

The Impact of Epilepsy on Sleep Characteristics in Epileptic Adolescents and their Caregivers

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Epilepsy is a common chronic neurological disorder that afflicts up to 1% of the children. Sleep problems are frequently reported in epileptic children as in healthy children. Epileptic discharges interrupt the organization of sleep. Poor sleep quality links to a decline in children’s physical growth, behavior, cognitive functions, such as memory, attention, and learning. The relationship between behavioral assessment and sleep disturbances was studied in a few study, which are predominantly based on parental statements about their children’s sleep.

We aimed to evaluate sleep problems and behavioral difficulties of epileptic adolescents by using both self- and parent reports. For this purpose, we assess adolescents with The children's sleep habits questionnaire and diagnostic and statistical manual of mental disorders (DSM) 5 sleep disturbance- child report which are validated tools used for assessing sleep disorders and enables to compare adolescents with epilepsy to healthy controls.

MATERIALS & METHODS

A total of 90 adolescents aged 11–17 years who were attended to the pediatric neurology outpatient clinic between February and June 2020 were recruited to this observational case-control study with their caregivers. The children sleep habits questionnaire (CSHQ), DSM-V Level II sleep disorders scale For children, and Strengths & Difficulties Questionnaire (SDQ) were used to evaluate sleep habits, sleep problems, and psychometric properties of adolescents. DSM-V Sleep disorder scale for adults was used to evaluate the caregivers’ sleep problems. Subjects were excluded from the study if they had intellectual disability, psychiatric or progressive neurological disorder other than epilepsy.

RESULTS

The clinical profile of the participants, and demographic features of their caregivers are summarized in Table I.

Significant differences in total sleep disturbance and daytime sleepiness scores of CSHQ (p= 0.003 and p= 0.001, respectively) was detected between the groups.

Concerning the caregivers’ sleep quality, 35.1% of the study group (n = 13/37) and 14% of the control group (n= 6/43) were poor sleepers. The poor sleepers were more frequent in caregivers of epileptic adolescents (p = 0.036).

Significant differences of behavioral scores like total behavior, conduct problem, and hyperactivity/inattention scores between the groups (p < 0.05, p < 0.01, and p < 0.05)

A weak significant positive correlation between bedtime resistance and social score (r = 0.35, p = 0.032) in epileptic adolescents

Positive correlation with weak significancy was found between parasomnia and 196 hyperactivity/inattention (r = 0.35, p = 0.036).

The sleep onset delay showed a moderate significant negative correlation with both total behavioral difficulties (r = - 0.44, p = 0.007), and emotional problems (r = -0.47, p = 0.03).

The sleep duration showed weak significant negative correlation to conduct problems (r = - 0.33, p = 0.046).However, it showed moderate positive significant correlation with social score (r = 0.46, p = 0.004) in epileptic adolescents.

Night waking had a weak positive significant correlation between both total behavioral difficulties (r = 0.35, p < 0.05) and hyperactivity/inattention score (r = 0.38, p < 203 0.05) in epileptic adolescents.

DISCUSSION

Daytime sleepiness is a common problem among epileptic adolescents. The maladaptive behaviors like conduct problems and hyperactivity were seen more often in epileptic adolescents. Night waking and parasomnias were correlated with maladaptive behaviors and induce hyperactivity in epileptic adolescents And also insufficient sleep duration was associated with conduct problems and social interaction problems in epileptic adolescents.

Even sleep problems of epileptic children were associated with anti-seizure medication use in numerous studies, we couldn’t find significant difference between the groups.

The sleep disorders are closely associated with behavioral problems in epileptic children, regardless of seizure control.

Table I. Demographic characteristics of the participants

	Epileptic Adolescents (n= 37)	Healthy Controls (n= 43)	p
Age, years (Mean ± SD)	13.7 ± 2	14.5± 2	.096 ¹
Gender, n (%) Female	13 (36.1)	23(63.9)	.100 ²
BMI, kg/m² (Mean ± SD)	20.7 ± 4	22.5± 4.6	.086 ¹
Sleep Duration, hours (Mean ± SD)	8.83 ± 1.04	8.81± 1.05	.919 ¹
Caregiver’s age, years (Mean ± SD)	41.3 ± 5.21	41.7 ± 5.7	.751 ¹
Education level of caregiver,n (%)			
Illiterate	3(3.8)	3(3.8)	.798 ²
Preliminary school	14(17.5)	20(24.9)	
High school	11(13.8)	9(11.2)	
University	9(11.2)	11(13.8)	

