

# THE ASSOCIATION BETWEEN THE SEVERITY OF FATIGUE AND SLEEP QUALITY IN PREGNANT WOMEN: A SNAPSHOT FROM NORTHWEST TURKEY

## Gebelerde Yorgunluk Şiddeti ve Uyku Kalitesi Arasındaki İlişki; Türkiye'nin Kuzeybatısı'ndan Bir Fotoğraf

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### ABSTRACT

**Objective:** Fatigue during pregnancy and the postnatal period affects the quality of life of women. One of the factors that affect fatigue during pregnancy is the impairment of sleep quality. We aimed to increase the awareness on this topic to diminish the negative effect of pregnancy on sleep quality and to evaluate the parameters that affected the level of fatigue and sleep quality. We evaluated the roles of protective and risk factors during pregnancy.

**Material and Methods:** Our study involved 232 pregnant who were attending to the Perinatology of Trakya University between March- November 2019. The participants filled Pittsburg Sleep Quality Index and The Fatigue Severity Scale.

**Results:** Data we obtained from our study allowed us to review parameters that affect perinatal fatigue. Many pregnant experience fatigue. Support to increase the life standard of mothers will have a role to improve the healths of the mother and the baby. The increased sleep quality in pregnant women with increasing income status. A higher education level in women will provide a unique opportunity to prevent pregnant health. We found a lower level of fatigue in pregnant women with regular dietary habits. Those who attended at least once to pregnancy training had lower fatigue scores. The patients who were happy with their pregnancies felt lower fatigue.

**Conclusion:** The sociocultural features of pregnant women and their interpretations of fatigue should be carefully evaluated while providing healthcare services. Fatigue levels of pregnant women presenting to a clinic for routine pregnancy controls should be objectively evaluated.

**Keywords:** *Pregnant Women; Caring; Sleeping Habits; Fatigue*

### ÖZET

**Amaç:** Gebeliği sürecinde pek çok kadın prenatal yorgunluk yaşamaktadır. Gebelikte yorgunluk, kadınların yaşam kalitelerini etkiler. Yorgunluğu tetikleyen önemli nedenlerden birisi de uyku kalitesinde negatif değişimlerdir. Çalışmamızda, gebeliğin uyku kalitesi ve yorgunluk üzerindeki negatif etkisini hafifletmek için, maternal bakım sürecinde bu konuda farkındalığı arttırmayı amaçladık. Sosyodemografik değişkenleri, risk faktörlerini inceledik.

**Gereç ve Yöntemler:** Çalışmamız Trakya Üniversitesi Perinatoloji kliniğine başvuran gebelerle yapıldı. Katılımcıların sosyodemografik özellikleri, klinik özellikleri sorgulanıp; "Uyku kalite indeksi" ve "Yorgunluk ciddiyeti ölçeği" soruları yöneltildi.

**Bulgular:** Birçok gebenin yorgunluk yaşadığını ve doğuma yaklaşırken, uykusuzluk prevalansının arttığı izlendi. Parite arttıkça, yorgunluğun arttığı görüldü. Çalışmamızda, son trimesterdeki gebelerde uyku kalitesinin düşük olduğu görüldü. Gelir düzeyi yükseldikçe, uyku kalitesinin arttığı görüldü. Bunun yanında, eğitim düzeyi arttıkça uyku kalitesinin artma eğiliminde olduğu izlendi. Eğitimli kadınların toplumda artması; toplum sağlığının önemli bir bileşeni olan gebe sağlığını korumak için gerekli olduğu kanısına varıldı. Çalışanların, yorgunluk düzeyi daha iyi seviyelerdeydi. Yorgunluk düzeyinin artmasıyla, uyku kalitesinin düştüğü görüldü. Düzenli beslenme alışkanlığı olanların yorgunluk düzeyi daha azdı. Uyku, düzenli beslenenlerde iyiydi. Çalışmamızda, gebe eğitimine katılanların, yorgunluk puanları daha iyi idi. Gebeliğinden memnun olanların yorgunluğu daha az hissettiklerini gözlemledik.

