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Original Research Article

OBSERVATIONAL STUDY OF SLEEP DISORDERS IN PATIENTS WITH BIPOLAR DISORDER DURING REMISSION

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ABSTRACT

Background: Sleep disturbances are common in bipolar disorder and may persist even after the resolution of acute manic or depressive episodes. Poor sleep during remission can impair functioning, reduce quality of life, and may contribute to mood instability and recurrence. However, sleep disorders are often under-recognized during routine psychiatric follow-up, particularly when patients are considered clinically stable. **Aim:** To assess the frequency and pattern of sleep disorders and to identify sociodemographic and clinical factors associated with poor sleep quality among patients with bipolar disorder during remission.

Materials and Methods: This hospital-based observational cross-sectional study included 105 adult patients with bipolar I or bipolar II disorder who were in clinical remission and attending the Department of Psychiatry at a tertiary care hospital. Remission was confirmed using the Young Mania Rating Scale and the 17-item Hamilton Depression Rating Scale, with scores of 7 or less on both scales. Sleep quality was assessed using the Pittsburgh Sleep Quality Index, insomnia severity using the Insomnia Severity Index, daytime sleepiness using the Epworth Sleepiness Scale, and risk of obstructive sleep apnoea using the STOP-BANG questionnaire. Symptoms of restless legs syndrome, circadian rhythm disturbance, parasomnias, and other sleep-related problems were also evaluated.

Results: The mean global PSQI score was 6.84 ± 3.29, and 57 patients (54.29%) had poor sleep quality. Clinically significant insomnia was present in 30 patients (28.57%), excessive daytime sleepiness in 27 (25.71%), and high risk of obstructive sleep apnoea in 13 (12.38%). Restless legs syndrome symptoms, circadian rhythm disturbance, and parasomnia symptoms were observed in 15.24%, 18.10%, and 10.48% of patients, respectively. Poor sleep quality was significantly associated with older age, female sex, longer illness duration, recurrent mood episodes, medical comorbidity, higher body mass index, residual depressive symptoms, sedative use, and prolonged pre-sleep screen exposure. On multivariable analysis, three or more previous mood episodes, BMI ≥25 kg/m², higher HAM-D-17 scores, and screen exposure before bedtime exceeding two hours independently predicted poor sleep quality.

Conclusion: Sleep disorders remain highly prevalent in patients with bipolar disorder despite clinical remission. Routine screening and targeted management of sleep-related problems should be incorporated into long-term bipolar disorder care.

Keywords: Bipolar disorder; remission; sleep quality; insomnia; daytime sleepiness.

INTRODUCTION

Bipolar disorder is a chronic and recurrent psychiatric condition characterized by episodes of mania or hypomania alternating with episodes of depression. The disorder has a heterogeneous clinical course and is frequently associated with impaired occupational functioning, interpersonal difficulties, reduced quality of life, medical comorbidities, and an increased risk of self-harm and suicide. Although pharmacological and psychosocial treatments can achieve symptomatic improvement, many patients continue to experience clinically important difficulties between acute mood episodes. Remission is generally defined by the absence or minimal presence of syndromal manic and depressive symptoms; however, symptomatic remission does not necessarily indicate complete recovery of biological rhythms, cognitive functioning, psychosocial functioning, or subjective well-being. Sleep and circadian disturbances are increasingly recognized as important clinical features that may persist during apparently stable phases of bipolar disorder.[1] Sleep is a complex biological process regulated through an interaction between homeostatic sleep pressure and the circadian timing system. Adequate sleep is essential for emotional regulation, attention, memory, metabolic balance, immune functioning, and maintenance of daily performance. Sleep disorders can involve abnormalities in sleep initiation, sleep maintenance, total sleep duration, sleep timing, sleep efficiency, breathing during sleep, movement-related symptoms, and daytime alertness. In bipolar disorder, the relationship between sleep and mood is particularly important because disturbances in either system may adversely influence the other. Changes in the sleep–wake cycle are prominent during acute episodes, with reduced need for sleep commonly occurring during mania and insomnia or hypersomnia occurring during depression. However, abnormalities of sleep duration, sleep continuity, sleep timing, and daytime functioning may remain detectable even after the acute mood episode has resolved.[2] The remission phase of bipolar disorder has traditionally been viewed as a period of relative clinical stability. Nevertheless, patients in remission may experience residual depressive or manic symptoms, irregular routines, impaired social rhythms, medication-related sedation, reduced physical activity, and maladaptive sleep behaviours. These factors may contribute to poor subjective sleep quality and altered rest–activity patterns despite the absence of a full mood episode. Sleep disturbances during remission may therefore be overlooked when clinical follow-up focuses mainly on recurrence of syndromal mania or depression. Systematic assessment of sleep is important because patients may normalize chronic sleep problems, fail to report them spontaneously, or attribute daytime tiredness and cognitive difficulties entirely to psychiatric medication. Objective and subjective investigations of remitted bipolar disorder indicate that sleep and circadian abnormalities can persist independently of overt mood symptoms.[3] The sleep problems encountered in bipolar disorder are not limited to insomnia. Patients may experience delayed sleep onset, repeated nocturnal awakenings, early morning awakening, non-restorative sleep, short or prolonged sleep duration, irregular bedtimes, reduced sleep efficiency, excessive daytime sleepiness, and frequent daytime napping. Sleep-disordered breathing, particularly obstructive sleep apnoea, may be relevant in patients with obesity, increased neck circumference, hypertension, metabolic abnormalities, or sedating medication use. Restless legs syndrome, periodic limb movements, parasomnias, nightmares, circadian rhythm sleep–wake disturbances, and medication-associated alterations in sleep may also contribute to impaired sleep. These conditions may coexist, making a broad assessment preferable to the evaluation of insomnia alone. In addition, sleep variability across different nights may be clinically meaningful even when the average sleep duration appears acceptable.[4] The mechanisms underlying sleep disturbance in bipolar disorder are multifactorial. Circadian dysregulation, altered responsiveness to environmental light, instability of daily social routines, genetic vulnerability, neuroendocrine changes, and disturbances in reward and arousal systems may contribute to abnormal sleep–wake regulation. Lifestyle factors such as evening screen exposure, caffeine consumption, nicotine use, physical inactivity, irregular mealtimes, and inconsistent bedtimes may further disrupt sleep. Psychotropic medications may improve sleep by controlling mood symptoms but may also produce sedation, weight gain, daytime sleepiness, or changes in sleep architecture. Contemporary methods such as actigraphy and digital monitoring have demonstrated the clinical value of studying rest–activity rhythms, sleep regularity, and behavioural patterns alongside conventional clinical assessments.[5] Persistent sleep disturbance is clinically important because it may affect emotional stability, cognition, treatment adherence, physical health, and everyday functioning. Sleep loss can increase irritability, emotional reactivity, impulsivity, and difficulty regulating behaviour, whereas excessive or poorly timed sleep can interfere with social and occupational routines. Disturbed sleep may also make it difficult to differentiate residual mood symptoms from independent sleep disorders. For example, fatigue, poor concentration, reduced motivation, psychomotor slowing, and daytime dysfunction may occur in both depressive states and primary sleep disturbances. Recognition of these overlapping symptoms is necessary to avoid underdiagnosis and to ensure that management extends beyond adjustment of mood-stabilizing medication. Interventions directed at sleep hygiene, insomnia, circadian regularity, and daily routines are therefore

