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ORIGINAL RESEARCH

Restless Legs Syndrome in Psoriasis: A Multicenter Study on Its Prevalence, Severity, and Impact on Patients

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Purpose: Psoriasis is a chronic inflammatory skin disease often associated with multiple comorbidities, including restless leg syndrome (RLS). However, the prevalence and impact of RLS on quality of life and clinical outcomes in patients with psoriasis remain underexplored, particularly in Asian populations. In this study, we compared the prevalence of RLS in patients with psoriasis and healthy controls and evaluated the association between RLS and quality of life, sleep disturbances, and clinical severity of psoriasis.

Patients and Methods: This multicenter, cross-sectional study involved 212 participants (106 patients with psoriasis and 106 healthy controls) and was conducted from March to July 2024 at three major hospitals in Ho Chi Minh City, Vietnam. RLS was diagnosed according to the International Restless Leg Syndrome Study Group (IRLSSG) criteria. The RLS severity, sleep quality, quality of life, and psoriasis severity were assessed using the Restless Legs Syndrome Rating Scale, Pittsburgh Sleep Quality Index, Dermatology Life Quality Index, and Psoriasis Area and Severity Index (PASI), respectively.

Results: The prevalence of RLS was significantly higher in patients with psoriasis than in healthy controls. Patients with psoriasis and RLS exhibited significantly poorer sleep quality and a greater impact on quality of life than those without RLS. The RLS group exhibited a higher PASI score, indicating more severe psoriasis. A strong positive correlation was observed between PASI and RLS severity.

Conclusion: RLS is significantly more prevalent in patients with psoriasis and is associated with worse sleep quality, greater impairment of quality of life, and increased psoriasis severity. Early screening for RLS in patients with psoriasis using the IRLSSG criteria may facilitate timely intervention and improve outcomes.

Keywords: psoriasis vulgaris, restless legs syndrome, restless legs syndrome study group, Pittsburgh Sleep Quality Index, Dermatology Life Quality Index

Introduction

Psoriasis is a common chronic disease characterized by systemic inflammation and skin proliferation, affecting multiple organ systems.[1] Recent studies have shown that psoriasis is associated with numerous comorbidities, including autoimmune and metabolic disorders, significantly impacting patients' quality of life.[2–12] A personalized and comprehensive approach is essential to optimize treatment and improve patient satisfaction. Therefore, identifying and managing comorbidities has become a cornerstone of psoriasis treatment.

Restless legs syndrome (RLS), a chronic sensorimotor disorder, is characterized by an irresistible urge to move the legs, primarily during rest and in the evening, leading to sleep disturbances.[13–16] A high prevalence of RLS has been reported in patients with certain chronic inflammatory autoimmune diseases,[17–21] including *celiac disease*[22,23] and *thyroid diseases*.[24,25] While RLS is associated with metabolic conditions, which are common comorbidities in psoriasis, it is increasingly recognized as a comorbidity of psoriasis itself, further underscoring the importance of comprehensive patient management.[26–29] Both psoriasis and RLS share common inflammatory pathways, with markers such as tumor

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necrosis factor-alpha (TNF-α) and interleukin-17 (IL-17) implicated in their pathogenesis. This shared mechanism may partly explain the observed co-occurrence of these conditions. RLS adversely affects the quality of life by causing sleep disorders, anxiety, and depression, further deteriorating the physical and mental health of the patient.[30–33]

Previous studies have investigated the association between psoriasis and RLS, shedding light on their potential interplay and clinical implications. Studies in Germany and Turkey have reported up to a 2.5-fold increase in RLS prevalence in patients with psoriasis than in healthy individuals, highlighting the need for targeted screening of patients with psoriasis.[34–37] Solak et al reported a correlation between RLS and psoriasis severity, with patients with psoriasis exhibiting higher International Restless Legs Syndrome Rating Scale (IRLSRS) scores than controls.[37] Patients with psoriasis and RLS have a poorer quality of life and sleep than those without, suggesting that the coexistence of RLS and psoriasis intensifies patient outcomes, necessitating early detection and management.[37]

RLS is diagnosed based on clinical criteria according to the International Restless Legs Syndrome Study Group (IRLSSG) standard, which is the most widely used and validated standard for quick and reliable screening.[13,38]

No previous studies in this field have been conducted in Vietnam. Therefore, understanding the impact of RLS on psoriasis in a local population, considering the potential differences in genetic and healthcare factors, is imperative. In this study, we primarily determined the prevalence of RLS in patients with psoriasis in Vietnam. Furthermore, we explored the correlation between RLS severity and patient-reported outcomes, including quality of life and sleep quality, in patients with psoriasis and RLS. This comprehensive approach will contribute to a better understanding of the burden of RLS in patients with psoriasis and may aid in the development of tailored screening and management strategies to improve overall patient outcomes.

