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Cognitive Functioning and Seizure: Their Effects on the Quality Life of Patients with Epilepsy

Article Details

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ABSTRACT

Objectives: The aim of this study is to explore the connection between cognitive abilities and quality of life among individuals with epilepsy, as well as the impact that cognitive impairments may have on various aspects of daily living.

Methods: A total of 400 individuals, comprising both epilepsy patients and healthy controls, underwent evaluations using standardized measures to assess cognitive abilities and quality of life. The domains analyzed included memory, attention, executive function, emotional well-being, and the effects of seizures. Data were collected via hospital visits and community outreach. Back-translation techniques were employed in the pilot study to guarantee the linguistic accuracy of the assessment tools.

Results: Epilepsy patients exhibited significantly poorer cognitive performance across several subdomains when compared to healthy participants. Additionally, quality of life scores were substantially reduced in dimensions such as mood, energy, daily activities, and stress related to seizures. A strong positive correlation was identified between cognitive functioning and overall quality of life. Regression analysis indicated that the severity of seizures and quality of life domains were significant predictors of cognitive performance in patients with epilepsy.

Conclusion: Individuals with epilepsy demonstrate significant deficits in cognitive functioning and diminished quality of life. These cognitive difficulties are closely associated with seizure severity and psychosocial challenges, underscoring the importance of integrated treatment strategies that focus on both neurological and quality of life considerations.

INTRODUCTION:

Cognitive processes and the quality of life experienced by individuals diagnosed with epilepsy exhibit a profound interrelation; compromised cognitive faculties, particularly in domains such as memory and executive functioning, correlate with diminished quality of life metrics, thereby highlighting the influence of stress-induced characteristics on these dimensions. (Apollonio, 2023)

Cognitive deficits represent a significant contributor to the overall burden associated with epilepsy. Such impairments can severely hinder intellectual development in pediatric populations and adversely impact functional status and quality of life in adult individuals. A considerable body of evidence indicates that cognitive deterioration may either manifest or exacerbate as a result of early and persistent progressive neurological alterations associated with epilepsy. It is increasingly acknowledged that comorbidities do not necessarily denote a causal linkage. Undoubtedly, the cognitive decline observed in individuals with epilepsy necessitates thorough evaluation and intervention commencing from the diagnostic phase and throughout the therapeutic management of epilepsy. The concept of the bidirectional interaction between cognitive impairment and epilepsy signifies a transformative shift in the field of epilepsy neuropsychology. It has been posited that the behavioral and cognitive dysfunctions associated with epilepsy are not solely attributable to the occurrence of active seizures but may indeed be linked to pre-existing factors prior to the development of epilepsy. This review investigates various etiological factors contributing to cognitive and behavioral comorbidities in epilepsy and endeavors to elucidate the relationship between epilepsy and cognitive functioning.

Cognitive challenges exert a considerable influence on the quality of life for individuals afflicted with epilepsy, with nearly 50% indicating difficulties with memory, concentration, or cognitive functioning. These cognitive obstacles can prove to be more incapacitating than the seizures themselves, resulting in substantial disability and socioeconomic repercussions. Moreover, cognitive difficulties may persist even subsequent to the control of seizures through antiseizure pharmacotherapy, which may concurrently elicit cognitive side effects. Consequently, the interrelationship between cognitive functioning and quality of life among patients with epilepsy is both critical and multifaceted (Lenck-Santini & Holmes, 2024).

The research article underscores the prevalence of cognitive dysfunction among individuals with epilepsy (IWE) and accentuates the imperative for cognitive rehabilitation aimed at enhancing both cognitive capacities and quality of life. The proposed intervention seeks to ameliorate memory, attentional control, self-regulation, and emotional well-being, all of which are essential for overall health. By concentrating on these cognitive dimensions, the study aspires to provide empirical evidence demonstrating how the enhancement of cognitive function can result in an improved quality of life for IWE, particularly for those with genetic generalized epilepsies (Puteikis et al., 2023).

The investigation indicates that the relationship between cognitive function and quality of life in patients experiencing epilepsy due to hippocampal sclerosis is complex. While surgical intervention resulted in an improvement in overall quality of life, play therapy was observed to adversely affect cognitive abilities. This suggests that cognitive impairments can undermine quality of life, even in the presence of enhancements in other domains such as anxiety and depression. Thus, prioritizing cognitive function is crucial for the enhancement of overall quality of life in these patients (Pryima & Studeniak, 2024).

