



## Original Article

# Coping with Stress among Pregnant Women with Gestational Diabetes Mellitus

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## ABSTRACT

**Introduction:** The stress of pregnancy itself, gestational diabetes mellitus (GDM) that develops during pregnancy is also a stressor, because it can cause serious maternal and fetal health problems. The aim of this study was to examine the relationships between the characteristics of pregnant women with GDM and their styles of coping with stress.**Methods:** This descriptive cross-sectional study was conducted on 126 pregnant women with GDM. The sample consisted of patients who applied to the diabetes mellitus training polyclinic of a training and research and university hospital in southeastern Turkey. Data were evaluated using descriptive statistics, Kolmogorov-Smirnov normality tests, Spearman's rho and Pearson Correlation analysis, the Student's t-test, Mann-Whitney U-test and Kruskal-Wallis- test by SPSS software (version 13.0).**Results:** It was determined that a planned pregnancy, a high educational level, a first pregnancy and weight gain were important factors in the women with GDM in the study who coped effectively with stress during pregnancy. Unemployment and a second or subsequent pregnancy were important factors in the women with GDM who coped ineffectively with stress during pregnancy. In addition, it was determined that the hemoglobin HbA1c levels of the pregnant women with GDM with "optimistic" and "submissive" approaches towards coping with stress were lower.**Conclusion:** It was determined that pregnant women with optimistic and submissive approaches towards coping with stress had lower HbA1c levels. It is suggested that randomized controlled studies be conducted to further determine the coping styles of patients with GDM.**Citation:** Sürücü HA, Besen DB, Duman M, Yeter Erbil E. Coping with stress among pregnant women with gestational diabetes mellitus. *J Car Sci* 2018; 7 (1): 9-15. doi:10.15171/jcs.2018.002.

## Introduction

Gestational Diabetes Mellitus (GDM) is steadily increasing throughout the world.<sup>1</sup> Hyperglycemia was experienced during pregnancy in 16.2% of live births in 2015.<sup>1</sup> In studies conducted in different regions in Turkey, the prevalence of GDM varied between 6.9 and 8.9%.<sup>2,3,4</sup> It is anticipated that 7.4% of the hyperglycemia experienced during pregnancy is first diagnosed during pregnancy, but originates from other diabetes mellitus types, that 7.5% originates from diabetes mellitus diagnosed prior to pregnancy and that 85.1% originates from GDM.<sup>1</sup>

The reason for this increase in GDM is associated with the change in GDM risk factors in the past 20 years. These factors are advanced age, a family tendency, high body mass index and ethnic origin.<sup>5,6</sup> Other risk factors are maternal factors (high reproduction rate, weight gain during pregnancy, etc.) and factors relating to pregnancy (hypertension during pregnancy, multiple pregnancies, etc.).<sup>5</sup> Pregnancy causes changes in body image, social relations and the roles of family members. Being pregnant not only has biological effects, but also has a psychological and social impact.<sup>7</sup> In addition to the stress of pregnancy itself, GDM that develops during pregnancy is also a stress factor,<sup>8,9</sup> because it can cause serious maternal and fetal health problems.<sup>10,11</sup> The most common effect of GDM on the mother is a cesarean birth. Moreover, it can also cause preeclampsia, hypertension

and type 2 diabetes mellitus in women of advanced maternal age. Other possible complications are iatrogenic, dyslipidemia, metabolic syndrome and cardiovascular diseases.<sup>10</sup> Effects of GDM on the fetus include post-pregnancy hypoglycemia, respiratory problems, stillbirth, macrosomia and fetal malformation.<sup>10</sup> Children of pregnant women with GDM have a high prevalence of child obesity and type 2 diabetes mellitus during adolescence.<sup>12</sup> Optimization of glycemic control and well-managed GDM treatment are required to prevent maternal and fetal complications in GDM.<sup>10</sup> In a study comparing women with a GDM diagnosis with healthy pregnant women, it was determined that being diagnosed with GDM caused an increase in the stress levels of pregnant women.<sup>13</sup> It was determined that the women with GDM perceived themselves to be in worse health and had fewer positive pregnancy experiences.<sup>14</sup> In qualitative studies, women with GDM experienced shock, fear, and stress.<sup>14,15</sup> In a study using a mix of qualitative and quantitative methods, the quantitative results showed that the stress levels of pregnant women with a GDM diagnosis increased due to them having highly risky pregnancies, worry over their inability to control GDM through diet, and fear of experiencing maternal-fetal complications. The quantitative results showed that, in particular, patients for whom insulin treatment was determined to be very important experienced higher levels of stress.<sup>16</sup>

Pregnant women should learn how to cope with stress because reducing the effects of stress is important for the health of both pregnant women and babies. It is important to determine how women with GDM cope with stressful experiences during pregnancy to improve the effects of GDM treatment.<sup>17</sup> In the literature review, no study was found which examined the relationship between coping styles and the characteristics of pregnant women with GDM. The aim of this study was thus to examine the relationships between styles of coping with stress and the characteristics of pregnant women with GDM.