Materials and Methods

Study Population

The case group consisted of patients with a confirmed diagnosis of psoriasis vulgaris based on clinical presentation and histopathological findings who were recruited from outpatient clinics and clinical departments at designated hospitals. The exclusion criteria were carefully developed to minimize confounding factors that could influence the assessment of RLS symptoms. Medications known to potentially induce or intensify RLS symptoms, such as psychotropic drugs, iron supplements, magnesium, L-thyroxine, and beta-blockers, were explicitly excluded. We rigorously screened for conditions mimicking RLS, referred to as "RLS mimics", following the IRLSSG diagnostic criteria.[13,38] These include myalgia, venous stasis, leg edema, arthritis, leg cramps, positional discomfort, and habitual foot tapping. Comprehensive clinical examinations and specialized assessments by experts were conducted to ensure diagnostic accuracy. For instance, patients with psoriasis and diabetes were subjected to detailed clinical evaluations and consultations with neurologists to rule out diabetic polyneuropathy, which could mimic or confound RLS symptoms. This approach ensured that diabetic polyneuropathy or other similar conditions did not interfere with the findings of this study.

The control group included healthy individuals without systemic diseases. All participants were aged ≥ 18 years and signed an informed consent form after confirming that they fully understood the benefits and risks of the study.

Following a physical examination confirming the diagnosis of psoriasis vulgaris by a qualified physician, each patient underwent a comprehensive medical history review, including general health, age, sex, disease course and duration, and family history. A clinical examination was performed. RLS was diagnosed according to the 2012 revised criteria established by the IRLSSG.[38]

Patients with symptoms that met the Classification Criteria for Psoriatic Arthritis were classified as having psoriatic arthritis.[39] The severity of skin disease was determined using the Psoriasis Area Severity Index (PASI).[40] The severity of RLS was assessed using the IRLSRS, which was validated by the International Restless Legs Syndrome Study Group in 2003.[13] This scale consists of ten questions, each scored by the patient from 0 to 4 points, with guidance and explanations provided by the interviewer. The total score ranges from 0 to 40, where a score of 1–10 indicates "mild" RLS, 11–20 indicates "moderate" RLS, 21–30 indicates "severe" RLS, and 31–40 indicates "very severe" RLS. The Pittsburgh Sleep Quality Index (PSQI), which is used to assess sleep quality, consists of 19 self-assessment questions that are grouped into seven component scores, each ranging from 0 to 3. The seven-component scores are summed to yield a global score

ranging from 0 to 21 points, with higher scores indicating poorer sleep quality. The Dermatology Life Quality Index (DLQI), which is used to assess quality of life, includes ten questions, each scored from 0 to 3 points; the total scores range from 0 to 30 points, with higher scores indicating a greater negative impact of the skin condition on the patient's quality of life.[41]

Statistical Analysis

All collected data were coded and analyzed using R software (version 3.6.3, Mac OS). Qualitative variables are expressed as frequencies and percentages (%). The Shapiro–Wilk test was used to assess the distribution of variables. This test is particularly suitable for small to moderate sample sizes and determines whether the data follow a normal distribution, which is crucial for selecting appropriate statistical analyses. Quantitative variables with a normal distribution are expressed as the mean and standard deviation, whereas those with a non-normal distribution are expressed as the median and interquartile range. The chi-square test was used to compare categorical data. For normally distributed quantitative data, the Student's *t*-test and one-way ANOVA were used for comparisons between two groups and between more than two groups, respectively. For non-normally distributed data, the Mann–Whitney U and Kruskal–Wallis tests were used for comparisons between two or more groups, respectively. Spearman's rank correlation was used to assess the relationships between the nonparametric quantitative variables. All statistical tests were two-sided, and p-values < 0.05 were considered statistically significant.

This study aimed to determine and compare the prevalence of RLS in two groups: patients with psoriasis and healthy individuals. With a 95% confidence interval ($\alpha = 0.05$), $Z_{1-\alpha/2} = 1.96$, $d = 0.09$, $P_1 = 18.6\%$, and $P_2 = 5.7\%$ (based on the prevalence rates reported by Berna Solak et al in 2023), the minimum sample size for each group was calculated using the formula for estimating the difference in proportions between two populations:

$$\frac{Z^2_{(1-\alpha/2)} * [P_1 * (1 - P_1) + P_2 * (1 - P_2)]}{d^2}$$

The minimum sample size required was 98 patients and 98 controls. This calculation ensured sufficient statistical power to detect significant differences in prevalence between the two groups.

