

# Prenatal distress level and its predictors according to the gestational age in pregnant women in the semi-urban region in Northwestern Turkey: A cross-sectional study

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## Research

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# Abstract

**Background:** The aim of the present study was to determine the level and predictors of prenatal distress in pregnant women according to gestational age.

**Methods:** This a cross-sectional study was conducted in eight Family Health Centers (FHCs) in Kirklareli, in Turkey. The study included 179 pregnant women who presented to the FHCs, who were at  $\geq 12^{\text{th}}$  week of gestation.

**Results:** The frequency of prenatal distress in the participants was 21.2% (between 12<sup>th</sup>-27<sup>th</sup> weeks: 16.5%, between 28<sup>th</sup>-41<sup>st</sup> weeks: 26.8%). It was found that level of education, age of the spouse, current pregnancy being unplanned, and social support levels were associated with the level of prenatal distress in  $\geq 12^{\text{th}}$  week or between 12<sup>th</sup>-27<sup>th</sup> weeks or between 28<sup>th</sup>-41<sup>st</sup> weeks ( $p < 0.05$ ). And also, perceived income level, abortion, and the number of pregnancies were associated with the level of prenatal distress in  $\geq 12^{\text{th}}$  weeks; the age of women, perceived income levels, previous abortion experience, and the number of pregnancies were associated with the level of prenatal distress in between 12<sup>th</sup>-27<sup>th</sup> weeks; the age of women, education level of spouse', and previous birth experience prenatal distress levels were associated in between 28<sup>th</sup>-41<sup>st</sup> weeks ( $p < 0.05$ ).

**Conclusion:** The level of prenatal distress according to the gestational age, the education level of the woman, the age of her spouse', the unplanned pregnancy, and social support levels were predictors. In both periods, the age of women were determinants in prenatal stress levels in pregnant women. Pregnant women should be screened and evaluated for prenatal distress in their application to FHCs.

## Plain English Summary

Pregnancy may be affected by the biological and physical characteristics of the woman, as well as many factors such as the psychology of the pregnant woman or social determinants during pregnancy. This situation may affect not only the mother but also the health of the baby, child, family, and society. The aim of the present study was to determine the level and predictors of prenatal distress in pregnant women according to gestational age. In the present study, one out of every five pregnancies suffered from prenatal distress. Prenatal distress was observed in about one out of every five participants with a gestational age of 12<sup>th</sup> -27<sup>th</sup> weeks, and in one out of every four participants with a gestational age of 28<sup>th</sup> -41<sup>st</sup> weeks. The level of lower education of women, young age of the spouse, current pregnancy being unplanned, and lower social support levels were increased the level of prenatal distress in 12<sup>th</sup> and more than weeks or between 12<sup>th</sup> -27<sup>th</sup> weeks or between 28<sup>th</sup> -41<sup>st</sup> weeks. And also, their perceived income level moderate & poor, previous abortion experienced, and the number of pregnancies two or lower were increased the level of prenatal distress in  $\geq 12^{\text{th}}$  weeks. The lower age of women, their perceived income level moderate & poor, previous abortion experienced, and the number of pregnancies two or lower were increased the level of prenatal distress between 12<sup>th</sup> and 27<sup>th</sup> weeks. The lower age of women, education lower level of spouse', and previous birth experience have increased the level of prenatal distress between 28<sup>th</sup> and 41<sup>st</sup> weeks. Pregnant women should be screened and evaluated for prenatal distress in their application to FHCs. In addition, in order to prevent or reduce prenatal distress, social support mechanisms of pregnant women should be activated, and their spouses should be encouraged to participate in the training and counseling programs to be conducted.

## Introduction

Prenatal distress is an umbrella term used to describe depression, anxiety and stress symptoms, which can have negative effects in women in postpartum period [1]. Fear of the unknown, and physical, social, psychological and hormonal changes during pregnancy bring about many changes in women, which leads to prenatal distress called stress, anxiety and depression [2–4]. The symptoms might vary depending on the condition and background of the woman, and include low motivation or lack of enjoyment of life, sense of excessive guilt, low mood, extreme concern about the health of the baby, or social isolation [1].

