

Original Research

Prevalence of Restless Leg Syndrome, Associated Variables and Impact on Sleep Quality in a Cohort of Patients with Neuropsychiatric Disorders

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Abstract

Background: Restless leg syndrome is a sensorimotor, sleep-related neurological disorder that is still an underdiagnosed condition characterized by an irresistible urge to move legs at rest, especially at night. Sleep being a vital component of comprehensive health is affected in RLS. The study was conducted to estimate the prevalence of restless leg syndrome (RLS) and its impact on sleep disturbance in patients presenting to the psychiatry clinic (outpatient psychiatric department).

Methodology: The present study was a cross-sectional, observational, single-center, interview-based study, conducted on 600 patients diagnosed with psychiatric illness. A questionnaire of the International Restless Leg Syndrome Scale (IRLS) was applied to assess the severity of RLS and sleep disturbance was assessed using the Pittsburgh Sleep Quality Index (PSQI) scale.

Results: It was found that among 600 psychiatric patients, the prevalence of RLS was 41.2% (247 patients). Major depressive disorder, migraine, and anxiety disorders show a high prevalence of RLS with a prevalence of 42.9%, 19.40%, and 15% respectively whereas alcohol use disorder has a low prevalence of 2.4%. The association between sleep and RLS was found to be statistically significant.

Conclusion: RLS is a highly prevalent disorder, and it needs to be evaluated in patients with sleep disturbance especially those presenting with symptoms of mood, migraine, and anxiety. Individuals with RLS suffer difficulty falling asleep and have shorter and more fragmented sleep experiences, leading to poorer overall sleep quality.

Keywords: Neuropsychiatric; Psychiatric Patients; Restless Leg Syndrome; Sleep Disorder; Sleep Quality.

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Introduction:

Restless leg syndrome is a sensorimotor, sleep-related neurological disorder that is still an underdiagnosed condition characterized by an irresistible urge to move legs at rest, especially at night.^{1,2} Sleep being a vital component of comprehensive health is also affected in RLS.³ Proposed mechanisms for RLS are iron deficiency and dopamine dysfunction in mesocortical, mesolimbic, and nigrostriatal pathways.⁴ In addition, RLS is viewed to have reduced functional connectivity in salience and executive networks.⁵ Major psychiatric disorders also had been explained by aberrant neuro circuitry disorder of the brain with sleep disturbance as a common presentation.⁶ RLS should be contemplated as a complex network disorder related to several neurochemical dysfunctions, with a typical circadian pattern of occurrence and evidence of abnormal excitability within CNS⁶ Therefore, it becomes essential to study RLS in psychiatric disorders and the relation between the two (RLS and psychiatric disorders) since a common functional circuitry is involved. RLS is misdiagnosed because of its chronic course and presentation like other psychiatric conditions, and decreased awareness among clinicians to rule out disorders are important causes.⁷ RLS is a disorder that rarely presents to neurology clinics and frequently presents to psychiatry clinics where it is diagnosed as depression, insomnia, and anxiety disorders.⁸

The prevalence rates of Restless Legs Syndrome (RLS) among psychiatric patients vary across different countries. In Germany and Switzerland, a study found a prevalence of 16.4% among psychiatric inpatients.⁹ On the other hand, a study in Turkey reported a prevalence of 12.1% in the adult population of a specific city.¹⁰ Additionally, RLS is common in psychiatric settings globally, with a prevalence rate of 5-15% in the general population.¹⁰ These findings highlight the significant presence of RLS among psychiatric patients in various regions, emphasizing the importance of recognizing and addressing this disorder within mental health care settings. This undiagnosed RLS is associated with increased use of benzodiazepines for sleep disturbance in RLS, raising the burden of unnecessary medications. The impact that RLS has on quality of life is still unrecognized.¹¹ Therefore this study aims to estimate the frequency of RLS and its impact on sleep disturbance in psychiatric patients presenting to the psychiatry clinic. This study aims to determine the prevalence of RLS in psychiatric patients. To the best of our knowledge, there is little information on the prevalence of RLS in the Asian population with no new updates on its prevalence and characterization. We hypothesize that there will be a higher prevalence of RLS in this population. We will focus on the prevalence of RLS in various psychiatric disorders and the correlation of RLS severity with sleep disturbance.

Methods

The present study was a cross-sectional, observational, single-center, interview-based study. Ethical approval: Prior approval from the institutional ethics committee was obtained with approval no. 1044/2021 dated 01/07/2021. Written informed consent was obtained from every participant after the purpose of the study had been explained.

