Sleep quality and quality of life in patients with epilepsy in a public teaching hospital in Rio de Janeiro, Brazil

Qualidade de sono e qualidade de vida em pacientes com epilepsia em um hospital público de ensino no Rio de Janeiro, Brasil

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ABSTRACT

The main aim of this paper was to estimate the prevalence of the "bad sleepers", correlate the "sleep quality" with the quality of life, and to study the risk factors for "sleep quality" in 98 unselected adult patients with epilepsy in a cross-sectional study performed in a public teaching hospital. They answered/were evaluated: clinical-socio demographics questions, Pittsburg Sleep Quality Index, Depression and Anxiety Beck Inventories, and SF-36 Health Survey. They were found a high rate of "bad sleepers"; statistically significant difference between "sleep quality" in relation to age, depression and anxiety symptoms, and three SF-36 concepts (physical role, vitality, and mental health). After multiple linear regression analysis, it was found that vitality and anxiety, besides mental health, were the predictors of lower quality of life in ''bad sleepers''. However, there was not any statistically significant difference regarding seizure frequency, nor number of antiepileptic drugs. Consequently, risk factors for low "sleep quality" have to be managed.

Keywords: Epilepsy, anxiety, depression, sleep disorder, quality of life.

RESUMO

O principal objetivo deste trabalho foi estimar a prevalência dos "maus dormidores", correlacionar a "qualidade do sono" com a qualidade de vida e estudar os fatores de risco para "qualidade do sono" em 98 pacientes adultos não selecionados com epilepsia em um estudo transversal realizado em um hospital público de ensino. Eles responderam/foram avaliados: questões clínicas e sociodemo-gráficas, Índice de Pittsburg de Qualidade de Sono, Inventários de Beck de depressão e ansiedade e Questionário de Qualidade de Vida SF-36. Foram encontradas alta taxa de "maus dormidores"; diferença estatisticamente significativa entre "qualidade do sono" e idade, sintomas de depressão e ansiedade, além de três conceitos do SF-36 (papel físico, vitalidade e saúde mental). Após análise por regressão linear múltipla, encontrou-se que a vitalidade e a ansiedade, além da saúde mental, foram preditores de baixa qualidade de vida nos "maus dormidores". No entanto, não houve qualquer diferença esta-tisticamente significativa em relação à frequência de crises, nem nú-mero de drogas antiepilépticas. Consequentemente, fatores de risco para baixa "qualidade do sono" têm de ser controlados.

Palavras-chave: Epilepsia, ansiedade, depressão, transtornos do sono, qualidade de vida.

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INTRODUCTION

Sleep is a vital element throughout the life of all mammals, and its quality must be preserved. However, "sleep quality" (SQ) represents a complex phenomenon difficult to define and measure objectively.[1] It includes quantitative aspects of sleep, such as its duration, latency or number of arousals, as well as more purely subjective aspects, such as "depth" or "restfulness" of sleep according to Buysse *et al.*[1] Subjective measurement tools can be used in clinical practice for diagnostic purposes, for monitoring treatment responses, in epidemiologic studies and in clinical research.[2] Some of them are designed for the assessment of specific sleep disorders, such as sleepiness or presence of awakenings, while others evaluate sleep in a broad spectrum, especially with regard to SQ.[2] There is a well know reciprocal relationship between sleep and epilepsy, besides the notion that sleep disturbances are common among patients with epilepsy and, on the other hand, sleep disorders can contribute to lack of seizure control.[3] Among these disorders, both excessive daytime sleepiness and obstructive sleep apnea are more frequent in patients with epilepsy than the general population. Some authors published papers about the relationship between SQ, measured by questionnaire and/or polysomnography, and epilepsy,[4-9] and some others have studied the links between SQ/sleep disorders, epilepsy and "quality of life" (QoL).[10-19] There are also many studies dealing with the general question "sleep quality" and epilepsy, but the literature remains meager and ambiguous regarding the prevalence of "bad sleepers" evaluated by means of a formal test with this aim (such as Sleep Quality Index Pittsburgh-PSQI), and the correlation between SQ and QoL, besides the study of several risk factors for the SQ [altogether] in patients with epilepsy: the aims of this study.