If not treated, prenatal distress affects not only the mother but also the health of the fetus, infant and child [3, 5, 6]. A positive relation was reported between anxiety and stress levels and medical risk and past or present pregnancy complications in pregnancy [7]. It was demonstrated that pregnancy loss, unplanned or unwanted pregnancy, and history of mental illness resulting in miscarriage or stillbirth affect prenatal stress levels [3, 7, 8]. It is already known that pregnant women experience stress and anxiety in the event of unhealthy or disabled babies [1, 9, 10]. It was also demonstrated in previous studies that prenatal distress increases the risk of developing a wide range of negative consequences in children like emotional problems, attention deficit, hyperactivity disorder, and neurodevelopmental or neurocognitive dysfunction [5, 11]. It is considered that the contribution of prenatal stress to emotional and cognitive development problems was 10–15% in children [5]. Also, prenatal distress is more common in pregnancy and in the early stages of motherhood, which can affect mother-baby relations and cause bonding problems [1, 12].

In the literature, the frequency of prenatal distress (stress, anxiety and depression) ranges between 11.9% and 55.6% [2, 13, 14]. This frequency, which varies by gestational age or trimester, is reported to be higher in late periods of pregnancy [15, 18]. The frequency of prenatal distress during pregnancy is also associated with many demographic factors along with the obstetric background of women [19]. Among the predictors of prenatal distress levels of pregnant women are demographic factors such as young age, low education level, and low income level [2, 20, 21]. On the other hand, several studies conducted on the issue have revealed a negative relation between anxiety, stress and depression levels, and variables such as the level of social support given by the family and spouse/ partner, self-esteem, mastery, uncertainty/ unhappiness and history of violence or adverse events in life [3, 7, 20].

Distress in pregnancy whose effects sustain in the postpartum period affects not only the pregnant woman but also her family adversely and remains to be a significant public health problem [22]. The Turkish Statistical Institute reported that the total fertility rate of Kirklareli was lower than the average rate of the entire Turkey in 2017 [23]. In this semi-urban city, no current studies were detected in the literature in which the current levels of prenatal stress of pregnant women were investigated; and also, the prenatal distress levels according to pregnancy week are not known.

## Objective

The present study aimed to determine the prenatal stress levels of women who were at the 12th gestational week and the following period and to detect the predictors the prenatal distress levels of women were according to gestational weeks.

## Methods

### Setting and Sample

The present study, which had a cross-sectional design, was conducted in eight Family Healthcare Centers (FHCs) in Kirklareli, located in the semi-urban region in Northwestern Turkey between June 2018 and November 2018. The number of births in the city center of Kirklareli was 1035 in 2017 [23]. The minimum sample size of the study was calculated as 140 ( $N = 1035$ ,  $p = 0.12$  [13],  $\alpha = 0.05$  and  $d = 0.05$ ) in the Epi Info 7.2 program. Considering possible data losses, the minimum sampling size was increased by 10%, and 154 pregnant women were targeted as the sampling. A total of 179 pregnant women, who were at the 12<sup>th</sup> gestational week and the following period between the dates of the study, who had no health problems in the fetus or infant, with no known medical, obstetric or psychiatric problems, with cognitive competence to answer questions in the questionnaires, and who volunteered to participate, were included in the study.

## **Data Collection Tools**

The study data were collected using the Personal Information Form, Tilburg Pregnancy Distress Scale (TPDS), and Multidimensional Scale of Perceived Social Support (MSPSS).

### **Personal Information Form**

The study data were collected using the Personal Information Form developed by the researchers based on the literature. This form contains items questioning the participants' socio-demographic characteristics such as woman's age, education level, marital status, family type, employment status, perceived income level, spouse's age, spouse's education level, and spouse's employment status. There were also questions on obstetric characteristics like previous deliveries, abortions, current pregnancy being planned, and the gestational week. The perceived income level variable was questioned as "How do you find your monthly income level?". The responses were recorded as "bad, moderate or good", and the women were asked to mark one of the options according to their own decisions. In this study, previous deliveries refer to having previously delivered vaginal or caesarean section except for the current pregnancy. The abortions variable refer to spontaneous or induced abortions.

### **Tilburg Pregnancy Distress Scale**

The scale was developed by Pop et al. (2011) to determine the level of pregnancy distress (stress, anxiety, depression). The validity and reliability study of the Turkish version of the scale was conducted by Çapık and Pasinlioglu (2015) [4]. It is designed in 4-Point Likert style with 16 items, and can be administered to pregnant women with a gestational age of  $\geq 12^{\text{th}}$  weeks. The scale has two sub-scales as Negative Affect and Partner Involvement. The scores that may be received from the scale vary between 0 and 48, and the higher the score, the higher the level of distress experienced during pregnancy. Çapık and Pasinlioglu reported the total Cronbach's alpha coefficient of the scale as 0.83. Given the cut-off point of the scale, a score of  $\geq 28.0$  indicates that the pregnant woman is at risk for distress [4]. The evaluations in this study were made over the total score; and Cronbach's Alpha coefficient was found to be 0.90.

