DETERMINATION OF PHYSICAL FUNCTIONING FOR EPILEPTIC PATIENT WITH VAGUS NERVE STIMULATOR IMPLANTATION

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Abstract

Background: Epilepsy is one of the most common neurological disorders with physical, emotional, and social consequences. Previous studies indicate that epilepsy symptoms can highly affect the epileptic patients' satisfaction in life.

Objectives: This study aim to explore of physical functioning for epileptic patient with vagus nerve stimulator implantation.

Methodology: A quantitative cross-sectional design was conducted in outpatient clinics at Amriya General Hospital. The Study Period Was extended from September 20th 2023, to February 20th 2024. Nonprobability purposive sampling was used including 100 patients with Vagus nerve stimulator implantation who visited outpatient clinics (epilepsy consultation) at Dr. Saad Al Watari Neurological Sciences Hospital and Neurosurgical Hospital, Iraq. The study instruments consist of two parts. First, regarding socio-demographic characteristics about the participants. The second part the quality of life was assessed using the SF-36item short form survey questionnaires . Data was collected by using structured and the collected data were analyzed using SPSS version 26.

Results: A total of 100 epileptic patients with a mean age 32±SD=2.9) years were involved in the study. 55% were male, and (45%) were females. Majority of the study participant was unmarried, (48%) followed by married, which accounts (45%). Concerning educational status, (40%) had primary education degree. Regarding monthly income, (73%) gets monthly income 300.000–600.000 ID, most of study participants related occupation (36%) were student. Concerning living, (55%) live in urban area. The result of this study was revealed that 47% (M±SD= 21.78 ± 7.036) of the respondents had moderate functional status of quality of life domain. There were statistically significant differences (P- value <0.05) between socio-demographic characteristics and functioning domain regarding level of education, and occupation.

Conclusion: This study revealed that the quality of life functioning domain among patients with epilepsy was moderate. Epilepsy is highly comorbid with physical disorders, which often additionally limit patient functional abilities in every day.

Keywords: Determination, Physical Functioning, Epileptic Patient, Vagus Nerve Stimulator Implantation

INTRODUCTION

Epilepsy is one of the most common chronic neurological disorders, affecting more than 70 million people of all ages, races, and social status, with neurobiological, cognitive, psychological, and social consequences [1]. Epilepsy is a disease that can begin at any time of life. The pattern of age distribution in the prevalence of epilepsy varies among different countries. In developed countries, the prevalence increase during adolescence tends to be stabilize in adulthood and increase with age after 50, with the highest prevalence occurring in the elderly [2]. Nearly 80% of people with epilepsy live in low- and middle-income countries, with a lifetime prevalence varying from 5.8 per 1000 (developed countries) to 15.4 per 1000 [3]. Globally, an estimated five million people are diagnosed with epilepsy each year. In highincome countries, there are estimated to be 49 per

100 000 people diagnosed with epilepsy each year. In low- and middle-income countries, this figure can be as high as 139 per 100 000. [4]. Approximately one-third of patients with epilepsy (PWE) are unresponsive to antiepileptic drugs (AEDs), which is called drug-resistant epilepsy (DRE). Most PWE suffer not only from disabling seizures but also a wide range of psychological comorbidities such as depression, anxiety, and high suicidality, which influence their quality of life (QOL) and seizure control [5].People with epilepsy face a condition that can affect their quality of life (QoL) in multiple domains. these include physical (increased risk of injury and death), psychological (increased risk of anxiety and depression), cognitive (both epilepsy and the medications used to treat it are associated with impaired cognition), and social and occupational (epilepsy is a stigmatizing condition, and also often carries limitations on