Results

From March 18, 2024, to July 10, 2024, we recruited 212 participants, including 106 patients with psoriasis and 106 healthy individuals who met the inclusion criteria.

Patients with Psoriasis Exhibited a Significantly Higher Prevalence of RLS

The two groups were comparable in terms of age, sex, and body mass index (BMI) (Table 1). The mean ages of the individuals in the psoriasis and control groups were 45.86 ± 13.42 and 47.69 ± 12.02 years, respectively, with no statistically significant difference between the groups ($p = 0.297$). The proportions of male and female participants were

Table 1 Clinical Manifestations Among the Patients in the Study Groups

Characteristics	Patients with Psoriasis (n = 106)	Healthy Controls (n = 106)	p-value
Sex, n (%) Male Female	 57 (53.8) 49 (46.2)	 57 (53.8) 49 (46.2)	1.000 †
Age (years), mean (± standard deviation)	45.86 ± 13.42	47.69 ± 12.02	0.297 §
BMI (kg/m^2)	23.41 (21.23–25.51)	22.32 (20.61–23.66)	0.0007* §

(*Continued*)

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Table 1 (Continued).

Characteristics	Patients with Psoriasis (n = 106)	Healthy Controls (n = 106)	p-value
BMI Categories, n (%)			< 0.0001* ¶
Underweight	3 (2.83%)	6 (5.66%)	
Normal weight	42 (39.62%)	62 (58.49%)	
Overweight	32 (30.19%)	34 (32.08%)	
Obese	29 (27.36%)	4 (3.70%)	
PASI, median (interquartile range)	3.95 (1.5–10.5)		
With RLS, n (%)	14 (13.21%)	2 (1.89%)	0.002* †

Notes: Results are presented as the mean (± standard deviation) for normally distributed data and as the median (interquartile range) for non-normally distributed data. Differences between patients and controls were analyzed using †chi-square test, §*t*-test, and ¶Fisher's exact test. *Statistical significance ($p < 0.05$).
Abbreviations: BMI, Body mass index; PASI, Psoriasis Area Severity Index; RLS, Restless legs syndrome.

the same in both groups, with 57 males (53.8%) and 49 females (46.2%) in each group. There was a statistically significant difference in BMI subgroups when comparing patients with psoriasis and the control group, with $p<0.0001$. However, a notable difference was observed in RLS prevalence, with the psoriasis group exhibiting a significantly higher prevalence than the control group (13.21% vs 1.89%; $p = 0.002$). Overall, the two groups were well matched in terms of demographic characteristics, but the significantly higher RLS prevalence in the psoriasis group suggests a link between psoriasis and RLS, warranting further exploration of their shared pathophysiological mechanisms.

Clinical and Demographic Characteristics of Patients with Psoriasis with and without RLS

We compared 106 patients with psoriasis, among whom 14 (13.21%) were diagnosed with RLS and 92 (86.79%) were not (Table 2). The RLS group exhibited distinct demographic and clinical characteristics compared to the non-RLS group. The RLS group had a higher proportion of males (78.6%) than the non-RLS group (50%), suggesting a potential sex-related predisposition to RLS among patients with psoriasis ($p = 0.046$). Additionally, the individuals in the RLS group were significantly older, with a mean age of 53.07 ± 14.44 years, compared to 44.76 ± 12.99 years in the non-RLS group ($p = 0.030$). The median disease duration was shorter in patients with RLS (6.5 years) than in those without (10 years), although the difference was not statistically significant ($p = 0.069$). The two groups did not differ significantly in terms of BMI and its categorized values (underweight, normal weight, overweight, and obese) ($p > 0.05$).

Table 2 Demographic Characteristics and Clinical Observations in Patients with Psoriasis with or Without RLS

Characteristics	Patients with RLS (n = 14)	Patients Without RLS (n = 92)	P value
Sex, n (%)			
Male	11 (78.6%)	46 (50.0%)	0.046*†
Female	3 (21.4%)	46 (50.0%)	
Age (years), mean (± standard deviation)	53.07 ± 14.44	44.76 ± 12.99	0.030*§
Duration of disease, years, median (interquartile range)	6.5 (3–10)	10 (5–18)	0.069‡

(*Continued*)

Table 2 (Continued).