### **Multidimensional Scale of Perceived Social Support**

The scale was developed by Zimet et al. (1988) to subjectively measure whether the perceived support received from three sources (family, friends, and special person) was adequate. The validity and reliability study of the Turkish version of the 12-item scale was conducted by Eker and Arkar (1995) [24]. The scores that may be received from this 7-Point Likert style vary between 12.0 and 84.0. The higher the score, the higher the level of the perceived support. The Cronbach's alpha coefficient for the sub-dimensions of the scale was reported to be higher than 0.77

by Eker and Arkar [24]. In this study, the evaluations were made over the total score; and the Cronbach's Alpha coefficient of the scale was found to be 0.97.

## Procedure

The purpose and scope of the study were explained to the pregnant women admitting to the FCHs in Kırklareli for antenatal follow-ups, vaccine follow-ups, or due to any disease. When the women agreed to participate in the study, the signed informed consent statement. The women who agreed to participate in the study in the antepartum period and who were at the 12<sup>th</sup> gestational week and the following period according to their statements were included in the study. The interviews lasted approximately 20-25 minutes, and were conducted in a room allocated to interviews in the FHCs, and the forms were filled in by the interviewer or by the interviewee. Each of the women who presented to the FHC was interviewed just once, when they first contacted.

## Data Analysis

To analyze the study data, of the descriptive statistics, numbers (n), percentages (%), mean and standard deviation (SD) were used. Reliability analysis was performed for the reliability of the scales, and the results were evaluated with Cronbach alpha coefficient. Whether the data had normal distribution was tested with the Shapiro-Wilk test. In the study, the prenatal distress levels and independent variables were compared for 12<sup>th</sup>-27<sup>th</sup> gestational weeks and 28<sup>th</sup>-41<sup>st</sup> gestational weeks. While the Mann Whitney-*U* test was used to compare the means in two independent groups, the Kruskal Wallis test was used to compare the means in three and more independent groups. In literature, associated with prenatal distress level [7,8,19,22,25] and in the univariate analysis, variables with  $p < 0.20$  were included in the model Multivariate Linear Regression Analysis was performed. The explanatory value of the models was evaluated with the Adjusted R-square (Adj.  $R^2$ ).  $P$ -values  $< 0.05$  were considered statistically significant. The analysis was performed using the Statistical Package for the Social Sciences, version 22.0 (SPSS Inc., Chicago, IL, USA).

## Results

In Table 1, distress levels of the participants according to their descriptive characteristics was presented. The mean age of the participants was  $29.01 \pm 5.68$  (Min: 17, Max: 42) years. The frequency of distress in the participants was 21.2%. This frequency was 16.5% at the between 12th -27th weeks and 26.8% at the between 28th -41st weeks of gestation (Fig. 1).

Table 1  
Distress levels of the participants according to their descriptive characteristics

<i>Variables</i>	$\geq$ 12th weeks (n = 179)		<i>p</i> -value	12th -27th weeks (n = 97)		<i>p</i> -value	28th -41st weeks (n = 82)		<i>p</i> -value
	n (%)	Mean (SD)		n (%)	Mean (SD)		n (%)	Mean (SD)	
<b>Age</b>									
< 35	143 (79.9)	19.24 (10.02)	0.002	81 (83.5)	17.02 (9.31)	0.007	62 (75.6)	22.12 (10.23)	0.014
$\geq$ 35	36 (20.1)	12.89 (6.23)		16 (16.5)	10.12 (5.50)		20 (24.4)	15.10 (5.99)	
<b>Education</b>									
Primary school or lower	41 (22.9)	24.24 (10.02)	< 0.001	16 (16.5)	22.12 (10.30)	0.008	25 (30.5)	25.60 (9.79)	0.004
Secondary or higher	138 (77.1)	16.09 (8.82)		81 (83.5)	14.65 (8.43)		57 (69.5)	18.14 (9.01)	
<b>Employment status</b>									
No	115 (64.2)	17.76 (8.54)	0.990	59 (60.8)	15.93 (8.30)	0.692	56 (68.3)	19.67 (8.42)	0.363
Yes	64 (35.8)	18.33 (11.57)		38 (39.2)	15.81 (10.43)		26 (31.7)	22.00 (12.36)	
<b>Perceived income level</b>									
Poor or Moderate	155 (86.6)	19.40 (9.50)	< 0.001	79 (81.4)	17.44 (9.18)	< 0.001	76 (92.7)	21.43 (9.46)	< 0.001
Good	24 (13.4)	8.67 (4.49)		18 (18.6)	9.06 (4.98)		6 (7.3)	7.50 (2.51)	
<b>Family type</b>									
Nuclear	162 (90.5)	17.82 (9.77)	0.532	85 (87.6)	15.04 (8.98)	0.020	77 (93.9)	20.88 (9.74)	0.086
Extended	17 (9.5)	19.29 (9.24)		12 (12.4)	21.83 (8.37)		5 (6.1)	13.20 (9.09)	
<b>Spouse's age</b>									
< 35	111 (62.0)	19.96 (8.79)	< 0.001	71 (73.2)	18.42 (9.12)	< 0.001	40 (48.8)	22.70 (7.50)	0.027
$\geq$ 35	68 (38.0)	14.69 (10.29)		26 (26.8)	8.96 (4.45)		42 (51.2)	18.23 (11.28)	
<b>Spouse's education</b>									
Secondary or lower	61 (34.1)	23.30 (9.69)	< 0.001	30 (30.9)	18.73 (9.54)	0.043	31 (37.8)	27.70 (7.68)	< 0.001

