



Comparison of Alexithymia, Perceived Stress and Emotion Regulation Between Patients with Epileptic and Non-Epileptic Seizures

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Abstract

Background: Different psychological factors may explain the differences between epileptic and non-epileptic seizures. Accordingly, the present study was conducted to compare alexithymia, perceived stress, and emotion regulation between patients with epileptic and non-epileptic seizures.

Methods: In the present cross-sectional research, 82 patients (39 with epileptic seizures and 43 with non-epileptic seizures) were selected. Using the Toronto Alexithymia Scale (TAS) (Bagby et al., 1994), Perceived Stress Scale (PSS) (Cohen et al., 1983) and cognitive emotion regulation questionnaire (CERQ) (Garnefski and Kraaij, 2006), the required data were collected and then analyzed using the SPSS-19 software.

Results: According to the results, patients with non-epileptic seizures had significantly higher scores in TAS, especially in the subscales of difficulty identifying feelings and externally oriented thinking, PSS and CERQ, especially in the subscales of catastrophizing and other-blame and lower scores in CERQ's subscales of acceptance, positive reappraisal, and positive refocusing compared to patients with epileptic seizures ($P < 0.05$). The non-epileptic seizure group score was higher in the event acceptance subscale (as a positive emotion regulation) ($P < 0.05$).

Conclusions: The results of this study showed that patients with epileptic seizures have a more favorable condition in terms of alexithymia, emotion regulation, and perceived stress compared to those with non-epileptic seizures.

Keywords: Epileptic Seizure, Non-Epileptic Seizure, Alexithymia, Perceived Stress, Emotion Regulation

1. Background

Seizure is an attack phenomenon, which occurs due to abnormal, severe, and synchronized discharges of a set of neurons in the central nervous system. Seizures can have epileptic or non-epileptic causes. Epileptic seizure is transient changes in brain function due to excessive and hyper-synchronous nervous activity that may lead to uncontrolled body movements or changes in the level of consciousness. Epileptic seizures occur due to excessive and abnormal cell activity of cortical neurons in the brain membrane (1). Unpredictability and the chronic nature of this disease can influence physical, psychological, and social functioning of the patient (2). Non-epileptic seizures may occur as a result of changes in the electrical activity of the brain, yet this electrical disturbance is not of epileptic seizure type (1). Uliaszek et al. have acknowledged that non-epileptic seizures are similar to epilepsy in terms of appearance yet are not accompanied by the brain's abnor-

mal electrical discharge. Non-epileptic seizures create serious problems for physicians in the treatment of patients (3).

Differentiating non-epileptic seizures from epileptic seizures is a major diagnostic challenge for clinicians and the rate of misdiagnosis is up to 20% to 30% (4). Misdiagnosis of non-epileptic seizures with epileptic seizures often leads to unnecessary interventions and treatment with antiepileptic drugs with negative consequences (5). Chronic non-epileptic seizures are a challenge in epilepsy diagnosis (6). The results show that the accuracy of correct diagnosis between these two types of epilepsy depends on the experience of professionals (7-9). Brown and Reuber found that non-epileptic seizures do not have a brain cause and are physiological or psychological, and the patient's personality traits affect response to treatment and the number of seizures (10). In a study aiming at evaluating the efficacy of psychological disorders in management

of non-epileptic seizures it was revealed that 47% of people with epilepsy also suffer from other psychiatric disorders, and results of 10 other studies showed that 82% of people, who completed treatment in psychology, had a seizure reduction of 50% (11). A study from France showed that people with psychological disorders had a higher rate of seizure decline (82%) and freedom from seizures (47%) in non-epileptic seizure compared with those, who did not have psychological disorders (9).

Alexithymia is a multidimensional problem in difficulty in identifying feelings and distinguishing physical feelings of emotional arousal, which refers to reduced ability to identify and diagnose emotions (12). Laurie et al. (2015) in a research entitled 'quality of life, physical role and alexithymia in two groups of patients with epileptic seizures and non-epileptic seizure', showed that patients with non-epileptic seizures had significantly lower alexithymia compared to patients with epilepsy experience (13). Research results of Uliaszek et al. showed that patients with non-epileptic seizures had more difficulty to identify and describe their feelings as well as higher levels of conscious thoughts than the benchmark group. The level of alexithymia and negative beliefs of emotions in patients with non-epileptic seizures was associated with the severity of seizure, reported by the patients (3). Alexithymia is a common problem in epilepsy (14). Poor understanding of emotions and negative beliefs about emotions are two important predictors for non-epileptic seizures (15). Plug et al. found that the metaphors used by patients with epileptic seizures to describe their attacks were internal, describing it as randomly happening, while people with non-epileptic seizures described these cases as the space or place, which were used (16).