Characteristics	Patients with RLS (n = 14)	Patients Without RLS (n = 92)	P value
BMI (kg/m^2), mean (± standard deviation)	23.2 ± 2.2	23.4 ± 2.9	0.778[§]
BMI category, n (%)			0.755[¶]
Underweight	0 (0%)	3 (3.3%)	
Normal weight	5 (35.7%)	37 (40.2%)	
Overweight	6 (42.9%)	26 (28.3%)	
Obese	3 (21.4%)	26 (28.3%)	
Comorbidities			
Psoriatic arthritis, n (%)	4 (28.6%)	21 (22.8%)	0.736[¶]
Hypertension, n (%)	8 (57.1%)	24 (26.1%)	0.028[*] [¶]
Heart failure, n (%)	1 (7.1%)	4 (4.3%)	0.515[¶]
Coronary disease, n (%)	4 (28.6%)	7 (7.6%)	0.037[*¶]
Diabetes, n (%)	2 (14.3%)	14 (15.2%)	1.000[¶]
Chronic kidney disease, n (%)	1 (7.1%)	6 (6.5%)	1.000[¶]
Smoking, n (%)	6 (42.9%)	17 (18.5%)	0.074[†]
Smoking (pack-year), mean (± standard deviation)	26.67 ± 12.51	24.82 ± 14.61	0.67[§]
Alcohol consumption, n (%)	6 (42.9%)	25 (27.2%)	0.343[†]
PASI, mean (± standard deviation)	15.05 (3.9–16.8)	3.65 (1.2–7.9)	0.002[*] [‡]
PSQI, mean (± standard deviation)	13.5 (9–15)	4 (2.5–7)	<0.001[*] [‡]
PSQI severity category			<0.001[*] [¶]
None	2 (14.3%)	48 (52.2%)	
Minor	1 (7.1%)	30 (32.6%)	
Moderate	2 (14.3%)	12 (13.0%)	
Severe	9 (64.3%)	2 (2.2%)	
DLQI, median (interquartile range)	13 (9–14)	5 (2–10.5)	0.006[*] [‡]
DLQI category			0.026[*] [¶]
None	1 (7.1%)	22 (23.9%)	
Minor	2 (14.3%)	32 (34.8%)	
Moderate	2 (14.3%)	15 (16.3%)	
Severe	9 (64.3%)	19 (20.7%)	
Extremely severe	0 (0%)	4 (4.35%)	

Notes: Results are presented as the mean (± standard deviation) for normally distributed data and as the median (interquartile range) for non-normally distributed data. Differences between patients and controls were analyzed using [†]chi-square test. [‡]Mann–Whitney test. [§]*t*-test. and [¶]Fisher's exact test. *Statistical significance ($p < 0.05$).

Abbreviations: BMI, Body mass index; DLQI, Dermatology Life Quality Index; PASI, Psoriasis Area Severity Index; PSQI, The Pittsburgh Sleep Quality Index; RLS, Restless legs syndrome.

Hypertension and coronary artery disease were notably more common in the RLS group, affecting 57.1% and 28.6% of patients with RLS compared to 26.1% and 7.6% of patients in the non-RLS group ($p = 0.028$ and $p = 0.037$), respectively. No significant differences were observed for other comorbidities, including diabetes, heart failure, and chronic kidney disease, between the two groups. We analyzed smoking habits and alcohol consumption among patients with psoriasis with and without RLS. Specifically, we examined the percentage of smokers and cumulative exposure to smoking in pack-years. The percentage of smokers was 42.9% in the RLS group compared to 18.5% in the non-RLS

group, whereas the mean pack-years of cigarette smoking were 26.67 ± 12.51 and 24.82 ± 14.61, respectively. However, these differences did not reach statistical significance ($p = 0.074$ for smoking status and $p = 0.67$ for pack-years). Similarly, the proportion of patients reporting alcohol consumption was 42.9% in the RLS group and 27.2% in the non-RLS group; however, this difference was not statistically significant ($p = 0.343$). These results indicate that neither smoking nor alcohol consumption significantly differed between patients with and without RLS (Table 2).

Patients with psoriasis and RLS had significantly higher median PASI scores (15.05) than those without RLS (3.65), indicating more severe skin involvement ($p = 0.002$). The mean IRLSRS scores for the psoriatic group ($n = 14$) and control group ($n = 2$) were 9.5 ± 4.07 and 6 ± 2.83, respectively. Because of the limited number of patients with RLS in the control group, a meaningful statistical comparison of severity between the groups could not be performed. A strong positive correlation was observed between PASI and IRLSRS scores ($r = 0.66$, $p = 0.01$) (Figure 1).

