

ORIGINAL ARTICLE

Association between Sleep Disorders and Psychiatric Illnesses: A Cross-Sectional Study

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ABSTRACT

Keyword: Sleep Disorders, Psychiatric Illnesses, Insomnia, Schizophrenia, Anxiety, Mood Disorder

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Background: Insomnia is the term used to describe the inadequate sensation, insufficient, or sleep that is not restorative and the most prevalent of all sleep disorders. **Objectives:** To ascertain the correlation between various psychiatric disorders and sleep disorders. **Methodology:** This cross-sectional study included 200 psychiatric patients diagnosed using bipolar disorder according to diagnostic and statistical manual of mental disorders (DSM-5). In order to evaluate each patient, an insomnia severity index was implemented, and screening symptoms were implemented to identify sleep disorders. **Results:** Obesity, marital status, and insomnia status were identified as significant predictors of any sleep disorder in the study of logistic regression. Narcolepsy and parasomnia were the only categories of sleep disorders that were significantly predicted by insomnia status, and all socio-demographic correlates and clinical correlates were insignificant predictors of circadian rhythm disorder. **Conclusions:** Our study concluded a higher rate insomnia and poor-quality sleep among Psychiatric patients. Insomnia status, obesity, and marital status are significant predictors of any sleep disorder. Insomnia status was a significant predictor of narcolepsy and parasomnia, with no association detected between socio-demographic correlates and clinical correlates for circadian rhythm disorder.

INTRODUCTION

Sleep is a critical element of maintaining both physical and mental health. Sleep disorders are distinguished by sleep disturbances that are linked to severe sleep deprivation, inappropriate sleep, and respiration interruptions during sleep. Cognitive abilities, including memory and focus, as well as an elevated susceptibility to chronic illnesses, daytime irritability, and a compromised immune system, may be adversely affected by sleep disturbances ^[1].

The causal relationship between sleep disorders and other mental disorders, such as anxiety, bipolar disorder, attention-deficit hyperactivity disorder (ADHD), and stress, is frequently influenced by two factors. Hypersomnia syndrome symptoms also have been reported by anywhere between 23% and 78% of bipolar disorder patients. Furthermore, patients with panic disorder and generalized anxiety disorder have reported significant sleep disturbances, with a range of 60% to 70% ^[2].

Insomnia is characterized by insufficient, inadequate, or non-restorative sleep. It is estimated that there are approximately 30 to 35% of individuals who suffer from insomnia, which is the most prevalent of all sleep-related disorders. Furthermore, it is estimated that chronic or severe insomnia 's prevalence ranges from 10% to 15%. Individuals with schizophrenia or bipolar disorder frequently experience sleep disturbances, particularly insomnia. A previous study reported that insomnia was observed in 50% of patients suffering from schizophrenia. The frequent reports of altered sleep

spindles and delayed sleep waves in schizophrenia patients are associated with cognitive impairments and clinical symptoms, as demonstrated by a variety of studies ^[3].

When comorbid mental disorders are present, the positively correlation between mental disorders and sleep disorders that has been documented in prior researches could potentially be more robust than when a solitary mental disorder is encountered. Comorbid mental disorders are characterized by two or more mental disorders 's presence in a single individual ^[4].

The prevalence of symptoms of specific sleep disorders, including circadian rhythm disorders, narcolepsy, parasomnia, obstructive sleep apnea, and restless leg syndrome/periodic limb movement in sleep, is limited, despite the fact that sleep disorders have been documented to be present in patients with psychiatric disorders ^[5].

There is a lack of clinical trials that explicitly manipulate the correlation between a variety of sleep disorders and psychiatric illnesses, as well as the prevalence of their symptoms, as well as other risk factors associated with psychiatric illnesses, particularly in the Egyptian population.

Our objective was to ascertain the correlation between various psychiatric disorders and sleep disorders.

SUBJECT AND METHODS

This cross-sectional investigation was implemented on 200 psychiatric patients at Aswan University Hospital. The investigation was conducted from April 2023 to December 2023 in compliance with the authorized guidelines of the institutional ethical committee of Aswan University Hospital (Approval code: Asw.U./784/5/23). All participants provided written consent that was informed.

