



## Original Article

# Prevalence of Restless Legs Syndrome and its related Factors among Older Adults in Eslamabad-e-Gharb, Iran

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## ABSTRACT

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**Introduction:** Restless legs syndrome (RLS) is a neurological sensory-motor disorder that is observed as an unpleasant sensation in the legs, especially when sitting or lying down and at rest. This study aimed to determine the prevalence RLS and its related factors among older adults in Eslamabad-e-Gharb, Kermanshah province, Iran in 2021.

**Methods:** Totally, 240 elderlies entered the study using two stages random sampling. The instruments used in the study included the International RLS Questionnaire, Pittsburgh Sleep Quality Index, Mind Wandering Questionnaire, Epworth Sleepiness Scale and Pain Self-efficacy Questionnaire.

**Results:** Symptoms of RLS were mild in 68.3% of the participants and severe in 14.2% of them. There was a statistically significant relationship between RLS and sleep quality ( $p = 0.001$ ) and daily drowsiness ( $p = 0.034$ ). The chance of developing RLS in the group with poor sleep quality was 22% higher than the group with good sleep quality ( $OR = 1.22$ ). Also, people with drowsiness were 13% more likely to develop RLS than others ( $OR = 1.131$ ), and in the age group of 71-80 years and over 80 years, 6% and 2% higher than the 60-70 years respectively ( $OR = 1.068$  and  $1.023$ ). No statistically significant relationship was found between RLS with mind wandering and pain self-efficacy.

**Conclusion:** Due to the high prevalence of RLS and its relationship with sleep quality and daily drowsiness among older adults, implementation of RLS screening to identify patients to prevent sleep disorders seems necessary. The relation of RLS with mind wandering and pain self-efficacy need further studies.

**Keywords:** Aging, Restless Legs Syndrome, Sleep Quality

## Introduction

Restless Legs Syndrome (RLS) is a neurological sensorimotor disorder, in which patients have an unpleasant sensation in the legs, especially when sitting or lying down and resting, which is usually felt deep between the wrists and knees (1-3). It is sometimes seen as numbness, itching and burning, shooting and severe pain in the arms and legs (4, 5). The four diagnostic criteria for this syndrome are: 1. Unpleasant and irritating sensation in the legs that causes a person to move their legs, 2. Symptoms appears or intensifies when resting (lying down, sitting) and calms down by moving the legs, 3. Symptoms appear in the evening (after sunset) and intensify at night, especially when resting and 4. Movement restlessness, which is seen as a small movement in the toes and shank, and sudden shaking and rotation of the legs in bed (6-8). Physical examination of patients is usually normal and does not help in the diagnosis of the disease and the only way to partially diagnose this syndrome is based on the reporting of mental symptoms by the patient (9).

It is reported that between 32% and 81% of RLS patients report having consulted a physician about their symptoms and only 6% report having received a diagnosis of RLS and even after receiving a diagnosis of RLS, as many as 13% of patients are treated with inappropriate medications (10). A study among an elderly French population, revealed a prevalence of RLS of 29.7% in women and 12.1% in men (2). A study in Iran showed that the prevalence of RLS is 42.6% among type II diabetes patients (11). Another study reported the prevalence of 28.9% among pregnant women in Iran (12). Prevalence of RLS in Ankara, Turkey among the population, above the age of 15, was reported 5.52 % (13).

Patients with RLS may sleep less than 5 hours a night. Nocturnal exacerbation of RLS in patients with moderate to severe syndromes leads to sleep disturbances, so people with RLS may experience chronic sleep deprivation, daily drowsiness, and stress and mind wandering that may interfere with patients' daily functional patterns. This condition prevents them from enjoying life and has negative effects on social activity, family life and continued employment, and affects their quality of physical and mental life (11).

RLS may alter patients' self-efficacy beliefs about pain. Pain self-efficacy beliefs are an important determinant of pain behaviors and disability associated with pain, over and above the effects of pain, distress and personality variables (14). There is also an association between mental health and pain reduction (15). Beliefs of pain self-efficacy predict behaviors related to physical and mental health, and then effective pain management (16).

