Original Article

Clinical profile of restless leg syndrome and its effect on sleep and quality of life

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Abstract

Background: Restless leg syndrome is a sensorimotor disorder characterized by unpleasant sensations primarily involving lower limb but may involve trunk, neck and upper limb. The present study analyzed the clinical profile of RLS patients and explored its association with sleep and quality of life. **Methods:** A cross-sectional study was conducted among adult patients diagnosed of RLS based on the IRLSSG (International RLS Study Group) diagnostic criteria. Severity of RLS was assessed using the IRLSSG rating scale. Sleep quality, daytime sleepiness, and quality of life were assessed using the Pittsburgh Sleep Quality Index, Epworth Sleepiness Scale, and RLS Quality Of Life Scale (RLSQOL). **Results:** We enrolled 133 participants, of mean age 45.9 ± 15.2 years and 57.14% (76) being females. Different sensory–motor complaints were present, predominant sensory complaints being pain in 56.39% (75) and motor complaint being excessive movements (78.20% (104)). 80.45% (107) of individuals had sleep complaints including delayed onset sleep, repeated awakening, and nonrefreshing sleep. Excessive daytime sleepiness was present in 56.39% (75), and 78.2% (104) were poor sleepers. Upper limb was involved in 12.78% (17) of patients. Symptoms were majorly bilateral, but 6.02% (8) of patients had unilateral symptoms. RLSQOL score was 35.23 ± 10.3, and there was significant deterioration of sleep quality as well as quality of life with the increasing severity of RLS. **Conclusion:** RLS remains an underdiagnosed, misdiagnosed, and undertreated clinical entity which has a negative effect on individuals' sleep as well as quality of life. Early detection of RLS by primary care physician will not only reduce the morbidity but also enhance the QOL of these individuals.

Keywords: IRLSSG-International Restless Legs Syndrome Study Group criteria, restless legs syndrome clinical profile, RLS and epworth sleepiness scale, RLS and quality of life, RLs and sleep quality on Pittsburgh sleep quality index

Introduction

Willis Ekbom or Wittmaack Ekbom Disease, commonly known as restless legs syndrome (RLS), is a sensorimotor disorder that primarily affects legs but may involve upper limbs, neck, as well as trunk.[1] RLS is underdiagnosed and often misdiagnosed due to its varied manifestations and mimics, including leg cramps, positional discomfort, peripheral neuropathy, radiculopathy, arthritic pain, local leg injury, frequent unconscious foot and leg movements like hypnic jerks, habitual foot tapping, and leg shaking.[1,2] Characterized by unpleasant sensations like burning, tugging, tightening, and/or feelings like crawling/creeping of insects, it can present either as a primary RLS (idiopathic) or as secondary RLS associated with conditions like thyroid disease, autoimmune disease, celiac disease, fibromyalgia, sleep apnea, uremia, diabetes, peripheral neuropathies, Parkinson's disease, multisystem atrophy, progressive supranuclear palsy etc.[3]

Patients usually have an intense desire to move limbs, especially during periods of rest or inactivity relieved partially or totally by movement. Severity of RLS varies from being infrequent and minimally annoying to severely disrupting and disabling. Though

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population-based studies from Western countries have reported a prevalence of 5–10%,[4,5] studies across India have reported a prevalence varying from 2.1% to 8.2%.[6,7]

Owing to its circadian pattern and tendency to worsen in evening and night, RLS impacts sleep as well as quality of life (QOL) negatively.[6] Chronic insufficient and poor quality of sleep leads to impaired daytime functioning, effecting job performance as well as participation in social and recreational activities, leading to an overall reduction in QOL. Early exploration of abnormal limb sensorimotor symptoms in patients by primary care physicians could beneficial in preventing deterioration of their QOL. Studies have shown an association of RLS with sleep problems and/or its effect on QOL with some reporting lesser daytime sleepiness than expected for their degree of sleep loss when assessed on the Epworth sleepiness scale (ESS).[8,9] However, less is known about the association of severity of RLS with sleep quality and QOL. The present study explored the clinical profile of RLS, its impact on sleep quality and QOL, in addition to association of RLS severity with sleep quality and QOL.

