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COGNITIVE PERFORMANCE AND QUALITY OF LIFE IN WOMEN WITH EPILEPSY DURING THEIR REPRODUCTIVE YEARS

Rendimiento cognitivo y calidad de vida en mujeres con epilepsia durante sus años reproductivos

Desempenho Cognitivo e Qualidade de Vida de Mulheres com Epilepsia e em Idade Fértil

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Palabras Clave: Epilepsia; Calidad de vida; Mujeres; Cognición.

Keywords: Epilepsy; Quality of life; Women; Cognition.

Palavras-chave: Epilepsia; Qualidade de vida; Mulheres; Cognição

R E S U M E N

Antecedentes: la genética, el medio ambiente, la edad de inicio de las convulsiones, la duración y la gravedad de la enfermedad, los tipos de convulsiones y los fármacos antiepilépticos (FAE) pueden influir en la cognición y la calidad de vida. **Objetivo:** Analizar la relación entre datos clínicos, desempeño cognitivo y calidad de vida en mujeres con epilepsia en edad fértil. **Método:** Estudio transversal, cuantitativo, en el Centro de Neurociencias de la Facultad de Medicina y Salud Pública de Bahía. Se incluyeron veintidós mujeres. Se utilizaron dos instrumentos para evaluar la calidad de vida y uno para la función neuropsicológica. Los datos se analizaron con el software estadístico SPSS. **Resultados:** La edad promedio fue de 27,32 años, solteros, la mayoría desempleados, con deterioro de la memoria, la praxis y las funciones ejecutivas. Aquellos que comenzaron las convulsiones luego presentaron mayor energía y menos efectos de la medicación, y las mujeres empleadas tienen mejor imagen corporal y mayor autoestima. **Conclusión:** Las mujeres en edad fértil tienen mayor riesgo de estar desempleadas y sin pareja. Asociado con deficiencias cognitivas puede promover retrasos en varios aspectos de la calidad de vida. Las condiciones clínicas, como el inicio temprano de la primera convulsión, también parecen ser más vulnerables a los efectos del tratamiento.

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A B S T R A C T

Background: Cognition and quality of life may be influenced by genetics, environment, age of onset of seizures, duration and severity of the disease, types of seizures, and antiepileptic drugs (AED). **Objective:** To analyze the relationship between clinical data, cognitive performance, and quality of life in women with epilepsy during childbearing age. **Method**: This was a cross-sectional, quantitative study at the Center for Neurosciences of the Bahiana School of Medicine and Public Health. Twenty-two women were included. Two instruments for assessing the quality of life and one for Neuropsychological function were used. The data were analyzed with SPSS statistic software. **Results**: The average age was 27.32 years, single, most unemployed, with impairment in memory, praxis, and executive functions. Those who started seizures later presented higher energy and fewer medication effects, and employed women have better body image and higher self-esteem. **Conclusion**: Women of childbearing age are at greater risk of being unemployed and without a partner. Associated with cognitive impairments can promote delays in several aspects of quality of life. Clinical conditions such as the onset of the first seizure early also appear to be more vulnerable to the effects of treatment.

R E S U M O

Introdução: A cognição e a qualidade de vida podem ser influenciadas pela genética, ambiente, idade de início das crises, duração e gravidade da doença, tipos de crises e medicamentos antiepilépticos (AED). **Objetivo:** Analisar a relação entre dados clínicos, desempenho cognitivo e qualidade de vida em mulheres com epilepsia em idade fértil. **Método:** estudo transversal, quantitativo, realizado no Centro de Neurociências da Escola Bahiana de Medicina e Saúde Pública. Vinte e duas mulheres foram incluídas. Foram utilizados dois instrumentos de avaliação da qualidade de vida e um da função neuropsicológica. Os dados foram analisados com o software estatístico SPSS. **Resultados**: A média de idade foi de 27,32 anos, solteiras, a maioria desempregada, com comprometimento de memória, práxis e funções executivas. Aquelas que iniciaram as crises após 11 anos, apresentaram maior energia e menor efeito de medicamentos, e as mulheres empregadas têm melhor imagem corporal e maior autoestima. **Conclusão:** Mulheres em idade fértil apresentam maior risco de ficar desempregadas e sem companheiro. Associado a deficiências cognitivas, pode promover atrasos em vários aspectos da qualidade de vida. Condições clínicas, como o início da primeira crise convulsiva, também parecem ser mais vulneráveis aos efeitos do tratamento.

