The effect of climate change-related anxiety on prenatal attachment: A descriptive study

İklim değişikliğine bağlı anksiyetenin prenatal bağlanmaya etkisi: Tanımlayıcı bir çalışma

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ABSTRACT

Aim: Our study was conducted to determine the effect of climate change-related anxiety on prenatal attachment.
Method: The sample of the study consisted of 287 pregnant women who visited the gynecology and obstetrics outpatient clinics of a state hospital between October 15, 2024, and March 1, 2025, for examination participated in the study. Data were collected with Personal Questionnaire, Climate Change Anxiety Scale (CCAS) and Prenatal Attachment Inventory (PAI).
Results: The mean PAI total score of the pregnant women was 37.65±9.76. When the total and sub-dimension mean scores of the CCAS were evaluated, the mean score was 19.64±7.38; the mean score of the Cognitive Impairment sub-dimension was 12.19±4.32; and the mean score of the Functional Impairment sub-dimension was 7.44±3.36. It was determined that there was a significant difference between the PAI total score and age, educational status, planned pregnancy, pregnancy and number of living children, and the importance of climate change in terms of women's health (p<0.05). When the mean total and sub-dimension scores of the CCAS and sociodemographic characteristics were compared, it was found that the mean total and sub-dimension scores of the CCAS were higher in pregnant women aged between 19-27 years and university graduates.
Conclusion: It was found that climate change anxiety decreased as prenatal bonding increases in pregnant women attachment increased attachment increased, and age, number of living children, the importance of climate change for women's health, and total variables of the CCAS had a significant relationship with prenatal attachment.

Keywords: anxiety; climate change; midwifery; pregnancy; prenatal care

ÖZ

Amaç: Çalışmamız, iklim değişikliğine bağlı anksiyetenin prenatal bağlanmaya etkisinin belirlenmesi amacıyla gerçekleştirilmiştir.
Yöntem: Araştırmanın örneklemini, 15.10.2024-01.03.2025 tarihleri arasında bir devlet hastanesinin kadın hastalıkları ve doğum polikliniklerine muayene için başvuran 287 gebe kadın oluşturmuştur. Veriler; Kişisel Bilgi Formu, İklim Değişikliği Anksiyetesi Ölçeği (İDAÖ) ve Prenatal Bağlanma Envanteri (PBE) ile toplanmıştır.
Bulgular: Kadınların PBE toplam puan ortalaması 37.65±9.76'dır. İDAÖ toplam ve alt boyut puan ortalamaları değerlendirildiğinde İDAÖ toplam puan ortalaması 19.64±7.38; Bilinçsel Bozulma alt boyut puan ortalaması 12.19±4.32; İşlevsel Bozulma alt boyut puan ortalaması 7.44±3.36'dır. PBE toplam puanı ile bazı özelliklerinin ve iklim değişikliği değişkenleri karşılaştırmasında yaş, eğitim durumu, gebelik ve yaşayan çocuk sayısı, gebeliğin planlı olma durumu, iklim değişikliğinin kadın sağlığı açısından önemli olma durumu ile PBE toplam puanı arasında anlamlı farklılık olduğu belirlenmiştir (p<0.05). Gebelerin sosyodemografik özellikleri ile İDAÖ toplam ve alt boyut puan ortalamalarının karşılaştırmasında 19-27 yaş aralığında ve üniversite mezunu gebelerin İDAÖ toplam ve alt boyut puan ortalamalarının daha yüksek olduğu belirlenmiştir.
Sonuçlar: Prenatal bağlanma arttıkça iklim değişikliği anksiyetesinin azaldığı; yaş, yaşayan çocuk sayısı, iklim değişikliğinin kadın sağlığı açısından önemi ve İDAÖ toplam değişkenlerinin prenatal bağlanma üzerinde anlamlı ilişkisi olduğu saptanmıştır.

Anahtar kelimeler: anksiyete; ebelik; gebelik; iklim değişikliği; prenatal bakım

Introduction

Climate change is defined as a change in weather conditions that affects the biotic process through living organisms, radiation, tectonic plates, volcanic eruptions and natural disasters. It is reported that the average temperature of the earth's surface has increased by 0.85 degrees Celsius over the last 100 years. Human activities related to the destruction of nature are one of the major and important causes of climate change, referred to as global warming (Dimitrov, 2019). Climate change has far-reaching environmental impacts, including changes in climate patterns and an increase in extreme weather events such as heat, storms, waves, drought, fire and heavy rainfall (Romanello et al., 2021). The impact of these changes on health is becoming increasingly important.

