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The effects of restless legs syndrome on sleep and quality of life during pregnancy: a comparative descriptive study

İffet Güler Kaya[1], Derya Yüksel Koçak[2]

[1]Department of Midwifery, Istanbul Medipol University, İstanbul, Türkiye
[2]Department of Nursing, Hitit University, Çorum, Türkiye

Abstract

Objective: The study aimed to identify the effects of restless legs syndrome (RLS) on sleep quality and quality of life in pregnant women.

Methods: This comparative and descriptive study was conducted with 109 pregnant women between the 24 and 39 weeks of gestation. The presence and severity of RLS were investigated using the International Restless Legs Syndrome Study Group's Diagnostic Criteria Scale and Severity Rating Scale, and the effects of the syndrome on sleep and quality of life were evaluated.

Results: The prevalence of RLS in pregnant women was found to be 47.7%. In the RLS group, 22.0% of the pregnant women had severe RLS symptoms and 20.2% had moderate RLS symptoms. The mean score for Restless Legs Syndrome Severity Rating Scale was determined 20.75±6.38. The mean score for quality of life scale was determined 17.75±3.73 in RLS group and 26.46±2.67 in non-RLS group.

Conclusion: The difference between the mean scores for Pittsburgh Sleep Quality Index of the pregnant women with RLS and those without the syndrome was found to be statistically significant. While the mean score for Quality of Life Scale in pregnant women with RLS was lower in general health, physical health and psychological health sub-dimensions, no statistically significant difference was found in social relations and environment sub-dimensions. It is recommended that nurses investigate RLS complaints of pregnant women and include non-pharmacological methods in their nursing practices.

Keywords: Pregnancy, restless legs syndrome, sleep quality, life quality.

Introduction

Restless legs syndrome (RLS) is a common neurological disorder characterized by the urge to move the legs (rarely also the arms) and strange, unpleasant sensations in the leg (paresthesia).[1] While all laboratory tests and neurological tests are normal in primary RLS, various clinical conditions are observed in secondary RLS. In idiopathic RLS cases, RLS is seen in first degree relatives (50–70%) of patients who report complaints[2] and it is most commonly associated with iron deficiency, pregnancy, or kidney disease for no apparent reason other than genetic predisposition.[3] Increased prolactin, estrogen and progesterone hormone levels during pregnancy are shown as the reason for the increased prevalence of RLS.[4,5] Regarding the development of RLS during pregnancy, it has been suggested that edema in the extremities, which develops due to increased peripheral venous distension and decreased peripheral vascular resistance, causes an increase in stimulation in the surrounding tissues.[6] Most studies conducted on the relationship between pregnancy trimesters and RLS reported an increase in RLS prevalence in the third trimester.[5,7–12] RLS during pregnancy is associated with gestational hypertension, preeclampsia, poor sleep and quality of life, daytime sleepiness, and depressive mood.[13] RLS complaints occur during rest, become

Correspondence: Derya Yüksel Koçak, PhD. Department of Nursing, Hitit University, Bahçelievler Mah., Gazi Cad., No 86, 19200 Çorum, Türkiye.
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ORCID ID: İ. Güler Kaya 0000-0003-2643-1776; D. Y. Koçak 0000-0001-6890-6755

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severe at night, and awaken the individual from sleep. Therefore, problems such as chronic sleep disorder and stress occur in individuals with RLS.[2] Physical changes that occur during pregnancy also change the sleep and wakefulness rhythm and cause the sleep pattern to be disrupted. It is stated that approximately one third of pregnant women experience sleep problems in different ways. The most common problems are snoring, obstructive sleep apnea syndrome, insomnia, and RLS.[14] Therefore, it is important to reveal the relationship between RLS frequency, sleep quality, and quality of life in pregnant women. In this comparative descriptive study, we aimed to investigate the effect of the RLS on sleep quality and quality of life among pregnant women.

Methods

The study was carried out in the obstetrics and gynecology outpatient clinic of a university hospital located on the European side of the city of Istanbul, Turkey between April 1 and June 30, 2019. A total of 109 pregnant women who were admitted to the obstetrics and gynecology outpatient clinics of the specified hospital for routine prenatal follow-up were included in the study.

