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THE RELATIONSHIP BETWEEN PREGNANCY STRESS AND SLEEP QUALITY WITH TRIMESTER

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Abstract

This study was conducted to evaluate pregnancy stress and sleep quality according to trimester. The study, which was planned as a descriptive cross-sectional type, was carried out with 148 pregnant women. Data were collected using a personal information form, PSAS-36 and PSQI. Descriptive statistics, One Way ANOVA, Kruskal Wallis, Mann Whitney U, Independent Two Sample Test and were used in the analysis of the data. The total of 33.1% of the pregnant women were in the first trimester, 33.1% were in the 2nd trimester and 33.8% were in the 3rd trimester. There was no statistically significant difference between the mean PSAS-36 total scores of the pregnant women according to the trimester ($p < 0.05$). However, it was observed that there was a statistically significant difference between the mean PSQI scores of pregnant women according to trimester ($p < 0.001$). Poor sleep quality rates were 44.9% in the 1st trimester, 38.8% in the 2nd trimester & 64% in the 3rd trimester. A positive and significant correlation was found between the PSAS-36 and the total PSQI score (r: 0.246; $p < 0.05$). Increased total pregnancy stress score and being in the 3rd trimester of pregnancy is significantly increases the total score of PSQI (p: 0.001, p: 0.005). It was determined that the stress level of pregnant women was high in all three trimesters, and the worst sleep quality was experienced in the third trimester. Sleep quality decreases as the level of pregnancy stress increases and in the third trimester of pregnancy. It is recommended that midwives and nurses evaluate stress and sleep quality during pregnancy with objective tests and take interventions to reduce the stress level of pregnant women and increase sleep quality.

Keywords: Pregnancy, Trimester, Pregnancy Stress, Sleep Quality

GEBELİK STRESİ VE UYKU KALİTESİNİN TRİMESTER İLE İLİŞKİSİ

Özet

Bu çalışma, trimestere göre gebelik stresi ve uyku kalitesinin değerlendirilmesi amacıyla yapılmıştır. Tanımlayıcı kesitsel tipte planlanan çalışma Ekim 2019-Mart 2020 tarihleri arasında bir eğitim ve araştırma hastanesinin kadın hastalıkları ve doğum polikliniğine başvuran 148 gebe ile gerçekleştirilmiştir. Veriler kişisel bilgi formu, Gebelik Stresini Değerlendirme Ölçeği (GSDÖ-36) ve Pittsburgh Uyku Kalitesi İndeksi (PUKİ) ile toplanmıştır. Verilerinin analizinde tanımlayıcı istatistikler, One Way ANOVA, Kruskal Wallis, Mann Whitney U, Bağımsız İki Örnek Testi ve Spearman Korelasyon analizi kullanılmıştır. Katılımcıların %33.1'i birinci, %33.1'i ikinci ve %33.8'inin üçüncü trimester gebedir. Trimestere göre gebelerin GSDÖ-36 toplam puan ortalamaları arasında istatistiksel olarak an-lamlı bir fark saptanmamıştır (p<0.05). Ancak trimestere göre gebelerin PUKİ puan ortalamaları arasında istatistiksel olarak anlamlı bir fark olduğu saptanmıştır (p <0.001). Kötü uyku kalitesi oranları 1.trimesterde %44.9, 2. trimesterde %38.8 iken 3. trimesterde %64 olduğu belirlenmiş-tir. GSDÖ-36 ile PUKİ toplam puanı arasında pozitif yönde anlamlı ilişki saptanmıştır (r: 0.246; p <0.05). Gebelik stresi toplam puanının artması ve gebeliğin 3. trimesterinde olmak PUKİ top-lam puanını anlamlı olarak artırmaktadır (p: 0.001, p: 0.005). Gebelerin stres düzeyinin üç trimesterde de yüksek olduğu, en kötü uyku kalitesinin üçüncü trimesterde olduğu saptanmıştır. Gebelik stres düzeyi arttıkça ve gebeliğin üçüncü tri-mesterinde uyku kalitesi kötüleşmektedir. Ebe ve hemşirelerin gebelikte stres ve uyku kalitesini objektif testler ile değerlendirmesi, gebelerin stres düzeyini azaltacak ve uyku kalitesini artıracak müdahalelerde bulunması önerilmektedir.