<i>Variables</i>	$\geq 12$ th weeks (n = 179)		<i>p</i> -value	12th -27th weeks (n = 97)		<i>p</i> -value	28th -41st weeks (n = 82)		<i>p</i> -value
	n (%)	Mean (SD)		n (%)	Mean (SD)		n (%)	Mean (SD)	
Graduate or higher	118 (65.9)	15.20 (8.52)		67 (69.1)	14.61 (8.73)		51 (62.2)	15.98 (8.24)	
<b>Previous deliveries</b>									
Nulliparous	71 (39.7)	16.72 (9.23)	0.141	37 (38.1)	14.24 (8.29)	0.181	27 (32.9)	17.96 (8.78)	0.115
Vaginal or Caesarean	108 (60.3)	18.78 (9.96)		60 (61.9)	16.90 (9.55)		55 (67.1)	21.61 (10.16)	
<b>Abortions</b>									
No	143 (79.9)	16.34 (9.45)	< 0.001	75 (77.3)	13.08 (7.40)	< 0.001	68 (82.9)	19.92 (10.19)	0.305
Yes	36 (20.1)	24.42 (7.92)		22 (22.7)	25.45 (8.06)		14 (17.1)	22.78 (7.67)	
<b>The number of pregnancies</b>									
$\leq 2$	153 (85.5)	16.50 (9.17)	< 0.001	84 (86.6)	13.95 (7.87)	< 0.001	69 (84.1)	19.61 (9.72)	0.112
> 2	26 (14.5)	26.54 (8.37)		13 (13.4)	28.39 (6.74)		13 (15.9)	24.69 (9.66)	
<b>Current pregnancy planning</b>									
Planned	152 (84.9)	16.39 (9.03)	< 0.001	87 (89.7)	14.56 (8.34)	< 0.001	65 (79.3)	18.83 (9.37)	0.007
Unplanned	27 (15.1)	26.81 (8.71)		10 (10.3)	27.40 (7.87)		17 (20.7)	26.47 (9.38)	

In Table 2, the mean scores of the TPDS and MSPSS Scales of all groups by gestational weeks were given. The mean prenatal distress level of the pregnant women was determined to be  $17.96 \pm 9.70$  (Min: 3, Max: 39), and the mean social support level was  $71.11 \pm 10.98$  (Min: 42, Max: 84). The mean TPDS scores were found to be higher in between 28th -41st weeks ( $20.41 \pm 9.82$ ) compared to between 12th -27th weeks ( $15.88 \pm 9.14$ ). The mean MSPSS score was found to be lower in between 28th -41st weeks ( $68.73 \pm 11.89$ ) compared to between 12th -27th weeks ( $73.12 \pm 9.76$ ).

Table 2

Distribution of the mean scores the participants obtained from scales (n = 398).

<i>Scales</i>	$\geq 12$ th weeks (n = 179)		12th -27th weeks (n = 97)		28th -41st weeks (n = 82)	
	Mean $\pm$ SD	Min.-Max.	Mean $\pm$ SD	Min.-Max.	Mean $\pm$ SD	Min.-Max.
TPDS	17.96 $\pm$ 9.70	3-39	15.88 $\pm$ 9.14	3-38	20.41 $\pm$ 9.82	4-39
MSPSS	71.11 $\pm$ 10.98	42-84	73.12 $\pm$ 9.76	42-84	68.73 $\pm$ 11.89	48-84
MSPSS: Multidimensional Scale of Perceived Social Support. TPDS: Tilburg Pregnancy Distress Scale.						