Although RLS is not as life threatening as diabetes and heart disease, it is one of the most common reasons for patients to seek medical attention because it affects patients' quality of life and causes sleep disturbances and daily drowsiness. Despite studies on this syndrome in different age groups, few studies have examined the prevalence of RLS and its related factors among the older adults (4), especially in developing countries. As far as

we know, no studies have been conducted on the prevalence of RLS and its associated factors in the elderly Iranian population. So this study aimed to determine the prevalence of RLS and its related factors among older adults in Eslamabad-e-Gharb, Iran, in 2021 as a developing country.

## Methods

### *Study design and participants*

This cross-sectional study performed on the community dwelling older adults (aged  $\geq 60$  years) in Eslamabad-e-Gharb (Kermanshah province), Iran. Those people who aged  $\geq 60$  years and were living in Eslamabad-e-Gharb, and also were able to communicate verbally, were eligible to participate in the study.

The required sample size based on the results of the study by Kim et al., (17), which the prevalence of RLS is estimated to be 28%, and considering the level of significance and error of 5%, and sampling method, 240 people were estimated. The sampling method was two-stage random. First, from the list of geographic regions (totally 8 regions) of Eslamabad-e-Gharb city, four regions were selected randomly. A list of Health Posts (healthcare delivery centers for urban regions in Iran's healthcare system) within four regions was prepared. There were totally eight Health Posts in the selected regions. In the second stage of sampling, from each Health Posts, the list of elderly covered was extracted and 30 elderly were selected and entered in the study by simple random sampling. It is noteworthy that all residents of the city, both elderly and non-elderly have family records in the Health Posts and the list of older adults was extracted from the demographic characteristics in their files.

### *Instruments*

In this study, a questionnaire including the following sections was used.

**Demographic information:** Including age, sex, education, marital status and physical activity level.

**International RLS questionnaire:** It measures the severity of RLS symptoms based on international standards on a 4-point Likert scale. The score range of this questionnaire is 0 -12, a score below 4 means no RLS, score between 4 to 8 degrees of mild syndrome; and the score between 8 to 12 is the presence of severe RLS. The validity and reliability of the tool were confirmed in two previous studies in Iran (18-19).

**Pittsburgh Sleep Quality Index (PSQI):** One of the best sleep quality assessment tools designed and built is the PSQI. The range of items scores is zero to 3 (no 0, weak 1, medium 2, strong 3). The total score of the index is from zero to 21. Higher scores indicate poor sleep quality. A total score greater than five indicates that the subject is poor sleep, and a total score less than 5 indicates good sleep quality (20). Validity score of 0.86 and the reliability score of 0.89 is reported for the Persian version of the tool (21).

Pain Self-efficacy Questionnaire (PSEQ): A ten-item questionnaire based on Bandura's theory of self-efficacy, developed by Nicholas in 1980 to assess a patient's belief in his or her ability to perform a variety of activities despite pain (22). The possible scores range of the questionnaire is zero to 60. A higher score indicates a stronger belief in performing daily activities despite the presence of pain. The score is categorized in two levels as 0-30 indicates inadequate self-efficacy and lack of belief in performing daily activities in the presence of pain and 31-60 indicates adequate self-efficacy. The internal consistency of this questionnaire is excellent as Asghari and Nicholas reported a Cronbach's alpha of 0.92. In addition, the validity coefficients of the tool using half-split and test-retest methods, reported 0.78, and 0.77, respectively (14).

Epworth Sleepiness Scale (ESS): The scale is designed to assess the drowsiness status of individuals. In ESS, people score their propensity for dozing in eight everyday situations on a 4-point scale, from 0, indicating "would never doze," to 3, indicating a "high chance of dozing." Adding the scores for each of the 8 questions yields a total score ranging from 0-24. An ESS score > 10 suggests excessive daytime sleepiness (23). In a study by Gaffari et al., (24), the Cronbach's alpha reliability coefficient of the Persian version was 0.73 and in another study it was reported 0.70 (25).