Anahtar Kelimeler: Gebelik, Trimester, Gebelik Stresi, Uyku Kalitesi

1. INTRODUCTION

Pregnancy is a period in a woman's life that includes physical, biological, psychological and social changes. As the pregnancy progresses, the changes experienced by women and the processes of adaptation to their new roles change as well (1,2). Although the pregnancy period is a process that encompasses affirmative emotions, it can cause stress and anxiety due to the changes that occur (3,4). While the first trimester includes the acceptance of pregnancy and ambivalent feelings, in the second trimester, a more calm and peaceful process is experienced by accepting the pregnancy with the feeling of baby movements. In the third trimester, pregnant women may commonly feel fear, excitement or anxiety incidental to childbirth (1).

Pregnancy-specific stress due to pregnancy and childbirth-related causes relates to physical symptoms/ bodily changes, fears about labor and delivery, concerns about the baby's health, and changing roles (4-6). Stress experienced during pregnancy affects women's self-care capacity and healthy life behaviours (7). At the same time, the stress experienced during this period causes psychological consequences such as anxiety, depression, weak mother-baby attachment, as well as many physiological negative pregnancy and birth outcomes such as nausea-vomiting, constipation, sleep problems, premature birth, low birth weight, and intrauterine development (8-11).

Stress experienced during pregnancy has many effects on women's quality of life. There is a strong relationship between the stress experienced during this period and sleep problems. Stressful pregnant women may have sleep problems, and sleep problems may cause stress levels to aggravate (12). According to the study of Hayase et al. concerning risky pregnancies, it was reported that stress levels increased, and sleep quality deteriorated especially in the last trimester, and increased stress levels were associated with shorter sleep duration and poor sleep quality (13). Similarly, other studies have revealed that increased stress negatively affects sleep quality (12,14). Ertekin Pınar et al. determined in their studies, as the sleep quality of pregnant women worsens, the perceived stress increases (15).

Sleep, which is a physiological need in human life, affects the quality of life and health of the individual (15). Epidemiological studies have demonstrated that the need for sleep increases during pregnancy (16). However, hormonal changes such as the increase in progesterone, physical changes resulting in weight gain, back pain, fetal movements, and psychological changes such as anxiety and stress affect the sleep quality of pregnancy symptoms (15-17). All these changes can cause common sleep problems during pregnancy (12,18). While the tendency to sleep during the day and total sleep time increase in the first trimester of pregnancy, sleep problems tend to increase in the last trimester (17). Poor sleep quality during pregnancy is associated with adverse maternal, fetal and neonatal outcomes such as preterm delivery, prolonged labor, increased caesarean section rates, preeclampsia, postpartum depression, intrauterine growth retardation, and neonatal infections (16,18-20). Good sleep quality is essential for a healthy pregnancy (21).

There are studies (7,12,15) available in the literature on sleep quality or perceived stress during pregnancy yet no study evaluating pregnancy-specific stress and sleep quality by trimester has been found. The aim of this study is to evaluate how pregnancy stress and sleep quality change according to trimester.

2. MATERIALS AND METHODS

2.1. Type of Research

The study was planned as a descriptive and cross-sectional study in order to evaluate how pregnancy stress and sleep quality change according to trimesters.

2.2. Place and Duration of Research

The study was conducted with pregnant women who applied to the obstetrics and gynaecology outpatient clinic of a training and research hospital between October 2019 and March 2020.

2.3. Universe and Sample of the Research

The universe of the study consists of pregnant women who applied to Gynaecology and Obstetrics Polyclinic of Gulhane Training and Research Hospital between October 2019 and March 2020. The sample of the study consisted of 148 pregnant women who met the inclusion criteria and volunteered to participate in the study. Individuals between the age range of 18 and 49 who were literate in Turkish, who were not diagnosed with risky pregnancy, who did not have any fetal anomalies, who did not have a diagnosed/treated psychiatric disease, and who volunteered to participate in the study were included in the study. Women who conceived with assisted reproductive techniques and had multiple pregnancies were excluded from the study.

