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An Assessment of Restless Legs Syndrome and Sleep Quality in Pregnant Women

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ABSTRACT

BACKGROUND/AIM: This study was conducted to review Restless Legs Syndrome (RLS) and some variables believed to be associated with RLS and to assess the relationship between the RLS and sleep quality in pregnant women.

MATERIAL AND METHODS: The study group consisted of 449 pregnant women. The diagnostic criteria developed by the International RLS Study Group were used to assess the diagnosis and severity of RLS, and the Pittsburgh Sleep Quality Index (PSQI) was used to assess sleep quality.

RESULT: The ages of pregnant women in the study group ranged from 18 to 45 years with a mean age of 28.78±5.31 years. RLS was diagnosed in 114 pregnant women (25.4%). The incidence of RLS was higher in those with a low to average family income, those having a nuclear family, those with a history of a gynecological surgery, those having irregular periods before pregnancy, those with a history of lower back pain during pregnancy and those with a history of macrosomia. No difference in terms of sleep quality was determined in those women with or without RLS. RLS is an important health problem in pregnant women. There is a moderate negative correlation between the severity of RLS and sleep quality.

CONCLUSION: It will be advantageous to refer pregnant women with RLS to specialists for final diagnosis and treatment. More extensive studies are required to demonstrate the relationship between RLS and quality of sleep.

Keywords: Pregnant women, Restless Legs Syndrome, sleep quality

INTRODUCTION

Restless Legs Syndrome (RLS) was first described by Thomas Willis in 1685 in patients with sleep disruption and restlessness in their legs and referred to as "anxietas tibiarum". Later in 1945, Dr. Karl-Axem Ekbom used the definitions of "irritable legs" and "restless legs" for the disorder which is also known as the Ekbom Syndrome.[1] RLS is a sensorimotor disorder characterized by an irresistible urge to move the legs and uncomfortable sensations, worsening at rest, which may be accompanied by dysesthesia that prevents falling asleep.[2]

Patients frequently express immediate relief when they move their legs in bed, get up and walk or dangle their legs off the bed. Symptoms are usually bilateral in the legs, and occasionally in the arms, starting during relaxation, prolonged inactivity and at night before sleeping. Symptoms disappear in the daytime.[3] While diagnosis of RLS is based on clinical

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history and evaluation, laboratory and imaging methods can also be used when needed. Neurological examination is usually required. Five criteria developed by the International Restless Legs Syndrome Study Group (IRLSSG) must be met for a final diagnosis of RLS.

Pregnancy is considered an important risk factor for the onset or worsening of RLS symptoms. It is believed that hormonal (prolactin, progesterone, estrogen levels), psychomotor and behavioral changes during pregnancy as well as changes in sleeping habits and in folic acid-iron levels may have an impact on RLS.[4]

Studies have shown that RLS affects sleep, cognitive functions and quality of life adversely and can be disturbing enough to require medical treatment.[5,6] There is a close relationship between RLS and sleep disorders which are known to be associated with undesirable effects in pregnancy such as intrauterine growth restriction or preeclampsia.

This study was conducted to review RLS and some variables believed to be associated with RLS and to assess the relationship between RLS and sleep quality in pregnant women.

MATERIALS AND METHODS

This was a cross-sectional study conducted on pregnant women who applied to Sakarya Training and Research Hospital from July 1, 2017 to November 1, 2017.

A questionnaire consisting of three sections was prepared based on literature in line with the aims of this study. The first section contained socio-demographic and pregnancy-related characteristics of pregnant women, the second section included questions on the presence and severity of RLS and the third section involved questions from a scale which was used to assess sleep quality.

The required approval of the Sakarya University Non-interventional Ethics Committee dated June 22, 2017 and number 71522473/050.01.04/141 and approval from Sakarya Training and Research Hospital management were obtained before collecting data in this study. The rules stated in the Helsinki Declaration were complied with during the stages of data collection.

The minimum sample size was calculated to be 449 in this study (power test = 0.847, RLS prevalence = 0.05 and margin of error = 0.07). Pregnant women presenting at the pregnancy polyclinic of Sakarya Training and Research Hospital during the study were informed about the subject and aims of this study and their verbal consent was obtained. A total of 449 pregnant women who agreed to take part in the study comprised the study group. Previously prepared questionnaires were completed by the investigators via a face-to-face interview method to collect the data.