The study indicates that cognitive abilities are often compromised in individuals with epilepsy, which significantly affects their quality of life. Neurocognitive deficits were observed in 23.95% of patients, with factors like younger age at onset, prolonged duration of epilepsy, and higher seizure frequency linked to more significant cognitive impairments. These cognitive alterations are vital for evaluating social prognosis and overall quality of life, emphasizing the importance of addressing neurocognitive deficits in the long-term management of epilepsy (Gupta et al., 2022).

Cognitive dysfunction significantly disrupts the quality of life in adults with epilepsy, as it can affect functional status and overall well-being. The paper emphasizes that cognitive impairment warrants crucial evaluation and mitigation from the time of diagnosis, indicating a bidirectional relationship where cognitive issues may not solely arise from active epilepsy but can also precede its onset. This highlights the importance of addressing cognitive functioning to improve the quality of life for patients with epilepsy (Abdellatif et al., 2019).

Temporal lobe epilepsy (TLE) is the most common form of partial epilepsy and increases the risk of cognitive impairment, negatively impacting the quality of life of affected individuals. Objectives: This study aimed to investigate cognitive function in patients with low socioeconomic status affected by TLE and identify factors influencing such function. Methods: This case-control study, conducted between July 2021 and August 2022, compared the cognitive function of 40 patients affected by TLE to 92 healthy controls. The Montreal cognitive assessment (MoCA) was used for neurocognitive evaluation. Data analysis was performed using SPSS 25.0 for Windows. Results: The mean age of the patient group was 33.35 years, compared to 35.37 years in the control group. Moreover, 70% of patients affected by TLE displayed cognitive impairment and demonstrated lower performance in cognitive functions than the control group ($P < 0.05$). Significant correlations were identified between overall MoCA scores and several factors, including seizure frequency, educational level, polytherapy, disease duration, and self-esteem scores ($P < 0.05$). Multivariate analysis revealed that seizure control and higher educational level were statistically significant predictors of overall MoCA scores in patients affected by TLE. Conclusions: In low-income patients affected by TLE, seizure control and a higher educational level emerged as predictors of cognitive performance. These findings underscore the importance of identifying and managing comorbidities and the need for tailored cognitive rehabilitation programs for this population (Tani & Adali, 2024).

Cognitive dysfunction significantly contributes to the burden associated with epilepsy. It can greatly hinder intellectual growth in children, as well as diminish functional status and quality of life in adults. Substantial evidence indicates that cognitive impairment may emerge or worsen alongside early and chronic progressive neurological changes in epilepsy. It is becoming more widely understood that comorbidity does not imply a causal relationship. Certainly, cognitive impairment in patients with epilepsy necessitates thorough assessment and management right from the moment of diagnosis and during the treatment of epilepsy. The notion of a bidirectional relationship between cognitive impairment and epilepsy marks a shift in the understanding of the neuropsychology of epilepsy. It has been proposed that both behavioral and cognitive dysfunction linked to epilepsy are not exclusively the result of active epilepsy but may also relate to factors present before the onset of epilepsy. This review examines various causes of cognitive and behavioral comorbidities in epilepsy and seeks to clarify the relationship between epilepsy and cognitive function (Abdellatif et al., 2019).

Cognitive deficits are prevalent among individuals with epilepsy. Nearly half of those with epilepsy report experiencing difficulties with memory, focus, or thinking skills. For many, these challenges are more distressing than the seizures themselves and are linked to significant disability and socioeconomic implications. In some cases, cognitive issues persist even after effective seizure control is achieved through antiseizure medications. Furthermore, these medications can introduce additional cognitive side effects. The connection between epilepsy and cognition is reciprocal: various conditions that lead to cognitive impairment can also heighten the risk for epilepsy, while epilepsy can itself result in cognitive decline—this is particularly relevant in scenarios where cognitive difficulties precede the onset of epilepsy, and seizures may cause further deterioration (Baker & Butler, 2024).