Study Population:

A total of 600 patients visited the psychiatric Outpatient department of Sir T. Hospital, Bhavnagar between July 2021, and July 2022. All of them were diagnosed with psychiatric illness according to the DSM-5 criteria and were included in this study.

Inclusion and exclusion criteria: All patients aged more than 18 years were included in the study. Patients who had arthritis, leg edema, peripheral ischemia, or other neurological disorders were excluded. Of the approached, 600 obliged and provided written informed consent. Mental status was assessed based on a standard interview like any other outpatient psychiatric patient as a part of their clinical evaluation.

Data collection: The anonymity and confidentiality of participants were maintained. Interviews were conducted in the patient's vernacular language. The International Restless Leg Syndrome Study

Group (IRLSSG) criteria were used to diagnose RLS among patients. The International Restless Leg Syndrome Scale (IRLS) has 10 questionnaires based on the criteria to assess RLS severity.¹² The patient must rate his or her symptoms on a 5-point scale. The severity of the RLS score was categorized based on the sum of points for every patient as follows: None: 0 points, mild: 1 to 10 points, moderate: 11 to 20 points, severe: 21 to 30 points, and very severe: 31 to 40 points.

Pittsburgh Sleep Quality Index (PSQI) is a self-reporting instrument designed to evaluate sleep quality for the previous month. It consists of 19 items measuring 7 aspects of sleep quality like sleep latency, duration, quality, disturbance, and efficiency. Scores were categorized as mild insomnia (5-10 points), moderate insomnia (10-15 points), and severe insomnia (15- 21 points).¹³

Statistical Analysis: P-value data was entered in Microsoft Excel and analyzed using Jamovi. The presence of RLS in different psychiatric conditions, associated factors, and symptoms were compared. The impact of RLS on sleep was assessed using the Mann-Whitney U test.

Results

Out of the 600 patients diagnosed with psychiatric illness, RLS was found among 247 (41.2%) patients. Among the 247 patients, 161 (65.2%) were women. The mean age of participants with RLS was 40 years (± 14). The proportion of participants with RLS varied across different mental health conditions (Table 1).

Table 1. Presence of RLS in various psychiatry illnesses (n=600)

Diagnosis	RLS Present (% of row)	RLS Absent (% of row)	Total
Schizophrenia	21(17.65%)	98(82.35%)	119
Bipolar Disorder	15(16.67%)	75(83.33%)	90
MDD	106(60.92%)	68(39.08%)	174
OCD	9(14.06%)	55(85.94%)	64
Migraine	48(77.42%)	14(22.58%)	62
Alcohol Use Disorder	6(33.33%)	12(66.67%)	18
Anxiety	37(78.72%)	10(21.28%)	47
Brief Psychotic Disorder	4(40.00%)	6(60.00%)	10
Schizoaffective Disorder	0(0.00%)	4(100.00%)	4
Cannabis Use Disorder	1(25.00%)	3(75.00%)	4
Benzodiazepine Use Disorder	0(0.00%)	2(100.00%)	2
Conduct Disorder	0(0.00%)	2(100.00%)	2

Dementia with Behavioural Disturbance	0(0.00%)	2(100.00%)	2
Mental Retardation with Behavioral Changes	0(0.00%)	2(100.00%)	2
Total	247(41.17%)	353(58.83%)	600

Among 247 who had RLS, according to IRLSSG criteria, 54 participants had mild RLS (21.86%), 126 had moderate RLS (51.01%), 52 had severe RLS(21.05%) and 15 had very severe RLS (6.07%). A very severe grade of RLS was noticed among patients with MDD, Migraine, and Anxiety (Figure 1).