Diagnosis criteria developed by the International RLS Study Group were used to assess diagnosis and severity of RLS.[5,6] A reliability and validity study of the scale in Turkey was conducted by Sevim et al.[7] If four of the following criteria were present, RLS was diagnosed: an urge to move the legs (a) caused by uncomfortable and unpleasant sensations in the legs; (b) worsening during periods of rest or inactivity such as lying down or sitting, (c) relieved by movement, such as walking or stretching, "at least as long as the activity continues" and (d) only occurring or worse in the evening or night rather than during the day. There were 10 items on a 5-point Likert-type scale which was used to assess RLS severity. Each item was scored from 0 to 4 in an ascending order of severity. The total score that can be obtained from the severity scale ranges from 0 to 40 where higher scores denote increasing severity of RLS.

The PSQI[8] was used to assess sleep disturbances over the past month. The PSQI is an 18-item self-reported questionnaire. These items produce seven component scores ranging from 0 (no difficulty) to 3 (severe difficulty). The components are sleep duration, sleep disturbance, sleep latency, day-time disturbance, habitual sleep efficiency, sleep quality, and taking sleep medications. The sum of the scores of the components yields a measure of global sleep quality which ranges from 0 to 21. Getting a score of 5 or more in the PSQI is defined as poor sleep quality. The index was translated into Turkish by Agargun et al.[9]

The data was evaluated in the IBM® SPSS® (version 20.0) (Chicago, IL, USA) Statistical Package Program. Chi-square test, Mann–Whitney U test and Spearman's Correlation analysis were used to analyze the data. The statistical significance value was accepted as $p<0.05$.

RESULTS

The ages of the pregnant women in the study group ranged from 18 to 45 with a mean age of 28.78±5.31 years. RLS was diagnosed in 114 pregnant women (25.4%) in this study. The distribution of women with or without RLS in the study group by some socio-demographic characteristics is given in Table 1.

In the study group, 137 women (30.5%) were having their first pregnancy and there were 152 women (33.9%) who had not given birth before. Ninety-seven women (21.6%) had irregular menstruation before pregnancy and 283 women (63.0%) had a history of lower back pain during pregnancy. The distribution of women with or without RLS in the study group by some pregnancy-related characteristics is given in Table 2.

The scores obtained from the Pittsburgh Sleep Quality Index (PSQI) by the participants in the study group ranged from 0 to 18 with a mean score of 6.86±3.50. The distribution of the scores obtained from the PSQI by the women with or without RLS is given in Table 3.

The scores obtained from the RLS Severity Scale ranged from 0 to 37 with a mean score of 15.17±7.97. A negative correlation was found between the scores obtained from the RLS Severity Scale and from the PSQI from the pregnant women (r_s=-0.444; p=0.001). The distribution of the scores obtained from the RLS Severity Scale and from the PSQI from the women in the study group is given in Figure 1.

DISCUSSION

Emerging with the urge to move the legs and causing uncomfortable sensations in the extremities, RLS may develop at any age in the general population but more frequently during pregnancy and with advancing age.[10] Pregnancy is considered among the important risk factors for the onset and worsening of RLS symptoms. RLS is believed to be associated with hormonal factors (prolactin, progesterone, estrogen) in pregnancy, psychomotor/behavioral factors, motor changes, changes in sleeping habits, anxiety and metabolic factors (low folate and iron levels).[4,10] The prevalence of RLS was reported to be about 10.0% in pregnant women. Studies conducted in several countries reported the prevalence of RLS ranged from 13.5% to

34%.[11,12] Some studies conducted in Turkey found that the prevalence of RLS ranged from 19.0% to 26.0%.[13,14] In our study, approximately one quarter of the pregnant women had RLS, which is consistent with the literature.

With advancing age, the production of endogenous dopamine reduces; therefore, the prevalence of RLS increases with age. In view of the studies on the general population, Taşdemir et al.[15] found that the prevalence of RLS is 3.5 times higher in women compared to men and it increases with advancing age. On the other hand, some studies reported no relationship between the prevalence of RLS and age.[14,16] Sahin et al.[13] found no relationship between the prevalence of RLS and age. The present study could not determine a difference regarding the prevalence of RLS between age groups.