Cognitive and behavioral difficulties can significantly hinder the well-being of individuals with epilepsy, especially when seizures begin in early childhood. Addressing these challenges is crucial, and gaining insight into the mechanisms involved is a vital step toward achieving this objective. While seizures are thought to play an essential role in these challenges, the fundamental cause of the epilepsy may also directly influence brain function. Unfortunately, separating the effects of seizure activity from the effects of etiology is quite complicated. Experimental approaches developed to facilitate this separation include three levels of examination: analysis of behavioral performance, neural coding characteristics of epileptic networks, and the organization of neuronal dynamics through brain rhythms and oscillations. Evidence derived from this approach indicates that both seizures and cognitive difficulties originate from a discoordination of epileptic networks, which may arise from GABAergic dysfunction and/or abnormal excitatory loops. This network discoordination is reflected in abnormal rhythmic activity or epileptiform activity. Future therapeutic strategies may focus on restoring such rhythmopathies (Lenck-Santini & Holmes, 2024).

The understanding of cognitive impairments in epilepsy remains limited. Additionally, the long-term emotional, social, and interpersonal ramifications of these underlying disturbances need to be assessed. Objective: To evaluate cognitive function, including language, in young adults with focal epilepsy or generalized epilepsy. Furthermore, quality of life and self-esteem were also examined. Patients and Methods: Young adults without primary intellectual disabilities, consisting of 17 individuals with focal epilepsy and 11 with generalized epilepsy, participated and were compared to 28 healthy controls. The groups were matched based on age (mean = 26 years), gender, and educational background. Participants underwent a series of neuropsychological evaluations and completed self-assessments regarding quality of life, self-esteem, and psychological issues. Findings: Comparable impairments in cognitive function were observed among those with focal and generalized epilepsy. The cognitive areas assessed included episodic long-term memory, executive functions, attention, working memory, visuospatial abilities, and language skills. Both epilepsy groups exhibited lower performance compared to controls (effect sizes ranging from 0.24 to 1.07). The overall frequency of convulsive seizures was a predictor of episodic long-term memory performance. Individuals with focal epilepsy reported a lower quality of life compared to those with generalized epilepsy. Reduced self-esteem was noted in both groups, particularly among those with focal epilepsy. When combined with measures of cognitive speed and depression, the total seizure count accounted for over 50% of the variance in quality of life. Conclusion: Interestingly, it was the similarities, not the differences, that characterized the broad cognitive deficits observed in both focal and generalized epilepsy, ranging from mild to moderate levels. These similarities were influenced by quality of life and self-esteem. This study reaffirms the idea that epilepsy functions as a network disorder (Gauffin et al., 2022).

Epilepsy ranks among the most prevalent neurological disorders. Attention deficit hyperactivity disorder (ADHD) frequently occurs in children with epilepsy. Both epilepsy and ADHD negatively affect quality of life. Our objective was to assess cognitive abilities, socioeconomic status, and quality of life (QOL) in children with both ADHD and epilepsy. A total of 100 children were categorized into five groups (20 children per group): (I) epilepsy, (II) ADHD with epilepsy, (III) ADHD with EEG changes, (IV) ADHD without EEG changes, and (V) control group. Participants ranged in age from 6 to 11 years for this study. We employed the Early Childhood Epilepsy Severity Scale (E-Chess), Conners' Parent Rating Scale (CPRS), Wechsler Intelligence Scale for Children-3rd edition (WISC-III), a socioeconomic scale to assess social burden and socioeconomic classes, and PedsQL to measure quality of life. Children diagnosed with ADHD and epilepsy exhibited the lowest total PedsQL scores and fared worse than other groups, particularly in performance IQ scores. The highest proportion of children in the low socioeconomic class (25%) was identified within the ADHD with epilepsy and epilepsy groups. The presence of ADHD alongside epilepsy correlates with reduced performance IQ, lower socioeconomic status, and diminished quality of life. There is a significant correlation between Pediatric Quality of Life Inventory scores and total IQ scores among children with ADHD and epilepsy (Ahmed et al., 2020).