Materials and Methods

This cross-sectional study was conducted at a tertiary healthcare facility in central India. It was performed in accordance with ethical principles stated of "Declaration of Helsinki", and requisite permissions were obtained from the institutional Human Ethics Committee (IHEC-LOP/2019/DM0002). Participants were enrolled after obtaining written informed consent.

Study population

Consecutive patients aged ≥18 years visiting neurology OPD between August 2019 and March 2021, presenting with complaints of discomfort in lower limbs, suspected to be suffering from RLS, were invited to participate. Those fulfilling IRLSSG (International RLS Study Group) diagnostic criterion were interviewed in detail after obtaining written informed consent. Patients unwilling to participate or having primary sleep disorder, RLS mimics like leg cramps, peripheral neuropathy, radiculopathy, arthritic pains, positional discomfort, and frequent leg movements like hypnic jerks, akathisia, habitual foot tapping, and leg shaking, assessed based on history were excluded.

Procedure

Complete physical and neurological examination was done to rule out any systemic diseases or associated neurological disorders after recording detailed demographic information including age, gender, level of education, occupation, and comorbidities. Participants were assessed on Pittsburgh sleep quality index (PSQI) for their sleep quality, Epworth sleepiness scale (ESS) for daytime sleepiness, RLS quality of life scale (RLSQoL) for quality of life and IRLS rating scale for RLS severity.

Pittsburgh sleep quality index (PSQI)

PSQI is a self-report questionnaire that assesses sleep quality over a 1-month time interval. It consists of 19 items, each weighted on a 0–3 interval scale, further creating 7 components, the total of which led to one global score ranging between 0 and 21, where lower scores denote a healthier sleep quality.[10]

Epworth sleepiness scale (ESS)

ESS asks subjects to rate his/her probability of falling asleep on a scale of increasing probability from 0 to 3 for eight different situations that most people engage in their daily lives, though not necessarily every day.[11] Total scores obtained by adding the scores of eight questions are interpreted as 0–7:unlikely to be sleepy; 8–9 average amount of daytime sleepiness; 10–15 excessively sleepy depending on the condition; 16–24 excessive sleepiness and should consider seeking medical attention.

RLS quality of life scale (RLSQoL)

It assesses the impact of RLS on daily life, emotional well-being, social life, and work life. RLS summary score was calculated for RLSQOL questionnaire based on questions 1 to 5, 7 to 10 and 13: 1 denotes most severe and 5 is least severe, so lower scores indicate worse QOL. Summary scores were further transformed to a score ranging from 0 to 100.[12]

Transformed summary score = ([Actual raw score—lowest possible raw score]/Possible raw score range) x100.

IRLSSG rating scale

Severity of RLS was measured with IRLSSG scale for RLS.[13] It is a subjective scale to measure the severity of RLS consisting of 10 questions each being graded as 0 to 4. Final scores are graded as mild, moderate, severe and very severe as 1–10, 11–20, 21–30, 31–40.

Hematological investigation

Patients were also evaluated for serum hemoglobin, iron profile, serum ferritin levels, kidney function tests, liver function tests, fasting and postprandial blood sugar, HbA1c, RA factor, ANA and thyroid function tests to ruleout any secondary cause.

Statistical analysis

Data were entered in Microsoft excel, and the final analysis was done with Statistical Package for Social Sciences (SPSS) software, IBM manufacturer, Chicago, USA, version 27. Categorical variables are presented as numbers and percentage (%) and continuous data as mean and standard deviation. Spearman correlation was done to find the association of severity of RLS with covariates; P value < 0.05 was considered as significant.

Observations and Results

One hundred and thirty-three patients fulfilling IRLSSG 2012 diagnostic criteria were enrolled in the study, of which

57.14% (76) were females. 24.06% (32) of the patients were in their 4th decade with a mean age of 45.9 ± 5.2 years. 51.13% (68) of patients were graduates or had higher level of education, and 55.64% (74) were overweight. The mean duration of RLS symptoms before its correct diagnosis was 4.44 ± 5.91 years, and 25.56% (34) had a family history of RLS.