Stress is a circular sequence that begins with an initial assessment of the threat level and continues with the effect of physiological and emotional changes (17). One of the factors that can influence seizures, is the intensity of the stress perceived by the individual. Everyday stress and crisis are threats of physical and mental health (18). Patients with non-epileptic seizures often report more stressful and disturbing experiences as compared to the control group and use less efficient use of coping strategies (17). Severe psychological trauma during childhood and the associated stress is more common in people with non-epileptic seizures compared to the general population (16). The findings by Novakova et al. showed that anxiety (a construct close to stress) is a unique predictor of depression in patients with non-epileptic seizures. The statistical results (after controlling for all variables) showed depression as 45% and anxiety as 60% in patients with non-epileptic

seizures and 16% and 13% in those with epileptic seizures, respectively (19).

Emotion regulation is defined as strategies to represent individual ways of dealing with stressful situations and events (20). Research findings by Baslet et al. (21), Quinn et al. (22), found that psychological non-epileptic seizure is accompanied by problems, such as excessive arousal and unexpected experiences of need for independence and avoidance.

Although comparison of the psychological indices between epileptic and non-epileptic seizures has been an important research topic in the field of epilepsy, research is limited in this regard. Besides, sometimes there are limitations in studies that have been done in this field. For example, findings by Urbanek et al. showed that patients with non-epileptic seizures earn higher scores on alexithymia and this is due to poor understanding of negative emotions and beliefs about feelings. However, in this study, difficulty in describing feelings, which is one of the subscales of this structure, has not been studied (15).

2. Objectives

This study was designed and carried out to compare alexithymia, perceived stress, and bad emotional dysregulation in patients with non-epileptic seizures and epileptic seizures.

3. Methods

3.1. Population and Sample

In terms of purpose, this research project was categorized as a comparative research. It should be noted that in this study, dependent variables consisted of emotional collapse, perceived stress, and emotional ill-regulation. The independent variable was membership of individuals in epileptic or non-epileptic seizures. The study population included all patients with a diagnosis of non-epileptic seizures and epileptic seizures in specialized public and private clinics of neurology, during years 2015 to 2016 in Isfahan. Firstly, with coordination of a neurology expert from a private hospital and a public policlinic, using convenience sampling, two groups of epileptic and non-epileptic seizure ($n = 50$) were selected; according to analysis of variances, 30 subjects were necessary in each groups and according to probable drop-out and degree of power estimation, 50 participants selected for each group. The participants, who had the research inclusion criteria from 10th March 2015 to 10th August 2016, and criteria for diagnosis and discrimination of these two seizures, were

checked symptoms (such as eyes' cornea twisting, having froth in the mouth, spastic, tonic and colonic movements, EEG results, and prolactin levels measurement test, measured 20 minutes after the seizure). In addition, risk of low blood sugar or syncope should be eliminated. Form of consent to participate in the research was given to the participants, and they were provided with the relevant questionnaire. Due to sample loss (failure to answer or not answering the questionnaire), the final sample was reduced to 39 cases of epileptic seizures and 43 cases of non-epileptic seizures. The study inclusion criteria included providing an informed consent to participate in the research and educational level of above secondary school, and the exclusion criteria were not responding to more than 5% of questions per questionnaire.

