Prevalence of Restless Legs Syndrome and Associated Factors in Nurses: A Multicenter Study in İstanbul (Türkiye)

Hemşirelerde Huzursuz Bacak Sendromu Prevalansı ve İlişkili Faktörler: İstanbul'da (Türkiye) Çok Merkezli Bir Çalışma

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ABSTRACT

Aim: Restless legs syndrome (RLS) primarily occurs in the evenings and is characterized by uncomfortable sensations such as numbness, tingling, burning, or pain that compel leg movement. This study aimed to determine the prevalence of RLS among hospital-based nurses and to explore its associations with health issues, symptoms, and quality of life.

Materials and Methods: This observational study included both retrospective and cross-sectional components and evaluated nurses aged 18-65 years working at two tertiary hospitals (University of Health Sciences Türkiye, Physical Medicine and Rehabilitation and University of Health Sciences Türkiye, Bakırköy Dr. Sadi Konuk Training and Research Hospital) between May 1, 2024, and February 1, 2025. A total of 488 participants were assessed, of whom 233 were diagnosed with RLS.

Results: RLS was diagnosed in 233 participants, with a prevalence of 47.7%. Patients in the severe group had a higher prevalence of doctor visits compared to other groups (p<0.003). Thyroid-stimulating hormone levels differed significantly according to disease severity (p-value). Older age at the onset was found to be a risk factor that decreases the severity of the disease. Lack of a family history of the disease was correlated with reduced disease severity. There was a difference between age at disease onset and having a chronic disease. Having a chronic disease increased the age at disease onset by 5.4 (confidence interval: 3.0-7.8) units. The age at the onset of the disease was older in patients who were non-alcohol users.

Conclusion: Certain factors, including age at disease onset, thyroid dysfunction, family history, and alcohol use, were found to influence the severity and onset of the disease. Patients in the severe group visit doctors more often than those in the mild or moderate groups. This may indicate that the severity of RLS leads to more frequent medical interventions or concerns.

Keywords: Chronic disease, nurses, prevalence, restless legs syndrome, thyroid-stimulating hormone, shift work

ÖZ

Amaç: Huzursuz bacak sendromu (RLS), genellikle akşam saatlerinde ortaya çıkan; uyuşma, karıncalanma, yanma veya ağrı gibi rahatsız edici hislerle karakterize, bireyi bacaklarını hareket ettirmeye zorlayan bir nörolojik hastalıktır. Bu çalışmanın amacı, hastanelerde görev yapan hemşirelerde RLS prevalansını belirlemek ve hastalığın sağlık sorunları, semptomlar ve yaşam kalitesiyle olan ilişkisini incelemektir.

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Gereç ve Yöntem: Bu gözlemsel çalışma hem retrospektif hem de kesitsel bileşenleri içermektedir. 1 Mayıs 2024-1 Şubat 2025 tarihleri arasında İstanbul'daki iki üçüncü basamak hastanede (Sağlık Bilimleri Üniversitesi, İstanbul Fizik Tedavi ve Rehabilitasyon Eğitim ve Araştırma Hastanesi ve Sağlık Bilimleri Üniversitesi, Bakırköy Dr. Sadi Konuk Eğitim ve Araştırma Hastanesi) çalışan 18-65 yaş arası hemşireler değerlendirilmiştir. Toplam 488 katılımcı incelenmiş olup, bunlardan 233'üne RLS tanısı konulmuştur.

Bulgular: Katılımcıların %47,7'sinde (n=233) RLS tespit edilmiştir. Şiddetli RLS grubundaki bireylerin diğer gruplara kıyasla daha sık doktora başvurduğu belirlenmiştir (p<0,003). Hastalık şiddeti ile tiroid uyarıcı hormon düzeyleri arasında istatistiksel olarak anlamlı bir fark bulunmuştur. Hastalık başlangıç yaşının artması, hastalık şiddetinde azalma ile ilişkili bulunmuştur. Aile öyküsünün olmaması, hastalık şiddetini azaltan bir diğer faktör olarak saptanmıştır. Kronik hastalığı olan bireylerde hastalık başlangıç yaşı ortalama 5,4 birim (güven aralığı: 3,0-7,8) daha ileri yaşta bulunmuştur. Ayrıca, alkol kullanmayan bireylerde hastalık başlangıç yaşının daha yüksek olduğu gözlenmiştir.