METHODS

This is a cross-sectional study based on 100 unselected patients data from the outpatient clinic of the Neurological Institute, Universidade Federal do Rio de Janeiro, Brazil, over a 1 year period. The patients were men and woman aged between 18 and 60 who had been diagnosed with epilepsy (focal or generalized) according to International League against Epilepsy criteria. The patients agreed with the informed consent, and the study was approved by the local ethics committee (*The Sleep disorders in adult patients with epilepsy: study of prevalence, quality of sleep and life based on questionnaire*). The patients were able to complete a self-administered questionnaire. Two subjects were excluded because of missing data on Sleep Quality Index Pittsburgh-PSQI. Only patients on stable antiepileptic drugs regimen were included (no changes over the last four weeks). Patients with other active neurological diseases were excluded.

The auto-applied questionnaires were answered before the medical consultation and they included: (1) clinical and socio-demographic questions (age, gender, education – in years, seizure frequency, and number of epileptic drugs); (2) SQ (dependent variable) evaluated by means of the PSQI.[1] This questionnaire comprise 19 questions that are combined to form seven components (sleep quality-individual perceptions about the quality of sleep; sleep latency – time required to start sleep; sleep duration-duration of sleep or how long it they stay asleep; habitual sleep efficiency – the relationship between the number of hours slept and the number of hours remaining in bed, not necessarily asleep; sleep disturbance – presence of situations that compromise the hours of sleep; use of sleeping medication – analyses the use of sleeping medication; daytime dysfunction – describes the disturbances and daytime sleepiness during the day referring to changes in the disposition for the performance of routine activities), each varying from 0 to 3. The seven components combine to form a global score that varies from 0 to 21, where 0 indicates no difficulty and 21 indicates severe difficulty. Global score ≥ 5 distinguishes "bad" from "good" sleepers 1; (3) depression symptoms were evaluated by the Beck Depression Inventory.[20,21] Depression was defined by a score of ≥ 12;[19-21] (4) anxiety symptoms were examined by the Beck Anxiety Inventory.[19] Anxiety was defined by a score of ≥ 10; 5) QoL was evaluated by the Short Form [36] Health Survey SF-36.20 The SF-36 is an instrument comprising 36 items that assess two health components: the physical and mental. The first has the following concepts: 1 – physical functioning (performance of daily activities, such as ability to care, dressing, bathing and climbing stairs); 2 – physical role (physical health impact on the performance of daily activities and/or professional); 3 – pain (pain level and the impact on

performance of daily activities and/ or professional); 4 – general health (subjective perception of general health). The second component (mental health) consists of the dimensions: 5 – vitality (subjective perception of health status), 6 – social functioning ([reflecting the condition of physical health on social activities), 7 – emotional role (emotional reflection of the conditions in the performance of daily activities and/or professional), and 8 – mental health (scale of mood and well-being). The results of each component range from 0 to 100 (from worst to best health status) – greater punctuation, better QoL.[22,23]

We studied the prevalence of "bad sleepers", and its 95% confidence interval (CI). Descriptive and inferential statistics were used by means of non-parametric tests according to the variable type, such as Spearman's rank correlation coefficient, chi-square test of independence, and Mann-Whitney U test by using the statistical package SPSS 11.01. The option was for the two tailed tests, and the significance of 0.05. The multivariate analysis was performed by multiple linear regression to assess the influence of the indicators of accessibility on SQ (evaluated by PSQI). The process of selection of variables was stepwise forward, at level of 5%, which selects the smallest subgroup of independent variables that influence the SQ.

For comparison purposes, our data regarding sleep quality measured by PSQI was compared with that of hypertrophic cardiomyopathy and control hospital based[24] besides that of insomnia and depression[2] Brazilian patients.

RESULTS

The main characteristics of the studied population are presented on table 1. The mean ± SD age of the sample was 39.71 ± 12.24. More than half of the participants were men. Most patients had generalized seizures, experienced fewer than four seizures during the past year, and 51% used two or more antiepileptic drugs during this period. The mean ± SD PSQI global score was 6.62 ± 4.3. Sixty-six participants (67.3%) were poor sleepers (global PSQI ≥ 5). The table 2 gives the coefficient x^2 providing the relationship between clinical and socio-demographic variables. We found statistically significant difference between bad or good sleepers in relation to age, depression, anxiety when these variables were dichoto-

mized. The table 3 gives the correlation between QS and QoL variables. We observed that there was correlation between three domains of the SF-36 (physical role, vitality, and mental health), depression and anxiety with QS (Table 3).