It is possible that the prevalence of RLS is lower among those women with a high education level as they are more conscious and well-informed about the early diagnosis and treatment of RLS as with all diseases and disorders. Moreover, one study mentioned that the higher prevalence of RLS in women with a low education level may be associated with the number of child-births. In their study conducted in India, Rangarajan et al.[17] similarly reported a higher prevalence of RLS in those with a low education level. In our study, no relationship was determined between education levels and the prevalence of RLS.

It is believed that unfavorable living conditions such as unemployment, poor income perception, etc. may increase the development of RLS.[18] The epidemiological study of Cho et al.[19] reported that there was a relationship between income perception and RLS and that the prevalence of RLS decreases with higher income levels. The higher prevalence of RLS among individuals with low-income levels may be

Table 1. Distribution of women with or without Restless Legs Syndrome in the study group by sociodemographic characteristics

Socio-demographic characteristics	Restless Legs Syndrome			Statistical analysis
	No (%)[a]	Yes (%)[a]	Total (%)[b]	X^2; p-value
Age group (year)				
≤24	86 (76.8)	26 (23.2)	112 (24.9)	3.456; 0.326
25–29	131 (77.5)	38 (22.5)	169 (37.6)	
30–34	70 (68.0)	33 (32.0)	103 (22.9)	
≥35	48 (73.8)	17 (26.2)	65 (14.5)	
Education level				
Primary school or lower	73 (69.5)	32 (30.5)	105 (23.4)	5.464; 0.141
Secondary school	94 (82.5)	20 (17.5)	114 (25.4)	
High school	101 (72.7)	38 (27.3)	139 (31.0)	
University	67 (73.6)	24 (26.4)	91 (20.3)	
Employment status				
Unemployed	220 (72.8)	82 (27.2)	302 (67.3)	1.513; 0.219
Employed	115 (78.2)	32 (21.8)	147 (32.7)	
Family income status				
Low-Middle	191 (70.7)	79 (29.3)	270 (60.1)	5.353; 0.021
High	144 (80.4)	35 (19.6)	179 (39.9)	
Family type				
Nuclear	243 (71.7)	96 (28.3)	339 (75.5)	6.266; 0.012
Extended	92 (83.6)	18 (16.4)	110 (24.5)	
History of a physician-diagnosed disease requiring constant drug use				
No	291 (74.8)	98 (25.2)	389 (86.6)	0.07; 0.932
Yes	44 (73.3)	16 (26.7)	60 (13.4)	
History of a physician-diagnosed gynecological disease				
No	311 (74.9)	104 (25.1)	415 (92.4)	0.126; 0.722
Yes	24 (70.6)	10 (29.4)	34 (7.6)	
History of any gynecological surgery				
No	291 (72.9)	108 (27.1)	399 (88.9)	4.559; 0.033
Yes	44 (88.0)	6 (12.0)	50 (11.1)	
Regular physical exercise				
No	225 (81.2)	52 (18.8)	277 (61.7)	16.714; 0.001
Yes	119 (64.0)	62 (36.0)	172 (38.3)	
Total	335 (74.6)	114 (25.4)	449 (100.0)	

[a]Percentage for the row, [b]Percentage for the column.

associated with poor dietary habits, particularly iron deficiency. Eckeli et al.[20] reported no relationship between the prevalence of RLS and family income levels. Our study found that the prevalence of RLS is higher in those whose family income level is low-middle. However, there was no difference regarding the prevalence of RLS between those women with or without a revenue-generating job.

In studies conducted in Nordic countries and Germany, no relationship was established between household and RLS.[18-21] However, it was determined that the prevalence of RLS is higher in pregnant women with a nuclear family in our study. We assume that this is because pregnant women lack enough support for housework, resulting in increased work-loads and stress levels.

It has been reported that patients with RLS usually have concomitant chronic diseases such as hypertension, diabetes mellitus and depression.[18,22,23] Our study revealed no difference regarding the prevalence of RLS between those with or without a history of a physician-diagnosed diseases requiring constant drug use. A similar result was also reported in the study of Unruh et al.[24]

While it is likely that the prevalence of RLS is higher in those women with a gynecological problem or a history of any kind of surgery, the literature presented no such finding. This study revealed no difference regarding the prevalence of RLS between those women with or without a history of a physician-diagnosed gynecological disease. However, it was determined that the prevalence of RLS is higher in women with a history of gynecological surgery. It is clear that more extensive studies are required to establish such a relationship.