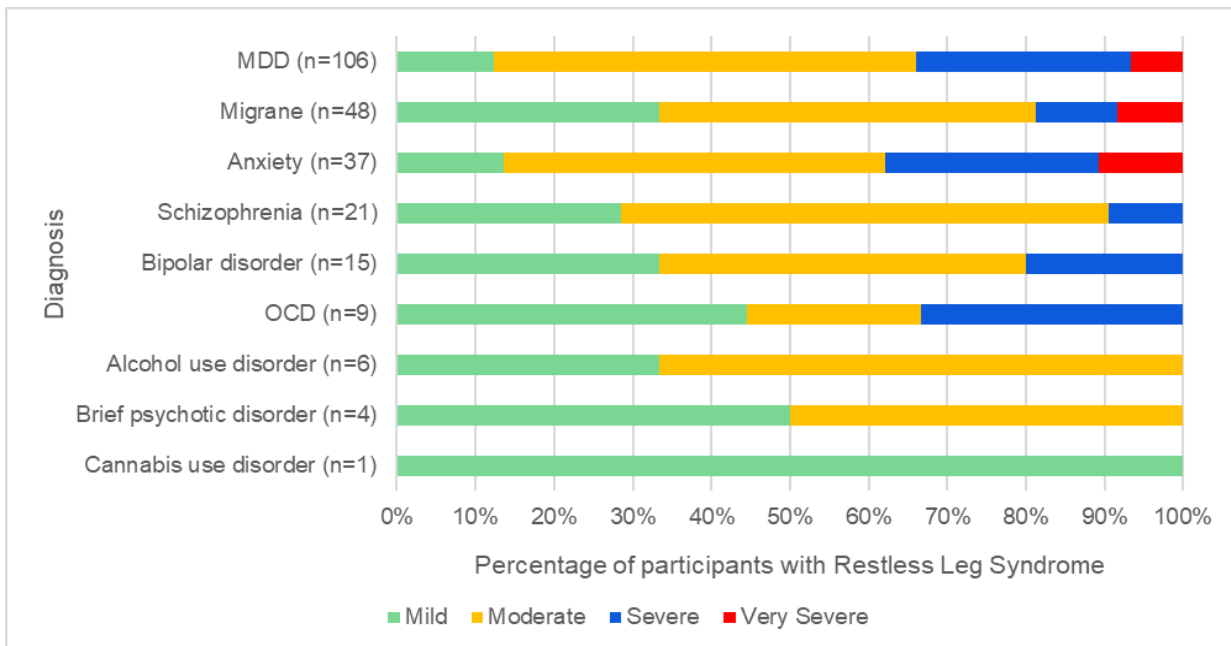


Figure 1. Severity of RLS among participants with different psychiatric illnesses, diagnosed with RLS (N=247)

High PSQI scores, indicating poor sleep were observed among participants with RLS (10.12 ± 2.99), compared to those who did not have RLS (6.73 ± 4.20). This difference was statistically significant (Mann Whitney U=23418, $p < 0.0001$), (Figure 2).

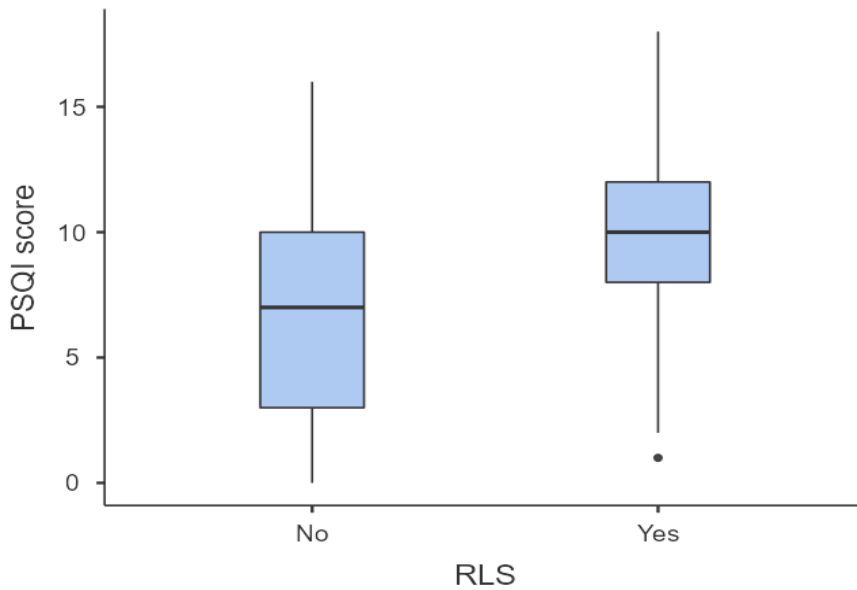


Figure 2. Comparison of PSQI scores in patients with and without RLS

Among 247 participants with RLS, 44.9% (111) had sleep latency of more than 30 minutes, compared with 33.4% (118) among participants without RLS. This difference was statistically significant ($\chi^2=8.16$, $df=1$, $p=0.004$). All participants with severe RLS had a high sleep latency (Table 2 & Figure 3).