Table 1. Patient characteristics

Variables	Category	N	% (95% CI)
Gender	Male	59	60.2 (0.50-0.69)
	Female	39	39.8 (0.31-0.50)
Age	< 40 years	51	52.0 (0.43-0.63)
	≥ 40 years	47	48.0 (0.39-0.58)
Education	< 8 years	25	25.5 (0.18-0.36)
	≥ 8 years	73	74.5 (0.67-0.83)
Seizure type	Focal	37	37.7 (0.28-0.48)
	generalized	61	62.3 (0.51-0.71)
Seizure frequency/year	< 4/year	67	68.3 (0.58-0.76)
	≥ 4/year	31	32.7 (0.24-0.43)
Number antiepileptic drugs	< 2	47	48.0 (0.39-0.58)
	≥ 2	51	52.0 (0.43-0.62)
Depression	< 12	60	61.2 (0.52-0.71)
	≥ 12	38	38.8 (0.30-0.49)
Anxiety	< 10	51	52.0 (0.43-0.62)
	≥10	47	48.0 (0.39-0.58)
Sleep quality (PSQI)	< 5	32	32.7 (0.24-0.42)
	≥ 5	66	67.3 (0.58-0.76)

PSQI: Pittsburgh Sleep Quality Index.

Table 2. Relationship between socio-demographic and clinical variables in relation to the quality of sleep (bad and good sleepers)

Variable	Category	Sleepers < 5		Sleepers ≥ 5		p^*
		N	%	n	%	
Gender	Male	23	38.9	36	61.0	0.22
	Female	10	23.6	29	76.3	
Age	< 40 years	24	43.6	31	56.3	< 0.001
	≥ 40 years	08	18.6	35	81.9	
Education	< 8 years	9	42.8	12	57.1	0.26
	≥ 8 years	23	29.2	54	70.1	
Seizure type	Focal	18	18.3	20	20.4	0.03
	generalized	16	16.3	44	44.8	
Seizure Frequency/ year	< 4/year	24	32.4	50	67.5	0.83
	≥ 4/year	08		15	65.6	
Number antiepileptic drugs	< 2	17	36.1	30	82.4	0.47
	≥ 2	15	29.4	36	70.5	
Depression	< 12	26	43.3	06	56.6	< 0.001
	≥ 12	34	15.7	32	84.2	
Anxiety	< 10	25	49.0	26	52.9	< 0.001
	≥ 10	7	14. 9	40	85.1	

* *Chi square statistic.*

Table 3. Correlation between quality of sleep with clinical and quality of life variables

Variables	Sleep quality index Pittsburgh	
	r_s	*p* value
Age	0.060	0.55
Seizure frequency/year	0.077	0.45
Number of antiepileptic drugs	0.104	0.31
Depression	0.518	< 0.0001
Anxiety	0.588	< 0.0001
SF-36		
1 – Physical functioning	-0.314	0.002
2 – Physical role	-0.506	< 0.0001
3 – Pain	-0.344	0.001
4 – General health	-0.478	< 0.0001
5 – Vitality	-0.635	< 0.0001
6 – Social functioning	-0.463	< 0.0001
7 – Emotional role	-0.466	< 0.0001
8 – Mental health	-0.623	< 0.0001

Multivariate analyses by means of multiple linear regressions were conducted to examine the associations between SQ and epilepsy-related QoL (Tables 4 and 5). We found that vitality (including in SF-36-5), mental health (including in SF-36-8, and anxiety – measured by Beck Anxiety Inventory) were independently predictive of lower SQ (Table 4). On a second step, the vitality variable was excluded to identify other significant predictors of SQ in multivariate analysis: mental health (Table 5).

Table 4. Multiple linear regression (step 1)

Variable	Coefficient	SE*	P value	R²
SF-36-vitality	-0.0732	0.016	< 0.0001	0.408
Anxiety	0.1150	0.036	0.002	

Dependent Variable: Sleep quality Index Pittsburgh.

* SE: standard error.

Table 5. Multiple linear regression (step 2)

Variable	Coefficient	SE*	P value	R²
SF-36-mental health	-0.0660	0.002	< 0.0001	0.412
Anxiety	0.127	0.004	0.001	

Dependent variable: Sleep quality Index Pittsburgh.

R²: squared multiple correlation coefficient.