## Materials and methods

A descriptive cross-sectional research design was used in this study.

The study was conducted on 126 pregnant women with GDM who were admitted to the diabetes mellitus training polyclinic of a training and research hospital and university hospital in southeastern Turkey, met the sample criteria, and agreed to be included in the study, which took place between April 15, 2014 and October 15, 2015.

The questionnaires were collected by two certified nurses. Two diabetes education nurses worked with the pregnant women who were admitted to the training polyclinic. The pregnant women had already been diagnosed with GDM, and had on-going follow-up care or had started insulin treatment. On arriving at the polyclinic, the pregnant women with diabetes mellitus were examined and registered. They also received some educational materials and had a personal consultation.

It is suggested by the Turkish Endocrinology and Metabolism Association (TEMA) that all women take the Oral Glucose Tolerance Test (OGTT) in the 24th week of pregnancy.<sup>18</sup> The women admitted to the maternity polyclinic were screened with a 50-g glucose load at the 24th week of pregnancy, and women with a blood glucose measurement of 140 mg/dl and above after 1 hour were directed to the endocrine polyclinic. In the endocrine polyclinic, a rescreen test was applied with a 75-g OGTT, and the pregnant women were diagnosed with GDM if they had at least one high value (fasting blood glucose (FBG)  $\geq 92$  mg/dl, 1st hour  $\geq 180$  mg/dl, 2nd hour  $\geq 153$  mg/dl) according to American Diabetes Association (ADA) criteria.<sup>19</sup> The pregnant women with diabetes mellitus diagnosed with these criteria who met other sample criteria and agreed to participate were included in the study. The patients meeting the inclusion criteria for the study were selected using the convenience sampling method. Pregnant women with GDM were included in the study if they had none of the following: visual, auditory, cognitive, or physical disabilities; an abnormal fetus; pregnancy complications; complications that could lead to premature birth. In addition to these, the pregnant women with GDM were required to be at least 18 years old and after the 24th week in pregnancy to meet the study's inclusion criteria.

The study data were provided independently by the patients. However, if the patient was unable to do this (e.g. as a result of being illiterate), the researchers conducted face-to-face interviews. Data were collected from a total of 132 pregnant women with GDM. Nevertheless, six pregnant women were excluded; three lacked understanding of type 2 diabetes mellitus, two had babies with fetal abnormalities, and one was at risk for premature birth. A total of 126 patients were included in the data assessment. In the preparation stage of the study, the diabetes education nurses were told by the research coordinator before distributing questionnaires to collect the data and sample inclusion/exclusion criteria, and a pre-application was performed with five patients. Data collection took an average of eight minutes. The Descriptive Information Form and Scale of Coping with Stress were used in collection of the data.

The Descriptive Information Form was prepared by the researchers in line with the literature. Questions related to place of residence; age; education level; economic status; employment status; family type; pregnancy planning; number of pregnancies and children; pre-pregnancy height and weight; weight gain in the pregnancy week in which data were collected; pregnancy week; treatment type; and HbA1c, FBG and PBG (postprandial blood glucose) values.<sup>3,4,5,6,20</sup> Height, weight, and up-to-date values for HbA1c, FBG, and PBG were taken from patient files or data registries at the clinic. Pre-pregnancy weight was obtained by asking the patient.