Globally, women are highly affected by the impacts of climate change due to their low economic independence, limited training and knowledge to manage climate-related risks in agriculture and animal husbandry, and greater family responsibilities (Abid et al., 2018; Gok & Ertem, 2022). As well as the effects of climate change on physical wellness, it is emphasized that climate change has negative effects on women's mental health such as anxiety and depression, as well as findings of gender-based violence (Stone et al., 2022). Increased impact of exposure other sexually transmitted infections (STIs) and Human Immunodeficiency Virus (HIV), impaired access to health services, and increased sexual and gender-based violence have the potential to harm sexual health (Lieber et al., 2021; Logie et al., 2021). Increasing evidence shows that climate change not only has negative impacts on sexual health, but also directly and indirectly affects perinatal health. These impacts include pregnancy complications, pregnancy loss, preterm birth, fetal growth retardation, low birth weight and some birth/neonatal

complications (Ha, 2022; Yuzen et al., 2023). Pregnant women are particularly vulnerable to health problems caused by climate change, namely premature birth, low birth weight relative to gestational age, hypertensive disorders in pregnancy, and other adverse reproductive health and birth outcomes (Fan & Zlatnik, 2023). Research shows that environmental factors related to climate change (air pollution, water insecurity, repeated exposure to heat stress) lead to serious adverse outcomes that affect the well-being of individuals during pregnancy, breastfeeding, and early infancy, and have been linked to increased risks of preterm birth, low birth weight, and emergency room visits. At the same time, asthma incidence and infectious respiratory disease risks are also affected by adverse weather events (Howells et al., 2025; Veras & Saldiva, 2025). The perception of fetal movements between 18-25 weeks of gestation enables the mother to distinguish between herself and the fetus and to see the fetus as an individual with needs and communication style. In this term, prenatal attachment begins to develop (Rollè et al., 2020). The attachment relationship is based on the bidirectional interaction between primary caregivers and the infant, established to provide security, protection and emotional regulation to the child in the first years after birth. Prenatal attachment refers to an abstract and unidirectional bond between parents and fetus. While conditions such as anxiety disorders, lack of social support, anxiety, and depression experienced during pregnancy negatively affect prenatal attachment, training status, age, pregnancy and number of living children, planning status of pregnancy, positive health behavior change in the process, and positive emotions experienced when pregnancy is learned positively affect prenatal attachment (Badem & Zeyneloğlu, 2021; Karabulutlu et al., 2020; Özdemir et al., 2020).

It is extremely important to raise awareness about the prenatal effects of climate change, especially for women. As a result of the literature review, no study was found showing the level of effect of climate change-related anxiety on prenatal attachment, this study purposed to determine the effect of climate change-related anxiety on the prenatal attachment level.

Methods
Purpose of the study
The purpose of this descriptive study was to determine the effect of anxiety due to climate change on the level of prenatal attachment. The study included 287 women who applied to the gynecology and obstetrics clinic of a state hospital to be examined between October 15, 2024 and March 1, 2025 and who agreed to participate in the study verbally and in writing.

Population and cross-section of the study
The population of the study consisted of pregnant women aged 19 years and older and older than 20 weeks of gestation. G*Power 3.1.9.7 program was used to determine the cross-section of the study (Faul et al., 2007). The sampling calculation was made by considering Cohen's small effect size recommendation and the data of the study conducted by Özkan et al. (2020) on prenatal attachment (effect size 0.23, confidence interval 95%). According to the two-tailed hypothesis method, H1=0.23, confidence interval (1-β)=0.95 and margin of error α=0.05 were determined. As a result of the calculation, it was determined that the sample

size should be at least 239 women, and considering the possible data loss (20% data loss), the study was completed with 287 pregnant women. Criteria for inclusion in the study; The study included women who were over 19 years of age, older than 20 weeks of gestation, had no communication problems, mental and chronic diseases, had a normal pregnancy, had a healthy and single fetus, and gave verbal and written consent to participate in the study.

Data collection and tools
Three forms were used to collect the data of the study. These are; Personal Questionnaire, Climate Change Anxiety Scale and Prenatal Attachment Inventory.

Personal questionnaire
The 11-question form, which purposed to measure the sociodemographic and obstetric characteristics of women and their level of knowledge about climate change, was developed by the researchers by reviewing the literatüre.

Climate Change Anxiety Scale (CCAS)
The scale was developed by Clayton and Karazsia (2020) and its Turkish validity and reliability was conducted by Cebeci et al. (2022) The first eight items of the scale constitute the Cognitive Impairment subscale and the remaining items constitute the Functional Impairment subscale. As the total score obtained from the scale increases, the anxiety value increases (Cebeci et al., 2022). In our research, the internal consistency cronbach alpha value of the scale was found to be 0.93.