In Table 3, the multivariate linear regression analysis of distress levels according to the gestational age of the participants was demonstrated. In the models created for 12th pregnancy week and the following period, between 12th -27th gestational weeks and between 28th -41st weeks gestation, 62.8%, 69.5% and 69.1% of the variance in the prenatal distress level, respectively ( $p < 0.001$ ).

Table 3

Multivariate linear regression analysis of distress levels according to the gestational age of the participants

<i>Predictors</i>	$\geq 12$ th weeks			12th -27th weeks			28th -41st weeks		
	$\beta$	(95% CI)	p-value	$\beta$	(95% CI)	p-value	$\beta$	(95% CI)	p-value
Age (years)	-0.126	(-0.375, 0.122)	0.317	-0.609	(-0.862, -0.355)	< 0.001	-0.412	(-0.757, -0.067)	0.020
Education level (primary school or lower)	-2.640	(-5.168, -0.111)	0.041	-3.211	(-5.704, -0.718)	0.012	-3.105	(-5.894, -0.316)	0.029
Perceived income level (poor or moderate)	-3.427	(-6.383, -0.470)	0.023	-4.570	(-7.901, -1.239)	0.008	-3.156	(-8.200, 1.887)	0.216
Family type (nuclear)				3.817	(-0.029, 7.662)	0.052	-3.680	(-9.009, 1.648)	0.173
Spouse's age (< 35 years)	-5.369	(-7.945, -2.793)	< 0.001	-2.851	(-5.503, -0.198)	0.035	-9.090	(-13.257, -4.923)	< 0.001
Spouse's education level (secondary school or lower)	-1.730	(-3.967, 0.507)	0.129	2.081	(-0.671, 4.833)	0.136	-5.437	(-8.653, -2.220)	0.001
Previous deliveries (yes)	-0.410	(-2.647, 1.827)	0.718				9.034	(4.202, 13.866)	< 0.001
Previous abortions (yes)	2.122	(-1.413, 5.658)	0.238	5.434	(1.238, 9.630)	0.012			
The number of pregnancies ( $\leq 2$ )	4.104	(0.115, 8.092)	0.044	6.389	(1.627, 11.151)	0.009	0.430	(-3.806, 4.666)	0.840
Current pregnancy planning (unplanned)	4.320	(1.222, 7.419)	0.007	4.585	(0.631, 8.540)	0.024	5.021	(0.575, 9.467)	0.027
MSPSS	-0.447	(-0.533, -0.361)	< 0.001	-0.258	(-0.375, -0.141)	< 0.001	-0.398	(-0.510, -0.286)	< 0.001
<i>Adj. R<sup>2</sup></i>	<i>0.628</i>			<i>0.695</i>			<i>0.691</i>		

\*\*\* $p < 0.001$ . MSPSS: Multidimensional Scale of Perceived Social Support.

<i>Predictors</i>	$\geq 12$ th weeks			12th -27th weeks			28th -41st weeks		
	$\beta$	(95% CI)	p-value	$\beta$	(95% CI)	p-value	$\beta$	(95% CI)	p-value
<i>F test</i>	31.028***			22.876***			19.109***		
*** $p < 0.001$ . MSPSS: Multidimensional Scale of Perceived Social Support.									

In 12th pregnancy week and the following period, a negative association was found between the level of prenatal distress and the education level of the pregnant woman ( $\beta = -2.640$ , 95% CI:  $-5.168, -0.111$ ), perception of poor or moderate-income ( $\beta = -3.427$ , 95% CI:  $-6.383, -0.470$ ), age of her spouse' ( $\beta = -5.369$ , 95% CI:  $-7.945, -2.793$ ) and social support levels ( $\beta = -0.447$ , 95% CI:  $-0.533, -0.361$ ); and a positive association with the number of pregnancies had two or less ( $\beta = 4.104$ , 95% CI:  $0.115, 8.092$ ) and the unplanned pregnancy ( $\beta = 4.320$ , 95% CI:  $1.222, 7.419$ ) (Table 3).

In between 12th -27th weeks, it was found that the age of the women ( $\beta = -0.609$ , 95% CI:  $-0.862, -0.355$ ), educational level ( $\beta = -3.211$ , 95% CI:  $-5.704, -0.718$ ), perceived income level ( $\beta = -4.570$ , 95% CI:  $-7.901, -1.239$ ), spouse's age ( $\beta = -2.851$ , 95% CI:  $-5.503, -0.198$ ), and social support levels ( $\beta = -0.258$ , 95% CI:  $-0.375, -0.141$ ) and prenatal stress level were associated negatively; and previous abortion ( $\beta = 5.434$ , 95% CI:  $1.238, 9.630$ ), the number of pregnancies had two or less ( $\beta = 6.389$ , 95% CI:  $1.627, 11.151$ ), current pregnancy being unplanned ( $\beta = 4.585$ , 95% CI:  $0.631, 8.540$ ) and prenatal stress levels were positively associated (Table 3).