The inclusion criteria were as follows: *(1)* having spontaneous conception and singleton pregnancy, *(2)* being at least in the 24 weeks of gestation according to the last menstrual period, *(3)* not being in the risky pregnant group (under 18, gestational diabetes mellitus - GDM, preeclampsia, hyperemesis gravidarum - HG), *(4)* being able to understand verbal and written instructions in Turkish, *(5)* having no psychiatric diagnosis, and *(6)* having no vision-hearing problems.

The exclusion criteria of the study were as follows: *(1)* having a risky pregnancy, *(2)* having a chronic disease, *(3)* having a psychiatric disorder, and *(4)* having been previously diagnosed with the RLS.

Pregnant women were recruited from a hospital in a cosmopolitan province in order to achieve heterogeneity. Systematic random sampling was performed. Sleep and life quality were the dependent variables. The independent variable was the RLS.

A Personal Information Form was developed by the researchers in line with the literature.[15–17] The diagnostic criteria established by the International RLS Study Group (IRLSSG) in 1995 and updated in 2003 and 2014 were used to diagnose the RLS.[18] In this study, the diagnostic criteria laid down in 2003 were used. In addition to the RLS Diagnostic Criteria Scale, the RLS Severity Rating Scale, the WHOQOL-BREF Quality of Life Scale, and Pittsburgh Sleep Quality Index (PSQI) were used to collect data. Data collection lasted approximately 15 minutes for each pregnant women.

In the study, those who responded "yes" to all the questions in the four-question RLS Diagnostic Criteria Scale were categorized as the group with RLS. The pregnant women who were diagnosed with the RLS as a result of the Diagnostic Criteria Scale were requested to answer the questions in the RLS Severity Rating Scale developed by the IRLSSG to determine the severity of the RLS. The study was carried out with a total of 109 pregnant women in their third trimester. Of these participants, 52 pregnant women were found to have the RLS and 57 pregnant women did not have the RLS. None of the 52 pregnant women who were found to have the RLS with the Diagnostic Criteria Scale had been diagnosed or treated for RLS before, according to medical records. The detailed information below is presented about the data collection tools.

Personal Information Form: The form consists of a total of 29 questions on the following socio-demographic and obstetric characteristics of the participants: age, level of education, employment status, smoking status, gravida and parity, number of abortions, weight (kg), weight gained during pregnancy (kg), height (cm), presence of fatigue, presence of a chronic disease, use of regular medication, and the presence of cramp and sleep apnea.

RLS Diagnostic Criteria Scale: The scale, which includes the criteria for RLS, consists of four questions. It was created by the IRLSSG in 1995 and is based on patient history. If the answer is "yes" to all questions, the individual is diagnosed with the RLS.[18]

Restless Legs Syndrome Severity Rating Scale: The scale was developed based on questions suggested by the members of the IRLSSG with clinical expertise on RLS. The scale consists of a total of 10 items. In the scale, subjective evaluation of basic features are made (items 1, 2 and 3), and the severity and frequency of the disease (items 7 and 8) and the associated sleep problems (items 4 and 5) are discussed. The scale also

includes items investigating the effects of symptoms on patients' mental state and daily functions (items 9 and 10). Each item is graded as 0 point in the absence of RLS or 4 points in case of very severe RLS. The total score that can be obtained from the scale ranges from 0 to 40. The severity of RLS is rated as mild in the range of 1–10 points, moderate in the range of 11–20 points, severe in the range of 21–30 points, and very severe in the range of 31–40 points.[19,20]

WHOQOL-BREF Quality of Life Scale (abbreviated version of the World Health Organization Quality of Life Scale): The scale was developed by the World Health Organization to evaluate the quality of life. It consists of 26 items under four sub-dimensions, which are physical health domain (PHD), psychological health domain (PSYD), social relations domain (SRD), and environment domain (ED).[21] The items are Likert-type close-ended items. The Turkish validity and reliability of the scale were conducted by Eser et al.[22] The Turkish version of the scale measures bodily, psychological, social and environmental well-being and consists of 26 items.[22] When the Turkish version is used, the score for the environment domain, for example, is named as Environment-TR.[23]