3.2. Instruments

3.2.1. Alexithymia Questionnaire

This questionnaire was developed by Taylor in 1986 and in 1994 it was revised by Bagby et al. The questionnaire includes 20 items in three subscales, including difficulty identifying feelings (DIF), difficulty describing feelings (DDF), and externality-oriented thinking (EOT). To check the reliability of this scale, Cronbach's alpha for the total scale (α) was obtained as 0.81, and for the three components, it was calculated as 1 = 0.78, 2 = 0.75, and 3 = 0.66. For determining validity of the scale, its correlation with the stress questionnaire was calculated as 0.23. The Farsi version was validated by Pourhosein et al. Cronbach's alpha coefficient for TAS-20 score, difficulty identifying feelings, difficulty describing feelings, and thoughts with externality-oriented thinking was obtained as 0.83, 0.80, 0.73, and 0.71, respectively. The retest reliability for the total score was 0.79 and it was obtained between 0.62 and 0.79 and for the three sub-scales (23).

3.2.2. Perceived Stress Scale

This scale was developed in 1983 by Cohen et al. and has three versions 4-10-14, which is used to measure general perceived stress in the past month. It measures thoughts and feelings about stressful events, control, domination, and coping with experienced stress. A higher score shows greater perceived stress. Cronbach's alpha coefficient for this scale was calculated as 0.74. In order to calculate the validity of the scale, its correlation coefficient was calculated with semiotic sizes as between 0.52 to 0.76. In the validated Persian version, Cronbach's alpha was calculated as 0.81 (24). Content validity of this questionnaire was verified by 10 experts (25).

3.2.3. Cognitive Emotion Regulation Questionnaire

This questionnaire is a self-report questionnaire designed in 1999 by Garnefski et al. and it was published in 2001. The questionnaire is based on theoretical and practical constructs. In this questionnaire, strategies of self-blaming, blaming others, rumination and catastrophizing are regarded as negative emotion regulation strategies and strategies of acceptance, renewed attention to planning, positive re-evaluation, positive reassessment, and adopting a perspective are positive emotion regulation strategies. Internal reliability of the Persian version was validated using Cronbach's alpha for positive strategies and negative strategies as 0.91 and 0.87, and it was calculated as 0.93 for the total inventory (26).

3.3. Procedure

After approval of proposal for implementing the research in the institute, two groups of epileptic and non-epileptic seizure ($n = 50$) that qualified for inclusion criteria were selected. The questionnaire booklet (including research purpose and how to respond to the questionnaire) was prepared and patients were asked to complete the questionnaires up to ten days and return them to the secretary at the health center. After collecting the data, and finally scoring on the basis of the scoring instruction of the questionnaire, data was compiled in the statistical software.

3.4. Statistical Analysis

Data obtained from the research were analyzed using SPSS-19 software by descriptive statistics and inferential analysis (after study of normality and equality of variances presumptions), including MANOVA. Since the purpose of this study was to examine three dependent variables and two independent variables, the 'MANOVA' method was used, because in the multivariable variance analysis, two or more dependent variables are assessed by one or more independent categorical variables.

4. Results

Demographic characteristics and descriptive indexes are given in Table 1. The mean and standard deviation of age were $36/05 \pm 10.22$ for epileptic and 34.81 ± 12.9 for non-epileptic groups. Also, the mean and standard deviation of disease duration were computed as 8.23 ± 2.75 for epileptic and 7.20 ± 2.79 for non-epileptic participants.

As the results of Table 2 show, most means of components of Alexithymia, negative regulation, and perceived stress of non-epileptic group were lower than epileptic cases.

Table 1. Frequency and Percentage of Demographic Characteristics of Participants^a

Variable	Epileptic	Non-Epileptic
Gender		
Male	21 (53.8)	13 (30.2)
Female	18 (46.2)	30 (69.8)
Educational level		
Below high school	19 (48.7)	11 (25.6)
Diploma	18 (46.2)	23 (53.5)
Bachelor and higher	2 (5.1)	9 (20.9)
Marital status		
Single	16 (41)	19 (44.2)
Married	21 (53.8)	22 (51.2)
Widow	2 (5.1)	2 (4.7)
Economic status		
Low	34 (87.2)	36 (85.4)
Moderate	5 (12.8)	7 (14.6)
High	0 (0)	0 (0)
Employment status		
Employed	23 (59)	22 (51.2)
Unemployed	16 (41)	21 (48.8)
Family history		
Yes	19 (7)	20 (51.3)
No	48.7 (16.3)	36 (83.7)

^a Values are expressed as frequency (%).