**Sonuç:** Sağlık bakım hizmeti sunumunda, maternal yorgunluğu değerlendirirken, kadınların sosyokültürel özellikleri, uyku kaliteleri incelenmelidir. Kaliteli sağlık bakım hizmeti sunumu için, gebelerin iyilik halinin incelenmesi önerilir. Bu anlayışa dayanarak, maternal yorgunluğu yönetmeye yardımcı olacak uygun planlar geliştirilmelidir.

**Anahtar Kelimeler:** *Gebelik Deneyimi; Gebelik; Gebe Bakımı; Uyku Kalitesi; Perinatal Yorgunluk*

## INTRODUCTION

Many women experience prenatal fatigue during pregnancy. Prenatal fatigue is not only caused by anxiety and the fear of childbirth. Fatigue during pregnancy and the postnatal period affects the quality of life of women (1). One of the factors that affect fatigue during pregnancy is the impairment of sleep quality. Understanding the fatigue during and after pregnancy may help to control it at an appropriate period. Adequate healthcare services should be provided to alleviate the burden of maternal fatigue on maternal and fetal health.

Poor sleep quality and inadequate sleep are very common during pregnancy and in the postpartum period (2, 3). Sleep disturbances may have adverse maternal and fetal consequences (2). It is important to determine the trends in sleep changes during pregnancy and the factors underlining these changes. Poor sleep quality during pregnancy is associated with many adverse consequences. The risk of preterm labor is proposed to be related to increased levels of systemic inflammatory markers and a shorter duration of pregnancy (4). Women with poor sleep quality are known to have longer labor times and increased risk of Caesarean section. Poor sleep quality during pregnancy also increases the risk of depression and hopelessness that may lead to suicide (5, 6).

Poor sleep quality during sleep has been widely searched (5, 6). Given the associations between sleep quality and many mental and physical health concerns, it is important to understand the moderators of poor sleep quality during pregnancy. The aim of our study was to determine sleep qualities and modifiable risk factors of pregnant women in the third trimester of their pregnancy to gain knowledge in order to contribute to maternal care. Our results emphasize the need to define women who require treatment and also to develop evidence-based interventions.

Insomnia symptoms during pregnancy increase in the third trimester, and they are associated with high Pittsburg Sleep Quality Index (PSQI). Many pregnant women experience decreases in sleep efficiency and deep sleep (7). Symptoms of sleep disturbance may augment symptoms of restless legs syndrome (8, 9). Research should aim to differentiate women who need further evaluation and intervention regarding fatigue and disturbed sleep during pregnancy.

We aimed to increase the awareness on this topic to diminish the negative effect of pregnancy on sleep quality. Our first aim was to evaluate the parameters that affected the level of fatigue and sleep quality of pregnant women. Then, we evaluated the roles of protective and risk factors such as sociodemographic background factors (familial income, family structure, education status, etc.), regular pregnancy follow up, feeding behavior, and communication of the mother with her own parents during pregnancy.

## MATERIAL AND METHODS

Our study involved voluntary pregnant women who were attending to the Obstetric and Gynecology department of Trakya University Medical School for follow up and treatment. Patients who had psychiatric diseases, preeclampsia, eclampsia, pregnancy-induced hypertension, neurologic illness, or inadequate IQ level that preclude them from giving informed consent were excluded. Multiple pregnancies were not included. Sociodemographic features and several clinical characteristics of the participants were questioned. The participants filled PSQI and The Fatigue Severity Scale (FSS).

The PSQI is commonly used in trials that evaluated sleep quality. It is accepted as a valid and reliable scale. It includes 19 items and seven clinical themes (sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleep medication, and daytime sleepiness) to measure sleep quality. Many previous trials in literature have used PSQI to evaluate sleep. In accordance with the literature, we used the PSQI cut-off score to define poor sleep quality (7, 8). A PSQI total score at or above 5 shows poor sleep quality with a 90% sensitivity and 67% specificity. In previous studies, three factors of PSQI have been defined. Factor 1 is named as sleep efficiency (sleep efficiency and sleep duration). Factor 2 is named as sleep quality (subjective sleep quality, sleep latency, and use of sleep medications). And factor 3 is named as daytime disturbance (sleep disturbance and daytime loss of function)(10).