being evaluated as useful additions to standard bipolar disorder treatment.[6]

MATERIALS AND METHODS

This hospital-based observational cross-sectional study was conducted to assess the frequency, pattern, and clinical correlates of sleep disorders among patients with bipolar disorder who were in remission. The study involved a single assessment of eligible participants without introducing any therapeutic intervention or alteration in their ongoing psychiatric treatment. The study was carried out in the Department of Psychiatry at a tertiary care hospital. Patients attending the psychiatry outpatient department and those reporting for routine follow-up were screened for eligibility. The tertiary care setting provided access to patients with confirmed bipolar disorder who were receiving regular psychiatric evaluation and maintenance treatment. The study population consisted of adult patients diagnosed with bipolar disorder who were clinically in remission at the time of assessment. Both patients with bipolar I disorder and bipolar II disorder were considered for inclusion, provided they fulfilled the predefined remission criteria and were capable of understanding and responding to the study questionnaires. A total of **105 patients** with bipolar disorder in remission were included in the study. Consecutive eligible patients presenting to the psychiatry outpatient department were approached until the required sample size was achieved.

Diagnostic Assessment

The diagnosis of bipolar disorder was established according to the criteria of the **International Classification of Diseases, 10th Revision, Diagnostic Criteria for Research (ICD-10-DCR)** or the diagnostic classification routinely followed at the study centre. The diagnosis was confirmed through a detailed clinical interview, review of previous treatment records, and assessment by a qualified psychiatrist. The type of bipolar disorder, age at onset, number and polarity of previous episodes, history of hospitalization, psychotic symptoms, suicidal behaviour, and treatment details were documented.

Definition of Remission

Remission was defined as the absence of a current manic, hypomanic, mixed, or major depressive episode based on clinical evaluation. The severity of residual mood symptoms was assessed using the **Young Mania Rating Scale (YMRS)** and the **17-item Hamilton Depression Rating Scale (HAM-D-17)**. Patients with a YMRS score of **7 or less** and a HAM-D-17 score of **7 or less** were considered to be in remission. The use of standardized cut-off scores minimized the inclusion of patients with clinically significant residual manic or depressive symptoms.

Inclusion Criteria

Patients aged 18 to 65 years, of either sex, with an established diagnosis of bipolar I or bipolar II disorder and who fulfilled the operational criteria for remission were included. Participants were required to be clinically stable, receiving maintenance treatment, willing to provide written informed consent, and able to understand the questions and complete the clinical assessment and sleep-related questionnaires.