2.4. Collection of the Data

"Personal Information Form", "Pregnancy Stress Assessment Scale (PSAS-36)" and "Pittsburg Sleep Quality Index (PSQI)" were used to collect data. Before giving the questionnaires to the pregnant women, the purpose of the study was explained, and after the written consent of the pregnant women who volunteered to participate in the study were taken, they were provided with the questionnaire and filled in individually. It took approximately 10-15 minutes for the participants to fill out the forms.

2.5. Data Collection Tools

2.5.1. Personal Information Form

The form prepared by the researchers by examining the relevant literature (12,15,17,19) consists of 12 questions about the socio-demographic and obstetric history of pregnant women.

2.5.2. Pregnancy Stress Assessment Scale (PSAS-36)

The scale developed by Chen in 2015 is used to define pregnancy-related stress factors among pregnant women (22). The scale consists of 36 questions and 5 sub-dimensions in total. The stress sub-dimension arising from the search for a safe process for the mother and the baby during pregnancy, labor process and birth consist of the first-ninth questions, the stress sub-dimension arising from the baby care and changing family relations consist of the tenth-eighteenth questions, and the stress sub-dimension arising from the definition of the maternal role consists of the nineteenth-twenty-sixth questions, the sub-dimension of stress arising from seeking social support consists of the twenty-seventh-thirtieth questions, and the sub-dimension of stress arising from altered physical appearance and function consist of the thirty-first-thirty-sixth questions. The scale is a 5-point Likert-type scale, with the degree of concern, distress and anxiety being "absolutely no", "mild", "moderate", "serious" or "very serious", and scores ranging from 0 to 4 are given. The lowest 0 and the highest

144 points can be obtained from the scale. The validity and reliability study of the scale was conducted by Akın in 2018 and the Cronbach alpha coefficient is 0.923 (23).

2.5.3. Pittsburg Sleep Quality Index (PSQI)

The Pittsburg Sleep Quality Index was developed by Buysse et al. (1989) to assess sleep quality (24). The index is used to evaluate sleep quality in the last one. It consists of 19 questions and 7 components in total. Each question is scored between 0-3 and the total score is obtained from the sum of 7 components. The score is calculated over 18 items and 7 components and varies between 0-21. A total index score of ≤5 indicates "good sleep" quality, and >5 indicates "bad sleep" quality. Agargün et al. (1995) performed the validity and reliability of the index and the Cronbach alpha coefficient is 0.80 (25).

2.6. Evaluation of Data

The data obtained from the study were analyzed using the SPSS 20.0 computer package program. Parametric or non-parametric distribution of the data was evaluated with the Single Sample Kolmogorov Smirnov test. One Way ANOVA, Kruskal Wallis, Independent Two Samples T and Mann Whitney U tests were used to compare the PSAS-36 and PSQI score averages according to the descriptive and obstetric characteristics of the pregnant women, and the Chi-square test was used to compare the PSQI scores by trimester. Pearson Correlation test was used to compare the scale scores. The effect of independent variables on the mean score of PSQI was evaluated with multiple linear regression analysis. The enter method was used while the independent variables were included in the model. The error level for all analyses was determined as 0.05.

2.7. Ethical Aspect of Research

Ethical permission for the study was obtained from the Health Sciences University Non-Interventional Research Ethics Committee (no: 19/296, date: 25.09.2019). After informing all pregnant women about the purpose of the study, their written consent was obtained. The study was conducted in accordance with the principles of the Declaration of Helsinki.

3. RESULTS

It was determined that the mean PSAS-36 scores of the pregnant women were 99.04 ± 21.03 in the 1st trimester, 89.84 ± 27.23 in the 2nd trimester and 100.1 ± 25.98 in the 3rd trimester. The dimensions of the pregnancy stress assessment scale of pregnant women are "stress from seeking safe passage for mother and child through pregnancy, labor and delivery", "stress from baby care and changing family", "stress from maternal role identification", "stress from social support seeking". When the total scores of "stress due to pregnancy stress" and pregnancy stress assessment scale were compared according to three trimesters, no statistically significant difference was found between them ($p < 0.05$). It was determined that the sub-dimensions "stress from altered physical appearance and function" differed significantly according to the three trimesters ($p < 0.05$) and the average score obtained in the third trimester was higher than the other trimester (Table 1).