Sonuç: Hastalık şiddeti ve başlangıcı üzerinde etkili olan faktörler arasında hastalık başlangıç yaşı, tiroid fonksiyon bozukluğu, aile öyküsü ve alkol kullanımı yer almaktadır. Şiddetli RLS grubundaki bireylerin daha sık tıbbi yardım arayışında bulunmaları, hastalık şiddetinin artmasının sağlık hizmeti başvurularını artırabileceğini göstermektedir. Bulgular, hemşirelerde RLS'nin erken tanılanması ve risk faktörlerinin yönetimi açısından önemli bilgiler sunmaktadır.

Anahtar Kelimeler: Kronik hastalık, hemşire, prevalans, huzursuz bacak sendromu, tiroid stimülan hormon, vardiyalı çalışma düzeni

INTRODUCTION

Restless legs syndrome (RLS), also known as willis-ekbom disease, is a chronic, progressive movement disorder characterized by abnormal sensations that occur with the urge or need to move the legs[1-3]. Complaints are prominent in the evening hours and occur in resting or immobilized conditions, with partial or complete relief provided by walking and moving the legs[2-4]. The prevalence of RLS in nursing staff is around 25%, with the syndrome also linked to shift work disorder[5]. It has been reported to be twice as common in women as in men, and sleep disturbances are present in 60-90% of patients[6]. There is no specific test for the diagnosis of RLS, and the diagnosis is made according to the diagnostic criteria first established by the International RLS Study Group (IRLSSG) and last revised in 2014[7]. RLS is a very common and underdiagnosed disorder in the community. RLS is divided into two groups as primary and secondary. Primary RLS is an idiopathic condition without any symptomatic cause. Secondary RLS develops due to a cause such as chronic renal failure, diabetes mellitus, pregnancy, hypertension, anemia, polyneuropathy, Sjögren's syndrome, Parkinson's disease (PD), congestive heart failure, sleep apnea syndrome, rheumatoid arthritis, or multiple sclerosis[8]. Although the pathophysiology of RLS has been focused on dopaminergic system disorder and iron deficiency, the pathophysiology of the disease is not clearly clarified[9].

Healthcare workers work under severe stress factors (psychological and physiological violence) with long shift hours and are frequently on call. Studies have reported that shiftwork may be associated with various serious health problems[10]. RLS has been shown to decrease sleep quality and cause daytime sleepiness, insomnia, and daytime dysfunction[11]. Sleep apnea syndrome is frequently associated with RLS[12]. Lack of restorative sleep can lead to problems with concentration, mood, and overall cognitive functioning during the day.

RLS can be a significant health concern for health professionals who stand or walk for long periods of time, such as nurses. Prolonged standing, fast walking, and the need to be physically active can make the symptoms of RLS more pronounced. To understand whether RLS is an important health problem for nurses, to increase awareness among nurses about the symptoms and effects of this disorder, thus helping nurses to provide better support to patients and guide them correctly. It is aimed to contribute to improving the professional performance of nurses with RLS by providing effective treatment.

MATERIALS AND METHODS

The study was approved by the Ethics Committee of University of Health Sciences Türkiye, İstanbul Physical Medicine and Rehabilitation Training and Research Hospital (approval number: 2024/2024-14, date: 30.04.2024) and conducted according to the Declaration of Helsinki principles. Since the study was retrospective, informed consent was not obtained from the patients.

Study Design and Population

This observational study included both retrospective and cross-sectional components. All nurses aged 18-65 who worked at University of Health Sciences Türkiye, Physical Medicine and Rehabilitation or University of Health Sciences Türkiye, Bakırköy Dr. Sadi Konuk Training and Researc Hospital between 1 May 2024 and 1 February 2025 were evaluated. A total of 488 participants were assessed, of whom 233 were diagnosed with RLS.

Diagnosis of RLS was made according to the criteria of the International IRLSSG updated in 2014, and the RLS positive group was examined in this study[7]. Additionally, diagnosed patients were assessed with the severity scale questionnaires developed by the IRLSSG. Nurses who did not volunteer to participate in the study and who had diseases that increase the incidence of RLS (diabetes mellitus, chronic renal failure,

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chronic kidney and liver diseases), used sedative drugs, and pregnant women were not included in the study.

The classification of RLS severity in the current study was indeed based on the IRLSSG rating scale, which is a validated and widely used tool for assessing RLS severity. According to this scale, scores are categorized as follows: mild (1-10), moderate (11-20), severe (21-30), and very severe (31-40)[13].

All volunteers who participated in the study were interviewed face-to-face, explained about the questionnaire, and informed about the purpose and method of the study. The questionnaire was administered by the same person (neurological specialist) without taking the name of the participant. Demographic characteristics, clinical features, and laboratory findings obtained during outpatient clinic follow-up of all cases were evaluated.