Clinical symptomatology of RLS

Most common sensory complaints were pain 56.39% (75), followed by discomfort in 39.10% (52) patients. Excessive limb movement was predominant nocturnal motor complaint in 78.20% (104) followed by nighttime massage in 72.18% (96) [Table 1]. 80.45% (107) of patients reported having sleep complaints with delayed sleep onset being a universal complaint followed by repeated awakening in 36.84% (49) and nonrefreshing sleep in 31.58% (42) of patients [Table 1]. Symptoms were maximally bilateral 93.98% (125) with predominant involvement of lower limb; upper limb too was involved in 12.78% (17) of patients with symptoms limited to forearm and hand in 7.52% (10) and extending up to arm in 5.26% (7) of patients. 97.74% (130) of patients had symptoms only while lying, 50.38% (67) had symptoms while sitting and 22.56% (30) had restlessness even while standing for prolonged duration. 63.41% (83) had associated comorbidities among which migraine was most common in 18.8% (25) followed by hypertension 12.78% (17) and diabetes 11.28% (15) [Table 1]. None of the comorbidities showed any significant association with RLS severity.

Hematological status of patients with RLS

The mean hemoglobin was 13.19 ± 1.6 gm/dL with anemia in 22.56% (30) as per WHO definition.[14] The mean iron level was 77 ± 28.56, with a low mean ferritin level of 78.05 ± 53.83; 53.38% (70) had ferritin <100 ng/ml [Table 1]. Severity of RLS showed a significantly negative association with serum iron ($P = 0.012$), percentage transferrin ($P = 0.004$) and serum ferritin ($P = 0.009$) and a positive association with total iron binding capacity (TIBC) [Table 2].

RLS severity and its impact on sleep and quality of life

66.92% (89) of patients reported severe to very severe RLS on IRLSSG rating scale [Table 3]. 48.12% (64) had very severe symptoms with 42.11% (56) having severe need to move around their affected part. 43.61% (58) reported getting complete relief after moving their affected part, while 13.53% (18) of patients had such severe restlessness that even after persistent movement, there was no relief. 70.68% (94) of patients had symptoms on 6–7 days/week, while 36.09% (48) had symptoms at least 8 hours on an average day [Table 3]. 36.09% (48) of patients reported severe impact of RLS symptoms on daily affairs with 19.55% (26) of patients having a very severe impact on their mood.

56.39% (75) had excessive daytime sleepiness on ESS, and the mean PSQI score was 9.26 ± 5.32 with 78.20% (104) of patients having global PSQI score ≥5 [Table 4]. 45.86% (61) of patients

Table 1: Clinical characteristics and features of RLS of the patients (*n*=133)	
Sociodemographic characteristics	**Mean±SD or Median (IQ range) or number (%)**
Age (years)	45.9±15.2
18-30	20.30% (27)
31-40	17.29% (23)
41-50	24.06% (32)
51-60	18.80% (25)
61-70	14.29% (19)
71-80	5.26% (7)
Gender	
Female	57.14% (76)
Male	42.86% (57)
Height (cm)	162.25±7.4
Weight (kg)	66.99±8.3
Education	No formal education- 17.29% (23)
	Up to primary school -3.01% (4)
	primary to secondary school- 28.57% (38)
	Graduate- 43.61% (58)
	Postgraduate and above- 7.52% (10)
Body mass index (kg/m²)	25.6±2.97
	Normal BMI (18.5-24.99)- 37.59% (50)
	Overweight (25-29.99)-55.64% (74)
	Obese (>=30)- 6.77% (9)
RLS characteristics	
Distribution of Laterality of Symptoms	Unilateral- 6.02% (8)
	Bilateral- 93.98% (125)
Limb involvement	Lower limb: calf only- 62.41% (83)
	Calf and thigh- 37.59% (50)
	Upper limb: Not involved- 87.22% (116)
	Forearm and hand- 7.52% (10)
	Arm, forearm and hand- 5.26% (7)
Predominant Posture for symptoms	
Prolonged sitting	50.38% (67)
Lying	97.74% (130)
Standing still	22.56% (30)
Sensory complaints 100% (133)	Pain- 56.39% (75)
	Twisting-28.57% (38)
	Pricking-18.80% (25)
	Tingling-26.32% (35)
	Burning-22.56% (30)
	Crawling-12.03% (16)
	Itching-11.28% (15)
	Discomfort- 39.10% (52)
Motor complaints 100%(133)	Excessive movements- 78.20% (104)
	Nighttime massage -72.18% (96)
	Pressing against bed -45.11% (60)
	Others- 9.77% (13)
	tie clothes affected limb- 42.11% (56)
Sleep complaints 80.45%(107)	Delayed onset sleep - 80.45% (107)
	Repeated awakening - 36.84% (49)
	Nonrefreshing sleep- 31.58% (42)
Distribution of family history:	Positive family history- 25.56% (34)
	Negative family history- 74.44% (99)
Comorbidities	Migraine -18.80% (25)
	Fibromyalgia -5.26% (7)