Furthermore, sleep quality was markedly worse in the RLS group than in the non-RLS group (median score: 13.5 vs 4; $p < 0.001$). Specifically, 64.3% of patients experienced "severe" sleep disturbances in the RLS group compared to only 2.2% in the non-RLS group ($p < 0.001$). Similarly, the quality of life was more significantly impaired in patients with RLS, with a median DLQI score of 13, compared to only 5 in the non-RLS group ($p = 0.006$). Most patients with RLS (64.3%) reported a "severe" impact on their quality of life, whereas only 20.7% of the patients without RLS reported a similar impact ($p = 0.026$). These findings suggest that patients with psoriasis and RLS have more severe disease and experience greater disruptions in sleep and a substantially diminished quality of life compared to those without RLS.

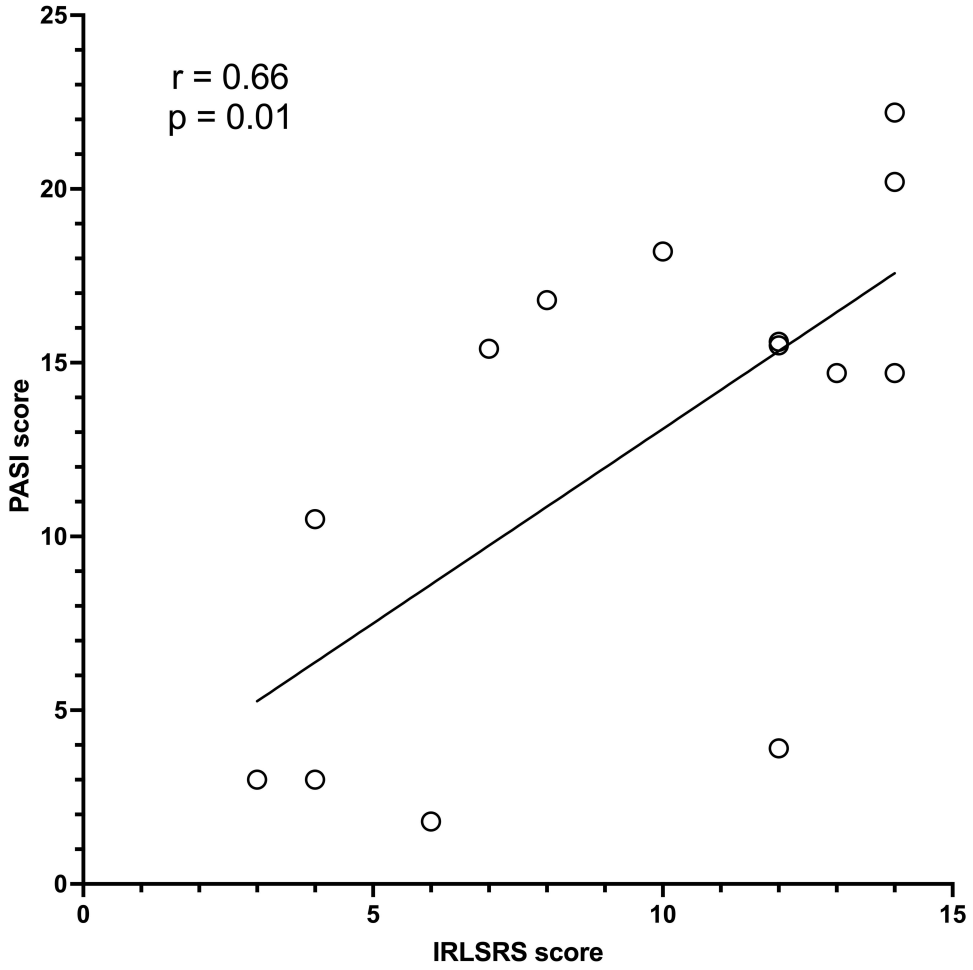

Figure 1 Correlation between PASI and IRLSRS. The PASI and IRLSRS scores were correlated ($r = 0.66$, $p = 0.01$). Statistical significance ($p < 0.05$).
Abbreviations: PASI, Psoriasis Area Severity Index; IRLSRS, International Restless Legs Syndrome Rating Scale.

Discussion

Frequency and Severity of RLS in Patients with Psoriasis

The prevalence of RLS in the healthy control group (1.89%) in this study is consistent with the previously reported prevalence of RLS in Asian populations, ranging from 1% to 7.5%.[42] The literature highlights a higher prevalence of RLS in European and North American populations (5.5–11.6%),[30,38,43–46] suggesting a notable regional difference compared to the lower rates observed in Asia.[42] In contrast, the prevalence of RLS in the psoriasis group was 13.21%, highlighting the first reported data on RLS prevalence in patients with psoriasis in Vietnam and potentially in a broader Asian context. This value is lower than the 18.6% prevalence reported by Solak et al[37] and 20% prevalence were reported by Sandikci et al in patients with psoriasis without psoriatic arthritis, which increased significantly to 64% in patients with concurrent psoriatic arthritis.[35] Other European studies have reported varied RLS prevalence rates in patients with psoriasis, including 40% (Sibel Guler et al, n = 70)[34] and 17% (Caroline Schell et al, n = 300).[36] Overall, these studies suggest that RLS is more common in European populations with psoriasis than in Asian cohorts, reflecting potential differences in genetic predisposition, environmental factors, and healthcare access between these regions.