Exclusion Criteria

Patients with a current manic, hypomanic, mixed, or major depressive episode were excluded. Patients with intellectual disability, major neurocognitive disorder, severe neurological illness, acute or unstable medical conditions, or cognitive and communication difficulties that interfered with reliable assessment were also excluded. Patients with active substance dependence, except nicotine or caffeine dependence, were not included. Patients receiving shift-based employment, those with recent transmeridian travel, and those with an acute medical condition known to temporarily disturb sleep were excluded to reduce the influence of external factors on sleep patterns.

Sociodemographic Assessment

Sociodemographic information was recorded using a structured proforma. The parameters included age, sex, residence, educational status, occupation, marital status, socioeconomic status, family type, and living arrangements. Information regarding tobacco use, alcohol use, caffeine consumption, level of physical activity, screen exposure before bedtime, and regularity of the sleep–wake schedule was also collected because these factors may influence sleep quality.

Clinical Assessment

Clinical characteristics recorded included the type of bipolar disorder, age at onset of illness, total duration of illness, duration of remission, predominant polarity, number of previous manic, hypomanic, depressive, and mixed episodes, number of psychiatric hospitalizations, history of psychotic symptoms, history of suicide attempts, family history of psychiatric illness, medical comorbidities, and current psychotropic medication. Current medications were categorized into mood stabilizers, antipsychotics, antidepressants, benzodiazepines, sedative-hypnotics, and other relevant drugs. The number of psychotropic medications and the use of medications with sedative or activating effects were documented.

Assessment of Sleep Quality

Sleep quality was assessed using the **Pittsburgh Sleep Quality Index (PSQI)**. The PSQI evaluates sleep over the preceding month and includes seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. The component scores are summed to obtain a global score ranging from 0 to 21. A global PSQI score greater than 5 was considered indicative of poor sleep quality.

Assessment of Insomnia

The severity of insomnia symptoms was assessed using the **Insomnia Severity Index (ISI)**. The ISI consists of seven items assessing difficulty in falling asleep, difficulty in maintaining sleep, early morning awakening, satisfaction with the current sleep pattern, interference with daytime functioning, noticeability of sleep problems, and distress caused by sleep difficulties. The total score ranges from 0 to 28, with higher scores indicating greater insomnia severity. Scores were categorized as no clinically significant insomnia, subthreshold insomnia, moderate clinical insomnia, and severe clinical insomnia according to established scoring criteria.

Assessment of Daytime Sleepiness

Excessive daytime sleepiness was evaluated using the **Epworth Sleepiness Scale (ESS)**. The ESS assesses the likelihood of falling asleep in eight common daytime situations. The total score ranges from 0 to 24, with higher scores indicating greater daytime sleepiness. An ESS score greater than 10 was considered suggestive of excessive daytime sleepiness.

Screening for Specific Sleep Disorders

Participants were screened for common sleep disorders through a structured sleep history. Symptoms suggestive of obstructive sleep apnoea included loud habitual snoring, witnessed apnoeas, nocturnal choking or gasping, non-restorative sleep, morning headache, and excessive daytime sleepiness. The risk of obstructive sleep apnoea was assessed using the **STOP-BANG questionnaire**, which evaluates snoring, tiredness, observed apnoea, high blood pressure, body mass index, age, neck circumference, and sex.

Symptoms of restless legs syndrome were assessed according to the essential clinical features of an urge to move the legs, worsening during rest, relief with movement, and predominance during the evening or night. Patients were also questioned regarding periodic limb movements during sleep, nightmares, sleepwalking, sleep talking, rapid eye movement sleep behaviour symptoms, sleep paralysis, nocturnal panic symptoms, and other parasomnias.

Circadian rhythm-related disturbances were assessed by enquiring about delayed sleep timing, advanced sleep timing, irregular sleep–wake patterns, difficulty awakening at the desired time, and differences in sleep timing between working and non-working days. Participants were also asked about reduced need for sleep, prolonged sleep duration, frequent daytime napping, and variability in bedtime and wake-up time.

Sleep Parameters

The principal sleep parameters recorded were usual bedtime, sleep onset latency, number of nocturnal awakenings, wake after sleep onset, early morning awakening, final wake-up time, time spent in bed, total sleep time, habitual sleep efficiency, frequency and duration of daytime naps, subjective sleep quality, restorative quality of sleep, and daytime impairment. Habitual sleep efficiency was calculated by dividing the total sleep time by the total time spent in bed and multiplying the result by 100.

Anthropometric and Physical Parameters

Height and weight were measured using standard procedures, and body mass index was calculated as weight in kilograms divided by height in metres squared. Neck circumference and waist circumference were recorded because of their association with sleep-disordered breathing and metabolic risk. Blood pressure was measured in a seated position after an adequate period of rest. Available information regarding diabetes mellitus, hypertension, thyroid disorders, obesity, chronic respiratory illness, chronic pain, and other relevant medical conditions was documented.

