher scores in these scales.

Jolfaei et al. examined the personality traits by MCMI-III. Their results showed that the most common personality disorder was depressive personality disorder (19%). In total, 36% of the patients suffered from at least one personality trait. The occupational-educational status was much worse in patients with personality disorders. Epileptic-related characteristics did not have meaningful relationship with personality disorders.⁷ In our study, though epileptic and normal individuals were significantly different in Milton's personality and clinical patterns, the latter had higher elevation and lower mental health than the former. No significant difference was found in their occupation, education, and so on.

In the results of a review, Victoroff reported that borderline personality disorder is the most common type of personality disorder among the epileptic patients.² In this regard, inconsistent with this finding, we achieved antisocial and schizoid personality. In our study, in the epileptic (all and men), the highest scores were related to narcissistic, obsessive and negativistic personality patterns, while among the women, the highest average was related to histrionic and obsessive personality; also in the normal people, the highest scores were found in the similar scales.

King et al. showed that 54, 51, and 38% of the epileptic patients had symptoms of schizophrenia, depression, and hysterical symptoms, respectively. Also, 45% of the samples had the least mental complaints. In addition, 30% of patients were at the upper limits of the profile while 20% lay in middle limits.²³ In our study, all participants were under the cutting line, but the highest scores were related to narcissistic, obsessive, and negativistic personality patterns in all the participants among men, while among the

women, the highest average was related to histrionic and obsessive personality.

Reuber et al. investigated the multi-dimensional personality evaluation of epileptic patients and the patients with psychological non-epileptic seizures. In this study, 85 patients with psychological non-epileptic seizure and 63 patients with epilepsy were selected and studied from the hospitals in Bonn, Germany, in addition to 100 healthy people. The results showed that personality disorders among patients with psychological non-epileptic seizure were more in comparison with two groups of healthy people and epileptic people. Also, personality disorders were much more common among epileptic groups than healthy people.²⁴

Beyenburg et al. in their own study reported that between 50 to 60% of the patients with chronic epilepsy suffered at least from one type of mood disorder or anxiety, such as depression or obsessive disorder, before having epilepsy.²⁵ Given that patient records were not available, we concluded that most scores were related to narcissistic, obsessive, and negativistic personality patterns in all participants, as well as in the men, while the most frequent average was related to histrionic and obsessive personality in the women.

In a study by Sondergaard et al. to assess the personality disorders in the epileptic patients, avoidant and dependent personality disorders were considered the most commonly diagnosed personality disorders in these patients.⁹ The highest scores among our participants were related to narcissistic, obsessive, and negativistic personality patterns in all participants, as well as in men, while these scores were related to histrionic and obsessive personality in the women.

The results of the current study are inconsistent with most studies, although some similarities are seen. The study showed that among all people, as well as man epileptic participants, the highest scores were related to narcissistic, obsessive and negativistic personality patterns, while among the epileptic women and the control group, the

highest average was related to histrionic and obsessive personalities. According to the results, there was no difference between demographic variables. Although previous studies had found most patients with low educational and economic levels, such a finding was not obtained in our study.

It is highly recommended that other groups of patients, people with different educational levels, with more compatible control counterparts a larger statistical community in the provinces or several provinces and regions, and more assessment scales such as screening scales could be considered for the future studies.

Conclusion

Individuals with epilepsy, unlike non-epileptic ones, had lower scores in personality and clinical scales, despite having greater tendency to expose their problems. The highest score of non-epileptic group was seen in histrionic and obsessive scales. There were significant differences between the two groups in all areas except for the debasement index (Z score) and the negativistic personality disorder. The profile obtained from the non-epileptic people had the highest degree of coordination with other studies, in which the epileptic individuals

had very lower scores, which is an issue requires consideration.

Acknowledgments

We are very thankful for patients with epilepsy who participated in our research study. The authors would like to express their gratitude toward all people who helped us throughout doing this study, all hospital personnel, nurses, and clinical staff.

Authors' Contribution

Ali Reza Shafiee-Kandjani devised the project, the main conceptual ideas and outline. Mohammad Yahyavimazraeh-Shadi worked out almost all of the technical details, and Salman Safikhanlou performed the numerical calculations for the suggested experiment. Asghar Arfaie revised technical details, and Mohsen Jafarzadeh-Gharehziaaddin wrote and revised the manuscript.

Funding

There was no funding for this research study.

Conflict of Interest

Authors have no conflict of interest.

Ethical Approval

Not indicated.