Laboratory Parameters

All blood samples were collected from the antecubital vein between 08:00-11:30 in the morning after 8-12 hours of fasting. Samples for thyroid-stimulating hormone (TSH), T4, vitamin B12, and 25-OH vitamin D tests were taken in a biochemistry tube with gel separator from Vacusera (İzmir, Türkiye). Following clotting, serum was obtained by centrifugation at 4000xg for 10 minutes. Tests were routinely measured on Roche Modular Analytics cobas 8000 Immunoassay analyzer (Roche Diagnostics GmbH, Mannheim, Germany) within 4 hours after centrifugation. Haemograms were performed on whole blood samples with EDTA from Vacusera (İzmir, Türkiye) using the Focusing Flow-DC method on a Mindray BC-6200 (Shenzhen/China) automated haematology analyzer.

Statistical Analysis

IBM SPSS Statistics for Windows, version 26.0 (IBM Corp., Armonk, NY, USA) was used to analyze the data. The normality of the variables was evaluated using the Kolmogorov-Smirnov test, Q-Q plots, and histograms. Continuous variables are presented as mean $\pm$ standard deviation and median (25th-75th percentile). Categorical data were presented as frequency (percentage). The relationship between categorical variables was evaluated by the chi-squared test or Fisher's exact test. The Mann-Whitney U test was used for two independent group comparisons, and the Kruskal-Wallis test was used for more than two independent group comparisons. The relationship between continuous data was evaluated with Spearman's correlation test. Variables with a p-value below 0.25 in univariate analyses were evaluated by multivariate logistic regression analysis to determine the factors affecting the development and severity of the RLS and the age of disease onset. Variance inflation factor was used to examine the interaction of independent variables in the logistic regression model. The model excludes variables with high correlation. Outliers in the data were examined by showing cook's values. Hosmer-Lemeshow fit statistics were used to assess model fit. For all analyses, $p<0.05$ was considered significant.

RESULTS

In this study, 488 participants with a mean age of 31.1$\pm$8.0 years and 79.1% women were evaluated. RLS was diagnosed

Table 1. Comparison of demographic and clinical characteristics between study groups				
Characteristics	All participants	RLS (–) (n=255)	RLS (+) (n=233)	p-value
Age (years)	31.1$\pm$8.0	30.8$\pm$7.6	31.4$\pm$8.4	0.517
Sex Female Male	386 (79.1) 102 (20.9)	193 (75.7) 62 (24.3)	193 (82.8) 40 (17.2)	0.052
Smoking Yes No	164 (33.6) 324 (66.4)	84 (32.9) 171 (67.1)	80 (34.3) 153 (65.7)	0.745
Alcohol use Yes No	86 (17.6) 402 (82.4)	48 (18.8) 207 (81.2)	38 (16.3) 195 (83.7)	0.466
Chronic disease Yes No	93 (19.1) 395 (80.9)	43 (16.9) 212 (83.1)	50 (21.5) 183 (78.5)	0.197
Mann-Whitney U test, Pearson chi-square test, n (%), mean $\pm$ SD RLS: Restless legs syndrome, SD: Standard deviation				

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in 233 participants, with a prevalence of 47.7% in the study. While the mean age of RLS positive cases was 31.4±8.4 years, the mean age of RLS negative cases was 30.8±7.6 years. There was no statistically significant difference in the demographic characteristics of the cases (p>0.05). The comparison of the demographic characteristics of the evaluated cases is presented in Table 1.

Risk factors for the development of RLS were evaluated by multivariate regression analysis. Participants' demographic variables of sex and chronic disease were not found to be independent risk factors for RLS (p>0.05). There were 233 RLS cases evaluated in the study, with an age range of 20-64 years, with a mean age of 31.4±8.4 years. 193 (82.8%) of the cases were female. Age at onset of the disease median value was 25.0 (23-29). The comparison of the demographic characteristics of the evaluated cases is presented in Table 2.

RLS disease severity [median (n: 233; 25-75) percentil] was classified as mild in 31(13.3), moderate in 121(51.9), severe in 77 (33.0), and very severe in 4 (1.7).

The association between demographic and clinical characteristics of RLS patients and disease severity was analyzed (Table 3). Patients in the severe group had a higher frequency of doctor visits than the other groups. Post-hoc analyses showed that doctor control was different in moderate and severe groups (p<0.003). There was a statistical difference

between disease severity and TSH level (p=0.04). Post-hoc analysis showed that the mild group was different from the moderate and severe groups. Patients in the mild group had lower TSH levels compared to the other groups. There was no significant correlation between disease severity and other demographic and clinical parameters (p>0.05).