Introduction

Epilepsy is a chronic disease that, from its onset, is fraught with stigmas and limitations. Difficulty in daily activities and social, psychological, emotional, and biological aspects may compromise the Quality of Life (QoL) of people with epilepsy (Hopker, Berberian, Massi, Willig & Tonocchi, 2017 and Viteva, 2014).

The treatment includes antiepileptic drugs (AED), surgery, and neurostimulation. Despite adequate seizure control, people with epilepsy need to be more careful when performing certain activities such as cooking, driving, and working in a high place. These factors can interfere with independence, employment opportunities, and QoL (Hopker et al., 2017).

It is crucial to understand which factors have more impact on the QoL of people with epilepsy. The World Health Organization (WHO) defines QoL as individuals' perception of their position in life in the context of the culture and value systems they live in and their goals, expectations, standards, and concerns. (Fleck, 2000).

Women with epilepsy present worse QoL when compared to men (Dijibut & Shakarishvili, 2003). Furthermore, in childbearing age are exposed to reduced oral contraceptives and even infertility related to AED (Santosh, Shastri, El-Sayeh & Cavanna, 2016). An increase in seizure frequency may occur during the menstrual period, which is known as catamenial epilepsy (Herzog, Fowler, Sperling & Massaro, 2015; Schachter & Sirve, 2014). In addition to AED's adverse effects and their impact on contraception and fertility, cognitive dysfunction may be another cause of decreased QoL in women with epilepsy. (Florindo & Maciel, 2004; Hopker et al., 2017).

The aimed to analyze the relationship between clinical data, cognition, and quality of life in women with epilepsy of childbearing age.

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Method

The research was a cross-sectional, correlational, quantitative study. Data were collected from May to September 2018. The research was carried out at the Center for Neuroscience of the Bahiana School of Medicine and Public Health in Salvador, a northeast Brazil. The Research Ethics Committee approved the study of the Bahiana School of Medicine and Public Health (no. 2,697,939).

Participants

Twenty-two women with epilepsy attended the Epilepsy outpatient clinic of the Bahian School of Medicine, and Public Health participated in the research. The selected for convenience, with the inclusion criteria: female gender, diagnosis of epilepsy according to the International League Against Epilepsy (ILAE definition), ability to answer questionnaires. Those who agreed to participate in receiving information about the study and the signed study or the consent form.

The exclusion criteria were: psychotic disorders, severe mental retardation, inability to answer questionnaires, and participants who did not complete the protocols thoroughly.

Procedures

Data was collected on Thursdays, the same day scheduled for their appointment with the neurologist. There were two individual assessments: one with the Psychology team and one with the Nursing team, lasting 60 minutes on average each. The interviews happened in a reserved room, ensuring privacy and patient comfort.

Instruments

The questionnaires began with the Nursing team, which applied 2 (two) questionnaires: the first was the semi-structured questionnaire regarding socioeconomic, demographic, and clinical variables.

The second questionnaire was the quality of Life Inventory in Epilepsy (QOLIE-31), an instrument validated in Brazil since 2007, which assesses the influence of epilepsy in people's quality of life, being an abbreviation of QOLIE-89. It is a to 31 (thirty-one) questions encompassing 7 (seven) domains (Silva et al., 2016) which are listed below:

1) Concern about seizures: fear of getting hurt during seizures; to have problems the seizures. With lower scores meaning greater concern;
2) Global quality of life: self-perception of quality of life. With lower scores meaning worse perception of the quality of life;
3) Emotional well-being: feelings of sadness, discouragement, and happiness. With smaller punctuation, meaningless well-being;
4) Energy/fatigue: a lower score meaning greater fatigue, that is, lower vitality;
5) Cognitive function: difficulty making decisions, learning new things, problems with concentration and memory. With lower scores meaning worse function cognitive;
6) Medication effects: concern about feeling / already experiencing side effects of medication; feel the side effects of medication on cognition. With lower scores meaning that the person feels more effects;
7) Social functions: to feel unable to relate to other people, to make activities outside the home; difficulties at work; reduction of social activities; and leisure. With lower scores meaning worse social function.

The score was calculated from the mean of each domain, with higher scores meaning better performance.