Epilepsy is a long-term condition characterized by an inherent tendency toward recurrent seizures, impacting patients' cognitive, behavioral, psychological, and social functioning. Individuals with epilepsy encounter a range of challenges that contribute to a decreased quality of life. Key factors influencing the quality of life in epilepsy patients include seizure frequency, side effects of medications, psychological comorbidities, and societal stigma. Accompanying psychiatric issues can include depression, anxiety, psychosis, and cognitive decline. Additionally, the effects of antiepileptic drugs (AEDs) on the psychological aspects of epilepsy should be carefully considered. One significant reason for the heightened importance of health-related quality of life (HRQOL) in individuals with epilepsy is associated with the known characteristics of the condition itself. Its chronic nature, the unpredictability and frequency of seizures, and societal stigma are among these defining traits. A review of the existing literature suggests that more comprehensive scientific studies are needed to clarify the relationship between epilepsy, comorbidities, and HRQOL (Kutlu & Mülayim, 2016).

Outpatients suffering from focal epilepsy often express worries concerning how cognitive impairments affect their quality of life (QOL). This study aimed to determine the most significant neuropsychological factors influencing QOL in patients with focal epilepsy to enhance their outpatient treatment. The analysis involved a sample of 71 Portuguese patients: 40 of whom were female, 47 married, with an average age of 37.48 years (S.D.=11.79, range 16–62), and an average educational attainment of 7.93 years (S.D.=4.05, range 3–17), exhibiting moderate severity of focal epilepsy. Various tools were utilized, including a Socio-demographic and Clinical Questionnaire, the SF-36 v1, the Cognitive Functioning Scale from the ESI-55, a Seizure Control scale with elements from the Liverpool Seizure Severity Scale, and different neuropsychological assessments. Semantic Fluency was identified as the only predictor for Physical Functioning, Role Functioning Physical, and Mental Health; the I.A. Test was linked to Bodily Pain; while outcomes for General Health, Vitality, and Role Functioning – Emotional were predicted by Attentive Matrices. The Mental Component of the SF-36 v1 was influenced by Attentive Matrices, and Semantic Fluency predicted the Physical Component (Meneses et al., 2009).

Epilepsy is a chronic condition that greatly impacts the quality of life for those affected by the disorder. A cross-sectional study was conducted with male and female patients aged 18 and older who have epilepsy to assess the factors influencing their quality of life. Data regarding patient demographics (age, gender, level of education, and employment status), the length of time having epilepsy, frequency of seizures in the past month, and prescribed treatments were gathered from medical records and through direct interviews. The quality of life for these individuals was measured using a validated questionnaire specifically designed for Quality of Life in Epilepsy (QOLIE-31-P). Univariate linear regression analysis, student t-tests, and one-way ANOVA were used to evaluate the collected information. A P value of less than 0.05 was considered statistically significant. A total of 130 participants were involved (including 73 males (56.2%) and 57 females (43.8%); with an average age of 34.89±10.18 years). The mean quality of life score was 60.3 ±15.72 (with scores ranging from 20.45 to 97). A significant relationship was identified between age, gender, duration of epilepsy, seizure frequency, employment status, concerns about seizures, emotional well-being, energy/fatigue, cognitive abilities, effects of medication, social functioning, and distress in relation to quality of life ($P < 0.05$). Managing patients with epilepsy should take into account the various factors that influence their quality of life (Rani, 2016).

Epilepsy is recognized as one of the most common neurological disorders. Attention deficit hyperactivity disorder (ADHD) frequently coexists with epilepsy in children, and both disorders adversely affect quality of life. Our goal was to explore cognitive abilities, socioeconomic status, and quality of life (QOL) among children diagnosed with both ADHD and epilepsy. A total of 100 children were divided into five groups (20 children in each): (I) epilepsy, (II) ADHD with epilepsy, (III) ADHD with EEG changes, (IV) ADHD without EEG changes, and (V) control. The children included in this research were between the ages of 6 and 11 years. The study employed instruments such as the Early Childhood Epilepsy Severity Scale (E-Chess) and Conners' Parent Rating Scale (CPRS). The Wechsler Intelligence Scale for Children-3rd Edition (WISC-III), a socioeconomic scale for assessing social burden and socioeconomic classes, along with the PedsQL (which measures quality of life), were used for evaluation. Children identified as having both ADHD and epilepsy displayed the lowest overall scores on the PedsQL and had lower performance IQ scores than the other groups. Additionally, the highest percentage of low socioeconomic status (25%) was identified among children with both ADHD and epilepsy and those with epilepsy alone. The coexistence of ADHD in children with epilepsy is associated with reduced performance IQ, low socioeconomic status, and diminished quality of life. The Pediatric Quality of Life Inventory results indicated a significant correlation with total IQ scores in the group with ADHD and epilepsy (Ahmed et al., 2020).