The factors related to the severity of the syndrome were evaluated. Older age at onset was found to be a risk factor that decreased the severity of the disease [odds ratio (OR): 1.047; 95% confidence interval (CI): 1.007-1.089, p=0.02]. The presence of a family history was a risk factor that increased the severity of the disease (OR: 1.808; 95% CI: 1.006-3.251, p=0.04). The severity of the disease was not influenced by either sex or the presence of a chronic disease (Table 4).

There was a significant difference between age at disease onset and having a chronic disease. Age at disease onset was older in patients with chronic disease compared to patients without chronic disease (respectively, 32.0±11.3; 26.5±6.4, p=0.005). Having a chronic disease increased the age at disease onset by 5.4 (95% CI: 2.986-7.819 p<0.001) units.

There was a significant difference between alcohol use and age at the onset of disease. The age at the onset of the disease was higher in patients who were non-alcohol users (respectively, 28.2±8.3; 25.3±6.2, p=0.046) (Table 5).

Table 2. Evaluation of clinical and demographic characteristics of Restless Legs Syndrome patients (n=233)	
Characteristics	n (%) median (25-75 percentile)
Sex	
Female	193 (82.8)
Male	40 (17.2)
Age (years)	28.0 (26-33)
Chronic disease (yes)	50 (21.5)
Smoking (yes)	80 (34.3)
Alcohol use (yes)	38 (16.3)
Family history (yes)	75 (32.2)
Doctor check-up (yes)	27 (11.6)
Treatment (yes)	2 (0.9)
Upper extremity involvement (yes)	2 (0.9)
Age at onset of the disease (years)	25.0 (23-29)
Hemoglobin (g/dL)	12.9 (11.9-14.0)
Ferritin (ng/mL)	32.2 (15.6-57.1)
TSH (μIU/mL)	1.7 (1.2-2.5)
T4 (ng/dL)	1.2 (1.1-1.4)
BUN (mg/dL)	22.0 (18.1-27.0)
Creatine (mg/dL)	0.7 (0.6-0.8)
B12 vitamin (pg/mL)	324 (256-402.5)
D vitamin (ng/mL)	19.4 (12.3-26.0)
TSH: Thyroid-stimulating hormone, T4: Thyroxine, BUN: Blood urea nitrogen	

Table 3. Comparison of demographic and clinical characteristics between RLS groups

Characteristics	Restless legs syndrome severity				
	Mild	Moderate	Severe	Very severe	p-value
Age (years)	27.0 (25-38)	28.0 (26-36)	28.0 (26-30)	37.5 (26.75-51.25)	0.459
Sex Female Male	27 (87.1) 4 (12.9)	98 (81.0) 23 (19.0)	65 (84.4) 12 (15.6)	3 (75.0) 1 (25.0)	0.704
Age at onset of the disease (years)	25.0 (24-35)	25.0 (23-30)	25 (23-28)	26.0 (20.75-38.0)	0.575
Family history Yes No	10 (32.3) 21 (67.7)	32 (26.4) 89 (73.6)	31 (40.3) 46 (59.7)	2 (50.0) 2 (50.0)	0.156
Doctor check-up Yes No	1 (3.2) 30 (96.8)	8 (6.6) 113 (93.4)	17 (22.1) 60 (77.9)	1 (25.0) 3 (75.0)	0.003
Treatment Yes No	0 (0.0) 31 (100.0)	0 (0.0) 121 (100.0)	2 (2.6) 75 (97.4)	0 (0.0) 4 (100.0)	0.246
Upper extremity involvement Yes No	0 (0.0) 30 (100.0)	0 (0.0) 120 (100.0)	2 (2.6) 75 (97.4)	0 (0.0) 4 (100.0)	0.246
Smoking Yes No	14 (45.2) 17 (54.8)	38 (31.4) 83 (68.6)	28 (36.4) 49 (63.6)	0 (0.0) 4 (100.0)	0.255
Alcohol use Yes No	6 (19.4) 25 (80.6)	18 (14.9) 103 (85.1)	14 (18.2) 63 (81.8)	0 (0.0) 4 (100.0)	0.829
Chronic disease Yes No	9 (29.0) 22 (71.0)	21 (17.4) 100 (82.6)	18 (23.4) 59 (76.6)	2 (50.0) 2 (50.0)	0.167
Hemoglobin (g/dL)	12.7 (11.5-14.2)	13.0 (12.2-13.9)	12.5 (11.7-14.0)	13.2 (12.9-15.1)	0.433
Ferritin (ng/mL)	31.1 (14.5-57.7)	38.4 (18.4-58.5)	25.6 (13.6-59.5)	26.6 (18.8-180.3)	0.252
TSH (µIU/mL)	1.3 (1.1-1.6)	1.9 (1.2-2.7)	1.8 (1.2-2.3)	1.5 (1.1-1.6)	0.04
T4 (ng/dL)	1.2 (1.1-1.3)	1.2 (1.1-1.3)	1.2 (1.1-1.4)	1.1 (0.5-1.3)	0.734
BUN (mg/dL)	24.1 (20-28)	21.7 (17.9-26.0)	22.2 (18.2-27.7)	27.3 (15.7-40.2)	0.340
Creatine (mg/dL)	0.7 (0.6-0.8)	0.7 (0.6-0.8)	0.7 (0.6-0.8)	0.7 (0.7-1.0)	0.803
B12 vitamin (pg/mL)	331 (256-417)	298 (234-386.5)	334 (279-418)	320 (223.2-482.0)	0.246
D vitamin (ng/mL)	18.4 (13.9-24.0)	19.8 (13.2-26.0)	19.7 (10.8-26.4)	23.5 (13.3-41.1)	0.721

