Brief Report DOI: 10.22114/ajem.v0i0.334

Predisposing Factors of Seizure in Patients Presenting to the Emergency Department; a Brief Report

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Published online: 2020-01-23

Abstract

Introduction: Identifying predisposing factors of seizure can be somewhat helpful in preventing it from occurring.

Objective: The present study has been designed aiming to assess the frequency of predisposing factors of seizure in patients visiting the emergency department (ED).

Methods: The present prospective cross-sectional study was performed on adult patients presenting to ED following seizure during 1 year. Known or probable predisposing risk factors for seizure were extracted from various studies and were asked from patients or their relatives during history taking and clinical examination.

Results: Finally, 246 seizure patients with the mean age of 38.8 ± 18.3 (18 – 92) years were included (68.7% male). Most patients were in the 18–29 years age group (41.1%), had an educational level less than high school diploma (59.8%), and were unemployed (47.8%). Among the predisposing factors of seizure, emotional stress with 107 (43.7%) cases, insomnia with 44 (17.9%), and irregular use of antiepileptic medications with 36 (14.6%) cases were the most common predisposing factors, respectively. In 43.5% of the patients, no identified predisposing factor was found. Insomnia ($p = 0.002$), stress ($p < 0.001$), and substance abuse ($p < 0.001$) were the most important predisposing factors of seizure in individuals less than 60 years old. In addition, being in the menstruation period was also shown to be a predisposing risk factor for women aged less than 60 years ($p = 0.002$).

Conclusion: Emotional stress, insomnia, and irregular use of antiepileptic medication were the most important predisposing factors of seizure in the studied patients. In more than 40% of patients presenting to ED following seizure, no predisposing factor was found.

Key words: Causality; Emergency Service, Hospital; Prevention and Control; Risk Factors; Seizures

Cite this article as: Rahmati F, Alavi S, Safari S. Predisposing Factors of Seizure in Patients Presenting to the Emergency Department; a Brief Report. Adv J Emerg Med. 2020;4(4):e90.

INTRODUCTION

Seizure is caused by aberrant brain discharges, which although is not life-threatening in most cases; it can affect the quality of life in those suffering from it. Prevalence of seizure has been estimated as about 4.2 cases in 100,000 population in adults and 23.17 cases in 100,000 population in children (1, 2). Many underlying factors make the individual prone to seizure, which are divided into 2 groups of inducer and provocative. Inducer factors are mostly environmental or internal factors, which lead to a drop in the threshold of seizure incidence; while, provocative factors are mostly chemical and physiological stimulants, which make the individual prone to manifesting seizure (3-5). For most patients, it is difficult and sometimes even impossible to diagnose which factors clearly and particularly cause the initiation of seizure in them (6). Not consuming medication regularly, using an excessive dose of medication, anxiety, emotional stress, heavy physical activity, insomnia, fatigue, hunger, fever, and smoking have been introduced as predisposing factors of seizure in various studies (7-10). By identifying predisposing factors of seizure and trying to eliminate or control them, we can help improve the quality of life in these patients through a decrease in the number of times seizure occurs. Therefore, the present study has been designed aiming to assess predisposing factors of seizure in those visiting the emergency department (ED).

Methods

Study design and setting

The present prospective cross-sectional study was performed on adult patients presenting to the EDs of Shohadaye Tajrish, Loghmane Hakim, and Imam

Hossein Hospitals, Tehran, Iran, following seizure during 1 year. Known or probable predisposing risk factors for seizure were extracted from various studies and were asked from patients or their relatives during history taking and clinical examination. Informed consent was obtained from all patients for inclusion in the study. Protocol of the study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences.

Participants

Patients presenting to the mentioned EDs with complaint of seizure were included in the study using non-probability convenience sampling without any limitations regarding sex, history of seizure, type of seizure, and probable cause of seizure. Patients with status seizure, those unable to answer questions, pregnant patients, children under 18 years old and individuals who did not give their consent for participation were excluded.