In between 28th -41st weeks, it was found that the age of the pregnant women ( $\beta = -0.412$ , 95% CI:  $-0.757, -0.067$ ), educational level ( $\beta = -3.105$ , 95% CI:  $-5.894, -0.316$ ), spouse's age ( $\beta = -9.090$ , 95% CI:  $-13.257, -4.923$ ), spouse's educational level ( $\beta = -5.437$ , 95% CI:  $-8.653, -2.220$ ) and social support level ( $\beta = -0.398$ , 95% CI:  $-0.510, -0.286$ ) and prenatal distress levels were negatively related; and previous birth ( $\beta = 9.034$ , 95% CI:  $4.202, 13.866$ ) and current pregnancy being unplanned ( $\beta = 5.021$ , 95% CI:  $0.575, 9.467$ ) were positively related with prenatal distress (Table 3).

## Discussion

In the present study carried out in the semi-urban region in Northwestern Turkey, one out of every five participating pregnant women in 12th pregnancy week and the following period was determined to suffer from prenatal distress (stress, anxiety, depression). In the literature, the frequency of prenatal distress was 55.6% in Indonesia and 11.9% in women whose gestational age was  $\geq 12$ th weeks in Turkey, and ranged between 37.5% and 54.1% in women whose gestational ages were between 16 and 36 weeks respectively in Iceland [2, 13, 14]. In some studies, the frequency of stress, anxiety, depression during pregnancy ranged between 7.9% and 33.8% [8, 21, 22, 26–28]. In addition, in our study, similar to literature [17, 21, 29–32], the levels of prenatal distress were higher in the participants whose gestational age was between 28th -41st weeks than that in the participants whose gestational age was between 12th -27th weeks. It was reported that prenatal distress experienced during pregnancy was mostly due to changes in women in the second and third trimesters and that mothers in advanced ages can adapt to these changes better [2, 5]. These findings, which were consistent with those in the literature, were associated with the fact that the majority of the participants were in the young age group and had a fear of birth.

It was demonstrated that younger pregnant women were 36% more likely to suffer depression than older pregnant women in Brazil [22]. In a study conducted in the USA, anxiety levels were found to be higher in younger pregnant women [29]. In a study conducted in Indonesia, young age was reported as the most dominant factor affecting prenatal distress in primigravidae.<sup>2</sup> According to our results, which were consistent with those in the literature, prenatal distress levels increased both in the pregnant women whose gestational age was between 12th -27th weeks, and in the pregnant women whose gestational age was between 28th -41st weeks as their age decreased [21, 30–32].

In the literature, it was stated that there was an inverse association between the education level and perinatal distress levels, that the low education level poses a risk for distress, and that the high education level was a factor preventing pregnancy distress [19, 20, 22, 28, 29, 32]. In our study, prenatal distress levels were found to be lower as the education level of the pregnant women 12th pregnancy week and the following period or between 12th -27th weeks or between 28th -41st weeks increased. According to this result, which was consistent with the results in the literature, it was thought that people whose education level was high can access more information about pregnancy and birth, and can cope with pregnancy distress more effectively.

In their study, Choi et al. reported that low education level and unemployment led to low income level, which increased pregnancy distress [31]. In several other studies conducted on the issue, it was shown that there was association between financial problems and the levels of prenatal distress including depression, anxiety, and stress [27–29, 32, 33]. On the other hand, in studies conducted with pregnant women in Iceland, Indonesia and South Africa, no association was determined between the income level and prenatal distress levels [2, 8, 14]. In our study, it was associated that the prenatal distress levels of pregnant women who reported had middle and poor income levels after the 12th gestational week or between the 12th -27th weeks of gestation were higher; it was not associated with the 28th -41st weeks. This result could be explained by the fact that the pregnant women focus on the birth process and baby care in the later weeks of pregnancy, or that those with a low perceived income level develop coping strategies.