SF-36-vitality was not considered at this stage.

* SE: standard error.

DISCUSSION

Our studied population demonstrated a high prevalence of low SQ (PSQI 6.62 ± 4.3), but not in the grade demonstrated by Bertolazi *et al.*[2] for insomnia and depression patients. Bertolazi *et al.*,[2] described in their study that the mean score for: control subjects [participants with history of normal sleep habits, without notice snoring] was 2.5 ± 2; for patients with OSA, 8.1 ± 4.0; for insomnia patients, 12.8 ± 3.7; for those with depression, 14.5 ± 3.7. The study on patients with hypertrophic cardiomyopathy in the same geographic region applied PSQI global score shown PSQI > 4: control (without a previous diagnosis of hypertrophic cardiomyopathy) – 48% (0.34-0.61); patients – 76% (0.67-0.83) *vs* 67.3% (0.58-0.76) in the studied epileptic patients.[24]

We found that vitality, anxiety, and mental health [concepts of the SF-36] independently are all related to QS: mental health components more important than physical health components [physical role] that was also impaired. Neves and Gomes[19] studied the same patients regarding low vitality and its important relationship to low SQ measured by PSQI. Kwan *et al.*[16] point out the effect of anxiety and depression on QoL scores.

In relation to others diseases applying similar approach, Taylor-Gjevre *et al.*[25] studied SQ in patients with rheumatoid arthritis and osteoarthritis using PSQI, SF-36, as we use, besides polysomnography. They identified global functioning to be an independent predictor for higher global PSQI scores in rheumatoid arthritis patients, whereas in osteoarthritis patients predictors were SF-36 mental component summary (regarding the mentioned instruments used before), the last more similar to ours patients. In the studied sample, it was not t demonstrated any important relationship between SQ and education, gender, seizure type, frequency of seizures, or number of antiepileptic drugs in use. It was not found correlation frequency of seizures and number of antiepileptic drugs because the majority of patients were pharmacologically controlled. In the other hand, it was found relationship with age, but only when this variable was dichotomized (cut off point, 40 years old).

The study findings call attention to importance of the low SQ as a whole, besides the under-diagnosed psychiatric symptoms in these patients. The psychosocial aspects of patient care and the SQ should be

an important focus on seizure management, but are relatively neglected in everyday clinical practice.

This is an investigation of the impact of QoL on the QS in patients with epilepsy. Others studies only mentioned the impact of sleep disturbances on QoL,[13,15-17] and several authors described the QoL in patients of epilepsy.[21] Carrion et al.,[8] evaluated the SQ in patients with refractory seizures who undergone epilepsy surgery.

We propose in a further study correlate these subjective changes with the structure of the sleep by polysomnography, trying to find interactions between nocturnal seizures, sleep stages, interictal epileptiform activity, exacerbation of seizures by disrupted sleep, the effects of number of antiepileptic drugs on sleep architecture, and daytime vigilance. Two papers did such type of study by Cho et al.,[9] and Bell et al.[4] The first compared the effect of levetiracetam monotherapy with the effect of carbamazepine-CR on subjective SQ and objective sleep parameters in patients with focal epilepsy. Bell et al. evaluated the objective and subjective effect of the use of levetiracetam *plus* carbamazepine therapy on SQ of patients with focal epilepsy and healthy subjects with the use of levetiracetam only.

CONCLUSION

Our findings suggest that poor sleep is frequent among patients with epilepsy, and is linked with anxiety, loss of vitality (the fifth component of SF-36), and mental health (the eighth conception of SF36) independently. These results emphasize the importance of screening the SQ and psychiatric comorbidities in patients with epilepsy. Therapeutic interventions including psychiatric and sleep assessment appear to be crucial for preserving QoL, and efforts must be made to evaluate how the modification of the variables could improve the QoL and seizure control in patients with epilepsy. We could also set targets to improve control of the SQ and consequently the QoL, indicating a major breakthrough in the treatment of the patients with epilepsy.

CONFLICTS OF INTEREST

The authors declare that there is no conflicts of interest regarding the publication of this paper.

PARTICIPATION

Gisele S. M. Leite Neves (gsmlneves@gmail.com.br) and Marleide da Mota Gomes (mmotagomes@acd.ufrj.br): objective proposal and text writing, Rosângela Noé (rnoe@uol.com.br): statistics and related text review.

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