In our study, the prevalence of RLS was significantly higher in patients with psoriasis than in healthy controls, which is consistent with previous research indicating an increased risk of RLS in patients with chronic inflammatory conditions, such as psoriasis vulgaris. The increased prevalence of RLS in patients with psoriasis may be attributed to overlapping pathophysiological mechanisms involving systemic inflammation and immune dysregulation. Chronic inflammation in psoriasis often extends beyond the skin, potentially affecting neurological pathways and increasing susceptibility to neuroinflammatory conditions such as RLS. Elevated levels of pro-inflammatory cytokines, such as TNF-α and interleukin-17, commonly observed in psoriasis, may disrupt normal neuronal function and contribute to RLS pathogenesis. This finding supports the hypothesis that systemic inflammation and immune dysregulation in psoriasis play a central role in the development of RLS, further complicating the disease burden, thus highlighting the need for comprehensive management strategies addressing dermatological and neurological aspects.

Demographic Characteristics and Clinical Observations of Patients with Psoriasis with or Without RLS

RLS Severity in Patients with Psoriasis

Various IRLSRS scores have been reported in different populations. Solak et al reported a significantly higher median IRLSRS score in patients with psoriasis (20) compared to healthy controls (9).[37] Similarly, Sandikci et al reported mean IRLSRS scores of 12.4 in patients with psoriasis without psoriatic arthritis, 13.5 in those with psoriatic arthritis, and 13.5 in healthy controls, with no statistically significant differences ($p > 0.05$).[35] Caroline Schell et al reported higher mean IRLSRS scores in patients with psoriasis (16.0 ± 9.2) compared to healthy controls (13.5 ± 7.1),[36] whereas Sibel Guler et al noted elevated scores in both patients with psoriasis (23.89 ± 6.86) and healthy controls (20.64 ± 7.16), although the differences were statistically non-significant in both studies.[34] The IRLSRS scores were higher in the psoriatic group, but the small sample size limited our ability to conduct robust analysis. Future studies with larger sample sizes are needed to obtain more conclusive results.

Overall, compared to the current study, previous European studies have consistently reported higher IRLSRS scores in both patients with psoriasis and healthy controls. This difference could be attributed to the generally lower prevalence of RLS in Asian populations, suggesting that Asian phenotypes are less susceptible to RLS than European phenotypes.

In our study, 7 of the 14 patients with psoriasis had mild RLS, and 7 had moderate RLS, whereas both patients with RLS in the healthy control group were classified as mild. This distribution is comparable to the findings of Sandikci et al and Schell et al[35,36] However, further analysis of RLS severity between the groups was limited because of the small number of patients with RLS in the control group.

The prevalence of RLS was significantly higher in patients with psoriasis than in healthy controls. Although the severity was greater in the psoriasis group, the small sample size of patients with RLS in the control group limited the statistical validation of this finding. Additionally, patients with psoriasis with RLS exhibited a higher prevalence of the

syndrome and more severe symptoms than healthy controls. Therefore, psoriasis may intensify RLS symptoms through mechanisms such as heightened psychological stress and sleep disturbances, which are often associated with severe psoriasis. Consequently, our study highlights the importance of early RLS screening in patients with psoriasis and tailored management strategies.

Age and Sex

Patients with psoriasis and RLS were significantly older than those without RLS. This finding is consistent with the established epidemiology of RLS, which is prevalent among older adults.[31] Additionally, the older age in the RLS group could be attributed to the increased prevalence of comorbidities, such as metabolic disorders, which tend to accumulate with age and have been associated with the development of RLS.

Regarding distribution based on sex, the RLS group had a significantly higher proportion of males than the non-RLS group, indicating a potential sex-related predisposition for RLS in patients with psoriasis. This finding contrasts with the findings of previous studies that did not find significant sex-based differences between patients with psoriasis with and without RLS.[36,37] The higher RLS prevalence in male patients with psoriasis may be attributed to the complex interplay between disease severity, inflammatory comorbidities, and lifestyle factors. Although this sex-specific pattern may not apply universally, it highlights the need for more nuanced research to understand RLS in different clinical contexts.