driving and employment). Hence, assessment of QoL is important in the management of epilepsy to achieve the optimal goal of therapy [6] .In addition to the economic burden, epilepsy patients are faced with seizure associated injuries and premature mortality [7]. Recurrent seizures and the associated depression/anxiety imparts epilepsy patients with a reduced quality of life [8]. Therefore, there remains an unmet need for curative or seizure-suppressive therapies for epilepsy patients [9]. The psychosocial effects of epilepsy have led to the need to quantify quality of life in epileptic patients [10] Vagus nerve stimulation (VNS) modulates the neural network by electrically stimulating the vagus nerve in order to treat diseases such as drug-resistant epilepsy (DRE). Some patients with epilepsy caused by structural etiologies, of them, become seizure-free by lesion resection, however, others who are not suitable for lesion resection or are not seizure-free after the surgery also use anti-seizure medications (ASMs), a ketogenic diet, and neuromodulation such as VNS to control seizures [11]. Therefore, this study was aimed to address the effect of vagus nerve stimulator implantation on Quality of life, physical status and its associated factors among patients with epilepsy.

Materials and Methods

3.1. Study design:

A descriptive cross-sectional design study was used to achieve the purposes of the current study that are stated earlier to evaluate impact of Vagus nerve stimulator implantation upon quality of life for epileptic patients.

3.2. Setting and period:

The study was carried out among patients who visited the outpatient clinics (neuro medicine Consultation) at Dr. Saad Al-Watery for Neurological Sciences teaching hospital and Neuro surgery teaching hospital at Baghdad Governorate, Iraq, that received all cases related to diseases of the nervous system, from September 20th 2023, to February 20th 2024. The total number of participating patients reached 100.

3.3. Study Population:

The study population was epilepsy patients who underwent vagus nerve stimulator implantation who have followed up in at Dr. Saad Al-Watery for Neurological Sciences teaching hospital and Neuro surgery teaching hospital at Baghdad Governorate, Iraq

3.4. Inclusion and exclusion criteria:

All patients aged 18 years and above with a diagnosis of epilepsy, patients who underwent vagus nerve stimulator implantation. Selection of male and female epileptic patients from different ages., Exclusion criteria patients who refused to participate in the study and patients who have not undergone vagus nerve stimulator implantation.

3.5. Study instruments and Data collection procedure:

Data was collected by using structured questionnaires consist from two parts. First regarding socio-demographic characteristics of patients including (age, sex, educational level, Residence, marital status, monthly income, occupational status, family history of epilepsy, patient's age at the onset of epilepsy,

and age of a vagus nerve stimulator implantation). The second part SF-36item short form survey questionnaires, this scale includes 36 items that can be used to measure quality of life. Each item is multiple choice, quality of life scale (MAS), it is comprised of (36) items divided into eleven axes a follow: -No. (1) Item related to health condition in general, (1) Item related to health status compared to last year, (10) Items related to daily activities, (4) Items related to physical problems that hinder the performance of daily activities, (3) Items related to psychological problems that hinder the performance of daily activities, (1) Item related to physical and psychological problems that hinder the performance of social activities., (1) Item related to the intensity of physical pain during the past month., (1) Item related to physical pain and the extent to which it interferes with performing your daily tasks., (9) Items related to feelings about the progress of medical matters due to the health condition during the past month., (1) Item related to the amount of time your physical and mental health interfered with your social activity, (4) Items related to a person's feeling about his health condition.

3.6. Ethical considerations:

The study protocol was approved by the Institutional Review Board (IRB) of the College of Nursing, University of Baghdad with IRB number MTB/1640/16/11/2023. Permission was obtained in the form of written informed consent from the study participants and another concerned body of the hospital administers. To ensure confidentiality, any identifying information about the study participants was not indicated on the questionnaires and they were informed that the collected data is used only for research purposes.

3.7. Data analysis:

The data were analyzed using Statistical Package for Social Science (SPSS) version 26. Descriptive statistics were used in this study (e.g., mean, standard deviation, frequency, and percentage). For quantitative data. The correlation between sociodemographic characteristics and the physical status domain related quality of life was examined by Spearman correlation coefficient test. Data was statistically significant when the p-value ≤ 0.05.