This is a 4-point Likert scale which was developed by Folkman and Lazarus (1980) and is used frequently in studies that examine coping with stress. It is oriented toward specific situations and consists of 66 items.<sup>21</sup> A Turkish adaptation called "Scale of Coping with Stress" was produced by Şahin and Durak, consisting of 30 items.<sup>22</sup> In the study was used the Turkish adaptation "Scale of Coping with Stress version". The scale consists of five sub-dimensions: "self-confident" (7 items), "optimistic" (5 items), "desperate" (8 items), "submissive" (6 items) and "requesting social support" (4 items). The scale measures two main approaches to coping with stress. These are "problem-oriented/active" styles and "feeling-oriented/passive" styles. Active styles score higher on the "social support", "optimistic" and "self-confident" subscales, and passive types score higher on the "desperate" and "submissive" subscales. Patients effectively coping with stress use the self-confident and optimistic styles more, and patients incapable of coping with stress used the submissive and desperate styles more. Cronbach's alpha internal consistency coefficients were 0.49-0.68 for the optimistic approach, 0.62-0.80 for the self-confident, 0.64-0.73 for the desperate, 0.47-0.72 for the submissive approach, and 0.45-0.47 for the social support factor. A high score in any of the sub-dimensions shows that individuals uses the said style more often. In addition, high scores for the total score for the scale indicate that an individual copes well with stress. The total possible score for the scale is at least 30 and at most 120 points. The total score for the self-

confident sub-group is at least 7, at most 28; the total score for requesting social support is at least 4, at most 16; the total score for the submissive approach is at least 6, at most 24; the total score for the desperate approach is at least 8, at most 32; and for the optimistic approach is at least 5 and at most 20 points. The author's permission was granted for the scale to be used in the present study.

At the end of the study, the Statistical Package for Social Sciences (SPSS) 16.0 program was used to assess the data. Number, percentage, average and standard deviation were used from among the descriptive statistics for information describing the pregnant women with GDM. Kolmogorov-Smirnov normality tests were applied to examine whether there were lost values relating to the data set of the research group, and whether the data showed normal distribution or not. Spearman's rho or Pearson Correlation analysis, and the Student's t-test, Mann-Whitney U Test or Kruskal-Wallis Test were implemented as descriptive statistics. The results were determined to have a significance level of  $P < 0.05$ .

Official permission was given by the institutions involved with the study. This study was approved by the Ethical Review Boards at the authors' institution and each hospital (Ethical permission no. 140, February 28, 2014). After pregnant women were identified as meeting the criteria for inclusion in the study, they were informed about the study by the researcher, and, if they agreed to participate, they completed an informed consent form.

## Results

Data relating to the socio-demographic and clinical features of the pregnant women with GDM are given in Table 1. It was determined that 86.5% of the pregnant women with GDM lived in a city, 82.5% lived in a nuclear family, 81.7% were unemployed, 38.1% had an education level of 6–11 years, 54.8% had an intermediate income, 69.0% had a planned pregnancy, 75.4% had one or more children, 81.0% were in their second or later pregnancy and 56.3% were being treated with insulin (Table 1). The average age of the pregnant women with GDM was 31.65 years, they had gained an average of 7.64 kilograms, their average body mass index (BMI) was 25.74 kg/m<sup>2</sup> prior to pregnancy, their HbA1c average was 6.10% (42 mmol/L), their FBG average was 101.00 mg/dl (5.7 mmol/L) and their average 1st hour PBG was 158.00 mg/dl (8.8 mmol/L).

Evaluation of effective coping sub-dimensions showed that those with a planned pregnancy had a better point average than those with an unplanned pregnancy in the Self-confident dimension ( $p < 0.001$ ). In the optimistic sub-dimension, education status and number of pregnancies were effective factors; the optimistic point average of the pregnant women with GDM was higher in those with 6–11 years of education ( $P < 0.05$ ) and those having their first pregnancy ( $P < 0.001$ ). Evaluation of ineffective coping sub-dimensions showed that unemployed pregnant women with GDM had a higher point average in the desperate dimension and that this was statistically significant ( $P < 0.05$ ). Also, women with GDM in their

second or later pregnancy had a higher point average in the submissive approach ( $P < 0.05$ ) compared to those in their first pregnancy (Table 2).