Contd...

Table 1: Contd...	
Sociodemographic characteristics	**Mean±SD or Median (IQ range) or number (%)**
	Diabetes mellitus- 11.28% (15)
	Hypertension- 12.78% (17)
	PD-9.02% (12)
	CVA-3.76% (5)
	Radiculopathy- 4.51% (6)
	Hypothyroidism-5.26% (7)
	Others-10.53% (14)
Iron profile	
Serum iron (μg/dL)	77±28.56
TIBC (micg/dL)	345.68±89.33
Transferrin saturation	24.63±12.07
Serum ferritin (ng/mL)	78.05±53.83
Low ferritin (<100 ng/mL)	53.3% (70)
Anemia as per WHO definition	22.56% (30)
Hemoglobin (mg/dL)	13.19±1.6
Other hematological parameters:	
TLC	13.19±1.6
MCV (fL)	86.39±7.73
MCH (pg)	28.89±3.05
MCHC (gm/dL)	31.56±1.8
Urea (mg/dL)	21.61±9
Creatinine (mg/dL)	0.85±0.34
Total bilirubin (mg/dL)	0.76±0.31
CRP (mg/L)	2.73±1.43
ESR	9.47±3.63
FBS (mg/dL)	97.16±17.77
PPBS (mg/dL)	120.32±14.1

had <6 hours of sleep, 27.82% (37) of patients reported <65% of sleep efficiency and 15.79% (21) of patients used sleeping pills on >3 occasions per week [Table 4].

The mean RLSQOL score was 35.23 ± 10.3, with 51.88% (69) of patients reporting RLS as distressing a lot. Nearly 32.33% (43) had their evening activities affected because of evening onset of symptoms and 22.55% (30) of patients reported refraining from attending evening social activities. 38.35% (51) of patients had trouble getting up in morning, and 31.58% (42) reported getting late for their early routine work. 7.52% (10) avoided travelling for a trip of more than 2 hours in last 4 weeks on all to most of the occasions. Majority of patients did not report the effect of RLS on their sexual activities. Patients had difficulty in carrying out daily activities ranging from a lot 20.30% (27) to a little 22.56% (30). 22.55% (30) of patients were working, and among them, the frequency of feeling difficulty working all the time was reported by 23.33% (7), and 20% (6) reported difficulty most of the time [Table 5]. 3.07 ± 2.85 number of days they got late due to RLS, and 3.81 ± 3.09 number of days they worked less than desired due to RLS [Table 5]. Sleep quality (PSQI) deteriorated (*P* = 0.0001), sleepiness (ESS) increased significantly and QOL deteriorated (*P* = 0.0001) with increasing RLS severity [Table 2].

Table 2: Association between various parameters, global PSQI, PSQI components, ESS and RLSQoL with severity of RLS	
Variables	**IRLSRS**
Serum Iron	r=-0.218, *P*=0.012*
TIBC	r=0.245, *P*=0.004**
Percentage Transferrin	r=-0.251, *P*=0.004**
Serum ferritin	r=-0.226, *P*=0.009**
ESS	r=0.832, *P*=0.0001**
PSQI	r=0.798, *P*=0.0001**
IRLSQOL	r=-0.771, *P*=0.0001**

Spearman's correlation

Discussion

The study highlights clinical profile of RLS individuals. Predominantly in females, 42.86% of males too reported having RLS. More than 50% of patients were either graduates or had higher degrees but were overweight, had severe RLS, and low serum ferritin with anemia in 22.56% (30). RLS mainly involved lower limbs but upper limb too was involved in 12.78% (17) of patients. 78.2% (104) of individuals had poor sleep quality with disturbances in daily activities present in 73.69% (98). RLS severity negatively impacted sleep quality as well as QOL.