Results:

The study included 100 patients with epilepsy, mean age 32($\pm$SD=10) years (range 18 60) years; more than half (55%), of were male; 48 (48%) were not married; 40 (40%) had primary school education; 73 (73%) were Monthly income, between 300.000-600.000 Iraqi Dinars. Regarding occupation, 36 (36%) of the participants were student (Table 1). Regarding physical functioning SF-36 item QOL domain of the participants, 47 (47%) had moderate physical functioning as reported based on total mean (M$\pm$SD= 21.78 $\pm$ 7.036) (Table 2). This study shows statistically significant differences between Physical Functioning domain for Epilepsy Patients with socio-demographic characteristics regarding level of education, and occupation at a P- value <0.05. (Table 3).

Table 1: Distribution of Patients according to their Socio-demographic Characteristics

No	Characteristics		Frequency	Percent
1	**Age group (year)**	18 – less than 28	62	62
		28 – less than 38	24	24
		38 and more	14	14
		Total	*100*	*100*
2	**Sex**	Male	55	55

No	Characteristic		f	%
		Female	45	45
		Total	*100*	*100*
3	**Residency**	Urban	55	55
		Rural	45	45
		Total	*100*	*100*
4	**Level of education**	Primary school	40	40
		Intermediate school	29	29
		Secondary school	8	8
		Diploma	6	6
		Bachelor	15	15
		Postgraduate	2	2
		Total	*100*	*100*
5	**Marital status**	Unmarried	48	48
		Married	45	45
		Widowed/er	3	3
		Separated	2	2
		Divorced	1	1
		Total	*100*	*100*
6	**Monthly income (Iraqi Dinars)**	300000 – 600000	73	73
		601000 – 900000	19	19
		901000 and more	8	8
		Total	*100*	*100*
7	**Occupation**	Employee	25	25
		Free works	12	12
		Retired	1	1
		Students	36	36
		Jobless	19	19
		Housewife	7	7
		Total	*100*	*100*

f: Frequency, %: Percentage

Table 2: Assessment of Physical Functioning for Epilepsy Patients with Vague Nerve Simulator Implantation

Physical functioning	Frequency	Percent	Mean	Sd	Ass.
Low	25	25			
Moderate	28	28	21.78	7.036	Moderate
High	47	47			
Total	*100*	*100*			

M= Mean of score, SD: Standard Deviation, (A.D.): Assessment Degree, M.s=mean of score [(1 – 1.66) = low (L); (1.67 – 2.33)= Moderate(M) ; [(2.34 – 3) = High (H)

Table 3: Relationships between Physical Functioning for Epilepsy Patients with their Sociodemographic Characteristics

No	Characteristics	Physical functioning		
		Correlation	P-value	Sig
1	Age	.071	.485	N.S
2	Sex	.173	.085	N.S
3	Level of education	**.246**	**.014**	**S**
4	Residency	.010	.923	N.S
5	Marital Status	.066	.515	N.S
6	Monthly income	.127	.208	N.S
7	Occupation	**.276**	**.005**	**H.S**

rs: Spearman Correlation coefficient, r*: Biserial correlation coefficient, P: Probability, Sig: Significance, N.S: Not Significant, S: Significant, H.S: High Significant

Discussion:

Regarding students' socio-demographic characteristics, the present study findings indicated that more than half of the respondents were male and the remainder were female. The majority of them were in the age group between 18 and 60 years, and the mean age of students was 32 ± 2.9. nearly to half of the study sample were single, and the remainder were married. Concerning educational status, (40%) of study participant hold primary school degree. (73%) of study sample were gets monthly income 300.000–600.000 ID, most of study participants related occupation (36%) were student. Concerning living, (55%) live in urban area. These findings agreed with many studies, which found that (51.8%) were male, and (48.2%) were females. The mean age of the study participant was 30.7 years with ± 10.04 standard deviation. Majority of the study participant was unmarried, (57.7%) followed by married, which accounts (37.0%). Concerning educational status, (27.6%) were completed grade (26.8%) were completed