Table 2. Sleep latency among participants with RLS, compared to those without RLS

Sleep latency	RLS (%)		Grand Total
	Present	Absent	
<15 minutes	51 20.65%	95 26.91%	146
16-30 minutes	85 34.41%	140 39.66%	225
31-60 minutes	98 39.68%	91 25.78%	189
>60 minutes	13 5.26%	27 7.65%	40
Total	247 41.17%	353 58.83%	600

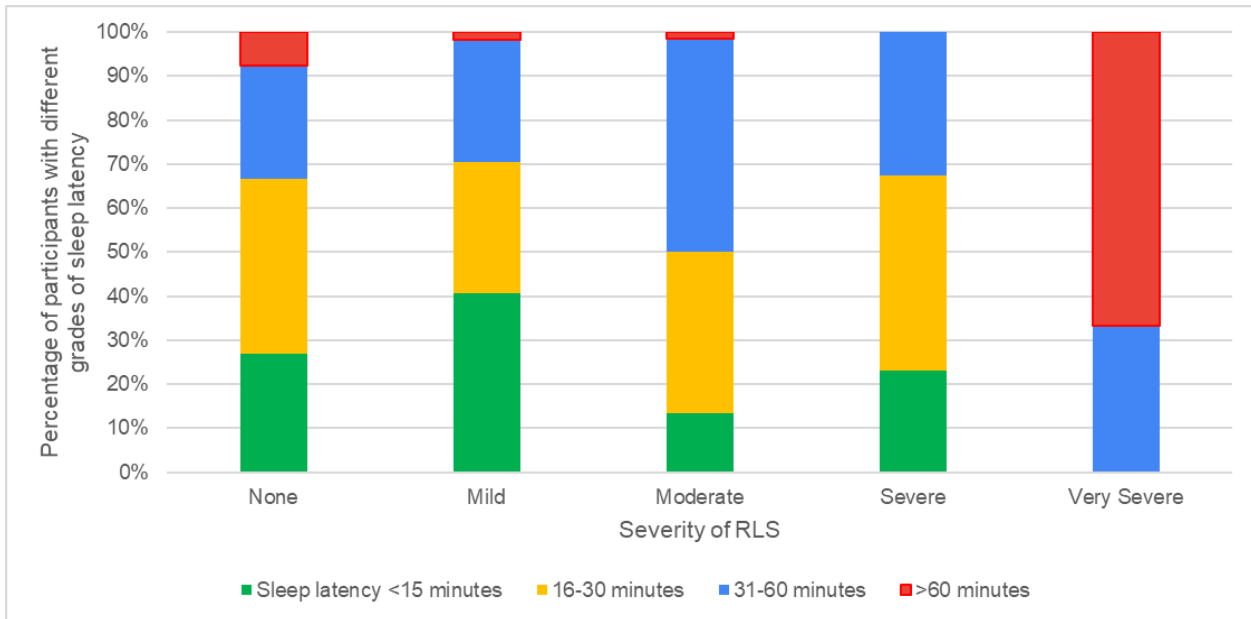


Figure 3. Sleep latency in participants with different grades of RLS

About 44% of the participants with RLS had a sleep efficiency of less than 65% (Table 3& figure 4). This difference was statistically significant ($\chi^2 = 62.8, df= 3, p=0.001$).

Table 3. Sleep efficiency among participants with RLS, compared to those who did not.

Sleep efficiency	RLS		Total
	No	Yes	
>85%	153	38	191
75-84%	63	49	112
65-74%	64	51	115
<65%	73	109	182
Total	353	247	600