Mind Wandering Questionnaire (MWQ): A self-report questionnaire for measuring mind wandering presented by Mrazek et al., (26). The questionnaires include five items and on a 5-point Likert scale from almost never (1) to almost always (5) and the range of scores are 5 to 25. Scores greater than five are subject to mind wandering and scores  $\geq$  five are no mind wandering. In a study by Zamani Zad et al., the reliability using Cronbach's alpha was 0.73 (27).

#### Statistical analysis

Descriptive statistics were used to describe the data. In order to perform inferential statistics, first the normality of the data in quantitative variables was checked by Kolmogorov-Smirnov test. Chi-square test was used to compare the variables in the two groups (RLS (yes-no)) and univariate and multivariate logistic regression was used to determine the effect of factors affecting RLS. The significance of the tests was considered less than 0.05.

#### Ethical considerations

The study proposal was approved by the ethics committee of Shahid Sadoughi University of Medical Sciences in Yazd, Iran. (IR.SSU.SPH.REC.1400.049). The questionnaires were distributed anonymously among the participants and they were assured that their information would kept confidential.

#### Results

A total of 240 people participated in the study. The age range of participants was from 60 to 100 years with a mean of  $73.22 \pm 7.52$  years. Of them 50.4% (n = 121)

were female and 54.2% (n = 130) were married. In addition, 38.8% (n = 93) of the participants had secondary level of education and 36.3% (n = 87) reported very little physical activity level. Other demographic information is presented in Table 1.

Symptoms of RLS were mild in 68.3% of the participants and severe in 14.2% of them, and 17.5% had no symptoms. There was no significant difference in RLS symptoms in terms of age group, gender, education and physical activity level. (Table 2)

Examination of RLS status in the participants in terms of sleep quality, drowsiness, mind wandering and pain self-efficacy revealed that 19.5% of the participants with poor sleep quality had severe and 71.3% had mild RLS symptoms. In addition, 14.5% of the participants with drowsiness had severe and 67.7% of them had mild RLS symptoms. Moreover, 72.4% of the symptoms with inadequate pain self-efficacy had mild RLS symptoms. There was a statistically significant relationship between RLS status and sleep quality, but there was no statistically significant relationship between RLS status and drowsiness, mind wandering and pain self-efficacy. (Table 3)

Logistic regression analysis revealed that the chance of getting RLS in the group with poor sleep quality is 22% higher than the group with good sleep quality (OR = 1.227). In other words, poor sleep quality increased 22% the chance of getting RLS compared to the good sleep quality. The chance of developing RLS in the group with drowsiness is 13% higher than the group of no drowsiness (OR = 1.131) and the chance of developing RLS in the age group of 71-80 years to the age group of 60-70 years was 6% higher (OR = 1.068). Also, the chance of getting RLS in the age group over 80 years is 2% higher than the age group of 60 to 70 years (OR = 1.023). (Table 4)

**Table 1. Frequency distribution of demographic variables in study participants**

Variable	Levels	N	%
Age	60-70	126	40.1
	71-80	62	19.7
	$\geq$ 81	52	16.6
Gender	Female	121	50.4
	Male	119	49.6
Marital status	Single	17	7
	Married	130	54.2
	Divorced	18	7.5
	Widow	75	31.3
Education	Primary	90	37.5
	Secondary	93	38.7
	Diploma	39	16.3
	University	18	7.5
Physical activity level	At all	55	22.9
	Very little	87	36.3
	Little	48	20
	Moderate	42	17.5
	High	8	3.3