4.1. Statistical Assumptions

One of the assumptions of using parametric tests is the normality of scores distribution. In this research, the Kolmogorov-Smirnov test was used to test this hypothesis. The hypothesis for normality of scores distribution remains in all research variables and all groups, that is the distribution of sample grades is normal and similar to the society, and deviation and skewness are accidental (all significant levels are greater than 0.05). Also, the assumption of the equality of scores variances in several groups was approved for the research measures. Based on the assumption approval for normality and equality of variances, analysis of variances was used to obtain inferential results.

As observed in Table 3, significance levels suggest that there was a significant difference between the two groups of participants in terms of Alexithymia ($P < 0.05$). Thus, it was concluded that there was a difference between epileptic and non-epileptic people, who were different in terms of alexithymia. According to the mean, it can be noted that alexithymia was higher in non-epileptic people compared to participants with epilepsy. Also, significance levels denote that there was a significant difference between epileptic and non-epileptic groups in terms of perceived stress ($P < 0.05$). Thus, it was found that there is a difference between epileptic and non-epileptic people in terms

Table 2. Mean and Standard Deviation of Variables Among the Two Groups

Variables	Mean \pm SD	Min	Max
Component of Alexithymia			
Difficulty identifying feelings			
Epileptic	17.12 \pm 2.75	13	23
Non-epileptic	30.32 \pm 3.24	16	35
Difficulty describing feelings			
Epileptic	13.79 \pm 3.41	10	19
Non-epileptic	12.39 \pm 1.62	10	16
Externality-oriented thinking			
Epileptic	21.33 \pm 2.22	19	28
Non-epileptic	25.93 \pm 4.69	20	33
Total alexithymia			
Epileptic	52.25 \pm 5.17	43	62
Non-epileptic	68.65 \pm 5.95	52	80
Emotional dysregulation (positive)			
Event acceptance			
Epileptic	8.20 \pm 1.82	6	11
Non-epileptic	12.02 \pm 3.18	8	19
Positive re-evaluation			
Epileptic	10.64 \pm 3.17	6	14
Non-epileptic	10.88 \pm 2.45	7	15
Renewed attention to planning			
Epileptic	10.79 \pm 2.35	7	14
Non-epileptic	10.81 \pm 2.72	8	19
Positive reassessment			
Epileptic	10.28 \pm 2.45	6	13
Non-epileptic	7.65 \pm 51.98	5	14
Adopting perspective			
Epileptic	10.33 \pm 1.95	7	13
Non-epileptic	7.30 \pm 3.00	4	14
Dysregulation (positive)			
Epileptic	50.25 \pm 7.05	34	63
Non-epileptic	48.67 \pm 6.77	36	62
Emotional			
Self-blaming			
Epileptic	10.51 \pm 1.65	8	13
Non-epileptic	9.69 \pm 3.71	4	15
Dysregulation (negative)			
Rumination			
Epileptic	12.92 \pm 1.93	10	15
Non-epileptic	13.55 \pm 2.59	10	18
Catastrophizing			
Epileptic	9.02 \pm 1.30	7	11
Non-epileptic	13.97 \pm 2.07	10	17
Blaming others			
Epileptic	6.89 \pm 1.39	5	9
Non-epileptic	14.30 \pm 3.36	8	19
Emotional dysregulation (negative)			
Epileptic	39.35 \pm 3.37	32	46
Non-epileptic	51.37 \pm 5.41	40	63
Perceived stress			
Epileptic	32.35 \pm 7.12	21	46
Non-epileptic	40.48 \pm 5.50	24	48

of perceived stress. According to the mean, it can be noted that perceived stress is higher in non-epileptic participants compared to epileptic participants.

5. Discussion

The current study aimed at comparing alexithymia, perceived stress, and emotional dysregulation in epileptic and non-epileptic individuals.