**Table 1.** Socio-demographic and clinical features of the pregnant women with GDM (n: 126)

Characteristics	N (%)
<b>Place of residence</b>	
Urban	109 (86.5)
Rural	17 (13.5)
<b>Family type</b>	
Nuclear	104 (82.5)
Extended	22 (17.5)
<b>Employment status</b>	
Employed	23 (18.3)
Unemployed	103 (81.7)
<b>Education level</b>	
Illiterate	20 (15.9)
5 years and under	40 (31.7)
6–11 years	48 (38.1)
12 years and over	18 (14.3)
<b>Income status</b>	
Low	29 (23.0)
Intermediate	69 (54.8)
Good	28 (22.2)
<b>Planned pregnancy</b>	
Yes	87 (69.0)
No	39 (31.0)
<b>Number of children</b>	
None	31 (24.6)
≥1	95 (75.4)
<b>Number of pregnancy</b>	
First pregnancy	24 (19.0)
≥2 <sup>nd</sup> pregnancy	102 (81.0)
<b>Type of treatment</b>	
Those using insulin	71 (56.3)
Those not using insulin	55 (43.7)
<b>Age (years)<sup>ε</sup></b>	31.65 (5.61)
<b>Weight gain during pregnancy (kg)</b>	7.64 (5.36)
<b>Pre-pregnancy BMI<sup>ε</sup></b>	25.74 (4.74)
<b>HbA1c<sup>ε</sup></b>	6.10 (1.45)
<b>Fasting blood glucose (FBG)<sup>ε</sup></b>	101.00 (34.78)
<b>1<sup>st</sup> hour postprandial blood glucose (PBG)</b>	158.00 (58.49)

<sup>ε</sup>Mean (SD)

Data examining the relationship of the socio-demographic and clinical features of the pregnant women with GDM and their coping styles are given in Table 3. The self-confident approach, as one of the effective coping styles, was found to be in a statistically significant negative linear relationship with weight gain during pregnancy ( $r: -0.342$ ,  $P < 0.01$ ) at an intermediate level. A low-level negative linear relationship was found between the optimistic ( $r: -0.247$ ,  $P < 0.05$ ) and submissive ( $r: -0.257$ ,  $P < 0.01$ ) point averages and HbA1c averages of the pregnant women with GDM (Table 3).

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**Table 2.** Factors affecting levels of coping with stress in pregnant women with GDM (n: 126)

Variables	Self-confident Mean (SD)	Optimistic Mean (SD)	Coping Styles#		
			Social support-seeking Mean (SD)	Desperate Mean (SD)	Submissive Mean (SD)
<b>Place of residence<sup>€</sup></b>					
Urban	13.40 (3.42)	8.85(3.06)	7.38(2.38)	13.04(3.89)	9.29(3.58)
Rural	12.23(4.08)	8.11(3.14)	6.35(2.62)	14.70(4.66)	10.00(3.96)
P-Value	0.312	0.421			
<b>Family type<sup>€</sup></b>					
Nuclear	13.00(3.53)	8.82(3.00)	7.32(2.39)	13.22(4.19)	9.45(3.75)
Extended	14.40(3.36)	8.40(3.43)	6.86(2.66)	13.50(3.14)	9.09(3.02)
P-Value	0.145	0.703	0.529	0.613	0.727
<b>Employment status<sup>€</sup></b>					
Employed	13.60(3.46)	9.39(2.72)	6.47(2.90)	11.60(3.38)	8.34(3.28)
Unemployed	13.16(3.55)	8.61(3.13)	7.41(2.29)	13.64(4.07)	9.62(3.67)
P-Value	0.499	0.331	0.101	0.016*	0.098
<b>Education level<sup>‡</sup></b>					
Illiterate	11.80(4.06)	7.00(3.61)	7.30(2.22)	13.05(4.18)	10.95(3.44)
≤5 years	13.80(3.59)	8.40(2.78)	7.72(2.23)	14.02(4.07)	9.50(3.56)
6–11 years	13.22(3.40)	9.56(2.93)	7.18(2.42)	13.08(4.08)	8.81(3.71)
≥12 years	13.66(2.82)	9.33(2.67)	6.27(2.96)	12.33(3.56)	8.94(3.47)
P-Value	0.181	0.021*	0.237	0.395	0.258
<b>Income status<sup>‡</sup></b>					
Low	12.86(3.66)	7.62(3.63)	7.44(1.90)	13.65(4.52)	9.68(3.64)
Intermediate	13.02(3.41)	8.98(2.78)	7.30(2.60)	13.33(3.77)	9.20(3.81)
Good	14.17(3.63)	9.35(2.92)	6.89(2.54)	12.71(4.15)	9.53(3.19)
P-Value	0.224	0.054	0.446	0.587	0.733
<b>Planned pregnancy<sup>€</sup></b>					
Yes	13.70(3.48)	8.87(3.08)	7.17(2.50)	13.21(3.90)	3.53(0.37)
No	12.23(3.46)	8.48(3.05)	7.41(2.30)	13.38(4.32)	3.85(0.61)
P-Value	0.030*	0.516	0.614	0.831	0.798
<b>Number of children<sup>€</sup></b>					
None	13.77(2.59)	9.61(3.00)	6.58(2.65)	12.80(4.09)	8.61(3.69)
≥1	13.07(3.78)	8.47(3.05)	7.46(2.33)	13.42(4.00)	9.64(3.58)
P-Value	0.339	0.073	0.080	0.462	0.171
<b>Number of pregnancy<sup>€</sup></b>					
First pregnancy	13.87(2.72)	10.25(2.65)	6.83(2.53)	12.45(4.12)	8.20(3.43)
≥2 <sup>nd</sup> pregnancy	13.09(3.68)	8.40(3.06)	7.34(2.41)	13.46(3.99)	9.66(3.62)
P-Value	0.354	0.007*	0.408	0.262	0.048
<b>Type of treatment<sup>€</sup></b>					
Those using insulin	13.70(3.83)	8.40(3.24)	7.14(2.59)	12.85(4.09)	9.35(3.52)
Those not using insulin	12.65(3.02)	9.20(2.79)	7.38(2.23)	13.80(3.90)	9.43(3.78)
P-Value	0.098	0.152	0.194	0.898	0.584