Table 1. Comparison of PSAS-36 total and sub-dimension mean scores of pregnant women according to trimester

	1st trimester	2nd trimester	3rd trimester	Total Score

	Mean±SD	Mean±SD	Mean±SD	Test and p value	
1.Stress from seeking safe passage for mother and child thorough pregnancy, labor, and delivery	28.47±7.3	26.57±8.44	29.72±6.01	2.324 0.102[x]	28.26±7.37
2.Stress from baby care and changing family relationships	24.65±5.79	23.18±8.96	23.84±7.44	1.524 0.467[y]	23.89±7.48
3.Stress from maternal role identification	22.02±6.83	19.45±7.76	20.76±7.81	2.331 0.312[y]	20.74±7.50
4.Stree from social support seeking	7.59±3.65	6.47±3.29	8.16±4.11	5.294 0.071[y]	7.41±3.74
5.Stress from altered physical appearance and function	16.31±5.46[ab]	14.16±5.93[a]	17.62±6.42[b]	6.436 **0.040**[y]	16.04±6.08
PSAS-36 Total	99.04±21.03	89.84±27.23	100.1±25.98	3.712 0.156[y]	96.35±25.15

[x]:One Way ANOVA
[y]:Kruskal Wallis
[a-b]: There is no difference between groups with the same letter.

Good and bad sleep rates depend on trimester (p <0.05). Poor sleep quality rates were 44.9% in the 1st trimester, 38.8% in the 2nd trimester, and 64% in the 3rd trimester (Figure 1). Similarly, sleep quality total score averages differ according to trimester, and the PSQI score average obtained in the third trimester was higher than all other trimesters (p <0.001) (Table 2).

No statistically significant difference was found between the total mean scores of PSAS-36 and PSQI according to the sociodemographic characteristics of the pregnant women, age, educational status, employment status, economic status, place of residence and smoking status (Table 3).

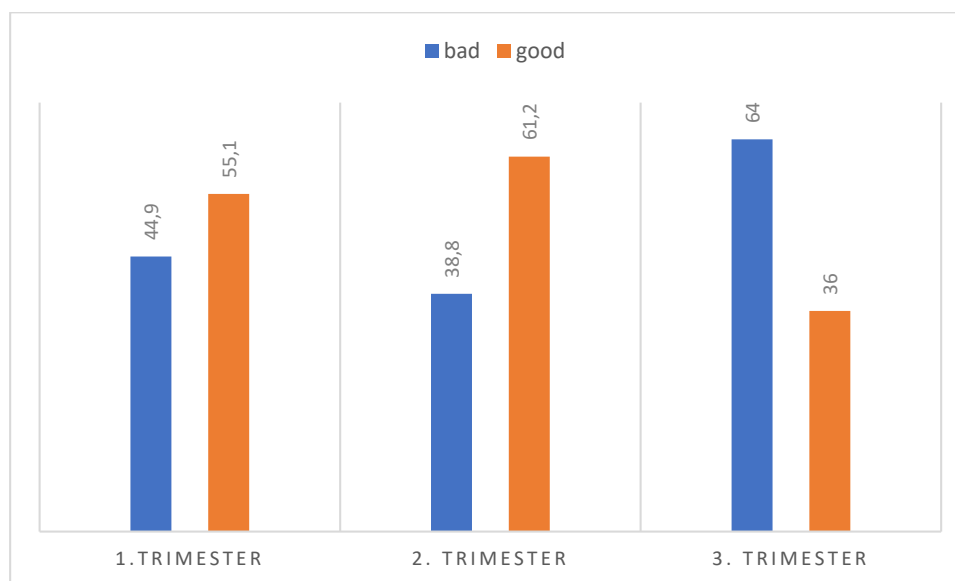**Fig 1. Sleep quality rates of pregnant women by trimester**

Table 2. Comparison of sleep quality rates of pregnant women according to trimesters

	1st trimester (n=49)	2nd trimester (n=49)	3rd trimester (n=50)	p value
PSQI good (≤5)	27 (%55.1)[ab]	30 (%61.2)[a]	18 (36.0)[b]	**0.032***
PSQI is bad (>5)	22 (44.9)[ab]	19 (%38.8)[a]	32 (64.0)[a]	
	Mean ± SD	Mean ± SD	Mean ± SD	
PSQI Total	5.57±2.50[a]	4.73±2.37[a]	7.00±2.69[b]	**<0.001[b]**

*Chi-square test
[a-b]: There is no difference in sleep rates between trimesters with the same letter.