Study Procedure

Potential participants were screened for eligibility during their psychiatric consultation. After obtaining written informed consent, a detailed psychiatric interview and review of medical records were performed. The diagnosis and remission status were confirmed using clinical criteria, the YMRS, and the HAM-D-17. Sociodemographic and clinical information was then recorded on the structured proforma. Participants subsequently completed the PSQI, ISI, ESS, and STOP-BANG questionnaire under the supervision of the investigator. A structured interview was used to assess symptoms of other sleep disorders and sleep-related behavioural factors. Anthropometric and relevant physical parameters were recorded using standardized methods.

Statistical Analysis

Data were entered into a computerized database and analysed using **IBM Statistical Package for the Social Sciences, version 27.0 (SPSS 27.0)**. Continuous variables were summarized as mean and standard deviation for normally distributed data and as median with interquartile range for non-normally distributed data. Categorical variables were presented as frequencies and percentages. The normality of continuous variables was assessed using appropriate graphical methods and the Shapiro–Wilk test.

RESULTS

Sociodemographic characteristics

Table 1 shows the sociodemographic profile of the 105 patients with bipolar disorder in remission. The largest proportion of patients belonged to the 26–35 years age group, comprising 36 patients (34.29%), followed by the 36–45 years age group with 32 patients (30.48%). Patients aged 18–25 years accounted for 19 cases (18.10%), while 18 patients (17.14%) were in the 46–65 years age group. Males were more commonly represented than females, with 61 males (58.10%) and 44 females (41.90%). A slightly higher proportion of participants were from urban areas, accounting for 58 patients (55.24%), while 47 patients (44.76%) belonged to rural areas. Regarding marital status, 63 patients (60.00%) were

married, whereas 42 patients (40.00%) were unmarried, divorced, or widowed. In terms of education, 57 patients (54.29%) had studied up to higher secondary level or above, while 48 patients (45.71%) had education up to secondary level. Occupationally, 62 patients (59.05%) were employed, while 43 patients (40.95%) were unemployed, students, or homemakers. Most participants belonged to nuclear families, with 66 patients (62.86%), whereas 39 patients (37.14%) were from joint or extended families. Among lifestyle-related variables, tobacco use was present in 24 patients (22.86%) and absent in 81 patients (77.14%). High caffeine intake was reported by 39 patients (37.14%), while 66 patients (62.86%) did not report high caffeine intake. Screen exposure before bedtime for more than two hours was observed in 56 patients (53.33%), suggesting that more than half of the study participants had prolonged pre-sleep screen exposure.

Clinical characteristics

Table 2 summarizes the clinical characteristics of the study participants. Bipolar I disorder was the more common subtype, seen in 76 patients (72.38%), whereas bipolar II disorder was present in 29 patients (27.62%). The mean age at onset of illness was 25.68 ± 7.46 years, suggesting that bipolar disorder commonly began during early adulthood in this sample. The mean duration of illness was 10.35 ± 7.18 years, indicating that many patients had a long-standing course of illness. The median duration of remission was 8.00 months, with an interquartile range of 5.00 to 14.00 months. A history of three or more previous mood episodes was present in 61 patients (58.10%), while 44 patients (41.90%) had fewer than three episodes. Manic or hypomanic predominant polarity was seen in 59 patients (56.19%), whereas depressive predominant polarity was reported in 46 patients (43.81%). Previous psychiatric hospitalization was present in 54 patients (51.43%), showing that nearly half of the sample had required inpatient care at some point during the illness. A history of psychotic symptoms was present in 43 patients (40.95%), while 62 patients (59.05%) had no such history. Eighteen patients (17.14%) had a history of suicide attempt, whereas 87 patients (82.86%) did not report any previous suicide attempt. Family history of psychiatric illness was present in 33 patients (31.43%) and absent in 72 patients (68.57%). Medical comorbidity was present in 36 patients (34.29%), while 69 patients (65.71%) had no documented medical comorbidity. A body mass index of 25 kg/m² or more was observed in 55 patients (52.38%), indicating that more than half of the participants were overweight or obese. Regarding treatment, mood stabilizers were used by 82 patients (78.10%), making them the most commonly prescribed medication group. Antipsychotics were used by 67 patients (63.81%), antidepressants by 26 patients (24.76%), and benzodiazepines or sedatives by 47 patients (44.76%). The mean HAM-D-17 score was 3.78 ± 2.04 and the mean YMRS score was 2.82 ± 1.76, supporting that the patients were in clinical remission with low residual depressive and manic symptom scores.