Data gathering

For gathering data, a checklist consisting of age, sex, level of education, childbearing status of women, place of seizure occurring, occupational data (temperature and humidity of workplace, environmental noise level, height of workplace), history of seizure, underlying diseases, type of medication and its method of use, family history of seizure, history of head trauma, history of infection, status and type of nutrition, sleeping status, being exposed to light and sound stimulants, watching TV, playing computer games, long duration of reading, characteristics of taking a shower, emotional stress, and substance abuse was filled out for all of the patients. In this study, definite or probable risk factors of seizure were extracted via review of literature and consultation with experts. A senior emergency medicine resident was responsible for gathering data from the patients or their relatives.

Statistical analysis

The required sample size for assessing predisposing factors of seizure based on 95% confidence interval (CI), frequency of 67%, and maximum acceptable error of 7, was estimated as 173 cases. Data were analyzed using SPSS statistical software version 21. Comparisons were done using chi square test with 95% CI. For describing qualitative variables, frequency and percentage, and for quantitative analyses, mean ± standard deviation (SD) were used.

RESULTS

Baseline characteristics of the studied patients

Finally, 246 patients with the mean age of 38.8 ± 18.3 (18 – 92) years were included (68.7% male). Table 1 depicts the baseline characteristics of the studied patients. Most patients were in the 18 – 29 years age group (41.1%), had an educational level less than high school diploma (59.8%), and were

Table 1: Baseline characteristics of the studied patients

Demographic data	Frequency (%)
Sex	
Male	169 (68.7)
Female	77 (31.3)
Level of education	
Less than high school diploma	146 (59.8)
High school diploma	81 (33.2)
Bachelor's degree	16 (6.2)
Occupation	
Unemployed	117 (47.8)
Self-employed	92 (37.6)
Student	16 (6.5)
Laborer	13 (5.3)
Employee	7 (2.9)
Underlying disease	
Hypertension	30 (12.2)
Brain tumor or brain metastasis	22 (8.9)
Brain stroke	18 (7.3)
Diabetes	32 (13.0)
Hyperlipidemia	8 (3.2)
Myocardial infarction	5 (2.0)
Head trauma	28 (11.4)
Seizure following head trauma	7 (2.9)
Family history of seizure	14 (5.7)
Brain infection	9 (3.7)
Other	21 (8.5)
History of seizure	
Yes	144 (58.5)
No	102 (41.5)
Duration of being affected with seizure (months)	
0 to 6	66 (45.8)
6 to 12	39 (27.1)
≥ 12	39 (27.1)
Anti-seizure medications	
Sodium valproate	46 (18.7)
Phenytoin	36 (14.6)
Carbamazepine	30 (12.2)
History of substance abuse	
Smoking	47 (19.1)
Methadone consumption	28 (11.4)
Alcohol	21 (8.5)
Drugs	13 (5.3)
Narcotics	8 (3.2)
Buprenorphine	4 (1.6)
History of medications	
Cardiac	28 (11.4)
Anti-depressant	11 (4.5)
Benzodiazepine	10 (4.1)
Anti-psychotic	9 (3.7)
Tricyclic antidepressants	5 (2.0)
Neurodegenerative	4 (1.6)
Pain controlling	2 (0.8)
High-dose penicillin	1 (0.4)

Table 2: Frequency of predisposing factors of seizure among the studied patients

Risk factors related to the present seizure	Frequency (%)
Emotional stress	107 (43.7)
Insomnia	44 (17.9)
Hunger	28 (11.4)
Menstruation	5 (2.0)
Watching television	4 (1.6)
Playing computer games	4 (1.6)
Fever	3 (1.2)
Long duration of reading	1 (0.4)
Carbon monoxide poisoning	1 (0.4)
Sciaenid poisoning	1 (0.4)

unemployed (47.8%). 144 (58.5%) patients had a history of seizure among which, 66 (45.8%) patients revealed a history of seizure in the past 6 months.

Prevalence of predisposing factors of seizure

Among the predisposing factors of seizure, emotional stress with 107 (43.7%) cases, insomnia with 44 (17.9%) cases, and irregular use of antiepileptic medications with 36 (14.6%) cases were the most common predisposing factors in the studied patients, respectively (table 2). In 43.5% of the patients, no identified predisposing factor was found.