Table 3. Comparison of sociodemographic characteristics of pregnant women with PSAS-36 and PSQI scores

			PSAS-36	Test and p value	PSQI	Test and p Value
Age						
≤25	47	31.8	103.0 (47-134)	2.300	6 (1-11)	1.546
26-30	52	35.1	87.5 (53-133)	0.317[x]	5 (0-12)	0.462[x]
≥30	49	33.1	101.0 (36-166)		6 (0-13)	
Education						
Primary education	40	27.0	100.3±26.7	0.723	6 (0-12)	0.430
High school	51	34.5	94.1±24.4	0.487[y]	5 (1-12)	0.807[x]
University	57	38.5	95.5±24.9		6 (2-13)	
Employment Status						
Yes	39	26.4	99.6±26.4	0.936	5 (0-13)	2.128
No	109	73.6	95.2±24.7	0.351[z]	6 (0-12)	0.991[q]
Economic Situation						
Income more than expenses	17	11.5	89.0 (36-121)	2.833 0.243[x]	5 (2-8)	3.696 0.158[x]
Income equals expense	98	66.2	101.5 (36-166)		6 (0-13)	
Income less than expenses	33	22.3	94.0 (51-149)		5 (2-12)	
Living place						
City center	101	68.2	95.8±26.2	-0.423	5 (0-13)	2.456
Rural	47	31.8	97.6±23	0.673[Z]	5 (2-12)	0.732[q]
Smoking Status						
Smoker	20	13.5	107.5 (36-131)	-0.499	5.5 (0-10)	1.452
Non-Smoker	128	86.5	97.5 (36-166)	0.618[q]	5 (2-13)	0.331[q]

[x]: Kruskal Wallis Test, [y]: One Way ANOVA, [z]: Independent Two-Sample T-Test, [q]: Mann Whitney U-Test

When the sociodemographic characteristics of the pregnant women were examined, the mean age was determined as 28.56±5.31 (minimum: 18, maximum: 44). 38.5% of pregnant women are university graduates. It was determined that 73.6% of the women were not working and 66.2% of them were equal to their income. It was determined that 68.2% of the women lived in the city center and 86.5% did not smoke (Table 3). When the obstetric characteristics were examined, it was determined that 33.1% of the pregnant women were in the first trimester, 33.1% were in the second trimester and 33.8% were in the third trimester. It was determined that 33.8% of the women had their first pregnancy and 29.1% did not have a history of D&C. It was determined that 69.6% of the women had planned pregnancies and 70.3% did not attend any training on pregnancy and childbirth (Table 4).

Table 4. Comparison of obstetric characteristics of pregnant women with PSAS-36 and PSQI scores

			PSAS-36	Test and P Value	PSQI	Test and P Value
Trimester						
1st trimester	49	33.1	103 (53-139)	3.712	5 (2-12)[a]	16.380
2nd trimester	49	33.1	88 (36-136)	0.156[X]	4 (0-10)[a]	**<0.001[x]**
3rd trimester	50	33.8	100.5 (49-166)		7 (2-13)[b]	
Gravida						
First pregnancy	50	33.8	95.2±25.4	1.244	5 (1-13)	1.365
Second pregnancy	48	32.4	100.9±24.8	0.291[y]	5 (0-12)	0.505[x]
Third pregnancy and more	50	33.8	93.2±25.1		6 (0-12)	
History of D&C*						
Yes	105	70.9	95.8±26.5	-0.457	6 (0-13)	2.298
No	43	29.1	97.7±21.9	0.649[z]	5 (0-12)	0.863[q]
Pregnancy planning status						
Planned pregnancy	103	69.6	95.6±25.4	-0.554	5 (0-12)	2.482
Unplanned pregnancy	45	30.4	98.1 ± 24.7	0.580[z]	6 (1-13)	0.489[q]
Participation in education about pregnancy and birth						
Yes	44	29.7	98.4±27.9	0.639	5 (0-13)	2.615
No	104	70.3	95.5±24	0.524[z]	6 (1-12)	0.167[q]

[x]: Kruskal Wallis Test, [y]: One Way ANOVA, [z]: Independent Two-Sample T-Test, [q]: Mann Whitney U-Test
[a-b]: There is no difference between groups with the same letter.
*D&C: Dilation and Curettage

No statistically significant difference was found between the total mean scores of PSAS-36 and PSQI according to the obstetric characteristics of the pregnant women, the number of pregnancies, D&C history, pregnancy planning status, and participation in education about pregnancy/birth. However, it was found that there was a statistically significant difference between the mean PSQI scores of pregnant women according to trimester ($p < 0.001$) (Table 4).

