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Journal of Sleep Disorders & Therapy

Research Article

Cognitive Symptoms in Patients with Epilepsy: Role of Sleep and Mood Disturbance

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ABSTRACT

Study background: Complaints of sleep disturbance are frequently encountered in patients with epilepsy, as are subjective memory complaints. Since the former may contribute to the latter, identification of sleep disturbance may contribute to diagnosis and treatment of subjective memory complaints in patients with epilepsy.

Methods: Jenkins Sleep Scale (JSS), a validated sleep scale, was administered to consecutive new patients attending a dedicated epilepsy outpatient clinic based in a regional neuroscience centre, along with the five-point subjective memory complaint (SMC) Likert scale and a two-item mood screener.

Results: Sleep disturbance identified using JSS was more frequent in patients with subjective memory complaint, as was mood disturbance (both $p<0.02$).

Conclusion: Identifying sleep disturbance using a simple sleep screening scale may contribute to both diagnosis and treatment of subjective memory complaints in patients with epilepsy.

Keywords: Diagnosis; Epilepsy clinic; Memory; Mood; Sleep screening

INTRODUCTION

Memory complaints are frequently encountered in patients attending epilepsy clinics. For example, 20% of patients in an epilepsy outpatient clinic population administered a subjective memory complaint (SMC) five-item Likert scale [1] assessed their memory to be either poor or fair and hence were classified as SMC+ [2]. Using the Ascertain Dementia 8 (AD8) screening questionnaire for cognitive impairment [3], no less than 48% of patients in an epilepsy clinic population scored above the test cut-off suggesting "cognitive impairment likely to be present" [4].

Various factors may contribute individually or collectively to these symptoms of impaired metamemory, including underlying seizure disorder, seizure frequency and/or duration, medication use, disturbances of sleep and mood, psychological distress [5] and illness perception [6].

Subjective memory complaints without objective evidence of underlying cognitive disorder are often encountered in dedicated memory clinics [7,8]. Various diagnostic labels have been applied, including functional memory disorder [9] and functional cognitive disorders (FCD) [10]. These designations are potentially helpful inasmuch as they draw attention to a pattern of complaints and deficits similar to that seen in other functional neurological disorders [11] which may facilitate positive rather than exclusionary diagnosis. Patients with FCD have been reported to be more likely than those with other cognitive disorders (dementia, mild cognitive impairment, transient amnesias) to screen positive for sleep and mood disturbance [12]. It may therefore be sensible to screen for sleep and mood disturbance, along with measures of metamemory, in patients with epilepsy. Sleep disturbance and subjective sleep complaints are recognised to be frequent in patients with epilepsy [13-16] and may impact quality of life more than seizure control in the short term [17].

The objective of this study was to administer brief screening instruments which assess disturbances of sleep and mood, as well as the SMC five-item Likert scale, to consecutive patients attending an epilepsy clinic to compare the prevalence of sleep and mood disturbance in those with or without subjective memory complaint.

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Received: December 12, 2018; **Accepted:** December 31, 2018; **Published:** January 07, 2019

Citation: Aji BM, Elhadd K, Larner AJ (2019) Cognitive Symptoms in Patients with Epilepsy: Role of Sleep and Mood Disturbance. J Sleep Disord Ther 8:299. doi: 10.35248/2167-0277.19.8.299

METHODS

The five-point subjective memory complaint Likert scale described by Paradise et al. [1] was administered to 100 consecutive patients attending a dedicated epilepsy outpatient clinic. This scale asks participants "In general, how would you rate your memory?" with a choice of the following five responses: 1-poor; 2-fair; 3-good; 4-very good; or, 5-excellent. The scale defines those rating their memory fair or poor (2 or 1) as experiencing SMC (SMC+) [1].

Patients were administered two further very brief screening instruments to assess respectively disturbances of sleep and mood (Table 1). The Jenkins Sleep Scale (JSS) addresses four sleep-related symptoms (difficulty falling asleep; waking up several times per night; difficulty staying asleep, including waking up too early; waking up feeling tired and worn out after usual amount of sleep) over the previous four week period [18]. JSS has the advantage of brevity (administration time ca. 1 minute), and a dichotomous index (JSS+, JSS-) is easily computed based on the presence of any one of the four symptoms occurring on 15 or more nights during the four week period under consideration [19]. Because of the possible link between inadequate sleep and mood disturbance, a two question screener for depression (M2Q) was also administered [20]. Again this scale is brief (administration time ca. 1 minute), and a dichotomous index (M2Q+, M2Q-) may be easily computed based on the presence of either one of the two symptoms (Have you often been bothered by feeling down, depressed, or hopeless? Have you often been bothered by little interest or pleasure in doing things?) Occurring in the previous month. Informed consent was obtained from all participants. Study procedure was approved by the local institutional review board.

Table 1: Screening instruments used to assess disturbances of sleep and mood.

Jenkins Sleep Scale (JSS) or Questionnaire and its dichotomization [18,19].
During the previous 4 weeks have you experienced:
Difficulty falling asleep?
Waking up several times per night?
Difficulty staying asleep (including waking up too early)?
Waking up feeling tired and worn out after usual amount of sleep?
If yes to any one of these, ask frequency question: 15 or more nights?
A dichotomous index was computed and coded as JSS+ if the respondents reported that any of the above sleep disturbances occurred 15 or more nights during the previous 4 weeks or as JSS-, if not.
Mood 2 Question screener (M2Q) and its dichotomization [20].
During the past month:
Have you often been bothered by feeling down, depressed, or hopeless?
Have you often been bothered by little interest or pleasure in doing things?
If yes to either one of these, coded as $M2Q^{+}$

Comparisons of patient groups categorised according to SMC status were undertaken. For categorical variables (patient gender; appointment type: new or follow-up; epilepsy type: partial or generalised; epilepsy treatment: Monotherapy or polytherapy; sleep disturbance: JSS+ or JSS-; and mood disturbance: M2Q+ or M2Q-) Fisher's exact test was used; for continuous variables (patient age; disease duration) t-tests were used. Calculations were performed using a freely available online statistics package (http://vassarstats.net/propcorr.html). A p value <0.05 was considered significant.

