To Study the Cognitive Functions and Quality of life in patients with Epilepsy

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Abstract

Introduction: Epilepsy is one of the most widely recognized neurological conditions, influencing people of all ages in the world. According to Global Burden of Disease Collaborators, in 2016 epilepsy was contributing to 0.5% of the total disease burden and accounted for >13 million DALYs. Cognition of the human mind is a conjunction of conscious and subconscious thinking along with concrete and abstract ability inclusive of the capability to conceptualize and exhibit intuitiveness. Research assessing the quality-of-life following treatment of epilepsy lags behind compared to other chronic diseases.

Methodology: This study is a cross-sectional type that was carried out in the Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana (Ambala) for a period of 18 months amongst 100 participants. Various scales were applied such as Socio-demographic profile, General Health Questionnaire-12 (GHQ-12), and Addenbrooke's Cognitive Assessment Scale- III (ACE III) under the direction of a consultant. Descriptive analysis was used by using standard deviation and mean, for all the variables. Data were further analyzed for significant values using nonparametric tests using SPSS software 25.0

Result: A total of 100 patients were recruited for the study after taking the informed written consent. During the analysis, the majority of the patients were females constituting 73% and 27% were males and most of the participants were educated till middle school 40%. The

overall score of cognitive examination of the patients presented as abnormal 42%, normal 32%, and inclusive 26%. The chi-square value was 15.1 when chi-square analysis was done between epilepsy according to occupation with respect to total cognitive features and statistically significant difference was seen in the craft-related to trade, skilled agriculture and skilled workers with respect to abnormal, inconclusive and normal domains of the cognitive features (p=0.05).

Conclusion: Epilepsy is a treatable disease. But it continues to a main public health concern due to stigma, huge treatment gap and socioeconomic inequity in India.

Keywords: Cognition, Quality of life, Epilepsy.

Introduction

Epilepsy is one of the most widely recognized neurological conditions, influencing people of all ages in the world. The International League Against Epilepsy (ILAE), defines it as any of the following conditions: (a) it could be two not stimulated (or reflex) seizures that occur 24 h apart; (b) one stimulated (or reflex) seizure with a probability of similar seizures to recur (at least 60%) after 2 unprovoked seizures, within the next 10 years; and (c) those with the diagnosis of an epilepsy syndrome.[1]

However, according to ILAE Epidemiology Commission, 2 or more unprovoked seizures which occur at least 24 h apart is considered epilepsy for the purpose of conducting population-based studies.[2] According to Global Burden of Disease Collaborators, in 2016 epilepsy was contributing to 0.5% of the total disease burden and accounted for >13 million Disability-Adjusted Life- Years (DALYs). In India, according to the data from recent studies on the general population, the overall prevalence (3.0-11.9 per 1,000 population) and incidence (0.2-0.6 per 1,000 population per year) rates

are comparable to the rates of high-income countries (HICs). For several centuries, the association between cognitive deficits and epilepsy has been observed [3]. Cognition of the human mind is a conjunction of conscious and subconscious thinking along with concrete and abstract ability inclusive of the capability to conceptualize and exhibit intuitiveness.[4,5] Studies have shown that symptomatic epilepsy within already existing brain damage is known to cause cognitive impairment.[6] Many studies have shown that the quality of life is compromised in epilepsy because of cognitive deficits.[7] Hence early detection and intervention is of profound importance for patients diagnosed with epilepsy. Cognitive evaluation through brief screening tools or through a comprehensive neuropsychological evaluation can be of great help in identification and monitoring cognitive impairment.[8] Research assessing the quality-of-life following treatment of epilepsy lags behind compared to other chronic diseases.[9] In India, very few studies have been carried out in relation to the quality of life in epileptic patients. Considering this the study was planned with the aim to determine the quality of life of patients with epilepsy in a college-affiliated hospital with a General Health Questionnaire.

Methodology

This study is a cross-sectional type that was carried out in the Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana (Ambala) for a period of 18 months amongst 100 participants. Ethical clearance was received from the institutional ethics committee prior to the conduction of the study. Patients fulfilling the inclusion criteria were approached and taken up for the study. The inclusion criteria stand for patients of either gender, patients of the age of 18 years, patients with a history of epilepsy for 1 year and above, patients with

only generalized tonic-clonic seizure, and patients fulfilling the diagnostic criteria of Epilepsy by ICD -10 (G40). The Patient with a history of mental retardation/ dependence/ dementia, with any major co-morbid psychiatric disorder, a patient already on medication that can affect cognition (e.g., benzodiazepines), and patients with low MMSE Mini-Mental Status Examination) the score was excluded. Informed written consent was taken and various scales were applied such as Socio-demographic profile, General Health Questionnaire-12 (GHQ-12), and Addenbrooke's Cognitive Assessment Scale- III (ACE III) under the direction of a consultant. It took approximately 15-20 minutes to complete the entire interview. After the collection of the data, scores were calculated using respective statistics. Descriptive analysis was used by using standard deviation and mean, for all the variables. Data were further analyzed for significant values using nonparametric tests using SPSS software 25.0.