References

1. Austin JK, Dunn DW, Johnson CS, Perkins SM. Behavioral issues involving children and adolescents with epilepsy and the impact of their families: recent research data. *Epilepsy Behav* 2004; 5(Suppl 3): S33-S41. DOI:10.1016/j.yebeh.2004.06.014
2. Victoroff J. DSM-III-R psychiatric diagnoses in candidates for epilepsy surgery: Lifetime prevalence. *Neuropsychiatry Neuropsychol Behav Neurol* 1994; 7(2): 87-97.
3. Kobasa SC, Maddi SR, Kahn S. Hardiness and health: A prospective study. *J Pers Soc Psychol* 1982; 42(1): 168-77. DOI: 10.1037/0022-3514.42.1.168
4. Schultz DP, Schultz SE. *Theories of personality*. 10th ed. Belmont, CA: Wadsworth Publishing; 2012.
5. Swinkels WA, Kuyk J, de Graaf EH, van DR, Spinhoven P. Prevalence of psychopathology in Dutch epilepsy inpatients: A comparative study. *Epilepsy Behav* 2001; 2(5): 441-7. DOI: 10.1006/ebbeh.2001.0242
6. Zahiroddin AR, Shafiee-Kandjani AR, Ghoreishi FS. Depression rate among 18-40-year-old patients suffering from generalized tonic-clonic epilepsy referred to Neurology Clinics in an Iranian Hospital. *Neurosciences (Riyadh)* 2008; 13(1): 86-7.
7. Jolfaei AG, Nasr Esfahani M, Mirblock Jalali Z, Tamannai S. Assessment of personality disorders in epileptic patients referred to epilepsy clinic of Rasoul Akram Hospital. *Razi J Med Sci* 2015; 21(129): 10-7. [In Persian].
8. Sato S, Yamakawa Y, Terashimai Y, Asada T. A clinical psychiatric study about post-stroke depression. *Seishin Shinkeigaku Zasshi* 2006; 108(9): 906-16. [In Japanese].
9. Sondergaard MP, Jarden JO, Martiny K, Andersen G, Bech P. Dose response to adjunctive light therapy in citalopram-treated patients with post-stroke depression. A randomised, double-blind pilot study. *Psychother Psychosom* 2006; 75(4): 244-8. DOI: 10.1159/000092895
10. Namazi H, Kulish VV, Hussaini J, Hussaini J,

- Delaviz A, Delaviz F, et al. A signal processing based analysis and prediction of seizure onset in patients with epilepsy. *Oncotarget* 2016; 7(1): 342-50. DOI: 10.18632/oncotarget.6341
11. Doldan L, Buyatti D, Farez M, Allegri R. Frontal vs temporal lobe epilepsy: Personality traits and neuropsychological profile. *Neurology* 2013; 80(7 Supplement): P03.139.
 12. Wichowicz H, Gasecki D, Landowski J, Lass P, Nyka WM, Kozera G. The stroke variables assessment as a prognostic factor for post-stroke depression with the emphasis on the cerebral SPECT regional blood flow asymmetry. *Psychiatr Pol* 2006; 40(3): 539-50. [In Polish].
 13. Khwaja Mughli N. Preliminary preparation of the Persian form of Millon's Clinical Multiaxial Inventory-II in Tehran [MSc Thesis]. Tehran, Iran: Tehran Psychiatric Institute; 1993. [In Persian].
 14. Sharifi AA. Standardization of Millon's Clinical Multiaxial Inventory-III in Isfahan [MSc Thesis]. Isfahan, Iran: University of Isfahan; 2002. [In Persian].
 15. Azad M. Prevalence of psychiatric disorders in epileptic patients referring to Farabi Hospital in Kermanshah in 1999 [MSc Thesis]. Kermanshah, Iran: Kermanshah University of Medical Sciences, Medical School; 1999. [In Persian].
 16. Bahraynian SA, Karamad A. Generalized anxiety disorder prevalence rate in patients with epilepsy referred to neurology clinic of Emam Hossein Hospital affiliated Iranian epilepsy society. *Pajouhesh Dar Pezeshki* 2005; 29(3): 230-8. [In Persian].
 17. Zahiroddin A, Ghoreishi F. A survey of depressive symptoms in patients. *Pajouhesh Dar Pezeshki* 2006; 30(4): 305-8. [In Persian].
 18. Salehi M, Firouz Kouhi M, Najafi MR. Comparison of mental health in patients with chronic idiopathic generalized seizure with control group. *Zahedan J Res Med Sci* 2007; 9(1): 37-44.
 19. Banihashemian K, Etesami Pour R. Investigation of obsessive-compulsive disorder and assessment of obsessiveness as a personality trait in patients with complex partial seizure. *Tehran Univ Med J* 2010; 68(2): 121-7. [In Persian].
 20. Noohi S, Azar M, Karamad A, Shafiee Kandjani A, Amiri M, Habibi M, et al. Frequency of symptoms of depression, general anxiety, obsessive-compulsive and phobia in interictal phase in patients with epilepsy. *Med Sci J Islamic Azad Univ Tehran Med Branch* 2008; 18(1): 39-43. [In Persian].
 21. Najafi MR, Rezaei F, Vakili Zarch N, Dehghani F, Berekatain M. Personality and psychopathology of patients with grand mal and complex partial seizures. *J Shahid Sadoughi Univ Med Sci* 2010; 18(2): 84-91. [In Persian].
 22. Mokhber N, Azarpajoo M, Asgharipoor N. Effect of citalopram on depression and cognitive functions of stroke patients. *J Sabzevar Univ Med Sci* 2013; 20(3): 242-428. [In Persian].
 23. King TZ, Fennell EB, Bauer R, Crosson B, Dede D, Riley JL, et al. MMPI-2 profiles of patients with intractable epilepsy. *Arch Clin Neuropsychol* 2002; 17(6): 583-93. DOI: 10.1016/S0887-6177(01)00137-8
 24. Reuber M, Pukrop R, Bauer J, Derfuss R, Elger CE. Multidimensional assessment of personality in patients with psychogenic non-epileptic seizures. *J Neurol Neurosurg Psychiatry* 2004; 75(5): 743-8. DOI: 10.1136/jnnp.2003.013821
 25. Beyenburg S, Mitchell AJ, Schmidt D, Elger CE, Reuber M. Anxiety in patients with epilepsy: Systematic review and suggestions for clinical management. *Epilepsy Behav* 2005; 7(2): 161-71. DOI: 10.1016/j.yebeh.2005.05.014