Inclusion criteria were both sexes, aged 18-65 years, mood disorders (bipolar and depressive disorder), schizophrenia spectrum disorders, and anxiety disorders (including obsessive-compulsive disorder, panic disorder, post-traumatic stress disorder, and generalized anxiety disorder) are diagnosed according to the diagnostic and statistical manual of mental disorders (DSM-5) ^[6]. The exclusion criteria encompassed patients with dementia, and other forms of cognitive impairment, including intellectual disability.

Two set of questionnaires were completed in a neuropsychiatry clinic or a hospital. Participants were required to complete two types of questionnaires. The initial questionnaires were self-administered and were designed to gather data on socio-demographic variables, including age, gender, residence, educational level, and employment. A second questionnaire will be administered by the study staff to answer the following questions: The second set of subjects was administered by the research team as well. At first, Memorizing the number of days that the participants were requested to participate in activities that occasionally resulted in an increase in their pulse rate and/or difficulty breathing during an average week and the duration of each day. Subsequently, Patients classified themselves either "not active physically "or " active physically." The body mass index and the duration of the primary psychiatric illness were determined using the electronic medical records. The participant categorization was categorized as either obese (≥ 27.5) or not obese.

Insomnia severity index (ISI):

The insomnia severity index (ISI) is a self-report instrument that is intended to evaluate the perceived severity of insomnia. The scale is a five-point Likert scale that comprises seven items, with a range of zero (not at all satisfied/worried/interfering) to four (very much satisfied/worried/interfering). Higher scores suggest that insomnia is more severe, with a total score range of 0–28. Self-report measures are intended to evaluate the perceived severity of insomnia. Each item in the survey is evaluated on a five-point Likert scale, with a scale of zero (not at all satisfied/worried/interfering) to four (very much satisfied/worried/interfering). The survey consists of seven elements. Higher scores suggest that insomnia is more severe, with a total score range of 0–28 ^[7]. The use of a cut-off score of 14 resulted in a sensitivity of 94% and a specificity of 94% for the differentiation of individuals diagnosed with primary insomnia from controls with adequate sleep.

Screening symptoms of sleep disorder(s):

Narcolepsy, circadian sleep rhythm disorder, parasomnia, sleep respiratory disorder, and restless leg syndrome/periodic limb movements of sleep (RLS/PLMS) were among the topics that the participant was asked about during a structured interview. Inquiries were posed to participants, including: 'are you a heavy snorer?' (Obstructive sleep apnea); 'do you sometimes fall asleep in the daytime completely without warning?' (narcolepsy); 'do you tend to sleep well but just at the "wrong times" 'do your legs often twitch or can't keep still in bed?' (Restless leg syndrome/periodic limb movements in sleep)?' (Circadian rhythm sleep disorder); 'do you have unusual behaviours associated with your sleep that trouble you or that are dangerous?' (parasomnia); Supplementary questions were posed to participants in order to obtain additional information regarding their symptoms of sleep disorder if they responded affirmatively to any of the inquiries. The presence of sleep disorder symptoms was confirmed when the primary question and one of the supplementary questions were answered with a "yes. The primary query and one of the supplementary inquiries were both answered with a "yes."

Narcolepsy

- Do you occasionally fall unconscious during the day without any prior warning?
- Are you experience extremity muscle paralysis or collapses as a result of intense emotions?
- Do you experience visual hallucinations, either upon waking in the morning or immediately upon falling unconscious?
- Do you experience are unable to move upon awakening from a sleep and paralysis?
- Is it wholly unfeasible to endure "sleep attacks" during the day?

Sleep breathing disorder

- Do you constantly snore?
- Have you been experiencing occasional episodes of unconsciousness, as reported by your companion?
- Do you frequently awaken in the middle of the night, struggling for air?
- Do you frequently experience excessive daytime sleepiness or fall unconscious without intending to?