Sleep characteristics and frequency of sleep disorders

Table 3 presents the sleep profile of the patients. The mean global PSQI score was 6.84 ± 3.29. Based on PSQI classification, 57 patients (54.29%) had poor sleep quality, while 48 patients (45.71%) had good sleep quality. According to the Insomnia Severity Index, 44 patients (41.90%) had no clinically significant insomnia, while 31 patients (29.52%) had subthreshold insomnia. Moderate clinical insomnia was present in 24 patients (22.86%), and severe clinical insomnia was seen in 6 patients (5.71%). Overall, clinically significant insomnia, which included moderate and severe insomnia, was present in 30 patients (28.57%) and absent in 75 patients (71.43%). The mean Epworth Sleepiness Scale score was 8.46 ± 4.18. Excessive daytime sleepiness, defined as ESS score greater than 10, was present in 27 patients (25.71%), while 78 patients (74.29%) did not have excessive daytime sleepiness. STOP-BANG assessment showed that 61 patients (58.10%) were at low risk for obstructive sleep apnoea, 31 patients (29.52%) were at intermediate risk, and 13 patients (12.38%) were at high risk. Restless legs syndrome symptoms were present in 16 patients (15.24%), while 89 patients (84.76%) did not report such symptoms. Circadian rhythm disturbance was present in 19 patients (18.10%) and absent in 86 patients (81.90%). Parasomnia symptoms were reported by 11 patients (10.48%), whereas 94 patients (89.52%) had no parasomnia symptoms. Frequent daytime napping was present in 35 patients (33.33%), indicating that one-third of the sample had regular daytime sleep episodes. Sleep duration of less than 6 hours was present in 28 patients (26.67%), while 77 patients (73.33%) slept for 6 hours or more. Sleep efficiency below 85% was observed in 39 patients (37.14%), whereas 66 patients (62.86%) had sleep efficiency of 85% or higher. The mean sleep onset latency was 31.62 ± 18.47 minutes, the mean total sleep time was 6.48 ± 1.24 hours, and the mean habitual sleep efficiency was 82.71 ± 11.36%.

Comparison of patients with good and poor sleep quality

Table 4 compares patients with good sleep quality and poor sleep quality. Patients with poor sleep quality were significantly older, with a mean age of 39.49 ± 11.18 years compared with 34.58 ± 9.74 years among those with good sleep quality. This difference was statistically significant with a p value of 0.019. Female sex was also significantly associated with poor sleep quality, as females constituted 50.88% of the poor sleep quality group compared with 31.25% of the good sleep quality group, with a p value of 0.043. The proportion of patients with bipolar I disorder was higher in the poor sleep quality group, but this difference was not statistically significant. Bipolar I disorder was present in 75.44% of patients with poor sleep quality and 68.75% of

patients with good sleep quality, with a p value of 0.448. Duration of illness was significantly longer among patients with poor sleep quality, with a mean duration of 11.98 ± 7.62 years compared with 8.42 ± 6.15 years in the good sleep quality group. This difference was statistically significant with a p value of 0.011. A significantly higher proportion of patients with poor sleep quality had three or more previous mood episodes. This was seen in 39 patients (68.42%) in the poor sleep quality group compared with 22 patients (45.83%) in the good sleep quality group, with a p value of 0.019. Previous hospitalization was more frequent among those with poor sleep quality, but the association did not reach statistical significance. Hospitalization was reported in 59.65% of patients with poor sleep quality compared with 41.67% of those with good sleep quality, with a p value of 0.066. Medical comorbidity was significantly associated with poor sleep quality. It was present in 25 patients (43.86%) with poor sleep quality compared with 11 patients (22.92%) with good sleep quality, with a p value of 0.024. Similarly, BMI ≥25 kg/m² was significantly more common in the poor sleep quality group, affecting 36 patients (63.16%) compared with 19 patients (39.58%) in the good sleep quality group, with a p value of 0.016. Residual depressive symptoms were strongly associated with poor sleep quality. The mean HAM-D-17 score was 4.63 ± 1.98 in the poor sleep quality group compared with 2.77 ± 1.66 in the good sleep quality group, and this difference was highly significant with a p value of less than 0.001. YMRS scores were slightly higher in the poor sleep quality group, but the difference was not statistically significant, with a p value of 0.088. Benzodiazepine or sedative use was significantly more common among patients with poor sleep quality. It was reported in 31 patients (54.39%) with poor sleep quality compared with 16 patients (33.33%) with good sleep quality, with a p value of 0.031. High caffeine intake was more common among patients with poor sleep quality, but the association was not statistically significant, with a p value of 0.121. Screen exposure before bedtime for more than two hours was significantly associated with poor sleep quality. It was present in 37 patients (64.91%) in the poor sleep quality group compared with 19 patients (39.58%) in the good sleep quality group, with a p value of 0.010. Tobacco use was more frequent in the poor sleep quality group but was not statistically significant, with a p value of 0.166.

Independent predictors of poor sleep quality

Table 5 shows the multivariable binary logistic regression analysis for independent predictors of poor sleep quality. After adjusting for other variables, three or more previous mood episodes remained a significant predictor of poor sleep quality. Patients with three or more previous mood episodes had 2.49 times higher odds of poor sleep quality compared with those having fewer than three episodes, with a 95% confidence interval of 1.03–6.01 and a p value of 0.043. Body mass index of 25 kg/m² or more was also an independent predictor of poor sleep quality. Patients who were overweight or obese had 2.36 times higher odds of poor sleep quality compared with those with BMI below 25 kg/m². This association was statistically significant, with a 95% confidence interval of 1.01–5.54 and a p value of 0.048. Residual depressive symptoms showed a strong independent association with poor sleep quality. For every one-point increase in HAM-D-17 score, the odds of poor sleep quality increased by 1.55 times. This was statistically significant, with a 95% confidence interval of 1.20–2.01 and a p value of 0.001. Screen exposure before bedtime for more than two hours was another significant independent predictor. Patients with prolonged pre-sleep screen exposure had 2.71 times higher odds of poor sleep quality compared with those without such exposure. This association was statistically significant, with a 95% confidence interval of 1.12–6.57 and a p value of 0.027.