While prenatal distress levels are high in those with less than two pregnancies 12th pregnancy week and the following period or between 12th -27th gestational weeks; the prenatal distress levels of those who had previous-abortion experience between 12th -27th weeks of gestation and those who had previous-birth experience between 28th -41st weeks of gestation were high. In studies conducted in the USA, the Netherlands, Greece and India, nulliparous women were reported to have significantly higher prenatal distress levels [17, 25, 28, 29]. In a study conducted in Iceland, there was no significant difference between primiparous and multiparous women in terms of their prenatal distress levels [32]; however, in studies performed in Brazil, France, China, multiparous women were at higher risk of distress [19, 22, 26]. In the literature, it was shown that fetal loss and previous pregnancy loss are the predictors of distress, and that they increase distress levels [7, 8, 20]. These results, which might be due to lack of perceived parental knowledge, low self-efficacy, complications experienced during previous pregnancies and deliveries, fear of birth, inadequate social support levels and unplanned pregnancy were consistent with those in the literature [18, 21, 25, 32].

In our study, it was found that unplanned pregnancies 12th pregnancy week and the following period or 12th -27th weeks or 28th -41st weeks increased prenatal distress levels. A systematic review revealed a strong association between unplanned or unwanted pregnancy, and antenatal depression and anxiety [3]. In a study, antenatal depression in unplanned pregnancies was reported to be significantly more than that in planned pregnancies [22]. Several studies conducted in different countries yielded results similar to those of the present study, and the

authors of those studies showed that unplanned pregnancies in women whose gestational age was increased the distress levels [19, 29, 31].

In the literature were shown a negative association between the levels of emotional and practical social support received from the mother, mother-in-law, or spouse/partner or family, and the level of prenatal distress [2, 18, 20, 27, 33]. In our study, prenatal distress levels of the participants increased as their social support levels decreased. In a Canadian study, 12.9% of the pregnant women had inadequate social support, and partner tension affected the anxiety level in the pregnant woman [30]. In parallel with this finding, in our study, while the spouse's being at a younger age increased prenatal distress levels both in the participants with 12th pregnancy week and the following period or between 12th -27th weeks or between 28th -41st weeks, low education level of the spouse increased the prenatal distress levels in the participants with a gestational age of 28th -41st weeks. Similar to our finding, in a study conducted in Northern Tanzania, the frequency of antenatal depression was reported to be higher in pregnant women whose spouses were young [27]. In a studies conducted Turkey, no association was determined between the distress level and the spouse's education level [13]. The difference in our results was probably related to the fact that the spouses were knowledgeable and experienced enough in coping with problems likely to arise during pregnancy.

## Conclusion

In the present study, one out of every five pregnancies suffered from prenatal distress. Prenatal distress was observed in about one out of every five participants with a gestational age of 12th -27th weeks, and in one out of every four participants with a gestational age of 28th -41st weeks. In 12th pregnancy week and the following period, the level of prenatal distress according to the gestational age, the education level of the woman, perceived income level, the age of her spouse', the number of pregnancies, the unplanned pregnancy, and social support levels were predictors. Prenatal distress level was higher in the participants during the 28th -41st weeks of gestation than during the 12th -27th weeks of gestation. In both pregnancy periods, as the age, educational level, spouse's age, and social support level of women decreased, prenatal stress levels increased in those with unplanned pregnancy. It was also determined that although the perceived income level, the spouse's age, history of abortions and the number of pregnancies were the predictors of the prenatal distress level between the 12th -27th weeks of gestation, the spouse's age and education level, and previous birth experience were the predictors of the prenatal distress level between the 28th -41st weeks of gestation.

As a result, health professionals working at FCHs should be given an opportunity to screen and evaluate pregnant women in terms of distress during follow-ups. Healthcare professionals should provide education and counseling programs to pregnant women who are at risk of distress, and they should teach pregnant women coping strategies. One of the predictors of prenatal distress is unplanned pregnancies, which should be prevented by improving the quality of family planning services provided for women of childbearing age. In addition, in order to prevent or reduce prenatal distress, social support mechanisms of pregnant women should be activated, and their spouses should be encouraged to participate in the training and counseling programs to be conducted.

## Limitations

Because the study has a cross-sectional design, the findings require careful interpretation in terms of cause-effect relationship. Because the study was conducted with pregnant women who presented to the FCHs, its results can

hardly be generalized to the general population. The other limitation is that the evaluation of prenatal distress level was based on self-report data.

## Abbreviations

FHCs  
Family Health Centers  
TPDS  
Tilburg Pregnancy Distress Scale  
MSPSS  
Multidimensional Scale of Perceived Social Support

## Declarations

**Ethics approval and consent to participate** To conduct the study, ethics approval was obtained from the Ethics Committee of the Institute of Health Sciences at Kirklareli University (09/03/2018-P082R00); and official permission to conduct the study was also obtained. Participants were obtained informed consent.