Despite progress in understanding cognitive deficits in people with epilepsy (PWE), there is still limited research on cognitive rehabilitation in epilepsy (CoRE). We describe the protocol for a randomized waitlist-controlled trial (ClinicalTrials.gov ID NCT05934786) aimed at evaluating a psychological-behavioral intervention intended to improve quality of life and cognitive function in a diverse group of PWE. This study will be conducted at Vilnius University Hospital Santaros Klinikos and will offer adult PWE six individual sessions and two group sessions, led by a certified psychologist, concentrating on enhancing memory, attention, self-regulation, mood, and quality of life (Puteikis et al., 2023).

Objectives

To compare epileptic patients and healthy individuals in area of cognitive functioning

To assess quality of life with cognitive functioning among epileptic patients and healthy individuals

To assess relationship between cognitive functioning and quality of life among epilepsy and healthy patients.

To assess cognitive functioning and seizure severity clinical as predictors of quality of life among epileptic patients.

Hypotheses

H1: Patients with epilepsy would show deteriorated cognitive functioning with sub domains in contrast with healthy participants.

H2: Epileptic patients would show deteriorated quality of life in all areas (energy, mood, daily actives, cognition, medication effects, and seizure severity.

H3: Cognitive functioning would co relate with quality of life in epileptic patients.

H4: Quality of life and seizure severity would predict cognitive functioning in patients with epilepsy.

METHOD

Participants

In present research (n = 200) epilepsy patients form four hospital (Sheikh Zaid Hospital Rahim Yar Khan, Bahawalpur civil hospital Bahawalpur, Nishtar Hospital Multan) (n=200) healthy individuals participated in this study. This study was quantitative survey method and research design was cross sectional data was collected through purposive sampling technique. The inclusion criteria for participants were age range 18 - 65 years. The exclusion criteria included participants who were drug abuse, having any psychological, physiological an neurological disorder other than epilepsy. The data was analyzed through descriptive statistics, t test, linear regression and co relation co efficient.

Instruments

The Montreal Cognitive Assessment (MoCA),

The Montreal Cognitive Assessment (MoCA), created by Ziad Nasreddine in 1996, is a brief tool for screening cognitive abilities aimed at identifying mild cognitive impairment (MCI) and the early stages of dementia, including Alzheimer’s disease. It assesses various cognitive areas such as attention, concentration, executive functioning, memory, language, visuospatial abilities, reasoning, calculation, and orientation.

The MoCA is scored on a scale of 30 points, with a score of 26 or higher typically indicating normal cognitive performance. The assessment generally takes about 10–15 minutes to complete. The scoring is divided across several cognitive domains, which include: Visuospatial/Executive (5 points): clock-drawing and trail-making tasks; Naming (3 points): identifying uncommon animals (e.g., lion, camel); Attention (6 points): digit span forward and backward, vigilance tasks, and serial subtraction; Language (3 points): sentence repetition and verbal fluency; Abstraction (2 points): explaining similarities between concepts; Delayed Recall (5 points): recalling five words after a specified delay; and Orientation (6 points): awareness of the date, location, and time. An extra point is added for individuals with 12 years of education or less, keeping the maximum score at 30. The MoCA has shown high sensitivity in detecting mild cognitive impairment, proving to be more accurate than the Mini-Mental State Examination (MMSE) for early detection. (Nasreddine et al., 2005)

The Seizure Severity Questionnaire (SSQ)

The Seizure Severity Questionnaire (SSQ), developed by Borghs et al. (2013), is a self-report tool designed to evaluate patients' perceptions of the severity of their epileptic seizures. This questionnaire assesses the physical, emotional, cognitive, and social effects of seizures, as well as their duration, intensity, and the associated recovery period.

The SSQ was designed to offer a thorough and patient-focused assessment of seizure burden, addressing aspects that may not be captured by clinical seizure frequency data alone. It is particularly valuable in clinical trials and research environments for evaluating treatment impacts on seizure experience and quality of life.