The third instrument that the psychology team applied the Short Neuropsychological Assessment Instrument (NEUPSILIN) (Fonseca, Salles & Parente, 2009), which consists of an abbreviated examination battery that aims to provide a quantitative and qualitative neuropsychological profile. It presents 32 (thirty-two) tasks, with an average time of 50 minutes for its application, subdivided into eight primary neuropsychological functions: Working Memory (Ascending Number and Auditive Span), Short-Term Memory (Immediate Recall), Long-Term Memory (Late Recall), Praxis (Ideomotor, Constructive and Reflective) and Executive Functions (Phonemic Verbal Fluency).

All the interviewees received an individual report developed by the researchers, with the analysis and interpretation of their results in each research tool.

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Data analyses

Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) and software version 21 and JASP. Descriptive and inferential statistical tests were used. Chi-square and spearman correlation tests were used.

Results

The study aimed to analyze the relationship between clinical data, cognition, and quality of life in women and childbearing age. The results are presented in five main topics through tables with the following data: 1) sociodemographic characteristics of the participants; 2) cognitive performance of working memory, short and long term memory, visual construction, executive functions, and language; 3) relationship between cognitive functioning and the different dimensions of quality of life that were assessed; 4) comparison between the groups of women who work and those who do not work about their cognitive performance; 5) the dimensions of the quality of life of women who had their first crisis before the age of 11 and after the age of 11.

Table 1 shows the sociodemographic data of the participants. It is possible to observe the following data: the mean age was 27.3 years (± 6.8); the majority of participants are unemployed (68.2%); is single (86.4%); up to two attacks per month (59.1%); the type of epilepsy is focal (59.1%) and attended high school (63.6%).

Table 1

Sociodemographic data of participants.

Sociodemographic data			
		N	%
Employment status	Employed	7	31,8
	Unemployed	15	68,2
Marital Status	Single	19	86,4
	Married	3	13,6
Seizure frequency	Up to 2 seizures/month	13	59,1
	More than 2 seizures/month	9	40,9
Type of seizures	Focal	13	59,1
	Generalized/ focal and generalized	9	40,9
Schooling	Middle School	6	27,3
	High School	14	63,6
	Higher Education	2	9,1

Cognitive functions were analyzed using Z-score, is calculated according to the score of the standards presented in the instrument manual, with 0 being mean and -1 and +1 the standard deviations. Study participants performed worse than the general population in all cognitive functions assessed NEUPSILIN (Fonseca, Salles & Parente, 2009). Immediate recall seemed to be less impaired (Zscore = -0.75). Ascending Order of Number Test, which measures Working Memory, and Verbal Fluency were most impaired (Zscore = -1.53 and -1,51 respectively). According to the instrument standardization, women in our study were, on average, 1,5 standard deviations below the expected score for its reference population (according to the instrument standardization) (Table 2).

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Table 2-

Performance in cognitive functions, presenting the Z-score and raw score

Fig. 1. NEUPSILIN		Fig. 2.	Fig. 3. Z Score		
Fig. 4. Neuropsychological Function	Fig. 5. Task	Fig. 6. N	Fig. 7. Mean (SD)	Fig. 8. Min.	Fig. 9. Max.
Fig. 10. Working Memory	Fig. 11. Ascending order of number	Fig. 12. 22	Fig. 13. -1.53 (1.33)	Fig. 14. -4.38	Fig. 15. 0.72
	Fig. 16. Auditive Span	Fig. 17. 19	Fig. 18. -0.91(0.86)	Fig. 19. -2.52	Fig. 20. 1.21
Fig. 21. Short and Long Fig. 22. Term Memory	Fig. 23. Evocation Immediate	Fig. 24. 21	Fig. 25. -0.75 (0.61)	Fig. 26. -1.93	Fig. 27. 0.22
	Fig. 28. Evocation Late	Fig. 29. 21	Fig. 30. -0.84(0.73)	Fig. 31. -1.71	Fig. 32. 0.40
Fig. 33. Visuoconstruction	Fig. 34. Praxia Fig. 35. Constructive	Fig. 36. 21	Fig. 37. -1.20(1.29)	Fig. 38. -3.77	Fig. 39. 0.44
Fig. 40. Executive Function Fig. 41. /language	Fig. 42. Fluency Verbal	Fig. 43. 22	Fig. 44. -1.51(0.65)	Fig. 45. -2.65	Fig. 46. -0.31

Correlation between cognitive functions and the QoL was analyzed. We found a negative correlation between Evocation Late and certain sub-domains of Qolie-31: Energy / fatigue (r = -0.465), Psychological (r = -0.384) Social Relations (r = -0.445) and Physical Relations (r = -0.438). These results indicate that when the performance in long-term memory increases, the perceived QoL decreases. The opposite was noticed on Constructive Praxia, where better performance in Praxis tasks improves the perception of QoL (Cognitive r = 0.398;), General Quality of Life (r = 0.423); Environment (r = 0.569) (Table 3).