PLMS/RLS

- Are you frequently unable to remain still in bed, as your thighs quiver or jerk?
- Is it exceedingly challenging to fall asleep as a result of frequent muscle spasms?
- Do you frequently experience startling movements when you wake up from a profound sleep, a compulsion to move your legs or abrupt?
- Is it sufficient to rise from your bed and walk around in order to alleviate these emotions?

CRSD

- Are you prone to falling asleep easily, but only at the "wrong times"?
- Is it possible for you to sleep adequately, but only if you remain awake until a late hour?
- Are you currently in a state of deep, uninterrupted sleep at your typical awakening time and have the capacity to continue sleeping for an additional hour?
- Is it feasible for you to get sufficient sleep, provided that you adjourn to bed at an early hour?
- Is it the case that you awaken at an early hour, feeling alert and energetic, and no longer experiencing feelings of sleepiness?

Parasomnia:

- Are you experiencing any unusual behaviors that are either hazardous or causing you distress concerning your sleep?
- Are you at risk of injuring yourself or others due to your frequent sleepwalking?
- Do you frequently experience night terrors when you are profoundly distressed but not fully awake?
- Are you at risk of harming yourself or others by acting out your dreams?
- Do you suffer from severe, recurring nightmares?

Possible narcolepsy: 1a = "true" and (1b or 1c or 1d or 1e= "true"). Possible sleep breathing disorder: 2a = "true" and (2b or 2c or 2d = "true"). Possible PLMS/RLS: 3a = "true" and (3b or 3c

or 3d = “true”). Possible CRSd: 4a = “true” and either (4b and 4c = “true”) or (4d and 4e = “true”). Possible parasomnia: 5a = “true” and either (5b or 5c or 5d or 5e = “true”).

Statistical analysis:

Data analysis was carried out using SPSS v26, which was developed by IBM Inc. and is based in Chicago, IL, USA. There were also an illustration of the quantitative variables' means and standard deviations (SD). In order to represent qualitative variables, frequency and percentage (%) were implemented. The association between a dependent variable and several independent factors was also estimated using logistic regression. When the two-tailed P value was 0.05 or below, we said that the results were statistically significant.

RESULTS

Table 1 shows demographics, comorbidities, sleep disorders prevalence, and insomnia status of the studied patient, where 127 (63.5%) patients had insomnia.

Table 1: Demographics, comorbidities, prevalence of sleep disorders, and insomnia status of the studied patients

		N=200
Age	Mean ± SD	41.9 ± 13.94
	Range	18 - 65
	18-40 Years	102 (51%)
	>40 Years	98 (49%)
Gender	Male	123 (61.5%)
	Female	77 (38.5%)
BMI (Kg/m ²)	Mean ± SD	41.9 ± 13.94
	Range	18 - 65
	Obese (≥27.5)	106 (53%)
	Not obese (18.5 – 27.4)	94 (47%)
Residence	Urban	103 (51.5%)
	Rural	97 (48.5%)
Marital status	Single	96 (48%)
	Married	53 (26.5%)
	Divorced	51 (25.5%)
Education level	Secondary or below	89 (44.5%)
	Post-secondary to pre-university	84 (42%)
	Tertiary or above	27 (13.5%)
Physical activity	High	96 (48%)
	Low	104 (52%)
HTN		75 (37.5%)
DM		56 (28%)
Dyslipidemia		56 (28%)
Insomnia status		127 (63.5%)

Data are presented as mean ± SD or frequency (%), BMI: body mass index, HTN: Hypertension, DM: Diabetes mellitus.

Sleep quality was good in 90 (45%) patients and poor in 110 (55%) patients. 124 (62%) patients were on unhealthy diet and 90 (45%) patients were consuming medications. **Table 2**

Table 2: History and general habits of the studied patients

		N=200
Sleep Quality	Good	90 (45%)
	Poor	110 (55%)
Unhealthy diet		124 (62%)
Medication consumption		90 (45%)

Data is presented as frequency (%).