Results

The current study was performed in the tertiary care hospital Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana (Ambala). A total of 100 patients were recruited for the study after taking the informed written consent. The diagnosis of epilepsy was made, it was observed that about one third of the patients

35% were having episodes for last 6-7 years followed by 17% population having 5-6 episodes. Only 10% of the patients had history of episodes of more than 7 years. Old cases were 81% followed by new cases (19%) respectively. In our study, the majority of participants were females at 73%, followed by males at 27% with the mean age for both genders being 28 years.

Socio-demographic details of the participants are shown in Table-1. During the analysis, the majority of the patients were females constituting 73% and 27% were males and most of the participants were educated till middle school 40%, followed by high school at 32%, diploma/ intermediate and illiterate at (9%), primary school 7%, and graduation at 3%. The occupation status of the participants presented with statistics as skilled worker with highest at 35% followed by skilled agricultural and fishery, craft and related trade, elementary occupation and clerk at 34%, 5, 17%, 9%, and 5% respectively. The total of 58% of participants were married followed by a single at 40, and remarried at 2%. The income status was also assessed that ans showed that the majority of the patients 69% were having income ranging between 6327 to 18949, according to the modified Kuppuswamy scale. Very less population i.e. 3% had a monthly income of more than 31589 approximately.

Table 1: Socio-demographic details of the participants

Sample Profiling	Set	Frequency	Percentage
Gender	Male	27	27
	Female	73	73
Age-Group	< 30 Years	70	70
	31-40 Years	17	17
	41-50 Years	10	10
	>50 Years	3	3
Education	Illiterate	9	9

	Primary School	7	7
	Middle School	40	40
	High School	32	32
	Diploma/ Intermediate	9	9
	Graduation	3	3
Occupation	Elementary Occupation	9	9
	Craft and Related Trade	17	17
	Skilled Agricultural and Fishery	34	34
	Skilled worker	35	35
	Clerks	5	5
Marital Status	Single	40	40
	Married	58	58
	Remarried	2	2
Income	< 6327	4	4
	6327-18949	69	69
	18953-31589	24	24
	>31589	3	3

After demographics, the participants were interviewed for GHQ-12 and it was found that the majority of the patients reported the GHQ12 parameters as less than usual. Most of the patients reported loss of sleep over worry as less than usual (76%) followed by very much less than usual (17%).

Approximately 80% reported that they felt constantly under strain as less than usual. The GHQ-12 scoring numbers represented as half of the patients scored 51% on the GHQ12 score followed by 18% having more than 20.

Table 2: Analysis of GHQ- 12

Sn.	Parameters	Same as usual N (%)	Less than usual N (%)	Very much less than usual N (%)
1	Loss of sleep over worry	6(6)	77(77)	17(17)
2	Felt constantly under strain	3(3)	80(80)	17(16)
3	Able to concentrate on what you doing	6(6)	67(67)	27(27)
4	Felt that you playing a useful part in things	5(5.21)	65(67.71)	26(27.08)
5	Able to face your problem	7(7.14)	67(68.37)	24(24.49)
6	Felt capable of making decisions about things	6(6.8)	73(72.28)	21(20.79)
7	Felt you could overcome your difficulties	2(2)	77(77)	21(21)

8	Reasonably happy, all things considered	12(12.12)	67(67.68)	20(20.20)
9	Able to enjoy your normal day-to-day activities	13(13.13)	65(65.66)	21(21.21)
10	Feeling Unhappy or Depressed	48(48)	31(30)	21(21)
11	Losing Confidence in yourself	52(52)	22(22)	26(26)
12	Thinking of yourself as a worthless person	53(53.5)	28(28.2)	18(18.1)