Based on the findings of the present study, insomnia ($p = 0.002$), stress ($p < 0.001$), and substance abuse ($p < 0.001$) were the most important predisposing factors of seizure in individuals less than 60 years old. In addition, being in the menstruation period was also shown to be a predisposing risk factor for women aged less than 60 years ($p = 0.002$). 81% of those aged higher than 60 years had no predisposing factor for occurrence of seizure ($p < 0.001$). Irregular use of medication was significantly higher in men (72.2%) compared to women (27.8%) ($p = 0.02$). Additionally, substance abuse as a predisposing factor had a higher prevalence in men ($p < 0.001$). Those who had a history of seizure had a lower rate of substance abuse compared to others ($p < 0.001$). Other predisposing factors including childbearing status, nutrition, insomnia, stress, and visual stimulants were not different between those with and without a history of seizure.

Discussion

Based on the findings of the present study, emotional stress, insomnia, and irregular use of seizure controlling medication were the most important predisposing factors of seizure in the studied patients. In more than 40% of patients presenting to ED following seizure, no predisposing factor was found for the occurrence of seizure.

In various studies, stress has been introduced as one of the most important factors in induction of seizure (11-13). In addition, in various researches, not consuming medication, emotional stress, insomnia, exhaustion, hunger, fever, and smoking are introduced as major reasons for seizure. Other items such as doing calculations, eating heavy meals, heavy physical activity, high humidity, excessive consumption of medication, fighting, sleep characteristics, smoking, vomiting and sweating are identified as initiators of seizure (7, 8, 13).

In this study, male patients with the mean age of 38 years made up the majority of cases presenting, which is in line with other similar epidemiologic studies (13, 14). Level of education and occupation of most studied patients were less than high school diploma and unemployed, respectively. If people reach an appropriate level of knowledge and attitude regarding the provocative factors, seizure cases may significantly decrease via controlling these factors. In a study by Nakken et al. there was a significant correlation between level of education and occurrence of seizure (1).

Regarding the history of taking medication, a high percentage of patients had a history of consuming sodium valproate or irregular use of antiepileptic medications. Among other medications that may play a role in occurrence of seizure, ceftriaxone and benzodiazepines have been pointed out in some studies (15, 16); yet, similar results were not found in the present study considering the medication history of the patients. In this study, tramadol consumption, smoking and methadone use had the highest rate in seizure patients. In a similar study, history of tramadol consumption was positive in 49% of the patients (17).

In evaluating the correlation of age and sex with predisposing factors of seizure occurrence it was determined that in those aged less than 60 years, insomnia, stress, and substance abuse are among the most effective factors in incidence of seizure, yet in those over 60 years old, predisposing factors were rarely seen. Being on the menstruation period should not be overlooked as a predisposing factor for women aged less than 60 years. Irregular consumption of medication and substance abuse play a much bigger role in causing seizure in men compared to women. Those with a history of seizure had a lower rate of substance abuse compared to others. On the other hand, none of the predisposing factors of seizure had any correlation with family history of seizure. It seems that with

identifying effective factors in seizure incidence and introducing them to patients in educational pamphlets to improve the knowledge of the patients, we can prevent more seizures from occurring and avoid its debilitating side effects and improve the quality of life among these patients. Of course generalizing the results obtained from this study to the general population requires further studies with larger sample sizes in different healthcare centers.

Limitations

Not paying enough attention when filling out the seizure patients' medical profiles by the in charge physician and also not having all the required data in some cases are among the limitations of the present study. Additionally, there is also a possibility that some participants did not tell the truth about substance abuse. Moreover, having difficulty recalling the questioned information in the recovery phase after seizure should also be added to the limitations of this study.

Conclusions

Based on the findings of the present study, emotional stress, insomnia, and irregular use of antiepileptic medication were the most important predisposing factors of seizure in the studied patients. In more than 40% of patients presenting to ED following seizure, no predisposing factor was found.

Acknowledgements

The present article is derived from the thesis by Dr. Shideh Alavi for earning her specialist degree in emergency medicine from Shahid Beheshti University of Medical Sciences. All those who contributed to performance of the project are thanked.

Authors' contribution

All the authors met the standard criteria of authorship based on the recommendation of International Committee of Medical Journal Editors.

Conflict of interest

The authors declare that there is no conflict of interest regarding the present study.

Funding

No fund has been received for carrying out this project.

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