Table 1: Sociodemographic characteristics of the study participants (N = 105)

Sociodemographic characteristic	Category	Frequency (n)	Percentage (%)
Age group	18–25 years	19	18.10
	26–35 years	36	34.29
	36–45 years	32	30.48
	46–65 years	18	17.14
Sex	Male	61	58.10
	Female	44	41.90
Residence	Urban	58	55.24
	Rural	47	44.76
Marital status	Married	63	60.00
	Unmarried/divorced/widowed	42	40.00
Educational status	Up to secondary education	48	45.71
	Higher secondary or above	57	54.29
Occupational status	Employed	62	59.05
	Unemployed/student/homemaker	43	40.95
Family type	Nuclear	66	62.86
	Joint/extended	39	37.14
Tobacco use	Present	24	22.86
	Absent	81	77.14
High caffeine intake*	Present	39	37.14
	Absent	66	62.86

Screen exposure before bedtime >2 hours	Present	56	53.33
	Absent	49	46.67

Table 2: Clinical characteristics of patients with bipolar disorder in remission (N = 105)

Clinical characteristic	Category/statistic	Frequency (n)	Percentage (%)
Type of bipolar disorder	Bipolar I disorder	76	72.38
	Bipolar II disorder	29	27.62
Age at onset, years	Mean ± SD	25.68 ± 7.46	—
Duration of illness, years	Mean ± SD	10.35 ± 7.18	—
Duration of remission, months	Median (IQR)	8.00 (5.00–14.00)	—
Total previous mood episodes	<3 episodes	44	41.90
	≥3 episodes	61	58.10
Predominant polarity	Manic/hypomanic	59	56.19
	Depressive	46	43.81
Previous psychiatric hospitalization	Present	54	51.43
	Absent	51	48.57
History of psychotic symptoms	Present	43	40.95
	Absent	62	59.05
History of suicide attempt	Present	18	17.14
	Absent	87	82.86
Family history of psychiatric illness	Present	33	31.43
	Absent	72	68.57
Medical comorbidity	Present	36	34.29
	Absent	69	65.71
Body mass index ≥25 kg/m²	Present	55	52.38
	Absent	50	47.62
Mood stabilizer use	Present	82	78.10
	Absent	23	21.90
Antipsychotic use	Present	67	63.81
	Absent	38	36.19
Antidepressant use	Present	26	24.76
	Absent	79	75.24
Benzodiazepine/sedative use	Present	47	44.76
	Absent	58	55.24
HAM-D-17 score	Mean ± SD	3.78 ± 2.04	—
YMRS score	Mean ± SD	2.82 ± 1.76	—

Table 3: Sleep characteristics and frequency of sleep disorders (N = 105)

Sleep-related parameter	Category/statistic	Frequency (n)	Percentage (%)
Global PSQI score	Mean ± SD	6.84 ± 3.29	—
Sleep quality according to PSQI	Good sleep quality, PSQI ≤5	48	45.71
	Poor sleep quality, PSQI >5	57	54.29
ISI category	No clinically significant insomnia	44	41.90
	Subthreshold insomnia	31	29.52
	Moderate clinical insomnia	24	22.86
	Severe clinical insomnia	6	5.71
Clinically significant insomnia*	Present	30	28.57
	Absent	75	71.43
ESS score	Mean ± SD	8.46 ± 4.18	—
Excessive daytime sleepiness	ESS >10	27	25.71
	ESS ≤10	78	74.29
STOP-BANG risk	Low risk	61	58.10
	Intermediate risk	31	29.52
	High risk	13	12.38
Restless legs syndrome symptoms	Present	16	15.24
	Absent	89	84.76
Circadian rhythm disturbance	Present	19	18.10
	Absent	86	81.90
Parasomnia symptoms	Present	11	10.48
	Absent	94	89.52
Frequent daytime napping	Present	35	33.33
	Absent	70	66.67
Sleep duration <6 hours	Present	28	26.67
	Absent	77	73.33
Sleep efficiency <85%	Present	39	37.14
	Absent	66	62.86
Sleep onset latency	Mean ± SD, minutes	31.62 ± 18.47	—
Total sleep time	Mean ± SD, hours	6.48 ± 1.24	—
Habitual sleep efficiency	Mean ± SD, percentage	82.71 ± 11.36	—