Pittsburgh Sleep Quality Index (PSQI): The index was adapted to Turkish by Ağargün et al. (1996). It is a 24-item index evaluating sleep quality and disorder over the past month. While 19 items are self-report items, 5 items are answered by the spouse or the roommate. The 19 items are grouped into seven components: subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, sleep medication use, and daytime dysfunction due to sleepiness. Each component is scored between 0–3 points. The total score of the 7 components gives the total scale score and ranges from 0–21. A total score greater than 5 indicates poor sleep quality.[24]

The data were collected by the researchers using the face-to-face interview method. Those who volunteered to participate in the study signed the Free and Informed Consent Form (FICF). The participants received no financial incentive to participate in the study. To ensure that the schooling level of the participants did not prevent them from reading, understanding, and responding to the items, the researcher read aloud all the items in the scales.

The data were analyzed using the IBM SPSS 22.0 (IBM Corp., Armonk, NY, USA). Number and percentage distribution were used in the evaluation of the data, and mean-standard deviation was used to analyze the continuous data. In addition, the Chi square test, the Kruskal-Wallis test, the ANOVA, the independent sample t-test, and the Mann-Whitney U test were performed. Statistical significance was set at $p<0.05$.

Ethics committee approval was obtained from Istanbul University Cerrahpaşa Faculty of Medicine Ethics Committee (reference number: 83045809-60041.01.02, date: 26.02.2019). Informed consent was obtained from all pregnant women who agreed to participate in the study.]

Results

Among the 109 participants, 52 pregnant women met the RLS diagnostic criteria and were categorized as the RLS group, while 57 pregnant women did not meet the RLS diagnostic criteria and were categorized as the non-RLS group. The demographic characteristics of the pregnant women with and without the RLS are shown in **Table 1**.

27.52% of the pregnant women with the RLS were between the ages of 21–29, while 30.28% of the pregnant women in the non-RLS group were in this age group. The rate of pregnant women who graduated from secondary school was the same in both groups with 27.52%. The rate of non-working and non-smoking pregnant women was higher in the non-RLS group (43.12% and 47.71%, respectively). The rate of those who had multigravida and history of abortus and who were multiparous was lower in the non-RLS group (21.10%, 12.84%, and 13.76%, respectively). In the non-RLS group, the rate of women who gained more than 12 kilograms and who had a BMI higher than 30 kg/m^2 was higher than the other group (18.35% and 25.69%, respectively).

A statistically significant difference was found between the pregnant women in the RLS group and those in the non-RLS group in terms of history of abortus and the BMI (**Table 1**). A statistically insignificant difference was not found between the pregnant women in the RLS group and those in the non-RLS group in terms of age, education level, employment status, smoking status, gravida and parity, weight gain during pregnancy, and current weight (**Table 1**).

In addition, a statistically significant difference was found between the two groups in terms of fatigue,

cramps, regular medication use, sleep apnea and desire to sleep ($p<0.05$) (**Table 2**). Fatigue, cramps, regular medication use, sleep apnea and desire to sleep were found to be higher in the RLS group (**Table 2**). 92.3% of the pregnant women in the RLS group and 38.6% of the pregnant women in the non-RLS group stated that they experienced fatigue. While the rate of those who experienced cramps was 84.6% in the RLS group, this rate was 19.3% in the non-RLS. While sleep apnea was detected in 19.2% of the pregnant women in the RLS group, no sleep apnea was experienced in the non-RLS group. The rate of those who desired to sleep during the day was 67.3% in the RLS group and 22.8% in the non-RLS group (**Table 2**).

In this study, the diagnosis of RLS was performed according to the IRLSSG criteria established in 2003. The prevalence of RLS for all pregnant women was 47.7%. When the severity of RLS in pregnant women was examined, it was seen that 22.0% of the pregnant women in the RLS group complained about severe RLS

Table 1. Comparison of some descriptive characteristics of the pregnant women in the RLS group and the non-RLS group.