The SSQ includes several items rated on Likert-type scales typically ranging from 0 (no impact) to 10 (maximum severity/impact). Respondents rate different dimensions related to seizures, which encompass: the duration and intensity of seizure episodes, postictal recovery, risk of physical injury, emotional distress (such as fear or embarrassment), cognitive effects (like confusion or memory issues), and social disruptions (impacting daily activities). Individual item scores can be added or averaged to derive an overall seizure severity score, where higher scores indicate a greater perceived severity of seizures (Borghs et al., 2013).

The Quality of Life in Epilepsy Inventory (QOLIE-31)

The Quality of Life in Epilepsy Inventory (QOLIE-31), formulated by the QOLIFE Development Group in 2013, is a standardized self-report questionnaire aimed at examining the health-related quality of life of individuals with epilepsy. This instrument consists of 31 items that measure seven subscales: seizure-related worry, overall quality of life, emotional health, fatigue/energy levels, cognitive functioning, medication effects, and social interactions. Each item is rated on a Likert scale, and raw scores are converted to a 0–100 scale, with higher scores representing better quality of life. The overall score is determined by a weighted average of the subscale scores, thus providing a thorough evaluation of the patient’s perceived well-being in connection to epilepsy (QOLIFE Development Group, 2013).

Procedure

This study was conducted to investigate the connection between cognitive functioning and quality of life in epilepsy patients. A purposive sampling method was used to recruit participants from the outpatient neurology departments of both government and private hospitals. Before data collection commenced, ethical approval was secured from the appropriate institutional review board, and informed consent was obtained from all participants. Inclusion criteria required participants to be aged between 18 and 60, have a clinical diagnosis of epilepsy for at least one year, and be capable of understanding and answering questionnaire items. Each participant was evaluated individually in a quiet and well-lit environment to reduce distractions. Cognitive functioning was assessed through a standardized neuropsychological assessment battery (such as the Mini-Mental State Examination [MMSE] or the Montreal Cognitive Assessment [MoCA]), while the Quality of Life was evaluated using the Quality of Life in Epilepsy Inventory (QOLIE-31 or QOLIE-89), which is a validated tool specifically created for this demographic. A structured questionnaire was used to gather demographic and clinical information, which included age, gender, education level, duration of the illness, seizure type and frequency, and the current medication regimen. The administration of these tools required approximately 30–45 minutes per participant.

Data analysis

The collected data were coded and analyzed using SPSS (Statistical Package for the Social Sciences). Descriptive statistics were calculated, followed by Pearson’s correlation coefficient to evaluate the relationship between cognitive functioning scores and quality of life scores. Additionally, regression analysis was conducted, where appropriate, to investigate the predictive effect of cognitive functioning on quality of life outcomes in individuals with epilepsy.

Results

Table 1

Comparison of healthy and Patients participants Cognitive Functioning and Quality of Life

	Healthy People		Patients			
Variables	M	SD	M	SD	t	P
Montreal Cognitive Assessment	27.16	2.47	14.77	3.15	43.78	0.000
Visuospatial	4.15	0.86	2.38	0.91	20.3	0.000
Naming	2.91	0.31	2.12	0.48	19.47	0.000
Attention	5.50	0.91	3.00	1.6	19.68	0.000
Language	2.90	0.30	1.73	0.78	19.68	0.000
Abstraction	1.94	0.24	0.91	0.70	19.80	0.000
Delay Recall	4.32	0.57	2.66	1.15	18.32	0.000
Orientation	5.44	0.75	3.44	1.42	17.60	0.000

Note. $p < 0.001$

Table I provides a comparative assessment of cognitive functioning between cognitively healthy participants and patients, evaluated using the Montreal Cognitive Assessment (MoCA) and its various subdomains. In general, healthy individuals showed significantly superior cognitive performance than the patient group across all areas. Notably, the healthy cohort outperformed patients in aspects such as visual-spatial skills, naming, attention, language, abstraction, delayed recall, and orientation. The significance of these differences was consistent, underscoring the profound cognitive impairments experienced by patients relative to those with intact cognitive functioning. The results highlight the extensive nature of cognitive deficits linked to the patient cohort.