Ohayon et al. found that regular exercise reduces the risk of RLS;[25] however, another study reported that exercise before sleep increases the risk of RLS.[23] Another study established a gradual relationship between exercise and RLS according to the intensity of exercise.[18] Our study findings established that the prevalence of RLS is higher in those with a history of regular physical exercise. This may be related to the fact that the exercise frequencies, durations and timings of pregnant women are not known.

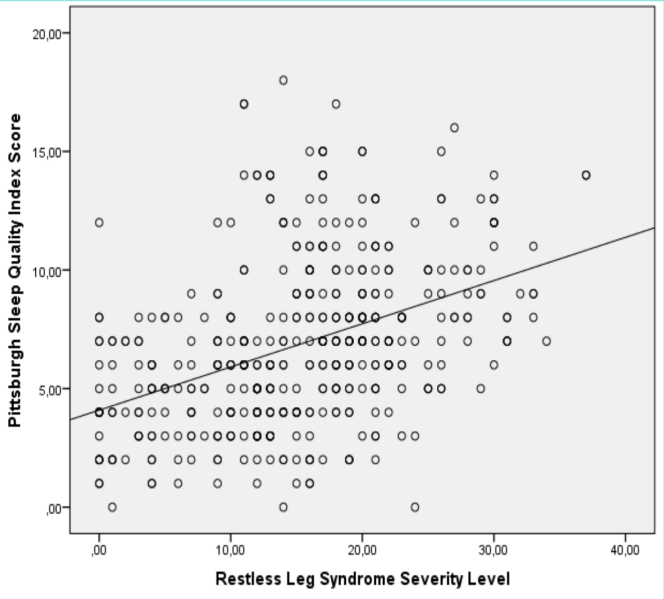

Figure 1. Distribution of scores obtained from the RLS Severity Scale and from the Pittsburgh Sleep Quality Index for the women in the study group

RLS: Restless Legs Syndrome

It is known that RLS symptoms may increase during pregnancy. Moreover, it has been reported that the number of childbirths may be a major factor for a higher prevalence of RLS in women. Berger et al.[18] reported a strong relationship between the prevalence of RLS in pregnant women and the number of childbirths. In our study, no relationship was determined between the number of childbirths and pregnancies and the prevalence of RLS. Shang et al.[26] established no difference regarding fertility in women with or without RLS.

It is known that hormone levels, primarily estradiol, increase during pregnancy. It is believed that increased prolactin levels in the third trimester may reduce dopamine levels, which may have an important role on RLS pathogenesis.[27] Several studies have reported that the prevalence of RLS is higher in the third trimester of pregnancy and that existing symptoms may be more severe.[14,17,27] Our study revealed no difference regarding the prevalence of RLS between women who had reached 28th week of gestation and those who had not.

Hormonal changes which are considered the main factor in women with irregular menstruation and a history of dysmenorrhea may be associated with RLS. In our study, there was no difference regarding the prevalence of RLS in women with or without a history of dysmenorrhea before pregnancy. However, it was determined that the prevalence of RLS is higher in those women with irregular menstruation before pregnancy. More extensive studies are required to establish such relationships.

In contrast to the findings of some epidemiological studies, there are studies which have demonstrated that body mass index is associated with a higher RLS risk. This relationship may result from a decrease in the number of dopamine receptors in the brains of obese individuals.[27] Despite these studies, the relationship between BMI in pregnancy and RLS has not been established clearly. Our study determined no difference regarding the prevalence of RLS in obese and non-obese women. There are other researchers who have reported similar results.[11,27]

Some studies concluded that there is no relationship between birth weight and RLS.[27,28] This study found a higher prevalence of RLS in women with a history of macrosomia. More extensive studies are required to establish such a relationship.

In our study, there is a moderate negative correlation between the severity of RLS and sleep quality. It was reported that 5%–10% of people with RLS had insomnia and disrupted sleep. All night long restlessness and an urge to move the legs make it difficult to fall asleep and to stay asleep, a reduced total-sleep time, impaired sleep-quality and these cause daytime drowsiness, chronic sleep deprivation, emotional disturbances and pathological fatigue in severe cases.[14,16,29] Yuksel et al.[16] found that RLS increases sleep-disorders which are associated with undesirable effects in pregnancy such as intrauterine growth restriction or preeclampsia. No difference in terms of sleep quality was determined in those women with or without RLS in the study group.

The limitations of this study include the fact that it is a cross-sectional study and it was not possible to establish a definitive diagnosis with the scales used.