Rangarajan *et al.*[15] reported a varying duration of 4 months to 10 years for RLS to be diagnosed. The mean duration for correct diagnoses of RLS in our study is 4.44 ± 5.91 years. The prolonged duration for RLS to be diagnosed may be either due to patients' reluctance to report complaints of restlessness, considering these symptoms as related to fatigue, overwork, and weakness, or maybe due to unawareness or misdiagnosis due to RLS mimics by the primary physicians.

As per the previous studies, 57.14% of RLS patients were female. Abnormal iron metabolism and central iron deficiency are one of the probable pathophysiological mechanisms suggested for RLS. Thus, factors like lower iron stores in women due to monthly blood loss during menstruation and hormonal factors like an abundance of estrogen in females are the potential proposed reasons.[16,17] RLS is a multimorbid condition and is associated with migraine, sleep problems, and psychiatric disorders, which are more prevalent in females. However, 42.86% of males too had RLS, and almost 50% of patients had low serum ferritin; thus, other pathophysiological reasons responsible for RLS need to be explored. Multimorbidity, neuropsychiatric conditions, and genetic association contribute to prevalence of RLS in males as well.

Allen *et al.*[18] shown an increasing incidence of RLS at age of 65 years. In the present study, maximum number of patients were in their 4th decade with a mean age of 45.9 ± 15.2 years, and 19.55% (26) individuals were of age >60 years. A study from Bangalore has reported a mean age of 38.1 ± 14.2 years and that conducted in Delhi by Shukla *et al.* has reported a mean age of 44.1 ± 14.5 years.[15,19] Higher prevalence of RLS among

relatively younger individuals in Indian studies may be due to early childbearing and nutritional deficiencies like iron among Indian women.[20] In addition, studies have suggested that RLS onset after 40 years is most likely secondary RLS which is associated with iron deficiency, pregnancy, chronic renal failure, or other neurological disorders.[21,22] In our study too, 41.35% (55) of individuals were of age between 31 and 50 years, with anemia in 22.56%.

Reiterating the genetic basis of RLS, family history as high as 40 to 60% has been reported.[23] However, Rangarajan *et al*.[15] shown that 18.5% of respondents had a family history of RLS. Our study too shows a family history in 25.56% of patients. The reduced reporting of family history may either be due to unawareness of patients of similar complaints in their family members or their reluctance to report to the doctor. In addition, it may be due to probable ethnic differences existing in the genetics of RLS.

All patients had sensory–motor symptoms, and 80.45% had nocturnal sleep complaints, with 56.39% (75) patients reporting excessive daytime sleepiness. In one multinational general population survey (the REST study), 88% of sufferers had sensory complaints, 37% had motor symptoms, 75.5% had sleep complaints and 55.5% reported disturbance of daytime functioning.[17] As RLS severity profile was high in our group, patients had more sensory and motor symptoms, which hampered both nocturnal sleep as well as daytime functioning. The most common sensory symptom was pain in 56.39% (75) of patients. Karroum *et al*.[24] described RLS as a severe burning form of disease in which 61% of RLS patients had painful symptoms leading to more tiredness and sleepiness.

RLS has a circadian pattern, and symptoms increase in the evening and/or nighttime time, but with increasing severity, symptoms are even present during the day. 50.38% (67) of patients had symptoms even on sitting for a prolonged duration, while 22.56% (30) of patients reported difficulty even standing still. Similar results were shown by Tzonova *et al*.[25] who described breakthrough symptoms of restlessness during daytime; 55% of patients reported daytime crisis on most (>3) days of week, and 41% suffered daytime symptoms on a daily basis.