RESULTS

Of 100 consecutive patients seen in the clinic (F:M=54:46, 54% female; age range 16-77 years, median 35 years) over a period of 9 months (March-November 2018), 27 were new patient referrals who received a diagnosis of epilepsy requiring drug treatment and 73 were follow-up appointments. 59 patients were diagnosed with partial epilepsy, 41 with primary generalised epilepsy. Mean disease duration was 5.97 ± 10.04 years (median 3; range 1-68 years). 79 patients were prescribed monotherapy, and 21 polytherapy. Using the SMC Likert scale, groups were categorised as SMC+ (n=6) or SMC- (n=94).

Using the Jenkins Sleep Scale, 20 patients were found to have sleep disturbance (JSS+). Using the two question screener for depression, 34 patients were found to have mood disturbance (M2Q+).

There was no statistically significant difference in the demographic or diagnostic data between the patients who reported memory complaints (SMC+) and those who did not (Table 2), with respect to patient age ($p>0.1$), gender ($p>0.2$),

new or follow-up appointment, epilepsy type (partial/generalised), disease duration, or treatment (monotherapy/polytherapy) (all p>0.5).

There was a statistically significant difference in sleep disturbance as categorised by JSS and mood disturbance categorised by M2Q between the patients who reported memory complaints (SMC+) and those who did not (Table 2; both p<0.02). A statistically significant association between disturbed sleep and disturbed mood was found (McNemar's test of association, chi-squared=7.54, p=0.009).

Table 2: Demographic and diagnostic details of consecutive patients with epilepsy (N=100) administered the sleep and mood rating scales.

	SMC+ (=Likert scale 1 or 2)	SMC- (=Likert scale 3, 4, or 5)	p
N (100)	6	94	-
Age (mean ± SD; range)	44.3 ± 11.1 (32-59)	38.2 ± 15.7 (16-77)	0.35
F:M (% female)	5:1 (83%)	49:45 (52%)	0.21
New:Follow-up appointment (% new)	1:5 (16.7%)	26:68 (27.6%)	0.67
General: Partial epilepsy (% general)	2:4 (33.3%)	39:55 (41.5%)	1.00
Disease duration (years, mean ± SD; range)	4.33 ± 4.08 (1-10)	6.07 ± 10.3 (1-68)	0.68
Monotherapy:Polytherapy (% monotherapy)	4:2 (66.7%)	75:19 (79.8%)	0.60
Disturbed sleep JSS: JSS (%)	4:2 (67%)	16:78 (17%)	0.014
Disturbed mood M2Q: M2Q (%)	5:1 (83%)	29:65 (31)%	0.017

DISCUSSION AND CONCLUSION

This study of an outpatient population of patients with epilepsy showed frequencies of sleep and mood disturbance of 20% and 34% respectively as assessed using very simple screening instruments which were easy to administer in the context of a busy outpatient clinic. Sleep and mood disturbances were significantly more frequent in those self-assessing their memory function to be poor or fair (SMC+), raising the possibility that these factors contribute to subjective memory complaints in patients with epilepsy.

The observed pattern of findings of sleep and mood disturbance resembled that seen in a cohort of patients with functional cognitive disorders [12,21]. This suggests the possibility of overlapping clinical profiles, as seen in other functional neurological disorders [11]. Inadequate sleep and mood disturbance may both impact on memory function.

Study shortcomings include the small size of the cohort: the number of SMC+ patients was unexpectedly lower than anticipated (6%, vs. 20% in a previous study [2]) the reasons for which are not immediately apparent. The demographic data were similar with respect to age in the prior study (SMC+ 42.7 ± 15.1 years, SMC- 42.0 ± 16.3) [2]. However, the possible association of disease duration with subjective memory complaint which was previously noted [2,4] was not observed in this cohort.

The reference and index tests also have limitations. SMC Likert may be a good screener of metacognition but is less good for cognitive screening [22]. The brevity of JSS, encompassing just four items, cannot adequately address the spectrum of sleep disorders so this instrument can only be used as a preliminary screener. JSS does not permit identification of specific sleep disorders which may occur in patients with epilepsy such as obstructive sleep apnea and REM sleep behaviour disorder [13]. Similar reservations also apply to M2Q as a mood screener. The dichotomous test results produced using these instruments allow easy categorisation and hence direct the appropriate clinical response (reassurance; further monitoring or investigation; immediate treatment), but result in loss of statistical power.

We suggest that enquiries about sleep should be a routine component of assessment in patients with epilepsy, particularly with those volunteering memory complaints or found to have memory issues when using simple screeners such as the SMC Likert scale. This study has suggested that screening for sleep and mood disturbance may contribute to the understanding of memory complaints in patients with epilepsy, although the findings need to be corroborated in larger, independent, patient cohorts with larger numbers of patients with subjective memory complaint. Use of other, more comprehensive, screeners of sleep quality (e.g. Pittsburgh Sleep Quaity Index [15,16]) may be indicated. Detection of sleep and/or mood disturbance in patients with epilepsy with subjective memory complaints may indicate pragmatic treatment targets.

ACKNOWLEDGEMENT

No sources of funding received.

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