The research findings showed that there is a significant difference between scores of alexithymia and two components of difficulty identifying feeling and externality-oriented thinking in the two groups. Results corresponded with Myers et al. they investigated the prevalence of alexithymia in epileptic and non-epileptic seizures and prediction of non-epileptic seizures, and showed that the mental damage and pessimism in patients with non-epileptic seizure are accompanied by alexithymia (27). The findings of this study are consistent with the above research. Furthermore, a research by Davoodi and Afshari found that high neuroticism and openness to experience and agreeableness had a meaningful relationship with alexithymia, yet extraversion and conscientiousness was not relevant in anticipation of alexithymia. Therefore, personality traits can predict alexithymic characteristics in individuals (28). Another study by Baghian et al. (2014) showed a negative relationship between alexithymia and MS patients' general health; a higher the level of alexithymia in a patient was associated with lower general health. Research results of Isazadegan et al. suggested that there is a connection between all alexithymia factors and mental health and its aspects. Studies suggest that alexithymia is associated with some physical illnesses, such as pain, bladder inflammation, diabetes, hypertension, and heart diseases. Dubey et al. believed that alexithymia is a risk factor for many psychiatric disorders because patients with this condition show strong physical-emotional correlations. This impairment prevents the adjustment of emotions, making it difficult to successfully adapt (29). However, this study showed that individuals with non-epileptic seizures scored higher in having difficulty recognizing emotions and thinking with an external orientation, and it was notable that the overall score in non-epileptic seizure patients was higher than those with epileptic seizures.

These findings are indirectly consistent with the findings of Myers et al. on accompaniment of trauma and cynicism in patients with non-epileptic seizures and alexithymia (27). Dubey et al. believed that alexithymia is a risk factor for several psychiatric disorders, because people with this problem cannot express their physical sensations

(29). When emotional information cannot be perceived and evaluated in cognitive and perceptual processing, people develop emotional and cognitive confusion and this helplessness and inability disturbs organization of their emotions and cognitions. These people are unable to identify, perceive or describe their emotions due to lack of emotional awareness and inability in cognitive processing of their emotions. If these emotions are not discharged and one cannot verbally express negative emotions, negative psychological symptoms, such as depression and anxiety increase. People, who have the ability to recognize their own feelings and emotional states effectively can better face life problems and they are more successful in compatibility with the environment and others, and as a result, these people have better mental health. Patients with alexithymia have undifferentiated emotions and feelings associated with physiological arousal.

Research findings showed there is a significant difference between the two groups in terms of perceived stress, so that perceived stress was higher in non-epileptic patients than epileptic patients. These findings are consistent with the findings of Myers et al. (17). A study by Myers et al. titled "Stress coping strategies in patients with psychogenic non-epileptic seizures and how they relate to trauma symptoms, alexithymia, anger, and mood" showed that these patients use emotion-focused strategies to deal with stress, which is successful in the short-term and focus on emotions rather than assessing and solving the problems; also, stress levels rise because of their alexithymia and cognitive distortions. Moreover, an investigation by Shokouhi et al. stated that there is a meaningfully higher perceived stress in individuals with external attribution in different situations. Also, there is a difference in perceived stress between individuals with uncontrollable attribution and those with controllable attribution in overall, negative, and personal situations, which is higher in those with uncontrollable attribution (26).

Stress acts as a chain sequence and it is created in the individual in the initial evaluation of threat and continues with physical and mental effects. Thus, it can be stated that since there is no brain cause in patients with non-epileptic seizure, and one experiences seizure due to stressful situations or traumas, patients with non-epileptic seizure have more stress compared to patients with epileptic seizure. Given that external factors cause stress in individuals, and since the reason for seizure in patients with non-epileptic seizure is not brain causes, thus, the number of seizures in people with non-epileptic seizures is higher than those with epileptic seizures. People with non-epileptic seizures do not want to experience seizure, thus, they avoid stress

Table 3. Results of Multivariate Analysis of Variances of Variables Among the Two Groups

Research variable	Sum of Squares	Degree of Freedom	Mean of Squares	F	P Value	Eta Square	Statistical Power
Alexithymia	549.041	1	549.041	175.400	0.005 ^a	0.687	0.99
Difficulty identifying feelings	3562.004	1	3562.004	390.463	0.005 ^a	0.830	0.99
Difficulty describing feelings	40.057	1	40.057	5.799	0.018 ^a	0.068	0.662
Externality-oriented thinking	432.165	1	432.165	30.955	0.005 ^a	0.279	0.99
Perceived stress	1351.562	1	1351.562	33.771	0.005 ^a	0.297	0.99
Event acceptance	298.140	1	298.140	43.261	0.005 ^a	0.351	0.99
Positive reevaluation	1.205	1	1.205	0.152	0.698	0.002	0.067
Renewed attention to planning	0.007	1	0.007	0.001	0.973	0.00	0.050
Positive reassessment	141.555	1	141.555	28.621	0.005 ^a	0.263	0.99
Adopting perspective	187.886	1	187.886	28.699	0.005 ^a	0.264	0.99
Negative emotional dysregulation	2951.418	1	2951/418	141.979	0.005 ^a	0.640	0.99
Self-blaming	13.589	1	13.589	1.592	0.211	0.020	0.239
Rumination	8.248	1	8.248	1.551	0.217	0.016	0.234
Catastrophizing	501.329	1	501.329	163.510	0.005 ^a	0.671	0.99
Blaming others	1121.389	1	1121.389	163.510	0.005 ^a	0.671	0.99