Addenbrooke's Cognitive Examination ACE III was use to assess the cognitive parameters. ACE III measures cognition in the following categories respectively: attention, memory, fluency, language and visual-spatial abilities. Total score of 5 domains is 100 (18+26+14+26+16). Mean and standard deviation of the cognitive examination of the patients as per ACEIII domains are calculated in the study which shows total attention score of the 100 patients was 13.75 ± 2.26. Among all the domains the maximum mean 21.7% was seen with language domain followed by memory, visual abilities, attention and fluency at 20%, 14%, 13%, and 11% respectively. The overall score of cognitive examination of the patients presented as abnormal 42%, normal 32%, and inclusive 26%. Table 3 shows the correlation between cognitive function and the quality of life of study participants. Other than this, a statistical significance was found between the occupation of the head and scores of the ACE Majority of the patients scored between 0-83 on the ACE IIII scale. Also, the positive correlation between the total score QOL and all the domains of ACEIII with the Pearson correlation of -0.4 with total attention, -.532 with total memory, -5.34 with total fluency, -0.47 with total language, and -0.54 with total visuospatial. The chi-square value was 15.1 when chi-square analysis was done between epilepsy according to occupation with respect to total cognitive features and statistically significant difference was seen in the craft-related to trade, skilled agriculture and skilled workers with respect to abnormal, inconclusive and normal domains of the cognitive features (p=0.05)

Table 3: Correlation between Cognitive Function and Quality of Life in Patients with Epilepsy

		Total SF36	Total ACQ
Total SF36	Pearson Correlation	1	-.560[**]
	Sig. (2-tailed)		.000
	N	100	100
Total ACQ	Pearson Correlation	-.560[**]	1
	Sig. (2-tailed)	.000	
	N	100	100
**. Correlation is significant at the 0.01 level (2-tailed).			

Discussion

Epilepsy is a chronic neurological condition. It is an illness of the brain which is described by susceptibility to seizures and by its psychological, neurobiological, cognitive, and social outcomes. Epilepsy is related with multidimensional stigmatization and uncertainties leading to considerable adverse role in the Quality of Life (QOL) of those suffering by the disease.[10] Epilepsy is a common neurological disorder affecting approximately 65 million people globally. Seizures are the most striking clinical symptom of the epilepsy.[11] But patients suffering from epilepsy are at risk of not only seizures, but also for numerous health issues that occur in patients suffering from epilepsy at a higher rate than would be anticipated

by chance. Commonly these patients suffer from cognitive dysfunction (attention, memory) and mental health issues (anxiety, depression) and other co-morbidities like migraines and sleep disorders. Epilepsy comorbidities are common among the patients. Literature has suggested that patients with epilepsy perceive the co-morbidities more troublesome than the seizures.[12] Although epilepsy is a manageable disease, care is delayed for most patients because of the stigmatization and inaccessibility of neurological facilities.

Epilepsy may be linked with intense physical, social, and psychological outcomes. This may affect person's QOL.[13]Patients suffering from epilepsy account a worse QOL due to social stigma, low and high degree of anxiety. Therefore, the present research was conducted to assess the QOL in patients suffering from epilepsy and to assess the correlation between cognitive function and quality of life in patients with epilepsy.

Our study found that a greater number of females (73%) were suffering from epilepsy as compared to males. This is in contrary to findings of to Panagariya A et al[14] which showed a male preponderance of epilepsy in community-based study of north western India. Nawale et al also reported 61.3% were male patients in their study.[15]

Literature reported lesser marriage rates among people suffering from epilepsy as compared to the overall population.[16] The current study also showed that 40% of the enrolled patients were unmarried. The reason could be that our society is saturated with misconceptions about epilepsy which are tough to confront and require persistent educational efforts to evade the fears. Myeong-Kyu Kim[17] analyzed marital status of patients suffering from epilepsy in Asia continent. The study stated high rate of divorce in patients suffering from epilepsy among Asians. Amu Dhan et al stated that for male the problems

of earnings and employment, whereas for females the concerns of pregnancy and child-rearing become critical during marriage. Studies reported a lower marriage rate, and higher divorce rate in epilepsy patients in contrast to overall population.[18]

Socio-economic status affects epidemiological trends among patients suffering from epilepsy. A higher prevalence of the disease among lower economic status (68%) and middle school pass out (40%) was noted in the current study. This indicates the relative impact of low socioeconomic and educational status. The same findings reported by another study conducted by Panagariya A et al[19]. The possible reason for school dropouts could be absence of knowledge among educators and peers linked with parental mindsets that may aggravate the condition more causing poor educational achievements. A review reported that epilepsy patients have poor employment potentials. It emphasized the possible reason to be the lower socioeconomic status and their limited capacity to access better quality healthcare. Epilepsy patients need to bear added costs of transport and loss of productivity to get medications also.[20]

Epilepsy is linked with numerous challenges including a high unemployment rate and lower intelligence.[21] Our study showed that majority of the head of the family were skilled workers (35%) followed by skilled agricultural/fishery (34%), craft and related trade (17%), elementary occupation (9%) and clerks (5%). These findings are consistent with Nawale et al which also indicated that that epilepsy affects the employment status of a person.