Table 3

Correlation between cognitive functions and quality of life (QoL 31).

	Ascending order of number	Auditive Span	Evocation Immediate	Evocation Late	Praxia Constructive	Fluency Verbal
Concern about seizures	-0.377	0.234	0.303	0.077	0.091	-0.165
Emotional well-being	-0.249	-0.056	-0.108	-0.298	0.022	-0.039
Energy / fatigue	-0.047	0.268	-0.129	-0.465*	-0.378	-0.173
Medication effects	-0.180	0.154	-0.010	-0.136	-0.104	-0.329
Cognitive function	0.229	-0.240	-0.194	-0.331	0.398[a]	-0.107
Social function	-0.021	0.247	-0.034	-0.063	0.007	-0.222
The general quality of life	-0.203	0.031	-0.153	-0.300	0.423*	-0.171
Psychological	-0.260	-0.413	0.033	-0.384[a]	0.229	-0.298
Social relations	0.140	-0.164	-0.358	-0.445*	0.269	-0.223
Environment	-0.272	-0.333	-0.243	0.001	0.569**	0.030
Physical	0.105	0.072	-0.203	-0.438*	0.116	-0.193

p= a<0,1; *<0,05; **<0,01

Employability was another variable compared to cognitive functioning and quality of life. It was found marginal differences between the Auditive Span test and Praxis comparing women who Employability and Unemployed. Employed women presented better QoL regarding the psychological domain when compared to unemployed women (15,143 vs. 12,311, p = 0.034) (Table 4).

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Table 4
Comparison between the employability condition and cognitive functions.

Subtests neuropsychological	Employability	N	Average (Z-score)	Standard deviation	p-value
Ascending order of number	Employees	7	-1.054	0.576	0.337
	Unemployed	15	-1.760	1.530	
Auditive Span	Employees	7	-1.375	0.760	0.062[a]
	Unemployed	12	-0.646	0.834	
Evocation Immediate	Employed	7	-0.672	0.469	0.700
	Unemployed	14	-0.804	0.693	
Evocation Late	Employed	7	-1.011	0.693	0.625
	Unemployed	14	-0.758	0.769	
Praxia Constructive	Employees	7	-0.667	1.488	0.060[a]
	Unemployed	14	-1.476	1.144	
Fluency Verbal	Employees	7	-1.469	0.633	0.860
	Unemployed	15	-1.540	0.682	
WHOQOL-BREFF					
Psychological	Employees	7	15.143	2.098	0.034*
	Unemployed	15	12.311	2.969	
Social relations	Employees	7	16.190	3.646	0.239
	Unemployed	15	14.133	3.258	
Environment	Employees	7	13.214	1.890	0.243
	Unemployed	15	11.533	2.532	
Physical	Employees	7	14.204	2.296	0.154
	Unemployed	15	12.343	3.053	

Level of Significance= a<0,1; *<0,05; **<0,01

Age of onset of seizures was related to QoL but was not associated with cognitive aspects. Women who presented first seizures after age 11 years (n = 12) had a higher score in the Energy / Fatigue factor, which is linked to greater vitality and medication effects (Table 5). In summary, the women who are the onset of seizures after 11 years of age present greater vitality and lower side effects of medications.

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Table 5

Comparison between the age of onset of seizures and quality of life.