^a P < 0.05.

and since they are not able to cope with the source of stress, they tolerate more stress and are caught by seizure, and experience higher frequency of seizures.

The results of this research showed that there are significant differences in terms of event acceptance, positive reassessment, adopting perspective, negative emotional dysregulation, catastrophizing, and blaming others in the two groups. In addition, findings of the current work showed that total score in positive emotion regulation in patients with epileptic seizure was higher and people with non-epileptic seizure gained higher score in event acceptance component. Shepherd and Wild stated that people, who have higher physiological arousal, have fewer negative emotions and people, who express or receive more negative emotions are less likely to use cognitive strategies (30). There is indirect compliance between this study's findings and those of Argyle (31); in their study, teaching emotion control and correct methods for expressing those emotions, proper ways to deal with problems and events, and learning the right way to communicate with individuals, helped patients improve their relationship with others. Also considering these trainings and altering their interpretation to a more logical one, they obtained a better view of the events and this positive attitude led to fewer difficulties in their relationships with others. Considering problems of these patients in the field of personal relationships and given the fact that the connection is systemic and

in mutuality with the family, peers, and community, it is plausible to think that the intervention was able to correct their communication network.

People with epileptic seizures, since in all situations, even situations without stress, constantly monitor their behavior to correct their behavioral manifestations at the time of excitement, they are more successful in positive emotion regulation than those with non-epileptic seizures. Noting that emotions occur before behaviors and the individual's adaptation to the requirements of physical and social environments are optimized, people with non-epileptic seizures experience more negative emotions during the day because they do not have the ability to regulate their emotions effectively and this leads to a decrease in mental health in these people.

Overall, the results indicated that people with non-epileptic seizures compared with those with epileptic seizures are more unfavorable in terms of psychological factors. These findings help mental health experts, including psychologists and psychiatrists to promote individual health by identifying factors affecting seizure. Also, it is suggested that people with seizure should participate in educational workshops for training emotion regulation and training improvement of individual perception of stressful situations so that they have less number and duration of seizures. Limited study sample and having physically undesirable people in the study were the limita-

tions of this study. Conducting research in a wider range (of the sample) and comparing between other psychological variables, such as personality characteristics, is proposed.

5.1. Conclusion

Considering that seizures, especially epileptic seizures, introduce some difficulties in social adequacy with others and have a significant effect on normal cognitive functions and patient's behavior, it is likely that these seizures affect alexithymia, perceived stress, and emotional dysregulation in individuals with both epileptic and non-epileptic seizures. The limitations of the present studies include limited sample and not considering the effects of drugs use, alcohol etc. on the patients. In future work, investigating these factors might prove important. To fill the literature gap, this paper investigated and compared epileptic and non-epileptic seizures for the first time in the Iranian society. Since this issue has not been studied in Iran perhaps comparing alexithymia, perceived stress and emotional dysregulation in seizure patients can provide a suitable approach in order to facilitate the treatment of these patients through their assistance in identifying excitements and controlling stress, consequently reducing the number of these seizures indirectly. Understating the difference between these two seizure types (epileptic and non-epileptic) can indicate that the cause of non-epileptic seizures is not being able to control excitement and stress.

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Footnotes

Authors' Contribution: Mitra Mirlohan conducted the sampling, performed the intervention, and collected the data. Sayed Abbas Haghayegh designed the research, performed the statistics analysis, drafted and revised the manuscript, designed and interpreted the clinical data of research.

Conflict of Interests: No conflict of interest for the authors.

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