This scale measures the severity, timing, and seriousness of fatigue and its effect on daily activities. Its application is easy and fast. FSS has a high internal consistency and good test-retest reliability (11, 12). It includes nine items that measure the severity of fatigue

symptoms in participants. Each item is scored from 1 to 7. "1" is "strongly disagree" and "7" is "strongly agree". The total score is calculated as an arithmetic mean. A score equal to or higher than 4 indicates severe fatigue.

**Statistical Evaluation**

SPSS 20.0 (IBM Corp. Released 2020. IBM SPSS Statistics for Windows. Version 27.0. Armonk, NY: Ibm Corp) package program was used to evaluate all data. Descriptive statistics for numerical variables were given as mean and standard deviation. Descriptive statistics for categorical variables were given as percentages and frequency. Shapiro-Wilk test was used to control the normal distribution of data. Pearson or Spearman tests were used for correlation. The Student t-test was used for binary comparison of the groups. The Chi-square test was used to compare categorical variables. One way analysis of variance was used for the comparison of more than two groups. Posthoc analyses, after one way ANOVA, were evaluated with Tukey’s test. Kruskal-Wallis test for multiple comparisons was used for the comparison of more than two groups. p<0.05 was accepted as significant for all comparisons.

**RESULTS**

Our study included 251 volunteer pregnant women. Some pregnant women were excluded because they did not answer all of the questions or they didn’t want to continue to the study. Our study was continued with the remaining 232 pregnant women. The study was conducted between March 2019 and November

2019 through face-to-face interviews with pregnant volunteers who presented to the Perinatology Clinic of Trakya University Medical Faculty Hospital.

We evaluated the association between PSQI scores and sociodemographic and clinical features of pregnancy. Pregnant women in our study were between 19-42 years old. Although there was not a statistically significant relationship between FSS and PSQI, FSS scores increased with increasing age (p= 0.138). No significant relationship was found between age and sleep quality (Table 1).

The mean week of pregnancy was 35.98 (SD: 2.51). The more the pregnancy week was, the higher was the FSS score (p= 0.002). Also, sleep quality tended to decrease with increasing pregnancy week, although the result was not statistically significant (p= 0.283) (Table 1).

There were 145 (62.77%) pregnant women who had pregnancy follow-ups at least once a month and had regular prenatal screening tests. Those who had regular pregnancy follow-ups had lower FSS scores (p= 0.021). No difference could be detected in PSQI scores (Table 2).

Ninety-six (41.56%) patients had their first pregnancy. 135 (58.44%) patients had their second or higher number pregnancies. Those with a higher number of pregnancies had higher FSS scores; no difference could be detected in PSQI scores (Table 3).

Sociodemographic features of the pregnant women were questioned. Two hundred patients (86.58%) were high-school graduates or had lower education levels, while 31 patients were college graduates or had higher

**Table 1.** Pittsburg Sleep Quality Index scores, The Fatigue Severity Scale and participants’ age and weeks of pregnancy

Parameters	N	Quarter 1	Median	Quarter 2	FSS p	PSQI P
Age	231	24.00	27.00	30.00	0.138	0.447
Pregnancy Week	231	34.00	36.00	38.00	0.002*	0.283
FSS	231	3.00	4.00	5.00	-	-
PSQI	231	5.00	7.00	9.00	-	-

FSS: The Fatigue Severity Scale; PSQI: Pittsburg Sleep Quality Index \*Statistically significance

**Table 2.** Pittsburg Sleep Quality Index scores, The Fatigue Severity Scale and sociodemographic and clinical features of pregnancy