BMI

The mean BMI did not significantly differ between the two groups. The lack of significant difference suggests that BMI alone may not strongly predict RLS in patients with psoriasis. However, the proportion of overweight and obese patients was higher in the RLS group (64.16%) than in the non-RLS group (56.52%). These results align with previous findings by Solak et al, wherein patients with psoriasis with RLS had a higher median BMI than those without RLS.[37] Although obesity and overweight are recognized risk factors for RLS, this association may be further influenced by other factors, such as systemic inflammation and metabolic dysregulation, requiring further investigation in larger studies.

PASI Score

The severity of psoriasis was significantly higher in the RLS group, indicating that extensive and severe skin involvement may be a risk factor for the development of RLS in patients with psoriasis. Similar findings were reported by Solak et al, who reported a higher PASI score in patients with psoriasis and RLS than in those without RLS.[37] The strong positive correlation between PASI and IRLSRS scores in our study further supports the hypothesis that severe psoriasis exacerbates RLS symptoms, likely due to heightened systemic inflammation and neuroinflammatory processes. These results highlight the need for close monitoring and early intervention to prevent or alleviate RLS in patients with severe psoriasis.

Psoriatic Arthritis and Other Comorbidities

The prevalence of psoriatic arthritis was higher in the RLS group than in the non-RLS group; however, the difference was not statistically significant. This is in contrast with the findings of Sandikci et al, who reported a significantly higher prevalence of RLS in patients with psoriatic arthritis than those without.[35] This discrepancy may be due to differences in sample size and study populations. Although psoriatic arthritis is associated with more severe systemic inflammation, our findings suggest that RLS in psoriasis may be influenced more by the overall severity of the disease than by the presence of joint involvement.

In terms of other comorbidities, hypertension and coronary artery disease were significantly more prevalent in patients with psoriasis with RLS than in the non-RLS group. However, no significant differences were observed in the prevalence of diabetes, chronic kidney disease, or heart failure between the two groups. The higher prevalence of hypertension and coronary artery disease in the RLS group may indicate a shared pathophysiological mechanism involving endothelial dysfunction and systemic inflammation, further complicating disease management.

Smoking and Alcohol Consumption

The potential roles of tobacco smoking and alcohol consumption as cofactors in RLS development have been discussed in the literature, but the findings remain inconclusive.[47–49] Tobacco smoking, in particular, has been hypothesized to influence RLS through its effects on dopaminergic pathways and vascular health, both of which are implicated in the pathophysiology of RLS. In contrast, alcohol has been suggested to exacerbate RLS symptoms due to its impact on sleep architecture and neurotransmitter regulation. Our results showed no significant differences in smoking status, cumulative exposure (pack-years), or alcohol consumption percentage between the two groups. These findings suggest that neither smoking nor alcohol consumption alone was a major contributor to RLS in our cohort of patients with psoriasis. However, it is important to consider that psoriasis itself is associated with systemic inflammation and potential vascular dysfunction, which may act as shared mechanisms linking psoriasis and RLS. Future studies with larger sample sizes and more detailed assessments of smoking intensity, alcohol consumption patterns, and their interactions with other risk factors may help clarify these relationships.

Patient-Reported Outcomes

Sleep Quality

The PSQI scores indicated significantly poorer sleep quality in patients with psoriasis with RLS than in those without RLS. The higher median PSQI score of 13.5 (9–15) in the RLS group than the PSQI score of 4 (2.5–7) in the non-RLS group indicated severe sleep disturbances in patients with psoriasis with RLS, consistent with the findings of previous studies.[35,37]

In our study, the severity of sleep disturbances was further stratified into mild (PSQI 6–8), moderate (PSQI 9–11), and severe (PSQI > 11), with PSQI scores of ≤ 5 indicating no sleep disturbance. Among the 14 patients with psoriasis and RLS, 64.28% experienced severe sleep disturbance, whereas only 2.17% of the 92 patients with non-RLS psoriasis experienced severe sleep disturbance. Conversely, the proportion of patients without sleep disturbance was markedly higher in the non-RLS group (52.18%) than in the RLS group (14.29%). This statistically significant difference suggests that RLS in patients with psoriasis significantly intensifies sleep-related issues, resulting in a higher prevalence of severe sleep disorders.