Characteristics (n=109)	RLS group (n=52)		Non-RLS group (n=57)		Test statistics*
Age					
21–29	30	27.52	33	30.28	p=0.961
30–34	11	10.09	11	10.09	χ^2=0.080
35 and above	11	10.09	13	11.93	
Mean±SD	29.88±5.97		29.74±5.69		
Educational level					
Elementary school	8	7.34	11	10.09	p=0.828
Secondary school	30	27.52	30	27.52	χ^2=0.378
High school	14	12.84	16	14.68	
Employment status					
Yes	10	9.17	10	9.17	p=0.820
No	42	38.53	47	43.12	χ^2=0.052
Smoking status					
Yes	2	1.83	5	4.59	p=0.295
No	50	45.87	52	47.71	χ^2=1.098
Gravida					
1–2	24	22.02	34	31.19	p=0.158
3 and above	28	25.69	23	21.10	χ^2=1.989
Parity					
Nulliparity (0)	18	16.51	26	23.85	p=0.285
Primiparity (1)	22	20.18	16	14.68	χ^2=2.511
Multiparity (2 and above)	12	11.01	15	13.76	
History of abortus					
Yes	24	22.02	14	12.84	p=0.018†
No	28	25.69	43	39.45	χ^2=5.583
Weight gained during pregnancy					
Between 0–8 kg	20	18.35	12	11.01	p=0.083
Between 9–12 kg	14	12.84	25	22.94	χ^2=4.989
Above 13 kg	18	16.51	20	18.35	
Body mass index					
Between 18.5–24.9 kg/m^2	5	4.59	9	8.26	p=0.022†
Between 25–29.9 kg/m^2	32	29.36	20	18.35	χ^2=7.629
Between 30–34.9 kg/m^2	15	13.76	28	25.69	

*Chi-square test; †$p<0.05$. **SD:** standard deviation.

Table 2. Complaints of pregnant women with and without RLS.

Characteristics (n=109)	RLS group (n=52)		Non-RLS group (n=57)		Test statistics*
	Number (n)	Percentage (%)	Number (n)	Percentage (%)	
Chronic illness					
Yes	7	13.5	4	7.0	p=0.265
No	45	86.5	53	93.0	χ^2=1.245
Regular medication use					
Yes	14	26.9	6	10.5	p=0.027†
No	38	73.1	51	89.5	χ^2=4.880
Fatigue					
Yes	48	92.3	22	38.6	p=0.000‡
No	4	7.7	35	61.4	χ^2=34.141
Cramp					
Yes	44	84.6	11	19.3	p=0.000‡
No	8	15.4	46	80.7	χ^2=46.409
Sleep apnea					
Yes	10	19.2	0	0	p=0.001‡
No	42	80.8	57	100	χ^2=12.069
Desire to sleep					
Yes	35	67.3	13	22.8	p=0.000‡
No	17	32.7	44	77.2	χ^2=21.851

*Chi-square test; †p<0.05; ‡p<0.01.

and 20.2% complained about moderate RLS. According to the Restless Legs Syndrome Severity Scale, the total score of pregnant women was calculated 20.75±6.40 (range 10–34).

When the effect of the RLS on quality of life was evaluated, it was seen that the total quality of life scale score of the RLS group was 17.75±3.73 and that of the non-RLS group was 26.46±2.67. A statistically significant difference was found between the total quality of life scale scores (p≤0.005). As for the sub-dimensions of the quality of life scale, a statistically significant difference was found in physical and psychological health sub-dimensions between the RLS group and the non-RLS group (p≤0.005). No significant difference was found in social relations and environment domains (p≥0.005) (**Table 3**).

When the effect of the RLS on sleep quality was examined, it was observed that the third trimester PSQI scores of all pregnant women were found to be 7.73±3.91. The PSQI total scale score of the RLS group was calculated 10.77±3.14, while that of the non-RLS group was found to be 4.96±2.31. Thus, it can be stated that a statistically significant difference was revealed between the PSQI total scale scores of the pregnant women in the RLS and non-RLS groups (p≤0.005).

Table 3. Comparison of the WHOQOL-BREF scores of the RLS group and the non-RLS group.

WHOQOL-BREF subscale	RLS group (n=52)	Non-RLS group (n=57)	Test statistics*	p-value
Physical health	9.69±2.21	11.35±1.28	-4.851	0.000†
Psychological health	25.35±4.93	30.46±2.94	-6.643	0.000†
Social relationships	10.56±2.15	10.89±1.52	-.953	0.343
Environmental health	27.79±4.67	28.47±4.69	-.763	0.447
QOL score	17.75±3.73	26.46±2.67	-.763	0.000†

*Independent sample t-test; †p<0.01. **SD:** standard deviation.