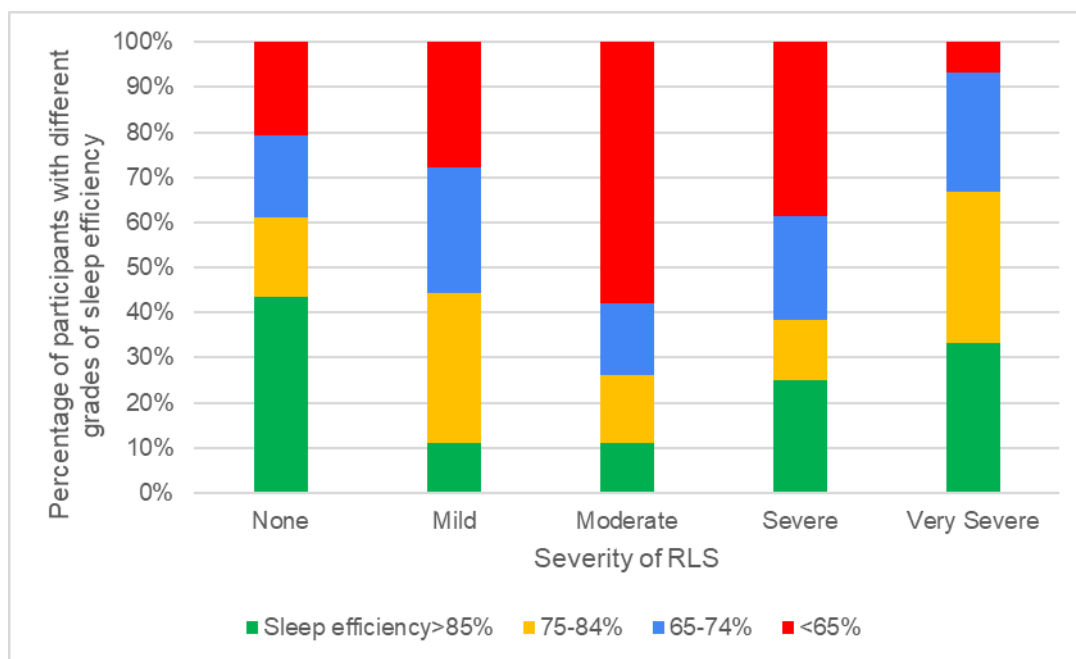


Figure 4. Sleep efficiency in participants with different grades of RLS

The patients with RLS spent a mean duration of 8.84 (SD± 2.38) hours in bed while those without RLS spent 8.52 (SD± 2.12) hours in bed. This difference was not significantly different (Mann Whitney U= 40237.00, p=0.1021). The time taken to sleep was 38.12 (SD± 21.84) minutes among patients with RLS compared to 37.91 (SD± 29.36) minutes among patients without RLS (Mann Whitney U= 39822.0, p=0.0645). However, the duration of sleep was 5.58 (SD± 1.40) hours among patients with RLS compared to 6.36 (SD± 1.43) hours among patients without RLS. This difference was statistically significant ((Mann Whitney U= 29493.0, p<0.0001).

Discussion

Restless leg syndrome is a common chronic sensorimotor disorder that remains underdiagnosed in most parts of the world. The present study found that RLS occurred in 247 (41.2%) patients out of a total of 600 psychiatric patients. It was noticed that major depressive disorder has the highest prevalence of 106 (42.9%) followed by migraine patients at 48 (19.40%) and anxiety disorder patients at 37 (15.00%) which was concordant with other studies. Previous studies reported frequent occurrence of psychiatric disorders, particularly affective disorder, anxiety disorder, and migraine in patients with RLS. In the present study, it was found 21 (8.50%) in schizophrenia patients, 15 (6.07%) in bipolar disorder pts, 9 (3.6%) in OCD patients, 4 (1.6%) in brief psychotic disorder patients, 6 (2.4%) in alcohol use disorder patients and 1 (0.4%) in cannabis use disorder patients. The prevalence of RLS in the general population varies from 5% to 32% in various parts of the world.¹⁴ Prevalence of RLS was 24% in the general population in American and European populations which was higher than previously reported figures in these countries. The reason for this high prevalence was explained based on three factors namely: geographic location, ethnic composition, and third where the sleep disorder presented to the primary care setting was diagnosed.¹⁵ The prevalence of RLS was estimated to be 32.9% in Iran.¹⁶ The prevalence of RLS in the general population was reported at 2.1%¹⁷ while a study conducted in Mangalore in 2022 showed the prevalence of RLS to be 11.9% which was higher as compared to other previous studies in the same region, the reasons explained were differences in age distribution, family history of RLS and role of genetic factors and lifestyle diseases in its occurrence.¹⁸ RLS is one disorder that remains under-

recognized in clinical settings, mostly because patients have a long duration of RLS before it comes to notice, and people are less aware of this illness which does not compel them to consult physicians. RLS being a sensorimotor or neurological disorder does not usually reach neurology clinics so the chances of missing RLS patients are high. RLS patients mostly visit psychiatric clinics with complaints of sleep disturbance and mood symptoms associated with long-term RLS. In psychiatric clinics, these patients are mainly diagnosed with depression, anxiety, and or hardly treated for sleep disturbance due to RLS, therefore prevalence varies in the general population and psychiatric settings.