<sup>€</sup>Student's *t*-test, <sup>€</sup>Mann–Whitney U Test, <sup>‡</sup>Kruskal–Wallis Test in independent groups. # The minimum and maximum values that can be achieved for each sub-dimension of Coping with Stress Scale; The total score for the self-confident approach sub-group is at least 7, at most 28; the total score for requesting social support is at least 4, at most 16; the total score for the submissive approach is at least 6, at most 24; the total score for the desperate approach is at least 8, at most 32; and for the optimistic approach is at least 5 and at most 20 points. \* Statistically Significant

**Table 3.** Relationship of socio-demographic and clinical features and coping styles in pregnant women with GDM

Variables	Correlation (r) value				
	Self-confident	Optimistic	Social Support-Seeking	Desperate	Submissive
Age	-0.068	-0.109	0.123	0.086	0.0172
Weight gain during pregnancy	-0.342**	-0.087	-0.115	0.143	0.078
HbA1c <sup>‡</sup>	-0.009	-0.247*	0.002	0.079	-0.257**
Fasting Blood Glucose (FBG) <sup>‡</sup>	-0.059	-0.150	-0.003	0.022	-0.120
1 <sup>st</sup> hour Postprandial Blood Glucose (PBG) <sup>‡</sup>	-0.147	-0.101	-0.005	-0.039	-0.167

\* $P<0.05$ , \*\* $P<0.01$ , <sup>‡</sup>Spearman's rho correlation was applied due to nonnormal distribution. Pearson Correlation analysis was used in other variables.

## Discussion

GDM causes stress in pregnant women due to maternal and fetal complications. It is important to determine how

pregnant women with GDM cope with stress. The aim of this study was to examine the relationships between styles of coping with stress and the characteristics of pregnant women with GDM.

We found in our study that the pregnant women with GDM who had planned pregnancies had a self-confident style in coping with stress. On reviewing the literature, we found no study that was oriented toward approaches towards coping with stress when pregnant with GDM. However, the ratio of using ineffective coping methods was found to be high in unplanned pregnancies in cohort studies conducted with healthy women and women with risky pregnancies.<sup>23,24</sup> In another study conducted by Yılmaz and Beji on healthy pregnant women, it was found that those with unplanned pregnancies tended to have a submissive style in coping with stress.<sup>20</sup>

Whether a pregnancy is unplanned is an important factor in the stress experienced by pregnant women. Women with unplanned pregnancies had a higher rate of negative perception of their life events due to the lack of planning and with regard to future possibilities. A diagnosis of diabetes mellitus is another stressor, and, in addition to the unplanned pregnancy, it increased the stress level, thereby increasing their use of ineffective coping styles.

We found in our study that unemployed pregnant women with GDM used the desperate approach in coping with stress. In other studies conducted with healthy pregnant women, results were obtained similar to our study.<sup>20,25</sup> Irrespective of a GDM diagnosis, it is thought that employment leads to women's economic independence, thus providing them with strength and enabling them to use more effective ways of coping with stress. Borcharding's study, conducted with healthy pregnant women, did find that employment had no effect on styles of coping with stress.<sup>26</sup> This difference is thought, however, to be caused by the fact that the study was conducted on primigravid healthy pregnant women in a different culture.