Table 4. Comparison of the PSQI scores of the RLS and non-RLS groups.

PSQI subscale	RLS group (n=52)	Non-RLS group (n=57)	p-value	Test statistics*
Subjective sleep quality	1.10±0.74	1.63±0.90	0.001†	-3.362
Sleep latency	2.21±0.82	1.09±0.95	0.000†	6.566
Sleep duration	1.10±0.98	0.72±0.86	0.034‡	2.142
Sleep disturbance				
Daytime dysfunction	1.67±1.07	1.56±0.70	0.000†	5.657
Use of sleep medication	0.08±0.33	0.07±0.37	0.921	0.099
Sleep efficiency	1.42±1.29	1.46±1.23	0.891	-0.137
Total PSQI score	10.77±3.14	4.96±2.31	0.000†	11.547

*Independent sample t-test; †p<0.01; ‡p<0.05. **SD:** standard deviation.

Sleep quality of pregnant women in the RLS group was lower than the pregnant women in the non-RLS group. When the mean scores on the PSQI scale sub-dimensions were compared, a statistically significant difference was found between the pregnant women in the RLS and non-RLS groups in terms of subjective sleep quality, sleep duration, sleep disturbance, and daytime dysfunction due to sleepiness sub-dimensions (p≤0.005) (**Table 4**). When the relationship between RLS and PSQI was examined, a positive correlation was found between the presence of RLS and the PSQI total score. Accordingly, the PSQI scores of the pregnant women with RLS increased, and as RLS became more severe, sleep quality deteriorated (**Table 5**).

Discussion

RLS is a common health problem during pregnancy. The symptoms usually begin in the second trimester, peaking in the third trimester, and they improve about a month after birth.[25] In the present study, we detected the RLS in 52 of 109 pregnant women. The prevalence of RLS in the last trimester was 47.7%.

A similar study conducted with pregnant women in Turkey found that the incidence of RLS in pregnant women was 46.4%, while in another study it was determined 44.6%.[26,27] In this study, the prevalence of RLS in pregnant women was similar to the rate reported in the national literature, while it was higher than the rate reported in previous studies conducted in different coun-

Table 5. Correlations between RLS score, PSQI score and WHOQOL-BREF subscale scores.

Total RLS score	r*	p-value
PHD	-0.524	0.000†
PSYD	-0.555	0.000†
SRD	-0.154	0.109
ED	-0.160	0.097
QOL score	-0.812	0.000†
Subjective sleep quality	-0.369	0.000†
Sleep latency	0.538	0.000†
Sleep duration	0.234	0.014‡
Sleep disturbance	0.460	0.000†
Daytime dysfunction	0.484	0.000†
Use of sleep medication	0.135	0.163
Sleep efficiency	0.013	0.894
Total PSQI score	0.803	0.000†

*Spearman's correlation coefficient; †p<0.01; ‡p<0.05. **ED:** environment domain; **PHD:** physical health domain; **PSYD:** psychological health domain; **SRD:** social relations domain.

tries.[28–30] This difference may be due to the variations in the sample.

When we examined the severity of RLS in pregnant women, we found that 22.0% of the pregnant women had severe and 20.2% had moderately severe RLS. Another study conducted in Turkey reported the severity of RLS as mild in 5.2%, moderate in 45.7%, severe in 40.5%, and very severe in 8.6% of the participants.[26] One study conducted in Riyadh, Saudi Arabia revealed that 25% of the pregnant women had severe/very severe RLS and 75% had mild/moderate RLS.[28] The findings in the literature are consistent with our findings. Our study has revealed that RLS is an important health problem during pregnancy. Healthcare professionals caring for pregnant women should assess the presence of RLS symptoms.