Total sleep quality and total pregnancy stress score (r: 0.246; $p < 0.05$), and its sub-dimensions "stress from seeking safe passage for mother and child through pregnancy, labor and delivery" (r: 0.289; $p < 0.001$), " A significant positive correlation was found between the stress from maternal role identification (r: 0.179; $p < 0.05$) and the "stress from the altered physical appearance and function" (r: 0.302; $p < 0.005$). As the pregnant women's "stress from seeking safe passage for mother and child through pregnancy, labor and delivery", "stress from maternal role identification" and "stress from the altered physical appearance and function" increase, their sleep quality also deteriorates (Table 5).

Table 5. The relationship between pregnancy stress and sleep quality

PSAS-36	PSQI r	p value
PSAS-1	0.289	**< 0.001**[**]
PSAS-2	0.145	0.080
PSAS-3	0.179	**0.030**[*]
PSAS-4	0.086	0.297
PSAS-5	0.302	**< 0.001**[**]
PSAS-36 Total	0.246	**0.003**[*]

[*]$p < 0.05$, [**]$p < 0.001$, r: Spearman correlation coefficient was used.

In the multiple linear regression analysis applied in our study, the effects of trimester and pregnancy stress total score variables on the total score of PSQI were examined. As a result, it was determined that the total score of pregnancy stress and being in the third trimester of pregnancy had

a significant effect on the total score of PSQI (p = 0.001, p = 0.005). According to the model, when there is a 1-unit increase in the total score of pregnancy stress, there will be an increase of 0.027 in the score that the pregnant woman will receive. There will be an increase of 1,400 in the score of those in the 3rd trimester of pregnancy compared to the pregnant women in the 1st and 2nd trimesters. The model explains 16.6% of the PSQI score (Table 6).

Table 6. Determination of the predictors affecting the mean PSQI score of pregnant women

	B (95% CI)	Beta	t	p	Zero-order	Partial
(Constant)	2.931 (1.189-4.673)	-	3.326	0.001		
Pregnancy stress total score	0.027 (0.011-0.043)	.250	3.264	**0.001**[*]	.296	0.26
2nd trimester pregnancy	-0.591 (-1.581-0.398)	-.104	-1.182	0.239	-.274	-0.09
3rd trimester pregnancy	1.400 (0.427-2.374)	.248	2.844	**0.005**[†]	.327	0.23

[*]p<0.001; [†]p<0.05. B: non-standardized coefficient; Beta: standardized coefficient; F=10.781, p<0.001, Adj.R^2 =0.166, SE=2.449

Fig 2. Pregnancy stress levels of pregnant women by trimester
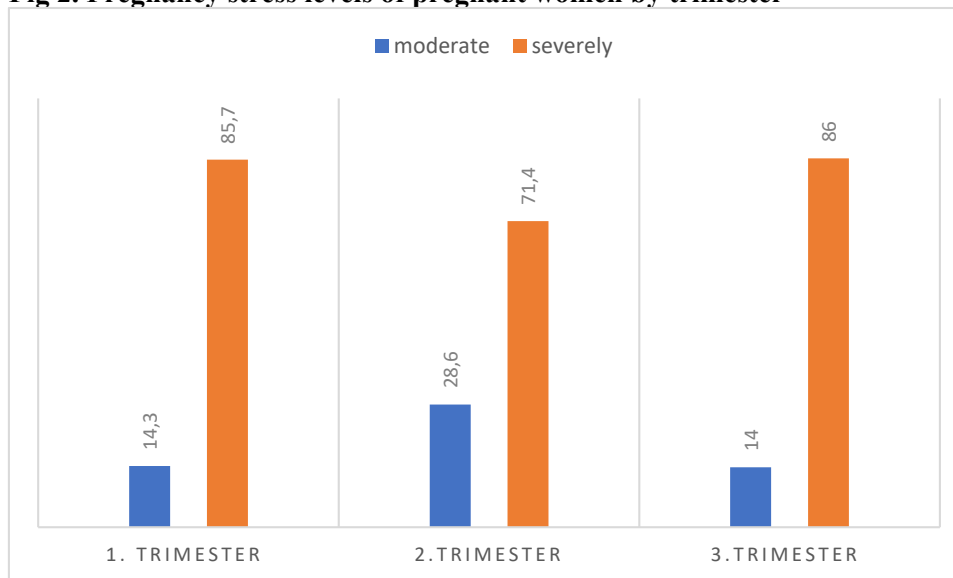
4. DISCUSSION