Fisher's exact test, Kruskal-Wallis test, n (%), median (25.-75. percentil)

RLS: Restless legs syndrome, TSH: Thyroid-stimulating hormone, T4: Thyroxine, BUN: Blood urea nitrogen

DISCUSSION

The pathophysiology of RLS is not yet fully understood; however, a localized decrease in dopamine levels within the central nervous system is considered to play a major role by triggering a hyperadrenergic state. In the current study, RLS was diagnosed in 233 participants, with a prevalence of 47.7%. Older age at the time of disease onset was associated with a reduction in disease severity, while the presence of a family history of RLS appeared to reduce the severity as well. Furthermore, alcohol consumption and the presence of chronic diseases influenced the age of disease onset, with non-alcohol users and those with chronic conditions experiencing the disease onset at older ages. TSH levels were significantly different across the severity groups, suggesting that thyroid functions may play a role in the development or progression

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Table 4. The factors related to the severity of the syndrome

Characteristics	Multivariate analysis–enter method		Multivariate analysis– forward: LR method	
	OR (95% CI)	p–value	OR (95% CI)	p–value
Age at onset of the disease	1.047 (1.007-1.089)	0.02	1.041 (1.002-1.081)	**0.03**
Family history (ref: yes)	1.808 (1.006-3.251)	0.04	1.909 (1.071-3.403)	**0.02**
Sex (ref: female)	1.103 (0.523-2.328)	0.796	-	-
Chronic disease (ref: yes)	0.668 (0.333-1.341)	0.256	-	-

Forward LR and enter methods were used for logistic regression analysis.

Enter model: Hosmer Lemeshow test p= 0.978, Cox & Snell R^2= 0.043, Nagelkerke R^2= 0.059, –2 Log Likelihood= 290.756

Forward LR model: Hosmer Lemeshow test p= 0.708, Cox & Snell R^2= 0.037 Nagelkerke R^2= 0.051 –2 Log Likelihood= 292.163

OR: Odds ratio, CI: Confidence interval, LR: Likelihood ratio

Table 5. Factors related to the age of disease onset

Characteristics	Unstandardized coefficients B	Std. error	Standardized coefficients beta	t	p–value	95% CI
Alcohol use	2.864	1.363	0.132	2.101	0.037	0.179-5.549
Chronic disease	5.402	1.226	0.276	4.405	0.000	2.986-7.819

CI: Confidence interval, Std: Standard

of RLS. The study emphasizes the significance of considering demographic, lifestyle, and clinical factors in understanding the progression and severity of the disease, which can inform future treatment and management strategies for RLS patients.