Prenatal Attachment Inventory (PAI)
The inventory was developed to determine women's feelings and thoughts during pregnancy and their level of attachment to the fetus in the prenatal period, and the Turkish validity and reliability of the scale was conducted by Yilmaz and Beji (2013). A minimum score of 21 and a maximum score of 84 can be obtained from the inventory consisting of 21 items. A higher score on the inventory indicates an increased level of prenatal attachment (Yilmaz & Beji, 2013). In our study, the internal consistency cronbach alpha value of the scale was found to be 0.88.

Ethical approval
Ethics committee permission (2024/07-24) was obtained from Sivas Cumhuriyet University Non-Interventional Clinical Research Ethics Committee and institutional permission was obtained from Sivas Provincial Health Directorate in 2024. Verbal and then written informed consent was obtained from the women who volunteered to participate in the study and they were assured that their personal information would not be shared with others, would not be used anywhere else and that they had the right to leave the study at any time. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Statistical analysis
The statistical evaluation of the obtained data was performed with SPSS 23.0 package program in computer environment. Descriptive statistical measures were used. While evaluating the normality analysis of the data, p value and Kolmogorov-Smirnov test statistics, kurtosis and skewness coefficients were examined to determine from which distribution the data of the variables came from, and in line with Tabachnick and Fidell's (2013) suggestion, if the skewness and kurtosis coefficients are within ±2 limits or the p value is greater than 0.05, it is accepted that the distribution of the data is within normal limits.

Table 1. Distribution of women's mean scores of total PAI and total and subscale scores of CCAS (n=287)

Scales	X̄	SD	Min-max score obtained from the scale	Min-max score that can be obtained from the scale	Cronbach's Alpha
PAI	37.65	9.76	21-65	21-84	0.88
CCAS	19.64	7.38	13-55	13-65	0.93
Cognitive impairment	12.19	4.32	8-32	8-40	0.87
Functional impairment	7.44	3.36	5-23	5-25	0.89

PAI: Prenatal Attachment Inventory; CCAS: Climate Change Anxiety Scale; X̄: Mean value; SD: Standard Deviation.

Results

The mean PAI total score was 37.65±9.76. When the total and subscale mean scores of CCAS were evaluated, the mean total score of CCAS was 19.64±7.38; the mean score of Cognitive Impairment subscale was 12.19±4.32; and the mean score of Functional Impairment subscale was 7.44±3.36. When the reliability levels of the internal validity coefficients of the scales were examined, it was determined that the overall reliability levels of the PAI and CCAS total and CCAS subscales were highly reliable ($0.81 < \alpha < 1.00$) (Table 1). The mean age of the pregnant women was 27.14±4.67 years and 61.0% were between the ages of 19-27 years. In addition, 41.5% of the pregnant women were university graduates and 78.7% were not working. The mean number of pregnancies was 1.77±0.95 and the mean number of living children was 1.47±0.70. It was determined that 50.5% of the pregnant women had their first pregnancy, 54.7% had no living children, 80.1% had planned pregnancies, 46.7% thought that climate change was an important problem for human health, and 50.5% thought that climate change was an important problem for women's health.

Table 2. Comparison of PAI and CCAS scores according to the socio-demographic and obstetric characteristics of pregnant women and their perceptions of climate change (n=287)