SD, standard deviation; BMI, Body mass index; n, number of adolescents.
¹ Student’s t-test was used for comparing continuous variables, ² x² test was used for comparing categorical variables. Bold represents the significant p-values: p < 0.05

CONCLUSIONS

The present study demonstrated a significantly elevated prevalence of sleep disturbances and behavioral problems in epileptic adolescents. Moreover ,their caregivers were vulnerable to sleep problems frequently than healthy adolescents' parents. Our findings provided that the management protocols of epileptic adolescents should include assessment for sleep and behavioral problems correspondingly. We suggest that taking precautions to improve the sleep quality of epileptic adolescents and their parents will help to mitigate the psychiatric comorbidities. The potential advantages of understanding the relationship between sleep disturbances and psychological problems in epileptic adolescents should be investigated in future interventional prospective control-case studies. Moreover, this would reduce the burden of disease for their families.

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Table III. The strengths and difficulties questionnaire's (SDQ) total and subscales scores in the participants of the study based on self and parent-report.

	Self-report			Parent-report		
	Epileptic	Healthy	p	Epileptic	Healthy	p
	adolescents	controls		adolescents	controls	
	Mean± SD	Mean±SD		Mean±SD	Mean±SD	
Total Score	12.1 ± 5.4	11.6 ± 5.5	.668 ¹	12.46 ± 4.9	9.9 ± 4.99	.026 ¹
Emotional	3 ± 2.1	3.1 ± 2.3	.938 ¹	3.05 ± 1.88	3.4 ± 2.36	.988 ¹
Symptoms						
Conduct	2 ± 1.5	1.5 ±1.5	.159 ¹	1.97 ± 1.42	1.18 ± 1.43	.002 ²
Problems						
Hyperactivity/ina	3.9 ± 1.9	4 ± 2	.683 ¹	4.29 ± 2.36	3.07 ± 2.42	.025 ¹
ttention						
Peer relationship	3.2 ± 1.9	2.9 ±1.8	.535 ¹	3.13 ± 1.61	2.63 ± 1.23	.171 ²
problems						
Prosocial	7.6 ± 2	8.4 ±1.9	.064 ¹	8.21 ± 1.9	9.3 ± 3.6	.124 ²
behavior						

SD, standard deviation; n, number of adolescents; ¹ Student's t-test was used for comparing continuous variables, ² Mann–Whitney U test was used for comparing nonparametric variables without a normal distribution. Bold represents the significant p-values: p < 0.05.

Table IV. The correlation between the CSHQ and the SDQ total and subscale scores in epileptic adolescents

CSHQ	SDQ					
	Total	Emotional	Conduct	Hyperactivity	Peer	Prosocial Score
	difficulties	Problems	Problems Score	Score	Problems	p r
	Score	Score	p r		Score	
	p r	p r		p r	p r	
Total score ¹	.55 -.10	.77 -.04	.08 -.28	.78 .04	.70 -.06	.24 .19
Bedtime	.63 -.08	.67 -.07	.13 -.25	.82 .04	.97.005	.032 .35
resistance ¹						
SOD ¹	.007 -.44	.03 -.47	.11 -.26	.04 -.33	.70 -.06	.10 .27
Sleep	.36 -.15	.30 -.17	.046 -.33	.75 -.05	.52 .10	.004.46
duration ²						
Sleep anxiety ¹	.90 .02	.78 .04	.12 -.25	.25 .10	.65 .07	.17 .22
Night wakings ¹	.033 .35	.17 .22	.28 .18	.02 .38	.62 .08	.30 -.17
Parasomnia ¹	.25 .19	.19 .21	.98 -.00	.036 .35	.31 -.17	.40 .14
SDB ²	.61 .08	.30 .17	.21 -.21	.45 .12	.73 .05	.66-.07
Daytime	.77 -.04	.84 -.34	.75 -.05	.62 .08	.28 -.18	.32 -.16
Sleepiness ¹						

CSHQ,Children's Sleep Habits Questionnaire; SDQ, Strengths and Difficulties Questionnaire; SDB, Sleep disordered breathing; SOD, Sleep onset delay. ¹ Pearson was used for correlating variables distributed normally ² Spearman Rho was used for correlateting non- normally distributed variables. Bold represents the significant p-values.