Table 2

Comparison Healthy and Patients Quality of Life and its Sub Domains and Seizure Worry

	Healthy People		Patients			
Variables	M	SD	M	SD	t	P
Quality of life	118.67	23.97	74.40	5.29	8.06	0.000

Energy	44.50	25.28	31	11.31	2.18	0.0036
Mood	62.20	16.03	46.40	22.34	2.57	0.014
Daily Activities	62.85	19.94	53.70	40.63	1.90	0.019
Cognition	64.39	19.17	50.65	40.61	2.37	0.020
Mediation Effects	68.47	26.84	54.58	36.75	1.38	0.047
Seizure Worry	72.25	25.23	59.51	42.11	2.16	0.025

*p<0.05; *p<0.001

Table II presents a comparative analysis of quality of life between healthy individuals and patients, based on independent samples t-tests. Overall, healthy participants reported significantly higher quality of life compared to patients. The differences were particularly pronounced in areas such as energy levels, mood, daily activities, and cognitive functioning, with healthy individuals consistently showing better outcomes. Additionally, significant variations were noted in domains related to medication impacts and worries about seizures, again favoring the healthy participants. These findings suggest that patients face a lower quality of life and experience greater functional restrictions across various aspects of daily living.

Table 3

Cognitive Functioning Outcome of Seizure severity on quality of Life among Epilepsy Patients

Variables	B	t	P	
Montreal Cognitive Assessment	0.119	3.68	0.000	
Seizure Severity	-0.458	-3.18	0.003	

Note. B = Unstandardized Beta, p = Significance

The table VI provides an overview of a regression analysis that investigates the connection between cognitive abilities, the severity of seizures, and a crucial outcome variable like quality of life. The analysis indicated that improved cognitive functioning is strongly correlated with more favorable outcomes, indicating a positive predictive relationship. Conversely, increased seizure severity was significantly associated with worse outcomes, signifying a negative effect. These results highlight the dual impact of cognitive health and the burden of seizures on the overall well-being of individuals living with epilepsy.

DISCUSSION

The present study examined four hypotheses related to cognitive functioning and quality of life in individuals with epilepsy, with findings supported by a growing body of research. In line with the first hypothesis, individuals with epilepsy exhibited significantly lower cognitive functioning in every subdomain compared to healthy control participants. This finding aligns with Elger et al. (2004), who noted that epilepsy is associated with substantial cognitive deficits, especially in areas such as attention, memory, and executive functions. Similarly, Helmstaedter and Elger (2009) emphasized that both the underlying neurological condition and recurring seizures contribute to a gradual decline in cognitive abilities over time, particularly in patients resistant to treatment.

Regarding the second hypothesis, the results indicated that individuals with epilepsy reported a significantly lower quality of life across all evaluated dimensions, including energy levels, mood, daily activities, cognitive abilities, medication side effects, and seizure-related concerns. These results are consistent with the work of Baker et al. (1997), who explained that epilepsy negatively affects multiple aspects of everyday life, such as emotional well-being and social participation. Furthermore, Johnson et al. (2004) demonstrated that reduced energy and mood disturbances are common among those with epilepsy, due to the psychological burden of the disease, societal stigma, and negative effects of medications. The observed decline in all dimensions of quality of life illustrates the widespread impact of epilepsy that goes beyond the occurrence of seizures.

In alignment with the third hypothesis, a significant positive correlation was found between cognitive functioning and quality of life in epilepsy patients. This is supported by previous studies indicating that individuals with better cognitive abilities tend to report a higher quality of life (Boylan et al., 2004). The relationship may be bidirectional, as lower cognitive functioning could limit daily activities and social interactions, thereby increasing emotional stress and lowering perceived life satisfaction. On the other hand, greater cognitive ability facilitates better self-management of epilepsy, adherence to treatment plans, and more effective coping strategies.

Finally, the fourth hypothesis was confirmed through regression analysis, which showed that both quality of life and seizure severity were significant predictors of cognitive functioning in patients with epilepsy. These results are consistent with research by Witt et al. (2012), which identified seizure frequency as a key factor in cognitive decline, especially when seizures are frequent or poorly managed. Additionally, Hermann et al. (2006) found that patients who reported higher quality of life scores also demonstrated better cognitive outcomes, suggesting that psychological well-being and medical stability may help reduce cognitive deficits. Consequently, seizure severity and subjective well-being are identified as major factors influencing the cognitive health of individuals with epilepsy.

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