Karroum *et al*.[26] did a topographical analysis of RLS symptoms in 44 patients and found that areas other than calf were also affected. They found that thighs were involved in 76%, hips and buttocks in 11%, in upper limb, most involved segment was arm 39%, followed by forearm 36%.[26] Thus, restlessness in other areas in isolation or in association with similar complaints should not rule out RLS. Karroum *et al*.[26] reported 34% RLS patients with unilateral symptoms as against 6.02% in our study which may be due to underreporting of complaints in Indian populations.

More than half (62.41%) of patients in our study had associated comorbid conditions, with migraine being the most common condition.[25] Markus Schürks *et al*.[27] reported an odds ratio

Table 3: RLS Severity according to international Restless Legs Syndrome rating scale	
International restless legs syndrome rating scale	**Mean±SD or number (%)**
Mild	6.02% (8)
Moderate	27.07% (36)
Severe	22.56% (30)
Very severe	44.36% (59)
Mean IRLS score	26.17±9.76
International restless legs syndrome rating scale components	
RLS discomfort in legs and arms	
Mild	6.02% (8)
Moderate	27.07% (36)
Severe	18.80% (25)
Very severe	48.12% (64)
Need to move around	
Mild	11.28% (15)
Moderate	28.57% (38)
Severe	18.05% (24)
Very severe	42.11% (56)
Relief from discomfort by moving around	
Complete or almost complete relief	43.61% (58)
Moderate relief	24.81% (33)
Mild relief	18.05% (24)
No relief	13.53% (18)
Severity of sleep disturbance	
None	5.26% (7)
Mild	15.04% (20)
Moderate	20.30% (27)
Severe	12.03% (16)
Very severe	47.37% (63)
Severity of tiredness and sleepiness	
None	9.02% (12)
Mild	16.54% (22)
Moderate	25.56% (34)
Severe	14.29% (19)
Very severe	34.59% (46)
Severity of RLS	
Mild	7.52% (10)
Moderate	27.07% (36)
Severe	15.79% (21)
Very severe	49.62% (66)
Frequency of RLS symptoms	
Occasionally (≤1 day)	1.50% (2)
Sometimes (2-3 days)	16.54% (22)
Often (4-5 days)	11.28% (15)
Very often (6-7 days)	70.68% (94)
Severity of RLS symptoms on an average day (/24 h)	
None	2.26% (3)
Mild (<1 h)	22.56% (30)
Moderate (1-3 h)	23.31% (31)
Severe (3-8 h)	15.79% (21)
Very severe (at least 8 h)	36.09% (48)
Severity of impact of RLS symptoms on daily affairs	
None	20.30% (27)
Mild	18.05% (24)
Moderate	12.03% (16)

Contd...

Table 3: Contd...	
International restless legs syndrome rating scale	Mean±SD or number (%)
Severe	13.52% (18)
Very severe	36.09% (48)
Severity of mood disturbance due to RLS symptoms	
None	40.60% (54)
Mild	14.29% (19)
Moderate	13.53% (18)
Severe	12.03% (16)
Very severe	19.55% (26)

of 1.22 in migraine patients for developing RLS. Our study, in accordance with previous studies, showed an increased risk of RLS in individuals with HTN.[28] Similarly, a study from Iran noted 26% prevalence of RLS in diabetic patients.[29] As lifestyle diseases like DM and HTN are rising, it raises the need for early identification of RLS and its treatment. Diagnosis of RLS is mainly interview-based; thus, screening of these unexplained symptoms by the primary care physicians at first contact may play an important role in its early detection.[30] Multiple case reports and studies with a limited number of patients have shown an association with other neurological disorders like Parkinson's disease, CIDP, GBS, and MG; thus, it is recommended to screen for RLS in all these conditions.[30-33]

A significant impact of RLS severity on sleep and QOL of individuals with RLS has been observed in our study. 44.36% (59) of patients had very severe RLS symptoms. 36.09% (48) reported a very severe impact on their daily affairs with very severe mood disturbances in 19.55% (26). Kushida *et al.*[34] shown decreased alertness and emotional disturbances due sleep disturbances. 56.39% (75) of patients reported excessive daytime sleepiness (EDS) signifying a major impact on daytime functioning. A meta-analysis of 26 studies by Stephany Fulda *et al.*[35] has shown that almost 25% of RLS patients are at increased risk of daytime sleepiness. In their study, 29.6% had an ESS score >10 with an average of 8.4 ± 4.8.[35] Thus, RLS can lead to either insomnia or EDS; insomnia is a frequent complaint, but EDS is often confused with fatigue and ignored.