Table 4: Comparison of patients with good and poor sleep quality

Variable	Good sleep quality, PSQI ≤5 (n = 48)	Poor sleep quality, PSQI >5 (n = 57)	Test statistic	p value
Age, years, mean ± SD	34.58 ± 9.74	39.49 ± 11.18	t = 2.38	**0.019**
Female sex, n (%)	15 (31.25)	29 (50.88)	$\chi^2 = 4.10$	**0.043**
Bipolar I disorder, n (%)	33 (68.75)	43 (75.44)	$\chi^2 = 0.58$	0.448
Duration of illness, years, mean ± SD	8.42 ± 6.15	11.98 ± 7.62	t = 2.60	**0.011**
Three or more previous episodes, n (%)	22 (45.83)	39 (68.42)	$\chi^2 = 5.47$	**0.019**
Previous hospitalization, n (%)	20 (41.67)	34 (59.65)	$\chi^2 = 3.38$	0.066
Medical comorbidity, n (%)	11 (22.92)	25 (43.86)	$\chi^2 = 5.08$	**0.024**
BMI ≥25 kg/m², n (%)	19 (39.58)	36 (63.16)	$\chi^2 = 5.80$	**0.016**
HAM-D-17 score, mean ± SD	2.77 ± 1.66	4.63 ± 1.98	t = 5.15	**<0.001**
YMRS score, mean ± SD	2.50 ± 1.62	3.09 ± 1.84	t = 1.72	0.088
Benzodiazepine/sedative use, n (%)	16 (33.33)	31 (54.39)	$\chi^2 = 4.65$	**0.031**
High caffeine intake, n (%)	14 (29.17)	25 (43.86)	$\chi^2 = 2.41$	0.121
Screen exposure before bedtime >2 hours, n (%)	19 (39.58)	37 (64.91)	$\chi^2 = 6.72$	**0.010**
Tobacco use, n (%)	8 (16.67)	16 (28.07)	$\chi^2 = 1.92$	0.166

Table 5: Multivariable binary logistic regression analysis of factors associated with poor sleep quality

Predictor	Adjusted odds ratio	95% confidence interval	p value
Age, per one-year increase	1.03	0.99–1.08	0.118
Female sex	1.72	0.69–4.29	0.244
Duration of illness, per one-year increase	1.02	0.95–1.10	0.558
Three or more previous mood episodes	2.49	1.03–6.01	**0.043**
Medical comorbidity	1.84	0.70–4.85	0.218
BMI ≥25 kg/m²	2.36	1.01–5.54	**0.048**
HAM-D-17 score, per one-point increase	1.55	1.20–2.01	**0.001**
Benzodiazepine/sedative use	1.68	0.69–4.09	0.256
Screen exposure before bedtime >2 hours	2.71	1.12–6.57	**0.027**

DISCUSSION

The present study included 105 patients with bipolar disorder in remission, with the highest proportion belonging to the 26–35 years age group (34.29%), followed by 36–45 years (30.48%). The mean age at onset of illness was 25.68 ± 7.46 years, indicating onset during early adulthood. This finding is comparable with Gruber et al. (2009), who, in the STEP-BD cohort of 2024 patients with bipolar disorder, reported that sleep-duration abnormalities were associated with clinical severity and earlier age at onset, suggesting that sleep disturbance is closely linked with illness expression from early stages of bipolar disorder. In the present study, males formed 58.10% of the sample and females 41.90%; however, female sex was significantly more frequent in the poor sleep quality group than in the good sleep quality group (50.88% vs 31.25%, p = 0.043), suggesting that sex-related vulnerability may influence sleep quality even during remission.[7]

Bipolar I disorder was the predominant diagnosis in the present study, observed in 76 patients (72.38%), while bipolar II disorder was present in 29 patients (27.62%). This distribution is similar to many tertiary care-based studies, where bipolar I disorder is often over-represented because patients with manic episodes, psychotic symptoms, and hospitalizations are more likely to reach specialist services. Harvey et al. (2005) studied euthymic bipolar patients and found clinically significant sleep disturbance in 70.00% of patients despite remission, supporting the view that sleep dysfunction persists beyond acute mood episodes. In comparison, the present study found poor sleep quality in 57 patients (54.29%), which is lower than Harvey et al. but still indicates that more than half of remitted bipolar patients continue to have clinically relevant sleep impairment.[8]

The present study found a mean global PSQI score of 6.84 ± 3.29, with poor sleep quality in 54.29% of patients. This is closely comparable with Saunders et al. (2013), who examined sleep quality during euthymia in bipolar disorder and reported that poor sleep quality was common among euthymic patients, with PSQI-based impairment persisting even after accounting for residual depressive symptoms. In the present study, the persistence of poor sleep quality despite low mean HAM-D-17 score (3.78 ± 2.04) and YMRS score (2.82 ± 1.76) similarly suggests that sleep disturbance is not merely a symptom of acute mania or depression, but may represent an independent clinical domain in bipolar disorder remission.[9]

Clinically significant insomnia was present in 30 patients (28.57%) in the present study, while subthreshold insomnia was seen in 31 patients (29.52%). Moderate clinical insomnia was present in 22.86% and severe insomnia in 5.71%. These findings are lower than those reported by Steinan et al. (2016), who found high rates of insomnia among patients with bipolar disorder, with insomnia present in 40.00% and hypersomnia in 29.00% in a Norwegian clinical sample. The lower rate of insomnia in the present study may be due to inclusion of only remitted patients, differences in assessment methods, and the use of ISI categories, but the findings still confirm that insomnia symptoms remain clinically important during remission.[10]