**Consent for publication** Not applicable.

**Availability of data and materials** The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

**Competing interests** The authors declare that they have no conflict of interest.

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**Authors' contributions** conceptualization: YM and KTS; methodology: YM and KTS; formal analysis: YM; investigation: YM, FD and HS; resources: FD and HS; data curation: YM and HS; writing - original draft: YM, FD and HS; writing - review and editing: YM, KTS and FD; visualization: YM, KTS, and FD; supervision: YM, KTS and FD. All authors endorse the data and conclusions.

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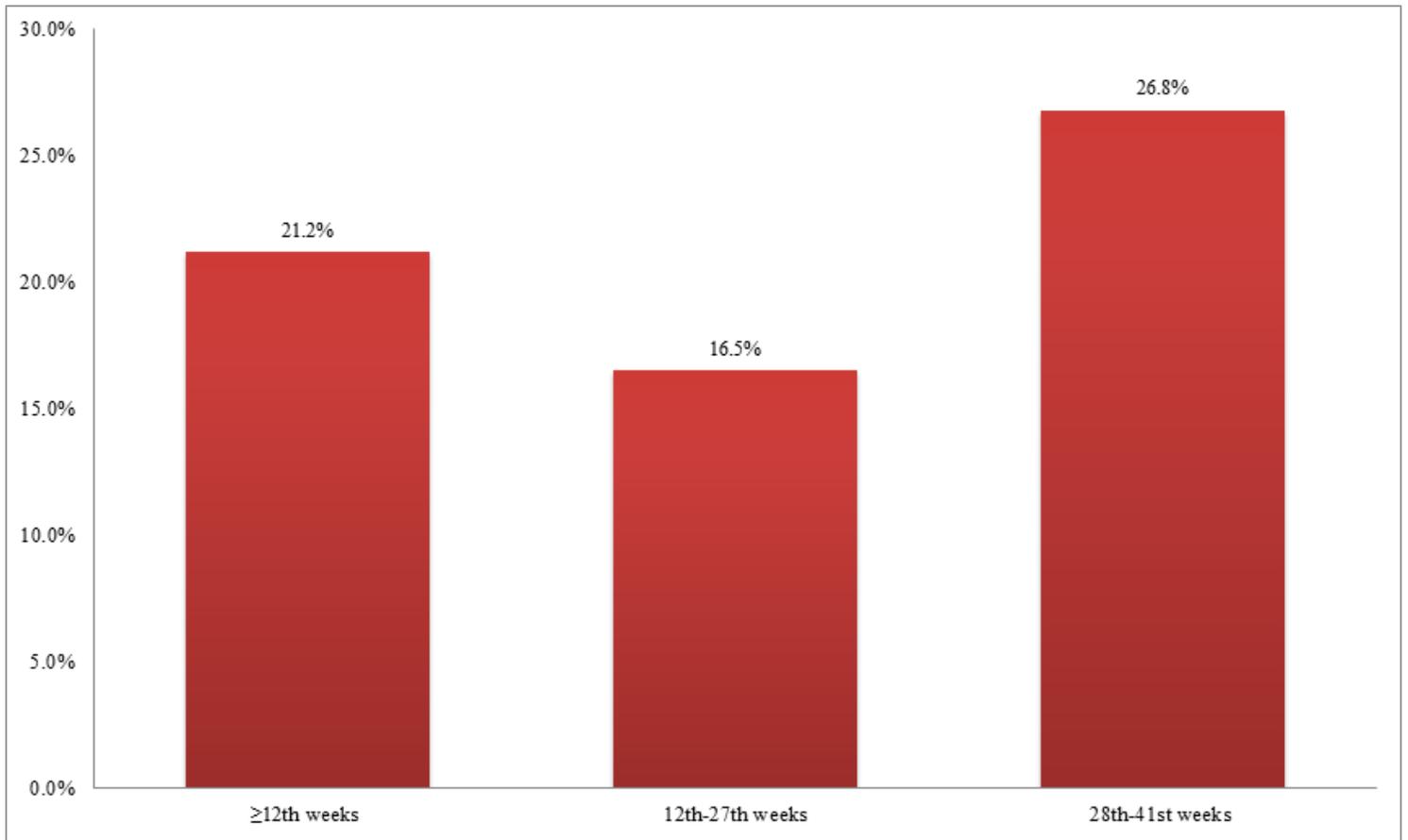
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## Figures



**Figure 1**

Prenatal distress frequency according to gestational age