78.20% (104) of patients were poor sleepers with a mean PSQI score of 9.26 ± 5.32. Sleep latency was affected most, with 65.41% (87) of patients reporting scores of 5–6 with a reduction in sleep duration to <5 hours in 17.29% (23). Studies have shown that there is nonrefreshing sleep with difficulty in initiating and maintaining sleep.[17] Joseph *et al.*[36] assessed the relationship of RLS with sleep and reported a PSQI score of 5.0 ± 3.1. Prolonged sleep latency ($P = 0.001$) and sleep disturbances ($P = 0.01$) were significantly higher among participants newly diagnosed with RLS ($n = 19$) compared to those without RLS ($n = 178$) in their study.[36]

Overall QOL was affected, impacting physical, mental, and social functioning with an overall impact on general health.

Table 4: Descriptive statistics of sleep (daytime and nocturnal sleep) and quality of life of RLS patients (*n*=133)	
Sleep Variables	Mean±SD or number (%)
Epworth sleepiness scale (mean score)	10.18±5.26
No daytime sleepiness (0-7)	28.57% (38)
Average daytime sleepiness (8-9)	15.04% (20)
Excessive daytime sleepiness (10-24)	56.39% (75)
Global PSQI (mean score)	9.26±5.32
Good sleepers	21.8% (29)
Poor sleepers	78.2% (104)
Components of Global PSQI	
Subjective sleep quality	
Very good	3.01% (4)
Fairly good	35.34% (47)
Fairly bad	27.07% (36)
Very bad	34.59% (46)
Sleep latency	
0	1.5% (2)
1-2 score	20.3% (27)
3-4 score	12.78% (17)
5-6 score	65.41% (87)
Sleep duration	
>7 hours	13.53% (18)
6 to7 hours	40.60% (54)
5 to 6 hours	28.57% (38)
<5 hours	17.29% (23)
Habitual sleep efficiency	
>85%	37.59% (50)
75% to 84%	24.81% (33)
65% to 74%	9.77% (13)
<65%	27.82% (37)
Sleep disturbances	
0 (Score-0)	27.07% (36)
1 to 9 (Score-1)	64.66% (86)
10 to 18 (Score-2)	8.27% (11)
19-27 (Score-3)	0% (0)
Use of sleeping medications	
Not during the past month	69.17% (92)
Less than once a week	4.51% (6)
Once or twice a week	10.53% (14)
Three or more times a week	15.79% (21)
Daytime dysfunction	
0 (Score-0)	66.92% (89)
1 to 2 (Score-1)	12.03% (16)
3 to 4 (Score-2)	15.79% (21)
5 to 6 (Score-3)	5.26% (7)

Abetz *et al.*[37] compared QOL of RLS patients with the general population and found significant deficits in physical functioning, bodily pain, role functioning, mental health, general health, and vitality on SF 36 scale. RLS individuals had significantly lower scores (worse QOL) on all 8 scales of SF-36 compared to patients with hypertension ($P < 0.01$), 7 of 8 scales compared with diabetes patients, 4 of 8 scales compared with osteoarthritis patients and on 6 of 8 scales compared to patients with other cardiovascular conditions (ie,

Table 5: Effect of RLS on Quality of life of patients according to restless legs syndrome quality of life questionnaire