Parameters	n	FSS				PSQI			
		Quarter 1	Median	Quarter 2	p	Quarter 1	Median	Quarter 2	p
Age	231	-			0.138	-			0.447
<b>Routine pregnancy follow up (visit per month)</b>									
1	145	3.00	4.00	5.00	<b>0.021*</b>	5.00	7.00	8.00	0.087
2	86	4.00	4.00	5.00		6.00	7.00	9.00	
Week					<b>0.002*</b>				0.283
<b>Number of pregnancies</b>									
0-1	96	4.00	4.00	5.00	<b>&lt; 0.001*</b>	5.00	7.00	9.00	0.119
2 or more	135	4.00	5.00	5.00		6.00	8.00	9.00	
<b>Graduation from</b>									
1	200	4.00	4.00	5.00	0.068	6.00	7.00	9.00	0.206
4	31	3.00	4.00	4.00		6.00	7.00	8.75	
<b>Did she work during pregnancy?</b>									
Yes	80	3.00	4.00	5.00	0.445	5.00	7.00	9.00	0.279
No	151	3.50	4.00	4.00		5.50	7.00	9.00	
<b>Income</b>									
Bad	153	3.00	4.00	5.00	0.690	5.00	7.00	8.50	0.622
Good	78	3.25	4.00	5.00		5.00	7.00	9.00	
<b>Family structure</b>									
Nuclear	193	3.00	4.00	4.00	<b>0.005*</b>	5.00	7.00	8.00	0.397
Extended	38	4.00	5.00	6.00		5.00	7.00	9.00	
<b>Does she have a regular diet?</b>									
Yes	149	3.00	4.00	4.00	<b>&lt; 0.001*</b>	5.00	7.00	8.75	0.463
No	82	3.00	4.00	5.00		5.50	8.00	9.50	
<b>Folic acid use</b>									
Yes	150	3.00	4.00	5.00	<b>0.042*</b>	5.00	7.00	9.00	0.641
No	81	4.00	4.00	6.00		6.00	7.00	8.50	
<b>Frequency of constipation</b>									
Absent or once a week	152	3.00	4.00	5.00	0.595	5.00	7.00	9.00	0.680
≥ twice a week	78	4.00	4.00	5.00		5.00	7.00	9.00	
<b>Is she happy with her pregnancy?</b>									
Yes	115	3.00	4.00	5.00	0.090	5.00	7.00	9.00	0.750
No	115	4.00	4.00	5.00		6.00	7.00	9.00	
<b>Use of iron preparations</b>									
Yes	160	3.00	4.00	5.00	<b>0.017*</b>	5.00	7.00	9.00	0.975
No	70	4.00	4.00	5.75		5.00	7.00	9.00	
<b>Training during pregnancy</b>									
Yes	128	3.00	4.00	5.00	<b>0.037*</b>	5.00	7.00	9.00	0.883
No	102	4.00	4.00	5.00		5.00	7.00	8.50	

FSS: The Fatigue Severity Scale; PSQI: Pittsburg Sleep Quality Index \*Statistically significant

education levels. No significant difference could be found in either of the scales however, those with higher education levels tended to have lower fatigue levels and higher sleep quality. Questions were asked to learn whether they worked during pregnancy. Although those who worked during pregnancy tended to have higher FSS scores, no statistically significant difference could be found in either of the scales. No significant difference could be found in either of the scales according to the income levels of the pregnant women (Table 2).

FSS scores of those with a nuclear family were lower than those with extended families (p= 0.005).

Dietary habits of pregnant women were questioned. Those having a regular diet with three main and three intermittent meals had lower FSS scores (p< 0.001). No difference could be found in PSQI scores. Regular folic acid use was also questioned. FSS scores were lower in those who used folic acid (p= 0.042). No difference could be found according to PSQI scores. The presence of constipation more than twice a week was questioned. No difference could be found according to either of the scales. The satisfaction of pregnant women from their pregnancies was questioned. Those with higher satisfaction levels had lower levels of fatigue (Table 2). Pregnant women who regularly used iron preparations (69.26%) were compared with those who did not regularly use iron preparations (30.74%). Those who used iron regularly beginning from the first trimester had lower fatigue levels (p= 0.017). No difference in sleep quality could be found according to the use of iron preparations.

Pregnant women were questioned about whether they received education during their pregnancies. Those who received education at least twice during pregnancy had better FSS scores. There was no

difference in sleep qualities (Table 2).

**DISCUSSION**

Data we obtained from our study allowed us to review parameters that affect perinatal fatigue. Although fatigue was found to be increased during early pregnancy in several societies, the more common opinion is that fatigue is increased during late pregnancy (1, 13). We found that many pregnant women experience fatigue, and the prevalence of fatigue increased towards the end of pregnancy.