Regarding the types of psychiatric disorders among the studied patients, 68 (34%) patients had schizophrenia, 41 (20.5%) patients had anxiety disorder, 91 (45.5%) patients had mood disorder. Duration of Psychiatric disorder was <2 years in 72 (36%) patients and ≥2 years in 128 (64%) patients. **Table 3**

Table 3: Psychiatric disorders' data of the studied patients

		N=200
Types of Psychiatric disorder	Schizophrenia	68 (34%)
	Anxiety disorder	41 (20.5%)
	Mood disorder	91 (45.5%)
Duration of Psychiatric disorder	<2 years	72 (36%)
	≥2 years	128 (64%)

Data are presented as frequency (%).

Table 4 demonstrates that the prevalence of different sleeping disorders among different psychiatric disorders (schizophrenia, anxiety, and mood disorder) of the studied patients.

Table 4: Prevalence of different sleeping disorders among different psychiatric disorders of the studied patients

		N=200
Sleep disorder in schizophrenia	Any sleep disorder	26 (38.24%)
	Narcolepsy	9 (13.24%)
	Parasomnia	13 (19.12%)
	Circadian rhythm disturbance	3 (4.41%)
	Sleep breathing disorder	11 (16.18%)
	Periodic limb movements of sleep/restless leg syndrome.	6 (8.82%)
Sleep disorder in Anxiety	Any sleep disorder	16 (39.02%)
	Narcolepsy	6 (14.63%)
	Parasomnia	6 (14.63%)
	Circadian rhythm disturbance	5 (12.2%)
	Sleep breathing disorder	6 (14.63%)
	Periodic limb movements of sleep/restless leg syndrome.	2 (4.88%)
Sleep disorder in Mood	Any sleep disorder	31 (34.07%)
	Narcolepsy	11 (12.09%)
	Parasomnia	15 (16.48%)
	Circadian rhythm disturbance	12 (13.19%)
	Sleep breathing disorder	14 (15.38%)
	Periodic limb movements of sleep/restless leg syndrome.	8 (8.79%)

Data are presented as frequency (%).

Insomnia status, obesity, and Marital status was a significant predictor of any diagnosed sleep disorder. **Table 5**

Table 5: Logistic regression of socio-demographic correlates and clinical correlates for any sleep disorder

Variable	Odds ratio	95% CI	P-value
Insomnia Status	0.4947	0.2694 to 0.9083	0.023*
Education level	1.1996	0.7809 to 1.8428	0.406
Gender	1.3279	0.7073 to 2.4928	0.378
Physical activity	0.7888	0.4267 to 1.4583	0.449

Age	1.1381	0.6250 to 2.0724	0.672
Obesity	2.4997	1.3613 to 4.5902	0.003*
Marital status	0.4035	0.2170 to 0.7503	0.004*

CI: Confidence interval. *: statistically significant as p value ≤ 0.05 .

Insomnia status was the only significant predictor of narcolepsy. **Table 6**

Table 6: Logistic regression of socio-demographic correlates and clinical correlates for narcolepsy

Variable	Odds ratio	95% CI	P-value
Age	0.7493	0.3235 to 1.7356	0.501
Marital status	0.7016	0.2745 to 1.7934	0.459
Insomnia Status	10.4162	2.0299 to 53.4498	0.005*
Obesity	1.2218	0.5327 to 2.8025	0.636
Physical activity	1.9792	0.8039 to 4.8730	0.138
Gender	0.4674	0.1903 to 1.1483	0.097

CI: Confidence interval. *: statistically significant as p value ≤ 0.05 .

All socio-demographic correlates and clinical correlates were insignificant predictors of circadian rhythm disorder. **Table 7**

Insomnia status was the only significant predictor of parasomnia. **Table 7**

Table 7: Logistic regression of socio-demographic correlates and clinical correlates for circadian rhythm disorder & parasomnia