	Quality of Life	Age of onset of seizures	N	Average	Standard deviation	p-value
QOLIE-31	Concern about seizures	≤11 years	12	2.367	1.513	0.789
		>11 years	10	1.880	0.818	
	Emotional well-being	≤11 years	12	3.617	0.824	0.690
		>11 years	10	3.720	0.860	
	Energy / fatigue	≤11 years	12	3.229	0.548	0.016*
		>11 years	10	4.000	0.687	
	Medication effects	≤11 years	12	1.944	1.153	0.002**
		>11 years	10	4.033	1.127	
	Cognitive function	≤11 years	12	3.333	1.064	0.552
		>11 years	10	3.583	0.979	
	Social function	≤11 years	12	3.117	1.300	0.144
		>11 years	10	3.920	0.790	
	Global QoL	≤11 years	12	4.458	1.356	0.947
		>11 years	10	4.700	1.337	

Level of Significance= a<0,1; *<0,05; **<0,01

Discussion

The main findings had as profile women with epilepsy, in childbearing age. The average age was 27.32 years, single, most unemployed, with impairment in memory, praxis, and executive functions. It could consider that women with worse memory performance tend to overestimate the quality of life; those who started convulsive seizures later presented higher energy and fewer medication effects, and employed women have better body image and higher self-esteem.

Our results suggest that women with epilepsy of childbearing age present cognitive impairment, especially in Working Memory and Verbal Fluency. This finding is in line with most of the published literature that reports that epilepsy and its treatment can negatively affect cognition and predict the quality of life (Menezes, Pais-Ribeiro, da Silva and Giovagnoli 2009; Wang, Chen, Liu, Lin, & Huang 2020; Witt, & Helmstaedter, 2017). Neurobiological aspects, sex, age, psychiatric issues, modifiable and not-modifiable epilepsy-related factors may impact cognition (Hermann and Seidenberg 2007; Helmstaedter and Witt 2017). Our study was not possible to identify the leading causes of cognitive deficits, but the functions that appeared most affected were Working Memory and Verbal Fluency. Several studies point out that, Executive Functions and Memory are the most impaired cognitive functions (Mader, 2001; Menezes, Pais-Ribeiro, da Silva & Giovagnoli, 2009; Mosiashvili, Kasradze, Tamar Gagoshidze 2017).

Praxis seems to be positively correlated to QoL, but surprisingly, we found a negative correlation between delayed recall and Quality of Life's self-perception. This finding suggests that as long-term memory capacity increases, the perception of the quality of life decreases. This result may seem counterintuitive, but similar results have been seen in patients with Alzheimer's (Almeida & Crocco 2000), probably because these patients underestimate their cognitive deficits and difficulties

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in carrying out daily living activities. When studying the quality of life in dementia of early-onset, Baptista et al. (2016) found that young people who presented cognitive deficits reported a better quality of life compared evaluated by caregivers.

Most of the participants in our study were unemployed. It is one of the major complaints of patients with epilepsy (Hopker, Berberian, Massi, Willig & Tonocchi 2016) and a significant cause of stigma and isolation (McCagh 2014). In particularly troubling in our study population since these women are at an economically active age.

Few studies have studied the quality of life, specifically in women with epilepsy of childbearing age (Santos, Castro-Lima, Matos, and Brito, 2018). Even fewer have studied cognition in this population. Younger age of epilepsy onset was also associated with greater complaints regarding side effects and less energy and vitality. Some authors demonstrated that epilepsies that begin earlier negatively influence the quality of life (Edefonti et al. 2011) and may also impact cognition (Castelló and Soler 2004).

Although we have studied a small number of patients, our results suggest that women with epilepsy of childbearing age present cognitive impairment and reduced life quality. More studies with a larger number of participants are needed to understand better the correlation between cognition and quality of life in this particular population.

Epilepsy is a condition that is intimately linked to stigma. Further studies are needed to discuss the subject to reduce the prejudice suffered by people with epilepsy. The importance of investments in the labor market and activities adapted to a better quality of life and self-perception. The present study presents evidence of the need for special care to focus on women's health, aiming at strategies for actions and daily activities that favor and improve their quality of life and provide subsidies to health professionals to provide accessibility in the care of this population. It is important to be aware of the physical limitations of the cognitive, and the variables that may be decreasing the quality of life of the people to be attended to. The importance of being aware of the age at which seizures start, and their effects on the patient's current age, considering their influence on cognitive functioning.

The study's main conclusions are that women of childbearing age are at greater risk of being unemployed and without a partner in an effective relationship. These environmental conditions associated with cognitive impairments can promote delays in several aspects of quality of life. Clinical conditions such as the onset of the first seizure before the age of eleven also appear to be more vulnerable to the effects of treatment. The findings suggest that the public studied in this research suggests psychosocial (unemployed and single), cognitive (memory and executive functions), and clinical (crises before 11 years of age) delays appear to decrease quality of life in the dimensions of drug effects, energy/vitality, and self-esteem.

No Conflict of Interest to declare

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