grade 1–8 and 71 (18.1%) have degree and above. Regarding monthly income, (31.6%) gets monthly income 501–1000 EB followed by monthly income greater than 2000 EB which accounts 99 (25.3%); whereas the mean monthly income was 1490.72 ± 1183.5 SD. Concerning living condition, (84.9%) live with parents [12-16]. The findings are in accordance with the results obtained from [17,18,19], who reported that the majority of subjects (93.3%) had an age range between 18 and 80 years. 95.6% were males, and the rest (8.33%) were females. According to their place of residence, 55% belong to rural areas and 45% belong to urban areas. Regarding physical functioning SF-36 item QOL domain of the participants, 47 (47%) had moderate physical functioning as reported based on total mean (M±SD= 21.78 ± 7.036). This result was in line with 61.49 mean score of Indian and 58 mean score of Ugandan studies [20,21]. These findings related functional domain disagree with different studies in this study, we estimated the quality of life of peoples living with epilepsy. The result showed that the mean quality of life is 60.47 ± 23.07 SD. The mean quality of life of in this study is similar with a study done in Uganda [22] and Addis Ababa [23]. However; the mean quality of life in the present study is lower than a study done in Australia [24]. Seizure frequency was significantly associated with quality of life. The probable explanation might be frequent seizure has been related to excess fear, feeling of stigmatization and limit their physical activity. This might lead to impairment in physical activity and psychological problems. This finding was consistent with other studies [25,26,27,28]. This finding disagrees with study's findings showed However, the other two domains (physical and psychological domains) had similar frequency distribution of poor quality of life which accounts for 182 (45.30%) [29]. Whereas a study which was conducted in Brazil showed that the physical domain (27.6%), psychological domain (33.3%), and social domain (32.1%) were found to be a higher poor quality of life than the environmental domain (25.0%) [2]. While 80% of epileptic patients live in developing countries, the primary goals of treatment are focused on physical complications and the control of seizures, while epileptic patients suffer from several psychological challenges such as low self-confidence, depression, and social challenges such as driving constraint, unemployment, and social isolation. These patients are less likely to get married, and they are more likely to get a divorce. Although epilepsy has effects on different social dimensions, marriage is the first source of social support and predicts health status. Studies show that married people report better psychological and physical health compared to single people [30]. The present study revealed that the quality of life of patients with epilepsy was significantly associated with educational status and occupation. This was supported by studies that were conducted in the United States of America and in Jimma teaching hospital [31,32]. The finding of this study showed that educational status was significantly associated with the quality of life of PWE. Those respondents who were unable to read and write were nearly three times more likely to have a poor quality of life than people who had a higher educational level. Respondents who were able to read and write were nearly two times more likely to have a poor quality of life than their counterparts. This finding was in line with studies in [33,34,35] The possible reason might be lower educational status had more prone to traditional attitude and decreased self-esteem which leads to psychologically unstable about the disease than well educated.

The association between socio-demographic and patient physical functioning score was explored. There is no relationship found with rest of studied variables. These findings are in line with study done by [36,37,38], who reported that found no statistically significant evidence for a real difference between mean scores with respect socio-demographic.

Limitation of the study: The study design is cross-sectional in nature and cannot confirm causality. The study design included all patients with a diagnosis of epilepsy, leading to a heterogeneous population. Another limitation is that the self-reported QoL and health-related scores represented the patients' subjective physical status, especially for daily living activities.

Conclusions: In conclusion, the mean health-related quality of life functional domain of people living with epilepsy in this study was moderate. This study found that VNS reduced the average frequency of seizures in patients with epilepsy, Physical Functioning and quality of life are also improved. Provide these results Further evidence of the therapeutic effect of VNS on patients' psychiatric comorbidities with epilepsy. Improvement in QOL metrics was significantly related to more favorable seizure outcome, and was associated with higher rates of VNS generator replacement. A large, prospective study using standardized measurements is needed to further evaluate QOL outcomes with VNS and other neuromodulation-based therapies. We suggest that it is up to health care system to give information and educate PWE and the society about the possible overwhelming factors which may affect the QOL in epileptic patients.

Author contribution
All authors made a significant contribution to the conception, study design, acquisition of data, analysis and interpretation. Furthermore, all authors took part in drafting, revising or critically reviewing the manuscript; gave final approval of the version to be published; have agreed on the journal to which the manuscript has been submitted; and agree to be accountable for all aspects of the works.

Conflict of interest
The authors have no potential conflicts of interest to disclose.

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