

Original Article

Comparison of Sleep, Quality of Life, Anxiety and Depression Levels with Normal and Gestational Diabetes and Postpartum Results

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Abstract

Objective: This study was conducted to compare the sleep, quality of life, anxiety and depression levels of pregnant women with and without gestational diabetes during pregnancy and to evaluate postpartum results in the postpartum period.

Methods: The research was conducted as a comparative, descriptive and prospective study. The study was conducted with 60 of whom were diagnosed with gestational diabetes mellitus (GDM) and 60 of whom were not diagnosed with gestational diabetes mellitus. The data were obtained by face-to-face interview technique using the descriptive information form, Health-Related Quality of Life Questionnaire -36 (SF-36), Pittsburgh Sleep Quality Index (PSQI), Beck Anxiety Inventory (BAI), Edinburgh Postpartum Depression Scale (EPDS), and postpartum data collection forms.

Results: It was determined that pregnant women with gestational diabetes had a significantly lower score in the field of mental health in the puerperal period ($p < 0.05$). Nevertheless, the PSQI sleep latency score of pregnant women with gestational diabetes was found to be significantly lower compared to those without gestational diabetes ($p < 0.05$). In the study, no significant difference was found in terms of Beck Anxiety Inventory scores of pregnant women with and without gestational diabetes in the pregnancy and puerperal periods ($p > 0.05$). However, it was determined that pregnant women with diabetes in the puerperal period had significantly higher Edinburgh Postpartum Depression Scale scores compared to those without diabetes ($p > 0.05$).

Conclusion: In this study, it was determined that gestational diabetes negatively affected women's sleep, quality of life and depression levels.

Keywords: Anxiety, Depression, Gestational Diabetes, Quality of sleep, Quality of life.

Introduction

Gestational diabetes (GDM) is defined as glucose tolerance disorder that occurs in the second or third trimester in pregnant women without previously diagnosed diabetes and usually disappears after delivery (ADA,2020;TEMMD,2020). Although the prevalence of gestational diabetes mellitus is variable, it is reported to be between 1-30% (TEMMD,2020). It is indicated that gestational diabetes mellitus may lead to various adverse maternal and neonatal outcomes such as

preeclampsia, cesarean delivery, fetal macrosomia, preterm birth and neuropsychiatric morbidity (Wilson et al.,2020). Gestational diabetes not only affects physical health, but also has effects on social and psychological health (Mokhlesi et al.,2019). Therefore, it is indicated that gestational diabetes mellitus may negatively affect all aspects of the quality of life of pregnant women, such as sleep, anxiety, and depression (Mokhlesi et al.,2019;Meltzer-Brody et al.,2018). In the studies, it was

determined that the pregnant women felt that their freedom was restricted due to continuous blood sugar monitoring, they were not satisfied with continuous invasive practices such as insulin administration, and their quality of life decreased due to common postpartum complications (Mokhlesi, et al., 2019; Meltzer-Brody, et al., 2018). Risky conditions such as GDM that occur during pregnancy may increase the level of maternal stress. In addition to hormonal changes during pregnancy and the changes caused by pregnancy, the diagnosis of diabetes and hyperglycemia in pregnant women with GDM increase the level of psychological stress and depression experienced (Guler, et al., 2020). In addition to the anxiety experienced, it is considered that hyperglycemia and insulin resistance may lead to depression in pregnant women with gestational diabetes (Byrn and Penckofer, 2015). In the studies, it has been suggested that pregnant women with GDM have a higher risk of postpartum depression compared to pregnant women with normal blood sugar levels (Byrn and Penckofer, 2015; Orbay, et al., 2017).

This study was conducted to determine the anxiety and depression levels and sleep and quality of life levels of pregnant women with gestational diabetes and normal glucose levels and evaluate their postpartum results.

Methods

Type of the study: The study was designed and carried out prospectively as a descriptive and comparative study.