Restless legs syndrome quality of life	Mean±SD or number (%)
RLS Quality of life score (mean score)	35.23±10.3
Amount of distressment reported by patients due to restless legs	10.18±5.26
A lot	51.88% (69)
Quite a bit	12.03% (16)
Some	21.80% (29)
A little	14.29% (19)
Frequency of disruption in routine evening activities in the past 4 weeks due to restless legs	
All the time	11.28% (15)
Most of the time	21.05% (28)
Sometimes	22.56% (30)
A few times	24.81% (33)
Never	20.30% (27)
Frequency of keeping from attending evening social activities in the past 4 weeks due to restless legs	
All the time	3.76% (5)
Most of the time	18.80% (25)
Sometimes	20.30% (27)
A few times	19.55% (26)
Never	37.59% (50)
Amount of trouble in getting up in the morning due to restless legs in the past 4 weeks	
A lot	14.29% (19)
Quite a bit	24.06% (32)
Some	13.53% (18)
A little	8.27% (11)
None	39.85% (53)
Frequency of getting late due to restless legs in the past 4 weeks	
All the time	13.53% (18)
Most of the time	18.05% (24)
Sometimes	18.80% (25)
A few times	10.53% (14)
Never	39.10% (52)
Frequency of getting troubled in concentrating in the afternoon in the past 4 weeks	
All the time	7.52% (10)
Most of the time	12.78% (17)
Sometimes	13.53% (18)
A few times	29.32% (39)
Never	36.84% (49)
Frequency of getting troubled in concentrating in the evening in the past 4 weeks	
All the time	2.26% (3)
Most of the time	11.28% (15)
Sometimes	18.05% (24)
A few times	25.56% (34)
Never	42.86% (57)
Amount of ability to make good decisions affected by sleep problems in the past 4 weeks	
A lot	2.26% (3)
Quite a bit	1.50% (2)
Some	5.26% (7)
A little	12.03% (16)
None	78.95% (105)
Frequency of avoiding traveling for trip of more than 2 hours in the past 4 weeks	
All the time	3.76% (5)
Most of the time	3.76% (5)
Sometimes	29.32% (39)
A few times	13.53% (18)
Never	49.62% (66)

Contd...

Table 5: Contd...	
Restless legs syndrome quality of life	Mean±SD or number (%)
Amount of interest in sexual activity in the past 4 weeks	
Yes	27.82% (37)
No	72.18% (96)
Amount of reduction and disturbance in sexual activity due to restless legs	
Answer	27.82% (37)
No answer	72.18% (96)
Amount of disturbance to carry out daily activity due to restless legs	
A lot	20.30% (27)
Quite a bit	10.53% (14)
Some	20.30% (27)
A little	22.56% (30)
None	26.32% (35)
Currently working as full or part time	
No	77.44% (103)
Yes	22.55% (30)
Frequency of feeling difficulty to work a full day in the past 4 weeks due to restless legs (*n*=30)	
All the time	23.33% (7)
Most of the time	20.00% (6)
Sometimes	13.33% (4)
A few times	6.67% (2)
Never	36.67% (11)
Number of days got late due to restless legs in the past 4 weeks	3.07±2.85
Number of days worked less than the desire in the past 4 weeks due to restless legs	3.81±3.09
Number of hours worked in the past 4 weeks	6.82±2.36
Number of hours worked less than wanted in the past 4 weeks due to restless legs	2.05±1.57

congestive heart failure, myocardial infarction within the past year, and angina).[37] In our study also, QOL was poor with a score of 35.23 ± 10.3 (overall QOL summary score) on RLSQOL. It deteriorated with increasing severity of RLS as evident with the significantly negative association of RLSQOL with severity [Table 2].

The present study included a large patient group with varied comorbidities and explored the impact of RLS severity on sleep quality as well as QOL. However, it too is not without limitations, as it was a cross-sectional study, the causal association of RLS with other comorbidities could not be ascertained. However, enrolment of a large patient group helped in exploration of varied presentations and severity of RLS. Furthermore, the impact on QOL, along with mood and sleep, was also measured in this study.

In spite of its high prevalence, RLS remains an underdiagnosed, misdiagnosed and undertreated clinical entity that has adverse effects on mental and physical health, functioning, and well-being, Thus, if awareness of RLS profile is increased, it would increase the rate of its clinical detection, which if treated adequately would enhance sleep as well as QOL of these patients. In future, population-based studies with follow-up could be conducted to ascertain the association of various comorbidities with RLS, which would further help in reducing the additional morbidity among the respective patient groups.

Conflicts of interest

There are no conflicts of interest.

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