We did not observe a significant correlation between the IRLSRS and PSQI scores ($r = 0.2936$, $p = 0.3082$), which is in contrast to the findings of Sandikci et al, who reported a moderate positive correlation between these scores ($r = 0.305$, $p = 0.001$).[35] This discrepancy may be due to the limited sample size of the RLS group in our study ($n = 14$), which reduced the statistical power to detect a true correlation. Additionally, in the current study, we focused solely on patients with psoriasis and RLS, whereas the study by Sandikci et al included a broader population, including patients with psoriatic arthritis and healthy controls.[35] These variations highlight the complexity of RLS in patients with psoriasis and the need for larger studies to clarify the interplay between RLS severity and sleep quality in this cohort.

Quality of Life

Patients with psoriasis and RLS reported experiencing a significantly greater impact on quality of life than those without RLS. The higher median DLQI score in the RLS group of 13 (9–14) than the score of 5 (2–10.5) in the non-RLS group indicated a substantial impact on daily activities, emotional well-being, and social interactions. These findings are consistent with those of Solak et al and Guler et al[34,37] In our study, 64.28% of patients with psoriasis and RLS experienced a "severe" impact on their quality of life (DLQI 11–20) compared to only 20.65% of the non-RLS group. Furthermore, 23.91% of patients with psoriasis without RLS reported no impact on their quality of life (DLQI 0–1), whereas only 7.14% of patients with RLS reported no impact on their quality of life. These results highlight the detrimental effect of RLS on the quality of life of patients with psoriasis, complicating disease management, and emphasizing the need for comprehensive care strategies addressing both the dermatological and neurological aspects of the disease.

Although the correlation between the IRLSRS and DLQI scores in our study did not reach statistical significance ($r = 0.4514$, $p = 0.1052$), the coefficient was comparable to those reported in previous studies. Schell et al reported

a significant correlation between the IRLSRS and DLQI scores ($r = 0.49$, $p < 0.001$),[36] while Guler et al reported a similar finding ($r = 0.394$, $p = 0.038$).[34] Despite the lack of statistical significance in our study, the similarity in correlation coefficients suggests an association between RLS severity and reduced quality of life in patients with psoriasis, warranting further investigation in larger cohorts to confirm these findings.

Collectively, compared to patients without RLS, patients with psoriasis and RLS have significantly poorer sleep quality, greatly impacting their quality of life. These findings highlight the need for the early identification and management of RLS in patients with psoriasis to address these comorbid conditions, improve patient outcomes, and ultimately enhance their quality of life.

Study Limitations

We did not investigate the relationship between RLS and other clinical characteristics, such as laboratory parameters and treatment history, in patients with psoriasis. Additionally, because of the cross-sectional study design, we could not assess the causality between RLS and psoriasis. The complex pathophysiology of RLS may be influenced by multiple factors, including psoriasis itself and various comorbid conditions commonly associated with it. Therefore, we did not establish a definitive cause-and-effect relationship.

Conclusion

The prevalence of RLS in patients with psoriasis was significantly higher than that in healthy controls. Patients with psoriasis and RLS experience poorer sleep quality and greater impairment in quality of life, as reflected by elevated PSQI and DLQI scores. The severity of psoriasis was notably higher in patients with RLS, with a strong positive correlation between PASI and RLS severity. RLS has been linked to a higher prevalence of comorbidities, such as hypertension and coronary artery disease, indicating increased cardiovascular risk in these patients. Overall, RLS should be considered an important comorbidity in psoriasis because of its impact on sleep quality and quality of life. Comprehensive management, including sleep quality assessment and neurological referral, is recommended to mitigate the impact of RLS and improve overall patient outcomes.

Data Sharing Statement

The raw data supporting the conclusions of this article will be made available by the authors without undue reservation.

Ethics Approval and Informed Consent

This study was conducted at the Ho Chi Minh City Hospital of Dermatology-Venereology; University Medical Center, Ho Chi Minh City, and Nguyen Tri Phuong Hospital, Ho Chi Minh City, Vietnam, between March 2024 and July 2024. Ethical clearance was granted by the respective Ethics Committees in Biomedical Research at the three institutions, and the study complied with the ethical standards for biomedical research at all participating institutions, as well as the principles of the Declaration of Helsinki.

Consent for Publication

Informed consent was obtained from all participants. Ethical clearance was granted by the respective Ethics Committees in Biomedical Research of the three institutions: the Ethics Committee of the University of Medicine and Pharmacy at Ho Chi Minh City on November 1, 2023 (approval number 1077/HĐĐĐ-ĐHYD), the Ethics Committee of Ho Chi Minh City Dermatology Hospital on February 29, 2024 (approval number 426/CN-BVDL), and the Ethics Committee of Nguyen Tri Phuong Hospital on January 26, 2024 (approval number 188/NTP-HĐĐĐ).

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Disclosure

The authors report no conflicts of interest in this work.

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