Research in various populations found that prenatal fatigue was frequent. An Australian study found maternal fatigue in about 50% of the pregnant women, while in Taiwan, the frequency of maternal fatigue exceeded 90% (14, 15). In our study, 52.43% of pregnant women had higher FSS scores.

Studies evaluating personal factors that affect perinatal fatigue found that perception of fatigue differed between primiparous and multiparous women. A previous study could not find a relationship between demographic factors and perinatal fatigue(16). However, other studies found higher prenatal fatigue levels in multiparous women(13). In our study, maternal fatigue increased with increasing number of parity. Increasing support for the care of their other children will help multiparous women in time management for their recent child. Support to increase the life standard of mothers will have a role to improve the healths of the mother and the baby.

Insomnia symptoms are frequent during the terminal period of pregnancy. Mothers who will have their first children had a lower level of sleep quality than those who will have their second or third child(2, 17). Our study demonstrated that sleep quality was lower in pregnant women in their third trimester of pregnancy.

**Table 3.** Analysis of variance for Pittsburg Sleep Quality Index

	PSQI			
	n	Mean	Standard deviation	P
<b>Number of pregnancies</b>				
<b>0-1</b>	149	6.75	2.50	0.404
<b>2 or more</b>	82	7.00	1.78	

PSQI: Pittsburg Sleep Quality Index

However, no relationship was found in our study between the number of pregnancies and sleep quality. Previous research has examined the effects of sociodemographic features on sleep during pregnancy. It was proposed that high socioeconomic status has a positive effect on sleep quality by decreasing stress(18). We found increased sleep quality in pregnant women with increasing income status, although the result was not statistically significant. In addition, sleep quality increased with increasing education level. A higher education level in women will provide a unique opportunity to prevent pregnant health, which is an important part of public health.

Previous research has reported that contrary to expectations, the mean fatigue level of employed women was lower than that of housewives. It was demonstrated that because working women are away from home, their responsibilities about childcare and house cleaning decrease, and also getting help for household chores decreases the level of fatigue(1). In our study, the mean fatigue level of those who worked during pregnancy was lower than that of housewives. Previous research has demonstrated that sleep disturbances and poor sleep quality were due to maternal fatigue(19). We found lower maternal sleep quality with an increasing level of fatigue.

The value of regular diet during pregnancy for maternal and fetal health has been demonstrated(9). We found a lower level of fatigue in pregnant women with regular dietary habits. Sleep quality was also higher in patients with regular diets.

Training during pregnancy was reported to decrease fatigue in the study group compared with controls(20). The effects of psychosocial factors on fatigue during pregnancy have been proven. Prenatal fatigue, depression, and anxiety may be diminished significantly with counseling services(20, 21) In our study, those who attended at least once to pregnancy training had lower FSS scores, but no difference was found in sleep qualities. Counseling and training are recommended, especially in the third trimester of pregnancy.

A previous trial reported that unhappiness from pregnancy was related to prenatal fatigue(1). We also found that patients who were happy with their pregnancies felt lower fatigue, although the difference was not statistically significant. Healthcare providers

should assess pregnant women's views on being pregnant and being a mother during follow up and treatment processes of pregnant women. Appropriate counseling services should be provided to those women who report negative feelings about pregnancy. The strength of this study is its contribution to the expanding spectrum of healthcare provision by the evaluation of both fatigue and sleep quality of pregnancies in the third trimester. Our study does not involve the first and second trimesters. Future studies may evaluate the changes in these parameters according to trimester.

## CONCLUSION

The sociocultural features of pregnant women and their interpretations of fatigue should be carefully evaluated while providing healthcare services. Fatigue levels of pregnant women presenting to a clinic for routine pregnancy controls should be objectively evaluated. It is recommended to examine the well-being of pregnant women in order to provide quality health care services. Appropriate plans to help manage fatigue can be developed based on this understanding. We recommend that the results of this study shall be used while providing healthcare for pregnant women in the third trimester of their pregnancies.

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Approval for this study was obtained from Trakya University Medical Faculty Ethical Committee on Scientific Research, and informed consent was obtained from all pregnant volunteers (Decision No: 22121724-050.04.02).

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