Population and sample of the study: This study was conducted in the pregnancy polyclinic of the obstetrics and gynecology clinic in a training and research hospital affiliated to the Ministry of Health in Istanbul between November 2019-January 2020. Pregnant women aged 18 and over who presented to the obstetrics and gynecology clinic of a training and research hospital affiliated to the Ministry of Health constituted the population of the study.

Data collection tools: The data were collected Health-Related Quality of Life Questionnaire-36 (Short Form Health Survey-SF-36), Pittsburgh Sleep Quality Index (PSQI), Beck Anxiety Inventory (BAI), Edinburgh Postpartum Depression Scale (EPDS), using the Descriptive Information Form (such as age, BMI, pregnancy, birth,

number of abortions, etc.) prepared by the researcher.

Health-related quality of life questionnaire-36 (SF-36) : It has eight subscales and 36 questions, with score ranging from 0 to 100. Higher score is directly proportional to the quality of life (Kocyigit, et al., 1995).

Pittsburgh sleep quality index (PSQI): The scale consists of a total of seven subscales and 19 questions. The total score is between 0-21. A high result indicates poor sleep quality and high sleep disorder (Ozhuner and Celik, 2019).

Beck anxiety inventory (BAI): The total score of the scale is between 0-63. A high total score from the scale indicates the severity of the anxiety experienced by the individual (Ulusoy, et al., 1998).

Edinburgh postpartum depression scale (EPDS): The total score of the scale is between 0-30. A high score indicates a higher risk of depression (Engindeniz, et al., 1997).

Ethical approval: The ethics committee approval from the Training and Research Hospital affiliated to the Ministry of Health (24/07/2019, B.10.1.TKH.4.34.H.GP.0.01) and the work permit from the institution (20/11/2019, 15816306-404.01.01) were obtained for the study. Each stage of this study was carried out in accordance with the Declaration of Helsinki.

Data analysis: The data were analyzed using the Statistical Package for Social Science (SPSS) 18 package program. Categorical variables were shown as frequency and percentage, and numerical variables were shown as mean and standard deviation. Chi-square test and Fisher's Exact test were used to compare categorical data. Paired Student's t test was used to compare the mean of the dependent groups with repeated measures, Student's t-test was used in independent groups to compare the means of two independent groups, and the One-Way Anova test was used for the comparison of more than two groups. The statistical significance level was determined as $p < 0.05$ in the interpretation of the results.

Results

In the study, no statistical difference was found between pregnant women with and without GDM in terms of age, BMI, number of pregnancies and miscarriages. Nevertheless, it was found that those with

GDM in their previous pregnancies were significantly higher among pregnant women with GDM compared to pregnant women without GDM ($p < 0.05$) (Table 1). It was determined that pregnant women with GDM who participated in the study had significantly higher scores from the pain subscale of the SF-36 Quality of Life scale compared to those without GDM ($p < 0.05$) (Table 2). On the other hand, when women with and without GDM were compared according to the subscales of the SF-36 quality of life scale in the postpartum period, it was determined that women without GDM had significantly higher scores in the mental health field of the SF-36 quality of life scale compared to those with GDM ($p < 0.05$) (Table 2). Nevertheless, when pregnant women with and without GDM were compared in terms of PSQI sleep quality subscale and total scores, it was determined that pregnant women with GDM had significantly higher scores in the sleep latency, one of the subscales of the PSQI sleep quality scale, compared to those without GDM. When women with and without GDM in the postpartum period were compared in terms of PSQI sleep quality subscale and total scores, it was determined that those with GDM had significantly higher scores from the PSQI sleep quality scale daytime dysfunction subscale and the total scale compared to those without GDM ($p < 0.05$) (Table 3). Women with and without gestational diabetes mellitus were compared in terms of Beck Anxiety Scale mean scores in the sixth week after pregnancy and delivery, no statistically significant difference was found between the two groups ($p > 0.05$ Table 2). On the other hand, when women with and without GDM were compared in terms of Edinburgh Postpartum Depression Scale mean scores at the sixth week after pregnancy and delivery, it was determined that those with GDM had significantly higher scores on the Edinburgh Postpartum Depression Scale at the sixth week after birth compared to those without GDM ($p < 0.05$) (Table 4). It was determined that while 85% ($n = 51$) of the pregnant women with GDM who participated in the study measured blood glucose, 56.7% ($n = 34$) of them measured blood glucose at home, and 45% of them measured blood glucose regularly every day. It was determined that 86.7% of the pregnant women who participated in the study were on a diet, 33.3%