Variable	Odds ratio	95% CI	P-value
circadian rhythm disorder			
Insomnia Status	2.2676	0.4350 to 11.8216	0.331
Obesity	1.1932	0.4500 to 3.1640	0.723
Physical activity	2.2219	0.7707 to 6.4056	0.139
Age	0.5886	0.2102 to 1.6481	0.313
Gender	2.2452	0.8069 to 6.2476	0.121
Education level	0.9983	0.4866 to 2.0484	0.996
parasomnia			
Insomnia Status	4.9464	2.9647 to 12.6052	0.003*
Obesity	0.9989	0.4703 to 2.1217	0.998
Physical activity	1.1783	0.5451 to 2.5473	0.677
Age	1.3028	0.6033 to 2.8135	0.501
Gender	1.0847	0.4921 to 2.3912	0.84
Education level	0.9863	0.5725 to 1.6993	0.96

CI: Confidence interval, *: statistically significant as p value ≤ 0.05 .

DISCUSSION

Two factors are frequently involved in the causal correlation among sleep disorders and stress, anxiety, melancholy, ADHD, bipolar disorder, and other mental disorders. Individuals with schizophrenia or bipolar disorder frequently experience sleep disturbances, particularly insomnia. OCD has also been linked to delayed circadian rhythms. It is acknowledged that insomnia is correlated with melancholy and is also recognized as a risk factor for depression. When individuals are anxious and agitated, their levels of alertness and arousal are elevated ^[4, 8]. All of these disturbances have the potential to impact one's ability to sleep.

Previous research has indicated that the positive correlation among sleep disorders and mental disorders may be more robust when comorbid mental disorders are present, as opposed to only a single mental disorder.

In our study, we found that 127 (63.5%) patients had insomnia. Sleep Quality was good in 90 (45%) patients and poor in 110 (55%) patients.

A previous study reported that insomnia was observed in 50% of patients diagnosed with schizophrenia; The altered sleep spindles and delayed sleep waves that are frequently reported in schizophrenia patients are related to cognitive impairments and clinical symptoms, as demonstrated by a variety of studies ^[9].

Albrecht-Bisset et al. ^[10] investigated the correlation between anxiety and sleep quality among postsecondary students in Ontario through a cross-sectional study. According to the results, the prevalence of poor sleep quality was substantial (61.8%) over a one-month period. Additionally, other reports suggested that students from the United States, Brazil, Australia, Egypt, Saudi Arabia, Iran, and Nigeria had substandard sleep quality (ranged from 48.5% to 63.2% over a one-month period) ^[11-18].

In the present study, 124 (62%) patients were on unhealthy diet and 90 (45%) patients were consuming medications.

The residential environment, culture, and lifestyle have been the primary focus of research on potential risk factors for mental health. These factors include physical activity, an inadequate diet, alcohol, and substance consumption. These factors have been shown to have an effect on mental health in a variety of contexts. Sleep disorders are frequently experienced by individuals with mental illness, and genetic analyses have identified significant associations between these characteristics ^[19].

An investigation conducted by O'Connell et al. ^[20] demonstrates that the genetic correlations between sleep-associated phenotypes and psychiatric disorders are significantly outweighed by a significant polygenic overlap. Li et al. ^[21] carried out a longitudinal study that concentrated on individuals of European descent between the ages of 38 and 73 by utilizing data from the UK Biobank. The results of this investigation recommend that the nonlinear correlation between mental and cognitive health and sleep duration may be supported by structural changes in the brain potential and genetic mechanisms.

Our research indicated that obesity, marital status, and insomnia status were significant predictors of any sleep disorder. Insomnia status was the only significant predictors of narcolepsy. All socio-demographic correlates and clinical correlates were insignificant predictors of circadian rhythm disorder. Also, insomnia status was the only significant predictors of parasomnia.

Kavya Muthuraman et al. ^[22] exhibited that the majority of patients were females who showed signs of anxiety or melancholy. On the other hand, the prevalence of insomnia among males was marginally higher than that of females. This is in contrast to prior research, which has demonstrated that insomnia is more widespread in women than in men ^[23]. The present investigation did not examine the possibility that the difference may be due to the fact that males and females consume medications in different quantities. Additionally, it was also determined that the majority of participants were married, and no correlation was found between marital status and insomnia. As the literature suggests, insomnia is inconsistently associated with both married and unmarried individuals ^[24].