The prevalence of RLS in nursing staff is approximately 25%[5]. In the current study, RLS was diagnosed in 233 participants, with a prevalence of 47.7%. The results of our study showed that nearly half of the subjects had RLS (+), of which one-third had severe and higher-grade RLS. The results of a study targeting to investigate the effects of the circulating shift schedule, chronotype, and RLS on sleep quality of female nurses and midwives in Japan showed that the prevalence of RLS and restless foot movement was 2.5% and 15.5%, respectively[14]. In another study, it can be concluded that RLS plays a significant role in contributing to fatigue in critical care nurses. However, it's important to note that previous studies have suggested fatigue can also be a contributing factor to the development of RLS. The relationship between these two conditions may vary depending on the individual case, with different causes and effects in each situation[15]. In a study conducted by Waage et al.[16] in Norway for the same purpose, the prevalence of RLS in nurses was 12.4% and the general prevalence was 26.8%, which was higher than the values obtained in the other study. The fact that health policies exhibit differences in determining the nurse-to-patient ratio when countries are compared may be one of the reasons for negative outcomes, such as work stress, burnout syndrome, and RLS. This suggests that improving staffing conditions and addressing these policy differences could help reduce the prevalence of RLS and related issues in nursing professionals.

Patients in the severe group had a higher frequency of doctor visits than the other groups. The findings suggest that patients in the severe group tend to visit doctors more frequently compared to those in the mild or moderate groups. This may indicate that the severity of the disease leads to more frequent medical interventions or concerns. The post-hoc analysis revealed a significant difference in doctor visits between the moderate and severe groups, which reinforces the idea that the severity of symptoms directly impacts healthcare utilization. Allen et al.[17] investigated the medical treatment received by participants in their study of RLS patients 3 months before their inclusion in the study. During these 3 months, 57.6% of participants with primary RLS had at least 1 visit to a primary care/general practitioner, with 36.4% of the visits reporting RLS-related visits. In contrast, 64.1% of RLS patients had at least 1 primary care/general practitioner visit, with 44% of these visits related to RLS. Additionally, 29.8% of participants with primary RLS had specialist visits (31.2% related to RLS), compared to 36.6% of RLS patients (37.5% related to RLS). Both medication and healthcare resource use costs related to RLS were significantly associated with symptom severity[17].

In the secondary form of RLS, the most common of which are symptoms, various clinical conditions may accompany it, such as iron deficiency, pregnancy, end-stage renal disease (uremia), thyroid dysfunction, Parkinsonism, depression, rheumatoid arthritis, fibromyalgia, diabetes mellitus, and multiple sclerosis[6,18-25]. In the current study, the statistically significant difference between disease severity and TSH levels indicates a potential link between thyroid function and RLS severity. However, no patients with hypothyroidism were found in the two groups. Lower TSH levels may be associated with more severe symptoms, or thyroid

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dysfunction could be a contributing factor to the intensity of RLS. The post-hoc analysis further indicated that the mild group differed from both the moderate and severe groups, which suggests that TSH levels may play a role in differentiating the severity of RLS. Ahmed et al.[26] reported a higher prevalence of hypothyroidism in RLS patients compared to healthy controls in a case-control study they conducted on RLS patients. In contrast, Tan et al.[27] found no significant difference in the prevalence of RLS between patients with thyroid disorders and normal individuals. In another study, when RLS (+) patients were compared with RLS (-), serum TSH levels and subclinical hypothyroidism prevalence were found to be significantly higher in RLS (+) patients[28]. The higher serum TSH levels and subclinical hypothyroidism prevalence in RLS patients suggest that the imbalance between thyroid hormones and the dopaminergic system may contribute to the development of primary RLS. Overall, these findings underscore the need to consider thyroid function as part of the broader clinical evaluation of RLS, as it may help better understand the factors influencing disease severity and inform treatment strategies. Parathormone (PTH), rather than calcium, phosphate, or even vitamin D itself, appears to be linked to the presence of RLS symptoms in PD, with this association not being significantly affected by the patient's motor symptoms. Vitamin D may potentially alleviate leg restlessness, suggesting possible future insights into the pathophysiology and treatment of RLS in PD patients. PTH is believed to play a potential role in modulating pain perception, and prior studies on hyperparathyroidism have indicated a possible link between elevated PTH levels and the development or exacerbation of RLS symptoms[29]. Since thyroid dysfunction is clinically easier to detect as well as treat, it should be taken seriously, given that it may be a potentially modifiable risk factor for RLS[28].

The factors related to the severity of the syndrome were also evaluated in the present study. Older age at the onset was found to be a risk factor that decreases the severity of the disease. The absence of a family history of the disease was a risk factor that decreased the severity of the disease. Sex and having a chronic disease were not independent risk factors for the severity of the disease. There was a difference between age at disease onset and having a chronic disease. Age at disease onset was older in patients with chronic disease compared to patients without chronic disease. Having a chronic disease increased the age at disease onset by 5.4 units. There was a significant difference between alcohol use and age at the onset of disease. The age at the onset of the disease was older in patients who were non-alcohol users. Geng et al.[28] found no significant differences in age, gender, body mass index, smoking, or alcohol consumption between the RLS group and the healthy group. The age of onset of the secondary form is late, and its progression is rapid[30-32]. RLS occurs in 22% of patients detoxifying from alcohol. RLS is more severe in opioid detoxification compared to alcohol detoxification[3,33].