of them exercised and 31.7% of them used insulin for the treatment of GDM. While 43.3% of the pregnant women had good compliance with the treatment, 73.3% of them indicated that they did not have any difficulties in compliance with the treatment. More than half of the pregnant women (86.7%) stated that they consulted their doctor for control once a month. In the study, it was determined that the birth weights of infants born to mothers with GDM were significantly higher compared to those born to mothers without GDM. Furthermore, the first and fifth minute APGAR scores of the infants of mothers with GDM were calculated to be significantly lower. Incision site pain was found to be the most common problem among the postpartum maternal complications. Nevertheless, it was determined that respiratory distress (10%) and neonatal hypoglycemia (10%) were the most common problems in the infants of mothers with GDM in the postpartum period, while jaundice (8.3%) was the most common problem in the infants of mothers without GDM.

Discussion

Gestational diabetes is affected by many risk factors such as age, BMI, family history of diabetes, history of diabetes in previous pregnancy, and multiparity (TEMD,2020). In this study, it was determined that the number of pregnancies of pregnant women with GDM was higher compared to those without GDM such as Aydin and Kavraz's studies (Aydin,2013;Kavraz,2018). It should be kept in mind that maternal obesity may be a risk factor for GDM due to the relationship between increasing number of pregnancies and sustained weight gain (TEMD,2020). A family history of diabetes is also a high risk for GDM (TEMD,2020). In this study, approximately half of the pregnant women with GDM had a family history of diabetes. It is known that the presence of GDM in a previous pregnancy is a factor that paves the way for gestational diabetes (TEMD,2020). It is known that mothers with a disease such as GDM (maternal hypoglycemia, neonatal respiratory distress, macrosomia, congenital anomalies, RDS, hyperbilirubinemia, etc.) and their infants experience some complications (Billionet et al.,2017;Dogan Deniz,2020;Oguz and Isik,2020;Riskin et al.,2020).

Table 1: Descriptive characteristics of pregnant women with and without gestational diabetes

Characteristics	Group with GDM (n:60)		Group without GDM (n:60)		t	p
	X±SD		X±SD			
Age	32.40±6.29		30.73±3.74		-1.762	.081
Pre-pregnancy BMI	25.69±5.08		25.42±5.58		-0.295	.783
Number of Pregnancies	2.76±1.33		2.65±1.69		-0.419	.676
Number of miscarriages	1.38±0.74		1.26±0.703		-0.466	.644
	Number	%	Number	%	X ²	P
History of GDM in Previous Pregnancy						
Yes	12	20.0	1	1.7	12.104	0.10*
No	48	80.0	59	98.3		

GDM, Gestational Diabetes Mellitus; SD, Standard deviation

Table 2: Comparison of SF-36 Quality of Life Scale subscale mean scores of pregnant women with and without gestational diabetes according to their gestational and puerperal periods

Subscales of the SF-36 Quality of Life Scale	Group with GDM		Group without GDM		Groups with and without GDM		Groups with and without GDM	
	Pregnancy X±SD	Puerperal X±SD	Pregnancy X±SD	Puerperal X±SD	t	p	t	P
physical function	47.08±43.44	44.16±43.26	35.00±44.43	50.83±39.58	-1.506	.135	.881	.380
Physical role limitation	54.25±28.47	54.25±28.47	48.25±27.16	48.25±27.16	-1.181	.240	-1.181	.240
General health	60.75±16.33	58.33±13.64	65.25±14.82	62.00±15.54	1.580	.117	1.373	.172
Vitality/vigor	53.58±20.79	54.08±16.71	52.75±19.96	52.00±18.04	-.224	.823	-.656	.313
Social function	52.77±22.65	42.03±20.26	46.26±23.15	46.48±21.11	-1.550	.124	1.177	.242
Emotional role difficulties	59.44±44.29	53.88±45.96	55.00±45.02	62.77±40.28	-.545	.587	1.127	.262
Mental health	66.93±15.37	60.53±15.64	66.13±15.17	67.53±16.37	-.287	.775	2.394	.018
Pain	71.85±24.07	71.11±22.61	52.59±25.04	64.44±19.81	-4.295	.000	-1.718	.089