Muthuraman et al. ^[25] observed an increase in subjective reports of insomnia among patients who were either unemployed or of a reduced socioeconomic status. These findings were not replicated in the study ^[22]. This may be due to the fact that the majority of our sample consisted of homemakers and was not categorized as "unemployed" for the purposes of the analyses.

The potential for insomnia to cause a reduction in sleep hours and, as a result, a decrease in emotional control by the prefrontal cortex could have a negative impact on the individual subject's responses to an emotional challenge. The result would be a difference in the capacity to regulate emotional stimuli,

which would be negatively perceived as "fear" and would serve as both the catalyst and perpetuator of anxiety disorders ^[26].

Furthermore, research has demonstrated that insufficient sleep can either increase the likelihood of the development of psychiatric disorders, such as anxiety and depression, or exacerbate their severity ^[27, 28].

Muthuraman et al. ^[22] concluded that dysfunctional beliefs regarding sleep and an increased level of participation in sleep-related maladaptive behaviors were both positively correlated with the severity of insomnia. Furthermore, they found that pre-sleep arousal was inversely linked to the intensity of sleep-related maladaptive behaviors.

Additionally, in India's tertiary mental health care institution's ambulatory department, sleep disorders were classified as the most prevalent, with insomnia afflicting three-fourths of the population ^[29]. According to one study, dysfunctional beliefs are less significant contributors to insomnia than sleep-related behaviors. Lower levels of physical activity were linked to symptoms of sleep respiratory disorders and any other sleep disorders ^[30].

Hombali et al. ^[5] found that the results of previous research conducted in the psychiatric population were consistent with the discovery that obesity is independently associated with sleep respiratory disorder ^[31].

Recent meta-analysis determined that sedentary behaviour was more prevalent among individuals with severe mental illness compared to healthy controls. Furthermore, a lower level of physical activity was linked to a greater body mass index. It is crucial to acknowledge that the susceptibility of patients with psychiatric disorders to obesity may be influenced by psychotropic medications, a sedentary lifestyle, and a lack of physical activity ^[32].

Individuals with greater education (post-secondary to pre-university) were significantly less likely to experience symptoms of any sleep disorder in comparison to those with lower education levels (secondary or below). Prior research has documented and observed this discovery. There have been numerous explanations for this discovery. Cohorts with lower levels of education are initially more susceptible to mental disorders. Second, it is more probable that individuals who have completed a higher education will employ these strategies to improve their sleep and are more cognizant of the significance of sleep hygiene practices ^[33].

Limitations: This cross-sectional study was carried out exclusively at a single center. The questionnaire that the team developed was suitable for assessing the presence or absence of symptoms associated with sleep disorders within the previous twelve months. Moreover, the prevalence estimates are constrained by the influence of recall bias and the dependence on self-reported symptoms of a wide range of sleep disorders. It is widely recognized that psychiatric medications have the potential to either exacerbate or precipitate symptoms of sleep disorders. We did not investigate the impact and advantages of consistent exercise on the prevention of sleep disorders by means of its antidepressant, thermogenic, anxiolytic, and circadian phase-shifting effects.

CONCLUSIONS:

Our study concluded a higher rate insomnia and poor-quality sleep among Psychiatric patients. Insomnia status, obesity, and marital status are significant predictors of any sleep disorder. Additionally, Insomnia status was a significant predictor of narcolepsy and parasomnia, no correlation was observed between clinical correlates and socio-demographic correlates for circadian rhythm disorder.

In the present patient population, we emphasized the critical importance of addressing modifiable risk factors, such as sedentary behavior. This can be achieved by incorporating supervised exercise programs into routine care or promoting physical activity.

Additional research is required to investigate the relationship between the symptoms of sleep disorders and psychotropic medication. Additional research for patients diagnosed with other psychiatric disorders. The integration of a comprehensive clinical assessment and examination conducted by a physician with extensive knowledge and training in sleep medicine, as well as objective assessments to differentiate and verify the presence of symptoms of sleep disorders from psychiatric disorders, should be the primary focus of ongoing research on prevalence.

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