Sleep-disordered breathing (SDB) and obstructive sleep apnea are common during pregnancy.[31] In this study, among the RLS complaints, we reported fatigue, cramps, regular medication use, sleep apnea and desire to sleep more in the RLS group. Similarly, more fatigue and sleepiness were identified in pregnant women with RLS in Sweden.[32] A similar study conducted in Thailand found that pregnant women with RLS had higher daytime sleepiness and desire to sleep.[29] One study carried out in Turkey revealed that RLS and obstructive sleep apnea symptoms during pregnancy are related.[33] Another study conducted in Turkey also reported that snoring, apnea, fatigue after sleep, and fatigue during the day were significantly higher in those diagnosed with RLS than in those who were not.[34] One study conducted in the US found that 38% of the pregnant women experienced insufficient night sleep, 49% had daytime sleepiness, and 19% had irregular breathing symptoms during sleep.[35] The findings in the literature coincide with our findings. In addition to hormonal changes during pregnancy, complaints such as abdominal discomfort, back pain, leg cramps, and frequent urination, which increase with the pressure exerted by the growing uterus on the diaphragm, disrupt the sleep pattern of pregnant women.[36] In our study, we found that sleep quality of pregnant women with RLS was worse than that of the pregnant women without RLS. In addition, we observed a significant difference between pregnant women with RLS and those without RLS in terms of subjective sleep quality, sleep duration, sleep disturbance, and daytime dysfunction sub-dimensions of the PSQI. One study conducted in India also revealed that sleep quality was lower in pregnant women with RLS and the presence of RLS in 92% of pregnant women was associated with daytime sleepiness.[37] Another study conducted in Slovakia reported that 50% of the pregnant women with RLS had sleep disorders.[17] It is stated that 24% of pregnant women in the USA have RLS symptoms and 76% of them have poor sleep quality.[35]

In our study, we found that the quality of life of the pregnant women with RLS was worse than that of the pregnant women without RLS. The WHOOBREF total score was 17.75±3.73 for the RLS group and 26.46±2.67 for the non-RLS group (p=0.000). Similarly, some studies conducted in Turkey revealed that women with RLS scored lower on all SF-36 Quality of Life subscales than women without RLS and had a lower quality of life.[26,38] The quality of life during pregnancy should be evaluated by the health personnel, and the pregnant women should be informed about the care and practices aimed at improving the quality of life in pregnant women reporting RLS complaints.

In our study, the PSQI mean score was 10.77±3.14 for the RLS group and 4.96±2.31 for the non-RLS group (p=0000). One study conducted in Thailand reported the PSQI mean scores of the RLS and non-RLS groups 8.63±3.71 and 7.77±3.21, respectively (p=0.26).[29] During pregnancy, sleep problems, including conditions other than RLS, should be investigated, and health professionals should give training to pregnant women about practices aimed at improving sleep patterns. According to the PSQI, 83.1% of the participants had good sleep quality, 14.2% had daytime sleepiness, and 21.9% had RLS.[37] Those with the RLS were reported to have lower sleep quality, poor daytime function, and excessive daytime sleepiness.[39] It is important to ensure adequate and balanced sleep during pregnancy. Complications such as RLS may occur when there is a lack of sleep. Health education on sleep hygiene is needed to raise awareness of pregnant women admitted to antenatal clinics about RLS, to improve their sleep quality, and to eventually reduce RLS.[37] It is recommended that healthcare professionals plan smoking cessation, nutritional education, sleep hygiene and similar interventions to improve the quality of life of pregnant women with RLS.[26]

Limitations of the study

Our study was carried out in a single center with a small sample size. While the sample size is sufficient to

estimate the prevalence of RLS, it is not large enough to identify certain predictive factors of RLS during pregnancy. Therefore, it is recommended to conduct further multi-center studies with larger sample sizes.

Conclusion

The findings indicate that almost half of the pregnant women in the study experienced RLS, and one out of every five pregnant women experienced severe or very severe RLS. A significant relationship was found between RLS and subjective sleep quality, sleep duration, sleep disturbances, and daytime dysfunction in pregnant women. As for the sub-dimensions of the Quality of Life Scale, a statistically significant difference was observed in the physical and psychological health sub-dimensions of the pregnant women with RLS. In addition, a negative relationship was revealed between RLS severity and the physical health and psychological health subdimensions of the Quality of Life Scale, suggesting that the increase in RLS severity is accompanied by a decrease in quality of life, causing sleep problems and impaired sleep quality. Based on these results, we recommend that pregnant women are regularly monitored during the prenatal period in terms of RLS, and sleep and quality of life measurements are performed using the standard measurement tools.

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Compliance with Ethical Standards: The authors stated that the standards regarding research and publication ethics, the Personal Data Protection Law and the copyright regulations applicable to intellectual and artistic works are complied with and there is no conflict of interest.

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