GDM, Gestational Diabetes Mellitus; SF-36, Short Form 36; t, Student's t test; SD, Standard deviation

Table 3: Comparison of PSQI Sleep Quality Scale subscale mean scores of pregnant women with and without gestational diabetes according to their gestational and puerperal periods

Subscales of the PSQI Sleep Quality Scale	Group with GDM		Group without GDM		Groups with and without GDM		Groups with and without GDM	
	Pregnancy X±SD	Puerperal X±SD	Pregnancy X±SD	Puerperal X±SD	t	p	t	p

Subjective sleep quality	1.35±0.73	1.35±0.73	1.31±0.65	1.31±0.65	-.264	.793	-.264	.793
Sleep latency	1.05±0.89	1.06±0.88	1.61±0.94	0.95±0.85	3.388	.001	-.738	.462
Sleep duration	0.71±1.04	1.21±1.05	0.90±1.05	0.90±1.03	.958	.340	-1.655	.101
Habitual sleep activity	0.75±1.14	1.16±1.10	0.63±1.05	0.91±0.84	-.580	.563	-1.388	.168
Sleep disorder	1.58±0.67	1.53±0.62	1.75±0.62	1.43±0.53	1.405	.163	-.945	.347
Use of sleeping pills	0.03±0.25	0.06±0.31	0.11±0.49	0.10±0.35	1.165	.246	.547	.585
Daytime dysfunction	0.90±0.91	1.28±0.92	0.95±0.87	0.80±0.91	.306	.760	-2.879	.005
Total Sleep Quality Score	13.30±2.25	7.68±3.14	13.50±2.06	6.41±2.60	.675	.599	-2.401	.018

GDM, Gestational Diabetes Mellitus PSQI, Pittsburgh Sleep Quality Index; t, Student's t test; SD, Standard deviation

Table 4: Comparison of Beck Anxiety and Edinburgh Postpartum Depression Scales mean scores of pregnant women with and without gestational diabetes according to their gestational and puerperal periods

	Group with GDM		Group without GDM		Groups with and without GDM		Groups with and without GDM	
	Pregnancy	Puerperal	Pregnancy	Puerperal	Pregnancy	Puerperal	t	p
	X±SD	X±SD	X±SD	X±SD	t	p	t	p
Beck Anxiety Inventory	12.61±10.38	15.16±9.60	12.16±7.51	11.96±9.42	-.272	.786	-1.842	.068
Edinburgh Postpartum Depression Scale	8.73±5.38	12.23±4.70	9.73±4.96	9.00±5.40	1.057	.293	-3.496	.001

GDM, Gestational Diabetes Mellitus; t, Student's t test; SD, Standard deviation

Discussion cont.

In this study, when the postpartum results of mothers with and without gestational diabetes were compared, it was determined that the infants born to mothers with gestational diabetes had higher birth weight and lower APGAR scores. While cesarean site infection and hypertension were observed in mothers with GDM, complications such as respiratory distress, neonatal hypoglycemia and congenital anomalies occurred in their infants. The rate of stillbirths of unknown cause is between 20-30% in pregnant women with gestational diabetes (Ozturk and Ustun,2020). It is estimated that the increased excessive fetal growth due to chronic fetal hyperinsulinism causes fetal death by not providing sufficient oxygen to the fetus and causing hypoxia. Furthermore, the adhesion of glucose to fetal erythrocytes, glucose movements, sudden displacements in water

and electrolytes increase the risk of intrauterine fetal death (Kahraman,2015;Ozturk Unsal and Cakal,2020). In this study, the number of miscarriages was found to be higher in pregnant women with GDM compared to those without GDM, although it was not significant (Table 1).