Excessive daytime sleepiness was present in 27 patients (25.71%) in the present study, and frequent daytime napping was reported by 35 patients (33.33%). These findings are consistent with Jermann et al. (2021), who found that subjective sleep-related complaints, including insomnia and sleepiness, remained prominent in euthymic bipolar disorder and were associated with quality-of-life impairment. In the present study, the mean ESS score was 8.46 ± 4.18, indicating that although the average level of sleepiness was below the conventional clinical cut-off, one-fourth of patients still had clinically significant daytime sleepiness, showing the functional relevance of sleep problems in remission.[11]

The present study also observed specific sleep-related problems, including intermediate STOP-BANG risk in 29.52%, high STOP-BANG risk in 12.38%, restless legs syndrome symptoms in 15.24%, circadian rhythm disturbance in 18.10%, and parasomnia symptoms in 10.48%. These findings are supported by Ng et al. (2015), who conducted a systematic review and meta-analysis and concluded that interepisode bipolar disorder is associated with persistent sleep–wake disturbance across several domains, including sleep duration, sleep timing, sleep efficiency, and circadian rhythm parameters. Compared with that review, the present study provides clinically useful screening data showing that sleep problems in remitted bipolar disorder are heterogeneous and extend beyond insomnia alone.[12]

Short sleep duration was present in 28 patients (26.67%) in the present study, and mean total sleep time was 6.48 ± 1.24 hours. Sleep efficiency below 85% was observed in 39 patients (37.14%), with mean habitual sleep efficiency of 82.71 ± 11.36%. These findings are comparable with Esan et al. (2022), who studied euthymic bipolar patients in Nigeria and reported that poor sleep quality frequently persists during euthymia and is associated with clinical and functional correlates. The present study similarly found reduced sleep efficiency and prolonged sleep onset latency of 31.62 ± 18.47 minutes, indicating that even when patients are clinically remitted, sleep continuity and restorative sleep may remain impaired.[13]

In the present study, poor sleep quality was significantly associated with longer duration of illness, recurrent mood episodes, medical comorbidity, overweight or obesity, residual depressive symptoms, sedative use, and prolonged screen exposure before bedtime. The strongest univariate association was seen with residual depressive symptoms, where mean HAM-D-17 score was 4.63 ± 1.98 in the poor sleep quality group compared with 2.77 ± 1.66 in the good sleep quality group ($p < 0.001$). Cretu et al. (2016) similarly reported that sleep disturbance and residual mood symptoms were clinically important in recovered bipolar disorder and were related to subsequent illness course. The present study extends this observation by showing that even low HAM-D-17 scores within the remission range are significantly associated with poor sleep quality.[14]

On multivariable logistic regression, three or more previous mood episodes (AOR 2.49, 95% CI 1.03–6.01, $p = 0.043$), BMI ≥25 kg/m² (AOR 2.36, 95% CI 1.01–5.54, $p = 0.048$), HAM-D-17 score (AOR 1.55, 95% CI 1.20–2.01, $p = 0.001$), and screen exposure before bedtime for more than two hours (AOR 2.71, 95% CI 1.12–6.57, $p = 0.027$) remained independent predictors of poor sleep quality. Exelmans and Van den Bulck (2016) reported that bedtime mobile phone use in adults was negatively associated with sleep outcomes, including poorer sleep quality and more insomnia-related symptoms. The present study supports this relationship in a psychiatric population, as prolonged pre-sleep screen exposure was common (53.33%) and independently predicted poor sleep quality during bipolar remission.[15]

Overall, the present study demonstrates that sleep disorders are frequent in patients with bipolar disorder even during remission. Poor sleep quality was present in 54.29%, clinically significant insomnia in 28.57%, excessive daytime sleepiness in 25.71%, sleep efficiency below 85% in 37.14%, and sleep duration below 6 hours in 26.67%. Gold and Sylvia (2016) reviewed the role of sleep in bipolar disorder and emphasized that sleep disturbance is highly prevalent across phases of bipolar illness and has adverse effects on illness course, quality of life, functioning, and relapse vulnerability. The present findings are in agreement with this view and suggest that routine sleep assessment should be incorporated into follow-up care of bipolar disorder patients even when they fulfil remission criteria.[16]

CONCLUSION

Sleep disturbances were common among patients with bipolar disorder even during clinical remission, with more than half demonstrating poor sleep quality. Insomnia, excessive daytime sleepiness, reduced sleep efficiency, short sleep duration, and risk of obstructive sleep apnoea were also frequently observed. Recurrent mood episodes, higher body mass index, residual depressive symptoms, and prolonged screen exposure before bedtime independently predicted poor sleep quality. Routine assessment and appropriate management of sleep problems should therefore be incorporated into the long-term care of patients with bipolar disorder.

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