**Table 2. Distribution of RLS status in the participants in terms of demographic variables**

Variable	Levels	RLS						p
		Severe		Mild		No symptom		
		N	%	N	%	N	%	
Age	60 - 70	14	11.1	93	73.8	19	15.1	0.046
	71 - 80	8	12.9	39	62.9	15	24.2	
	≥ 81	12	23.1	32	61.5	8	15.4	
Gender	Female	15	12.4	88	72.8	18	14.9	0.335
	Male	19	16	76	63.9	24	20.2	
Education	Primary	10	11.1	63	70	17	18.9	0.556
	Secondary	17	18.3	58	62.4	18	19.4	
	High school Diploma	5	12.8	28	71.8	6	15.4	
	University	2	11.1	15	83.3	1	5.6	
Physical activity level	At all	6	11.1	38	70.4	10	18.5	0.131
	Very little	8	9.6	59	71.1	16	19.3	
	Little	13	25	30	57.7	9	17.3	
	Moderate	3	7	33	76.7	7	16.3	
Marital status	High	4	50	4	50	0	0	0.377
	Single	2	11.8	13	76.5	2	11.8	
	Married	15	11.5	89	68.5	26	20	
	Divorced	1	5.6	13	72.2	4	22.2	
	Widow	16	21.3	49	65.3	10	13.3	

**Table 3. Distribution of RLS status in the participants in terms of sleep quality, drowsiness, mind wandering and pain self-efficacy**

Variable	Levels	RLS						p
		Severe		Mild		No symptom		
		N	%	N	%	%	N	
Sleep quality	Good (≤ 5)	2	2.6	47	61.8	27	35.5	0.001
	Poor (> 5)	32	19.5	117	71.3	15	9.1	
Drowsiness	No drowsiness (≤ 10)	2	10	15	75	3	15	0.034
	Drowsiness (> 10)	32	14.5	149	67.7	39	17.7	
Mind Wandering	No mind wandering (≤ 5)	31	14.7	143	67.8	37	17.5	0.810
	Mind wandering (> 5)	3	10.3	21	72.4	5	17.2	
Pain self-efficacy	Inadequate (0 - 30)	3	10.3	21	72.4	5	17.2	0.285
	Adequate (31 - 60)	31	14.7	143	67.8	37	17.5	

## Discussion

This study aimed to determine the prevalence of RLS and its related factors among the older adults of Eslamabad-e-Gharb, Iran, in 2021. The results revealed that RLS is highly prevalent among the older adults and is significantly related to sleep quality and daily drowsiness. Symptoms of RLS were mild in 68.3% of the participants and severe in 17.5% of them. In another study in Iran the prevalence of RLS was reported 21.1% in depressed and 7.4% in non-depressed elderly people in 2014 (28). In some other studies the prevalence of RLS has reported 10.6%, in the American older adults (29), 11.11% with an additional prevalence of 10. 10% of possible RLS in Spanish non-demented psychogeriatric outpatients (30), and 9.8%, in a population-based survey of the elderly in

Germany (31). The occurrence of RLS seems to be independent of the geographical environment and level of development of countries and the few differences observed may be attributed to other factors such as lifestyle, racial differences, predisposing and environmental factors.

In the present study, a statistically significant relationship was found between age and RLS, which was consistent with the results of Nichols et al., (32), meaning that the incidence of RLS increased with age. It seems that the physiological changes caused by aging process including changes in cardiovascular and metabolic changes, and the resulting lifestyle changes and can lead to RLS.

Table 4. Regression analysis of factors related to the occurrence or non-occurrence of RLS in the study participants

Variable	Levels	Univariate			Multivariate		
		OR	%95 CI	p	OR	%95 CI	p
<b>Mind Wandering</b>	No mind wandering	1	-	-	-	-	-
	Mind wandering	1.030	0.629-2.302	0.577	-	-	-
<b>Sleep quality</b>	Good	1	-	-	-	-	-
	Poor	1.227	1.130-1.332	0.001	1.244	1.141-1.355	0.002
<b>Drowsiness</b>	No drowsiness	1	-	-	-	-	-
	Drowsiness	1.131	1.015-1.260	0.025	1.139	1.013-1.280	0.029
<b>Pain self-efficacy</b>	Inadequate	1	-	-	-	-	-
	Adequate	1.290	0.706-2.356	0.407	-	-	-
<b>Age</b>	60-70	1	-	-	-	-	-
	71-80	1.068	0.778-1.464	0.053	1.037	1.016-1.816	0.049
	≥ 81	1.023	1.010-1.704	0.042	1.215	1.013-1.705	0.047
<b>Gender</b>	Female	1	-	-	-	-	-
	Male	1.198	0.692-2.073	0.519	-	-	-
<b>Education</b>	Academic	1	-	-	-	-	-
	Non-academic	0.971	0.119-7.925	0.978	-	-	-
<b>Physical activity</b>	Inactive	-	-	-	-	-	-
	Active	1.236	0.968-1.577	0.089	1.231	0.944-1.605	0.125
<b>Marital status</b>	Single, divorced, widowed	1.09	0.830-1.432	0.535	-	-	-
	Married	1	-	-	-	-	-