Study Limitations

This study has several limitations. First, the retrospective and questionnaire-based design relied on existing records and participant recall, which may introduce information and recall bias, potentially affecting the accuracy of reported symptoms and exposures. Second, the study was conducted in only two tertiary hospitals in İstanbul, and participation was voluntary, which may introduce selection bias and limit the generalizability of the findings to other regions or healthcare settings. Third, despite using multivariable analyses, residual confounding from unmeasured factors such as iron levels, work stress, or lifestyle variables cannot be excluded. Finally, as an observational study, only associations rather than causal relationships can be inferred.

CONCLUSION

RLS is a neurological sensory-motor disorder that should not be overlooked in clinical evaluation. Certain factors, including age at disease onset, thyroid dysfunction, family history, and alcohol use, were found to influence the severity and onset of the disease. The findings suggest that patients in the severe group tend to visit doctors more frequently compared to those in the mild or moderate groups. This may indicate that the severity of the disease leads to more frequent medical interventions or concerns. In patients with a prediagnosis of RLS, thyroid function parameters should be evaluated to determine whether hypo-/or hyperthyroid. More attention is needed to RLS in those with impaired thyroid function to prevent or treat this syndrome. In thyroid gland diseases, dopamine levels will become imbalanced and may trigger RLS. These tests are low-cost, widely available and promising parameters that can be performed in all health institutions, including primary care.

Ethics

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Footnotes

Author Contributions

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REFERENCES

1. Nanayakkara B, Di Michiel J, Yee BJ. Restless legs syndrome. Aust J Gen Pract. 2023;52:615-21.

2. Chenini S, Barateau L, Dauvilliers Y. Restless legs syndrome: from clinic to personalized medicine. Rev Neurol (Paris). 2023;179:703-14.

3. Winkelman JW, Berkowski JA, DelRosso LM, Koo BB, Scharf MT, Sharon D, et al. Treatment of restless legs syndrome and periodic limb movement disorder: an American Academy of Sleep Medicine clinical practice guideline. J Clin Sleep Med. 2025;21:137-52.

4. Talaia AM, Elnahhas A, Talaia NM, Abdelaal A. Prevalence of restless legs syndrome in adults with epilepsy: a systematic review and meta-analysis of observational studies. Sleep Med. 2024;119:258-66.

5. Kristoffersen ES, Pallesen S, Waage S, Bjorvatn B. The long-term effect of work schedule, shift work disorder, insomnia and restless legs syndrome on headache among nurses: a prospective longitudinal cohort study. Cephalalgia. 2024;44:3331024231226323.

6. Khachatryan SG, Ghahramanyan L, Tavadyan Z, Yeghiazaryan N, Attarian HP. Sleep-related movement disorders in a population of patients with epilepsy: prevalence and impact of restless legs syndrome and sleep bruxism. J Clin Sleep Med. 2020;16:409-14.

7. Allen RP, Picchietti DL, Garcia-Borreguero D, Ondo WG, Walters AS, Winkelman JW, et al. Restless legs syndrome/Willis-Ekbom disease diagnostic criteria: updated International Restless Legs Syndrome Study Group (IRLSSG) consensus criteria--history, rationale, description, and significance. Sleep Med. 2014;15:860-73.

8. Vlasie A, Trifu SC, Lupuleac C, Kohn B, Cristea MB. Restless legs syndrome: an overview of pathophysiology, comorbidities and therapeutic approaches (Review). Exp Ther Med. 2022;23:185.

9. Antelmi E, Mogavero MP, Lanza G, Cartella SM, Ferini-Strambi L, Plazzi G, et al. Sensory aspects of restless legs syndrome: clinical, neurophysiological and neuroimaging prospectives. Sleep Med Rev. 2024;76:101949.

10. Massey TH, Robertson NP. Restless legs syndrome: causes and consequences. J Neurol. 2020;267:575-7.

11. Yaseen M, Jarullah FA, Yaqoob S, Shakeel HA, Maqsood H, Naveed S. Association of quality of life, anxiety, and depression with restless leg syndrome in the hemodialysis patients. BMC Res Notes. 2021;14:284.