In the studies, it has been reported that pregnant women with gestational diabetes experience insulin administration, compliance with diet therapy, the stress caused by the disease, and consequently sleep disorders more frequently than normal pregnant women, which causes a decrease in their quality of life (Aydin,2013; Uzar,2016; Marchetti et al.,2017; Pantartzis et al.,2019).

However, it has been reported that GDM has no effect on the quality of life (Mokhlesi et al.,2019). In this study, when pregnant

women with and without GDM were compared, it was determined that the pain levels of pregnant women without GDM were higher compared to those with GDM. While it was expected that the pain would be more in pregnant women with GDM, it was considered that the pain occurring in pregnant women without GDM may be due to the individual characteristics of the pregnant women.

Gestational diabetes is not only a process that affects pregnancy, but also a problem that delays wound healing after delivery, increases the risk of type 2 diabetes, and paves the way for cardiovascular diseases and hypertension. In addition to its maternal effects, it may lead to many complications such as congenital anomalies, respiratory distress, hypoglycemia, hypocalcemia, and hyperbilirubinemia in infants in the fetal and neonatal periods (ADA,2020; Riskin et al.,2020).

In this study, it was determined that pregnant women with GDM had lower scores from the mental health subscale of the SF-36 quality of life scale compared to those without GDM. It was considered that this situation may be related to the fact that pregnant women with GDM encountered more complications and had lack of knowledge about infant development.

Anatomical and physiological changes and hormonal and psychological factors cause changes in sleep during pregnancy. The rise of the diaphragm due to the increase in the uterine volume with the increase in BMI during pregnancy may lead to respiratory distress. In this study, it was determined that people without GDM had more problems in falling asleep compared to those with GDM. The fact that pregnant women with GDM do not have difficulties in falling asleep may be due to the fact that GDM makes the pregnant woman more prone to sleep.

To become a mother causes a series of radical changes in the life of the woman, the infant and the family. Many situations, such as feeding and diaper changing, cause sleep interruptions in women and lead to a decrease in sleep quality (Ercel and Kahyaoglu,2020). In this study, it was determined that daytime dysfunction was higher in puerperant women with GDM compared to those without GDM.

When the total sleep scores were examined, it was determined that the sleep quality of puerperant women with GDM was worse. They are considered to be related to the fact that mothers with GDM and their newborns experience more complications in the postpartum period. Studies suggesting that gestational diabetes increases emotional stress and may lead to anxiety. It is considered that gestational diabetes causes anxiety in pregnant women, besides, the lack of information about the course of the disease also increases anxiety. However, in this study, no significant difference was found between the level of anxiety experienced by pregnant women with GDM and those without GDM during pregnancy and puerperium.

The difficulty in adapting to the changing new lifestyle during pregnancy and puerperium, the changes in sleep patterns, and anxiety experienced during this process pose a risk for postpartum depression. In this study, no significant relationship was found between the Edinburgh Postpartum Depression Scale scores of pregnant women with GDM, however, it was determined that pregnant women with GDM were more prone to depression in the puerperal period compared to those without GDM. It is estimated that it may be related to the fact that GDM, which is one of the risky pregnancies, may lead to many unexpected problems such as emergency hospitalization, cesarean delivery, meconium aspiration, umbilical cord prolapse and obstetric hemorrhage after delivery.

Conclusion: In the present study, it was determined that gestational diabetes negatively affected women's sleep, quality of life and depression levels. Therefore, the evaluation of sleep level and sleep quality should be a part of care and follow-up in the antenatal and postnatal periods. On the other hand, due to the high risk of postpartum depression in pregnant women with GDM, it is recommended to follow them carefully during postpartum follow-ups.

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