In this study, which was conducted to examine the relationship between pregnancy stress and sleep quality of pregnant women by trimester, it was determined that pregnancy stress did not differ according to trimester and the stress level was high in all three trimesters. It was determined that the sleep quality of the pregnant women's' differed according to the trimester, and the best sleep rates were in the second trimester and the worst in the third trimester. In addition, it was determined that as pregnancy stress levels increased, sleep quality worsened. It was determined that being in the third trimester of pregnancy and having high pregnancy stress scores worsened the sleep quality.

During the perinatal period, pregnant women may experience stress for various reasons such as caregiving difficulties, problems with the fetus, behaviours of integrating the child with external life, and economic concerns that will continue for life (26). In this study, it was determined that pregnancy stress (respectively; 99.04 ± 21.03, 89.84 ± 27.23, 100.1 ± 25.98) was above the average in all first, second and third trimester pregnant women (Figure 2). Similar to our findings, in various studies examining the stress level of pregnant women, it was determined that pregnancy stress was above the average (2,7,27,28). Unlike our findings, in a study conducted in Turkey (29) it was

determined that the stress level in pregnant women was quite low (40.13 ± 31.22). Our findings are largely similar to the literature. However, it is thought that the reason for lower pregnancy stress levels in a study may be due to the limitations of the research or the socio-demographic characteristics of the pregnant women. The high stress level of pregnant women was considered as a remarkable finding. Considering the potential effects of anxiety and stress experienced in the perinatal period on sleep quality, birth outcomes and maternal mental health, it should be considered to evaluate the stress level of pregnant women more than once during the perinatal period (26,30). It is important for nurses and midwives to determine the pregnancy stress level by using reliable measurement tools in prenatal care processes, in terms of providing the opportunity for appropriate interventions on time. In a meta-analysis study, it was emphasized that perinatal anxiety and stress are quite common and should be considered clinically (31). Various activities and regular routines can be recommended in order to relax pregnant women in the prenatal period and to reduce the risks of prenatal stress and anxiety (27).

In our study, it was found that the stress levels of pregnant women did not differ according to trimester. It is thought that this is due to the presence of different stress factors that develop due to various psychological and physiological changes in each trimester of pregnancy. In a similar study conducted in Turkey, it was determined that the mean pregnancy stress score of pregnant women did not differ according to the gestational month (7). Hou et al. also determined in their study that low, medium and high pregnancy stress levels did not differ according to the gestational week (27). Our findings are in conformity with the literature, and no other study comparing pregnancy stress by trimester could be found.

Studies conducted in different cultures demonstrate that women's self-esteem is significantly based on physical attractiveness. During pregnancy, pregnant women experience significant changes in their appearance. In this study, it was determined that the levels of "stress from altered physical appearance and function", one of the sub-dimensions of the pregnancy stress assessment scale, differed in three trimesters and the stress levels experienced by pregnant women in the third trimester were at the highest level. Skouteris et al. also reported in their study that late pregnancy is associated with dissatisfaction rather than with body image (32). These data are in line with the literature and emphasize the importance of taking steps to protect their body image in a positive way with appropriate interventions to reduce the increased stress caused by the changing physical appearance of women in the third semester and to provide weight control.