We found in our study that those with 6-12 years of education were optimistic in coping with stress. Other studies found that pregnant women with lower educational levels tended to be submissive and desperate in coping with stress.<sup>20,26,27</sup> Another study conducted on patients with Type 1 diabetes mellitus found that individuals with lower education levels used an ineffective coping style.<sup>28</sup> A study in Australia determined that pregnant women with GDM who had higher education levels used effective coping styles (learning new strategies, researching the future and seeking out social support).<sup>11</sup> These results support the results of our study. It is thought that a higher education level enables pregnant women to find out more about the diseases related to pregnancy, so they can cope with stress by themselves controlling their diabetes mellitus. Similarly, another study conducted in Australia showed an increase in research, collection and understanding of information among pregnant women with GDM.<sup>29</sup>

A study conducted by Dağlar and Nur on healthy pregnant women detected that women in the group with no children had an optimistic approach, while those with two and more living children had a submissive style.<sup>27</sup> Similarly, those in their first pregnancy had an optimistic approach in coping with stress, while those in their

second or a subsequent pregnancy were submissive. This may be explained by the fact that women in their first pregnancy were more eager to become mothers, as well as being due to the higher stress levels of those women in their second or a subsequent pregnancy. There may be two reasons that women in a second or subsequent pregnancy has a submissive style. The first may be fear of having a difficult pregnancy due to GDM that will result in an unsuccessful labor. They may have experienced stress relating to what will happen during labor, the possibility of a caesarian section and labor pains.<sup>30</sup> Another reason may be that pregnant women with other children were highly concerned and worried about their responsibilities towards their children.<sup>27</sup> In this study, the increase in stress levels may have led women to adopt the submissive approach.

Our study determined that being optimistic and submissive in coping with stress caused a decrease of the HbA1c level. The fact that those who were optimistic had lower HbA1c was an expected situation while the fact that those who were submissive also did was an unexpected result. The differences in the data may be due to those who perceived their situation as changeable adopting more active styles (being self-confident and optimistic), while those who perceived their situation as unchangeable were using feeling-oriented styles more (becoming submissive and desperate).<sup>31</sup> In meta-analytical studies conducted with individuals with diabetes mellitus, the patients using effective coping styles, i.e. perceiving their situations as changeable (self-confident and optimistic), were found to have better glycemic control.<sup>32</sup> Pregnant women with GDM in this study who had a high tendency towards the submissive type had a low HbA1c level because they generally had a low or intermediate socioeconomic level and believed that their GDM came from God; they associated their situation with religion and consequently perceived their situation as unchangeable. With this perception, it was easier for them to accept the disease and adapt to increases in GDM treatment, which led to decreased stress and lower HbA1c levels. There is no study on this topic in Turkey, however, in a qualitative study conducted with Indian and Pakistani people with Type 2 diabetes mellitus, which showed a cultural similarity in terms of the religious dimension (21 of the 32 patients were Muslims), there were findings supporting this interpretation. In the study, the patients with Type 2 diabetes stated that their illness had been given to them by God, and that it was bound to happen no matter what because it was the will of God.<sup>32</sup>

In our study, the pregnant women who were self-confident in coping with stress were found to have less weight gain during pregnancy. In the study of Çelik et al., of patients with Type 1 diabetes mellitus, it was detected that those with a normal BMI were more self-confident.<sup>28</sup> The suspected reason is that being a healthy weight affects body image positively and is effective in coping with stress.

The strengths of this study are that it is the first study to examine the levels of coping with stress in pregnant women with gestational diabetes and the first to evaluate

the relationship between levels of coping according to both clinical and socio-demographic characteristics. However, the fact that the number of pregnant women with gestational diabetes in the study is low and there is no long-term study or follow-up are weaknesses of the study.

## Conclusion

Level, a first pregnancy and weight gain during pregnancy were important factors in the use of effective styles of coping with stress in pregnant women with GDM. Unemployment and being in the second or any subsequent pregnancy were determined to be important factors in the use of ineffective styles of coping with stress in pregnant women with GDM. In addition, it was determined that the pregnant women who were optimistic and submissive in coping with stress had lower HbA1c levels.

In line with these results, diabetes mellitus educators providing care for pregnant women with GDM need to identify how pregnant women with GDM cope with stress, and recognize that pregnant women who are unemployed and are in their second or subsequent pregnancy may have ineffective coping styles and should be monitored with particular care. The ways pregnant women with GDM cope with stress should be evaluated to improve treatment management so they can be directed toward more effective coping styles through education and counseling. Future research should be conducted applying a longitudinal design and assessing the psychological determinants of coping and its outcomes. Randomized controlled studies are suggested in order to determine the full effects of GDM patients' coping styles.

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## Ethical issues

None to be declared.

## Conflict of interest

The authors declare no conflict of interest in this study.

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