Overall mean PSQI score in RLS patients was significantly higher than the mean PSQI score of Non-RLS ($p=60\text{min}$) in 57.58%, similar findings noticed the presence of RLS with delay in sleep onset with sleep latency of 1 to 3 hours, having difficulty initiating sleep.¹⁷ A study reported patients with RLS have decreased sleep efficiency with total sleep of less than 3 hours and lower sleep satisfaction.¹⁹ Also, daytime dysfunction was significantly associated with secondary RLS (or RLS associated with comorbidities) and has rapid evolution. A higher percentage of RLS in less than 45 years denotes RLS has a genetic component and showed RLS prevalence to be high with a positive family history.²⁰ Some genes like MES1S1, BTBD9, and MAP2K/SKOR1 were directly associated with RLS and found in the genome's noncoding part.^{20,21}

Moderate RLS, with a mean IRLS score of 14.11 ± 6.85 , was most prevalent in this study. Other studies reported compatible results of 12.1 ± 7.6 , 16.6 ± 6.6 , and 16.6 ± 4.8 which also showed moderate severity in RLS symptoms.^{22,23,24} The Association of RLS and mood disorders is highly studied and found a significant correlation between both. In this study, MDD has the highest prevalence of RLS with 106 (42.9%). Many studies say RLS precedes depression, and others say depressive patients develop RLS later, some say a bidirectional relation is present between both.²⁵ Association is explained by the common neurobiological pathway involved in RLS and depression which is dopamine dysfunction as dopamine deficiency is observed in depression and RLS patients treated with dopamine agonists. Circuits containing dopamine in the CNS are involved in the regulation of pleasure, concentration, and motivation, all of which are hampered by depression. And Dopamine agonists seem to possess antidepressant properties.¹⁰ In this study, migraine patients had a 48 (19.40%) prevalence of RLS which has been consistent with other studies showing results of 13.7% -25%.^{26,27} RLS and migraine share the same pathophysiology linked to iron deposition in the brain and dopamine dysfunction.²⁸ Particularly, yawning, irritability, and mood changes during the premonitory phase as well as nausea and vomiting during the premonitory and headache phases may be ascribed to dopamine, also antiemetics with antidopaminergic properties can treat migraine attacks. Also, RLS can cause chronic sleep insufficiency which can precipitate migraine attacks. In this study, anxiety disorder patients had a 37 (15.00%) prevalence of RLS. Patients with RLS frequently experience anticipatory anxiety about the misery of their symptoms and lack of sleep, which may compound a predisposition to an anxiety disorder.²⁹ In addition, RLS symptoms and the associated periodic leg movements of sleep frequently lead to inadequate total sleep time. Sleep deprivation increases sympathetic tone and powerful trigger for panic attacks with established anxiety disorder. This study reported a 21(8.5%) prevalence of RLS among patients having schizophrenia. Other studies showed a 21% prevalence of RLS in schizophrenics.³⁰ In this study, there was no significant relationship between the severity of IRLS score and antipsychotic drug exposure ($p= 0.211$) which was different from a study that suggested antipsychotics may precipitate RLS but only in susceptible individuals as all individuals on antipsychotics (dopaminergic antagonists) did not develop RLS, therefore, genetic predisposition was linked to antipsychotic-induced RLS.³⁰ Prevalence of RLS in alcohol use disorder was 6 (2.4%) in this study which was lower in compared to other disorders. Interestingly, a polymorphism in the alcohol dehydrogenase 1B gene (ADH1B) has been identified, which was associated with an increased risk for RLS and low alcohol consumption.³¹

Limitation

Being a cross-sectional study, the cause-effect relationship cannot be established. Various factors like iron deficiency assessment, family history, and chronic illness like chronic kidney disease were not included in this study due to the primary focus on psychiatric conditions and the feasibility of the study.

Conclusion:

RLS is a highly prevalent disorder, and it needs to be evaluated in patients with sleep disturbance especially those presenting with symptoms of mood, migraine, and anxiety. Since RLS precedes depression, early assessment of RLS can change the course of illness in patients by decreasing the burden of illness and improving quality of life.

The highly significant difference in sleep duration and PSQI scores ($p < 0.001$) reinforces that RLS demonstrably disrupts sleep quality and quantity. Beyond initial difficulty falling asleep, individuals with RLS face shorter, more fragmented sleep experiences, leading to poorer overall sleep quality. Recognizing and addressing RLS becomes crucial for improving sleep and enhancing the well-being of individuals with this condition.

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