12. Pistorius F, Geisler P, Wetter TC, Crönlein T. Sleep apnea syndrome comorbid with and without restless legs syndrome: differences in insomnia specific symptoms. Sleep Breath. 2020;24:1167-72.

13. Sharon D, Allen RP, Martinez-Martin P, Walters AS, Ferini Strambi L, Högl B, et al. Validation of the self-administered version of the international restless legs syndrome study group severity rating scale - The sIRLS. Sleep Med. 2019;54:94-100.

14. Uekata S, Kato C, Nagaura Y, Eto H, Kondo H. The impact of rotating work schedules, chronotype, and restless legs syndrome/willis-ekbom disease on sleep quality among female hospital nurses and midwives: a cross-sectional survey. Int J Nurs Stud. 2019;95:103-12.

15. Ameri M, Mirhosseini S, Basirinezhad MH, Ebrahimi H. Prevalence of restless legs syndrome and its relationship with fatigue in critical care nurses. Indian J Crit Care Med. 2021;25:1275-9.

16. Waage S, Pallesen S, Moen BE, Bjorvatn B. Restless legs syndrome/willis-ekbom disease is prevalent in working nurses, but seems not to be associated with shift work schedules. Front Neurol. 2018;9:21.

17. Allen RP, Bharmal M, Calloway M. Prevalence and disease burden of primary restless legs syndrome: results of a general population survey in the United States. Mov Disord. 2011;26:114-20.

18. Mendes A, Silva V. Possible etiologies of restless legs syndrome in pregnancy: a narrative review. Sleep Sci. 2022;15:471-9.

19. Earley CJ, Jones BC, Ferré S. Brain-iron deficiency models of restless legs syndrome. Exp Neurol. 2022;356:114158.

20. Minar M, Kosutzka Z, Danterova K, Gmitterova K, Straka I, Kusnirova A, et al. Restless legs syndrome in Parkinson's disease: relationship with quality of life and medication. Bratisl Lek Listy. 2022;123:55-60.

21. An T, Sun H, Yuan L, Wu X, Lu B. Associations of anxiety and depression with restless leg syndrome: a systematic review and meta-analysis. Front Neurol. 2024;15:1366839.

22. Gemignani F. Irritable bowel syndrome, restless legs syndrome, small fiber neuropathy, and fibromyalgia. Sleep Med. 2021;83:4.

23. Padhan P, Maikap D, Pathak M. Restless leg syndrome in rheumatic conditions: its prevalence and risk factors, a meta-analysis. Int J Rheum Dis. 2023;26:1111-9.

24. Demir S, Kucuk A, Altas M, Cure E. Restless leg syndrome and sleep disorders in patients with rheumatoid arthritis and its relation with anemia parameters. acta medica (Hradec Kralove). 2021;64:137-44.

25. Akın S, Bölük C, Türk Börü Ü, Taşdemir M, Gezer T, Şahbaz FG, et al. Restless legs syndrome in type 2 diabetes mellitus. Prim Care Diabetes. 2019;13:87-91.

26. Ahmed N, Kandil M, Elfil M, Jamal A, Koo BB. Hypothyroidism in restless legs syndrome. J Sleep Res. 2021;30:e13091.

27. Tan EK, Ho SC, Eng P, Loh LM, Koh L, Lum SY, et al. Restless legs symptoms in thyroid disorders. Parkinsonism Relat Disord. 2004;10:149-51.

28. Geng C, Yang Z, Kong X, Xu P, Zhang H. Association between thyroid function and disease severity in restless legs syndrome. Front Neurol. 2022;13:974229.

29. Marano M, Pozzilli V, Magliozzi A, Tabacco G, Naciu AM, Palermo A, et al. Leg restlessness and hyperparathyroidism in Parkinson's disease, a further clue to RLS pathogenesis? Front Neurol. 2023;14:1113913.

30. Manconi M, Garcia-Borreguero D, Schormair B, Videnovic A, Berger K, Ferri R, et al. Restless legs syndrome. Nat Rev Dis Primers. 2021;7:80.

31. Chenini S, Delaby C, Rassu AL, Barateau L, Vialaret J, Hirtz C, et al. Hepcidin and ferritin levels in restless legs syndrome: a case-control study. Sci Rep. 2020;10:11914.

32. Petramfar P, Jankovic J. Medication refractory restless legs syndrome: real-world experience. J Neurol Sci. 2024;463:123121.

33. Wipper B, Cooke MP, Winkelman JW. Prevalence of current restless legs syndrome symptoms among patients treated with buprenorphine/naloxone for opioid use disorder. Nat Sci Sleep. 2023;15:851-9.