The proportion of men without RLS symptoms was higher than women, but there was no statistically significant difference by gender, which was consistent with the some other studies (18, 33) but inconsistent with the results of Berger et al., (34), in which reported the prevalence of RLS in women twice as much as men. The higher prevalence of RLS symptoms among females may be due to hormones such as estrogen and progesterone and the various socially stressful roles of women. A reason for the difference in these results can be attributed to the race and sample size, since the last study was conducted on a large sample of the German general population.

Our study also showed that there is a statistically significant relationship between RLS and sleep quality. These people have poorer sleep, which significantly reports drowsiness during the day, which is in line with the results of Mollahosseini et al., (18), while some other studies (35, 36) showed that people with RLS did not report drowsiness even with chronic sleep loss during the day. A study by Gamaldo et al., showed that RLS subjects, despite having greater sleep loss, displayed greater sustained alertness than sleep-restricted controls (37). In this regard, RLS can be an interesting and unique model. To explore some of the nerve cells that somehow contribute to sleep deprivation alerts may require more extensive studies.

In this study, there was no association between RLS and mind wandering, which was different from some other studies (38, 39). Although normal drowsiness was reported in above mentioned studies, daily fatigue and consequent mind wandering were reported to be significant, which may reflect differences in the nature of the underlying pathology, as the root cause of this disease is not exactly known. For example, some

researchers say that RLS caused by problems with dopamine in the brain, while others believe it is linked to poor blood flow. Parkinson's disease is strongly associated with increased daytime sleepiness independent of drug therapy (40, 41). Thus, despite the common beneficial response to dopaminergic therapies seen in these two diseases, Parkinson's and RLS appear to have completely different effects on the sleep-wake mechanism.

The results of Ghanei et al.'s study showed that patients with mild to severe syndrome lead to sleep disorders. As a result, these patients experience chronic sleep deprivation and daily drowsiness, as well as stress, which interfere with patients' daily functional roles. This situation prevents them from enjoying life and has negative effects on their social and family activities, and consequently they had lower self-efficacy (11). However, in our study, no statistically significant relationship was found between pain self-efficacy and RLS.

Högl et al., Also noted a strong association between RLS and sleep disorders, and wrote that more than 90% of patients with RLS sought medical help to treat sleep disorders (42). The results of studies by Mollahosseini et al., (18), and Winkelmann et al., also showed that all people suffering from sleep disorders had RLS at the same time (43).

## Conclusion

In conclusion, the prevalence of RLS among the older adults is relatively high and considering that a high percentage of the elderly with RLS suffer from sleep disorders and drowsiness, which can impair their

quality of life, so health professionals should pay attention to all these issues. They should educate about screening for appropriate measures for RLS patients who may be experiencing problems such as sleep disturbance, reduced quality of life, and increased risk of death. Despite the literature, no statistically significant relationship was found between pain self-efficacy and RLS and also between RLS and mind wandering.

### Study limitation

The relatively small sample size is one of the limitations of this study. It is recommended to study the relationship between restless leg syndrome and mind wandering and pain self-efficacy, with a larger sample size in societies with different cultural characteristics.

### Conflict of interest

All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest, or non-financial interest in the subject matter or materials discussed in this manuscript.

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### Authors' contributions

All authors contributed in the design and execution of the study and also writing and editing of final version of the manuscript.

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