It was determined that there was no difference between the pregnancy stress levels according to the sociodemographic and obstetric characteristics of the pregnant women. In a study comparing low and high stress levels in Nepal in terms of sociodemographic and obstetric characteristics, it was seen that they differed according to age, education, family type, income level and marital status, but did not change according to the planning status of pregnancy and gravida status (33). In a study conducted in Turkey, it was reported that while pregnancy stress differed according to income status and education level, it did not differ according to employment status, family type, pregnancy planning status and baby gender (29). It is thought that the reason for the differences in the results obtained in the studies is due to the selection of the sample group studied or the changing sociodemographic characteristics.

There was no difference between the sociodemographic and obstetric characteristics of the pregnant women and their sleep quality levels, and only a significant difference was found between the sleep quality according to the trimester. In our study, the total PSQI index score of the pregnant women was determined as 5.57±2.50, 4.73±37 and 7.00±2.69 in the first, second and third trimesters, respectively. A PSQI total index score of ≥5 indicates poor sleep quality. In our findings, it was determined that the best sleep quality (61.2%) was in the second trimester, and the worst sleep quality (64%) was in the third trimester. In another study conducted with pregnant women in Turkey, it was determined that there was a significant difference in sleep quality according to trimester and the worst

sleep quality was in third trimester pregnant women (34). Similarly, there are different studies in the literature that determine that the worst sleep quality during pregnancy is in the third trimester (35-37). In a meta-analysis study (n: 11.002), it was reported that the sleep quality of pregnant women decreased from the second trimester to the third trimester and the PSQI index increased by 1.68 points (38). Our findings are similar to the literature, and it is seen that there is a need for interventions to improve the sleep quality of pregnant women in the third trimester. In our linear regression analysis results, it was determined that increased pregnancy stress level was effective on poor sleep quality. In a prospective study conducted with 1152 pregnant women in China, it was determined that poor sleep quality in the second trimester was associated with stress and depression symptoms (39). In another study conducted with Chinese pregnant women, it was determined that pregnancy-specific stress was a risk factor for poor sleep quality and endurance was reported as a protective factor (12). In a study conducted in Turkey, it was emphasized that sleep quality was poor in last trimester pregnant women and that the coping methods of pregnant women were inadequate (21). In this direction, it was evaluated that there is a need to develop evidence-based intervention strategies to reduce stress and improve sleep quality in addition to evaluating only stress and sleep quality of pregnant women.

It was observed that the sleep quality of the pregnant women who participated in our study worsened as the stress levels due to pregnancy, labor, mother-baby safety at birth, the role of motherhood, changing physical appearance and functions increased. In a prospective cohort study conducted in China, it was determined that poor sleep quality in pregnant women was associated with stress symptoms (39), and in another study conducted in China, sleep quality decreased as prenatal maternal stress increased (12). In this case, midwives and nurses should offer suggestions for reducing stress and improving sleep quality in the training and care processes of pregnant women in order to reduce the uncertainty, anxiety and worries that increase the stress level during pregnancy.

The Limitations of the Study

The limitations of this study should be taken into account when evaluating the results. One of the limitations of the study is that the data were collected with scales based on participants' self-report. Another limitation is that the results cannot be generalized to the population since it is a cross-sectional study.

5. CONCLUSION

It was determined that the pregnant women participating in this study had a high level of pregnancy stress and did not differ in three trimesters. It was determined that the sleep quality of the pregnant women differed according to the trimester, and the best sleep rates were in the second trimester and the worst in the third trimester. In addition, it was determined that as the stress levels of pregnant women increased, their sleep quality also deteriorated. There was a significant difference between the trimester in which the women were present and their PSQI score averages. However, no significant difference was found between the sociodemographic and obstetric characteristics of the pregnant women and their PSQI and PSAS-36 scores. According to the linear regression model, it was determined that there was a significant effect on the total scores of pregnancy stress and being in the third trimester of pregnancy on the total score of PSQI. If pregnant women with high pregnancy stress are identified in the early period and appropriate interventions can be carried out for pregnant women in the third trimester of pregnancy, the sleep quality of pregnant women can be improved, and the problems that may be seen in the mother and baby due to poor sleep quality and high stress can be reduced. Improving sleep quality is also important in terms of preventing possible problems such as depression, anxiety and weak attachment that may occur in the postpartum period.

Conflicts of interest

There are no conflicts of interest.

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