Categorization of seizures, include Generalised Tonic Clonic Seizures (GTCS), absence, myoclonic, focal and other seizures types. Our study showed that all patients suffered GTCS seizures. Another study also reported that

GTCS were the far most common type of all seizure.[21] Our findings also in consistent with findings from other Indian studies those have described that generalized seizures as the common seizure type[22]. Baker et al[23] reported that patients with GTCS had poor QoL. He also reported poor perception of overall health. Another study conducted by Her odes et al[24], described low scores in patients with GTCS. Singh et al[25] also reported that generalized seizure was the commonest of which the most frequent subtype was GTCS, then by generalized tonic, followed by myoclonic seizures.

Patients suffering from epilepsy generally categorized into those that respond well to medication and their seizures are well controlled, and those that fail to respond to medication are regarded drug resistant. The present study showed that majority (73%) of the patients was having good control as compared to rest having poor control of the illness.

In our study, high score on the general health questionaries indicated more severity of disorders among males (25%) and females (14%). Currie et al[26] reported that of the majority of the many of the epilepsy patients (19%) were anxious and 38 (6%) had severe affective disorder.

The current study showed that patients constantly felt under strain and felt that they were less than usual. Most of the patients in our study revealed loss of sleep over worry as less than usual (76%) and approximately 80% reported that they felt constantly under strain as less than usual. These findings are similar to another study in which females patients had emotional and physical difficulties due to the disease.[27]

The present study illustrated that majority of the patients reported the GHQ12 parameters as less than usual. Most of the patients reported loss of sleep and felt constantly under strain. There could be many explanations of psychological distress in the enrolled patients. A lack of society's empathetic view of disease is a psychosocial burden that is deeply felt. Many patients with epilepsy struggle to keep their illness a secret. Therefore, feelings of embarrassment, annoyance and vulnerability may build because of society's mindset towards the ailment. Additional variables for psychological distress incorporate dearth of education, gender, age and unemployment. Nevertheless, patients with epilepsy are not only stigmatized, but their education from the beginning also affected by the disease. A study has stated that curing distress in epilepsy improves psychological well-being[28]. Hence, it is crucial to assess psychological distress in patients suffering from epilepsy and to integrate this element in treatment plan.

Our study showed that majority of the patients had duration of illness more than 5 years. It has been suggested in literature that duration of disease may play a crucial role in QOL, and patients with long duration had poor QOL. Her odes et al,[29] stated low scores with smaller period of epilepsy with considerable effects on bodily pain, and emotional wellbeing.

In the current study one third of the patients (35%) were having episodes for last 6-7 years. Her odes et al[52] found that seizure occurrence had key effect on the QOL. Guekht et al[30] also stated that patients with frequent seizures reported stigmatization. More than half of the patients (51%) who had more than 5 episodes were in the abnormal cognitive domain. Cognitive disorders are common in patients suffering from epilepsy and etiology is multi-factorial. These may be influenced by the location or type of the seizures, epileptogenic lesion, frequency of seizures, and severity.

Proper diagnosis and treatment may help to minimize their effect on the patient's QOL. In the present study, 34.15% of the patients with organic lesion had impaired cognition. A study reported that a structural brain lesion is evident in approximately 65% of people with epilepsy on radiological examination examination.[31] The most stated cognitive illnesses in adults are regarding memory impairment and mental slowness. Because early seizures can cause permanent deficits and increase seizure susceptibility. This extended exposure to anomalous neural activity during cerebral maturation may interrupt functional and the structural changes in the brain[32].

Diffuse impairments are more often acknowledged in children with additional troubles in children in comparison to adults. These may be learning disabilities and behavior problems. Some brain "structures" develop into late adolescence such as the prefrontal cortex and hence, time is required to observe a number of deficits in children[33]. In our current study, QOL was assessed by the SF36 scale. These poor scores matched with the findings of previous studies. The low score in female patients points to the fact that females were more emotionally vulnerable and more affected. The present study also showed the positive correlation between the total score QOL and all the domains of ACEIII. This showed that quality of life is affected by the cognitive impairment of the patients.

Conclusion: Epilepsy is a treatable disease. But it continues to a main public health concern due to stigma, huge treatment gap and socioeconomic inequity in India. Epilepsy has a negative impact on the QOL of the patients suffering from epilepsy revealed by the poor QOL scores in the current study. Hence optimization of the pharma cological therapy with psychological counselling for the patients may be a move towards the customized medication model which may improve the QOL. Assessment of the psychological distress in patients suffering from epilepsy and to integrate this element in treatment plan.

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