Table 2. Distribution of women with or without Restless Legs Syndrome in the study group by pregnancy-related characteristics

Pregnancy-related characteristics	Restless Legs Syndrome			Statistical analysis X^2; p-value
	No (%)[a]	Yes (%)[a]	Total (%)[b]	
Number of pregnancies				
1	96 (70.1)	41 (29.9)	137 (30.5)	2.771; 0.428
2	81 (77.9)	23 (22.1)	104 (23.2)	
3	85 (78.0)	24 (22.0)	109 (24.3)	
4 and above	73 (73.7)	26 (26.3)	99 (22.0)	
Gestational week				
≤28	87 (79.1)	23 (20.9)	110 (24.5)	1.544; 0.214
≥29	248 (73.2)	91 (26.8)	339 (75.5)	
Number of childbirths				
0	106 (69.7)	46 (30.3)	152 (33.9)	5.346; 0.148
1	79 (73.8)	28 (26.2)	107 (23.8)	
2	85 (82.5)	18 (17.5)	103 (22.9)	
3 and above	65 (74.7)	22 (25.3)	87 (19.4)	
Menstrual regularity before pregnancy				
Irregular	63 (64.9)	34 (35.1)	97 (21.6)	5.464; 0.019
Regular	272 (77.3)	80 (22.7)	352 (78.4)	
History of dysmenorrhea before pregnancy				
No	215 (77.6)	62 (22.4)	277 (61.7)	3.452; 0.063
Yes	120 (69.8)	52 (30.2)	172 (38.3)	
Obesity before pregnancy				
No	275 (73.5)	99 (26.5)	374 (83.3)	1.060; 0.303
Yes	60 (80.0)	15 (20.0)	75 (16.7)	
History of lower back pain during pregnancy				
No	137 (82.5)	29 (17.5)	166 (37.0)	8.721; 0.003
Yes	198 (70.0)	85 (30.0)	283 (63.0)	
History of trauma during pregnancy				
No	310 (74.7)	105 (25.3)	415 (92.4)	0.000; 1.000
Yes	25 (73.5)	9 (26.5)	34 (7.6)	
History of macrosomia*				
No	199 (79.3)	52 (20.7)	251 (84.5)	4.357; 0.037
Yes	30 (65.2)	16 (34.8)	46 (15.5)	
Total	335 (74.6)	114 (25.4)	449 (100.0)	

[a]Percentage for the row, [b]Percentage for the column, *: Pregnant women who had given birth previously.

Table 3. Distribution of scores obtained from the Pittsburgh Sleep Quality Index for women with or without RLS in the study group

RLS	n (%)	Pittsburgh Sleep Quality Index Median (minimum-maximum)
No	335 (74.6)	6.0 (0.0-18.0)
Yes	114 (25.4)	7.0 (0.0-14.0)
Total	449 (100.0)	7.0 (0.0-18.0)

z=1.384, p=0.166, RLS: Restless Legs Syndrome, n: number.

CONCLUSION

RLS is an important health problem in pregnant women. There is a moderate negative correlation between the severity of RLS and sleep quality. It may be advantageous to refer pregnant women with RLS to specialists for a definite diagnosis and treatment. More extensive studies are required to demonstrate the relationship between RLS and quality of sleep.

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MAIN POINTS

- Restless Legs Syndrome is an important health problem in pregnant women.
- The Pittsburgh Sleep Quality Index was used to assess sleep quality.
- There is a moderate negative correlation between the severity of Restless Legs Syndrome and sleep quality.

ETHICS

Ethics Committee Approval: The required approval of the Sakarya University Non-interventional Ethics Committee dated June 22, 2017 and number 71522473/050.01.04/141 and approval from Sakarya Training and Research Hospital management were obtained before collecting data in this study.

Informed Consent: Pregnant women were informed about the subject and aims of this study and their consent was obtained. **Peer-review:** Externally peer-reviewed.

Authorship Contributions

Concept: S.Ş., K.Ö., A.U., Design: S.Ş., K.Ö., A.U., Data Collection and/or Processing: D.S.G., K.Ö., Analysis and/or Interpretation: A.U., S.Ş., K.Ö., Literature Search: S.Ş., K.Ö., A.U., D.S.G., Writing: S.Ş., D.S.G., K.Ö., A.U.

DISCLOSURES

Conflict of Interest: No conflict of interest was declared by the authors.

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