Characteristics	n	%	PAI total X̄ ±SD	CCAS total X̄ ±SD	Subscales of the CCAS	
					Cognitive Impairment X̄ ±SD	Functional Impairment X̄ ±SD
Age- Mean year 27.14±4.67 (min=19 – max= 43)						
19-27 years old	175	61.0	35.44±9.50	19.93±8.03	12.35±4.56	7.58±3.74
28 years and older	112	39.0	41.10±9.18	19.18±6.25	11.95±3.94	7.23±2.67
			t=-4.987 / **p=0.000**	MWU=-0.269 / p=0.788	MWU=-0.532 / p=0.595	MWU=-0.288 / p=0.773
Training status						
Primary school	22	7.7	39.77±11.29	20.27±6.00	12.68±3.64	7.59±2.50
Middle school	42	14.6	40.33±8.20	18.21±6.18	11.42±3.83	6.78±3.04
High school	104	36.2	37.90±9.17	18.59±6.16	11.50±3.69[a]	7.08±2.68
University	119	41.5	36.10±10.28	20.94±8.70	12.98±4.97[a]	7.96±4.03
			F=2.462 / p=0.063	KW=6.098 / p=0.107	KW=7.768 / **p=0.042**	KW=7.046 / p=0.070
Number of pregnancies- Mean number of pregnancies 1.77±0.95 (min:1 – max:5)						
First pregnancy	145	50.5	34.93±9.33	20.11±8.20	12.44±4.55	7.66±3.94
2 and above	144	49.5	40.42±9.43	19.16±6.43	11.94±4.07	7.22±2.64
			t=-4.955 / **p=0.000**	MWU=-0.797 / p=0.425	MWU=-1.089 / p=0.276	MWU=-0.991 / p=0.870
Number of living children- Mean number of living children 1.47±0.70 (min:1 – max:4)						
No survivors	157	54.7	35.05±9.44[a]	20.41±8.40	12.62±4.69	7.78±3.98
1 living	83	28.9	37.92±9.04[b]	18.51±5.63	11.44±3.59	7.07±2.38
2 and above	47	16.4	45.85±7.25[ab]	19.06±6.19	12.10±4.10	6.95±2.32
			F=26.015 / **p=0.000**	KW=1.924 / p=0.382	KW=3.200 / p=0.202	KW=0.905 / p=0.636
Planned pregnancy status						
Yes	230	80.1	36.76±9.87	19.55±7.63	12.12±4.47	7.43±3.46
No	57	19.9	41.24±8.46	20.01±6.30	12.50±3.71	7.50±2.92
			t=-3.149 / **p=0.002**	MWU=-1.189 / p=0.234	MWU=-1.283 / p=0.200	MWU=-1.145 / p=0.252
Climate change human health						
It is a very important problem	94	32.8	35.82±8.52	19.81±7.78	12.50±4.44[a]	7.31±3.68
It is an important problem	134	46.7	37.72±10.41	19.70±7.20	12.27±4.37	7.43±3.07
It is a trivial problem	15	5.2	40.33±10.23	23.86±9.04	13.66±4.33	10.20±5.05
No problem	15	5.2	39.06±8.59	17.40±4.28	10.80±2.42[a]	6.60±2.19
No opinion	29	10.1	41.13±9.98	17.75±6.57	10.82±4.23	6.93±2.37
			F=2.139 / p=0.076	KW=8.472 / p=0.076	KW=10.097 / **p=0.039**	KW=6.189 / p=0.185
Climate change women's health						
It is a very important problem	63	22.0	35.92±9.15[a]	19.88±7.28	12.42±4.03	7.46±3.48
It is an important problem	145	50.5	36.82±9.94	20.01±7.83	12.62±4.76	7.38±3.32
It is a trivial problem	15	5.2	40.53±10.36	19.26±6.96	11.53±3.79	7.73±3.30
No problem	27	9.4	41.51±8.87[a]	16.66±4.08	10.14±2.42	7.73±1.94
No opinion	37	12.9	39.86±9.56	20.10±7.58	11.89±3.97	8.21±4.06
			F=2.674 / **p=0.032**	KW=5.100 / p=0.277	KW=8.831 / p=0.065	KW=2.294 / p=0.682
Impact on life course						
Puberty	36	12.5	36.50±10.50	19.39±6.95	12.19±4.20	7.19±3.26
Pregnancy period	191	66.6	37.28±9.92	19.61±7.47	12.17±4.38	7.45±3.38
Birth	15	5.2	39.80±10.65	20.07±7.55	12.47±4.30	7.60±3.56
Postpartum	25	8.7	39.28±8.50	18.20±5.80	11.40±3.74	6.80±2.21
Menopause	20	7.0	39.65±7.48	21.90±8.93	13.30±4.90	8.60±4.30
			F=0.755 / p=0.555	KW=2.756 / p=0.599	KW=2.841 / p=0.585	KW=2.388 / p=0.665
Total	287	100.0				

PAI: Prenatal Attachment Inventory; CCAS: Climate Change Anxiety Scale; F: One Way ANOVA; t: Independent Sample t test; MWU: Mann Whitney U test; KW: Kruskal Wallis H test; a-b: there is a significant difference between groups with the same letter.

In the comparison of the PAI total score with some characteristics and climate change variables, it was determined that there was a significant difference between age, training status, number of pregnancies, number of living children, planned pregnancy status, and the importance of climate change for women's health and PAI total score ($p<0.05$). It was found that the mean PAI score was higher and there was a significant difference between age and PAI total score ($p<0.05$) (Table 2).

Table 3. PAI total and CCAS total and subscale correlations

	1	2	3	4
PAI (1)				
r		-0.158	-0.189	-0.105
p*	1	**0.007**	**0.001**	0.076
CCAS (2)				
r			0.969	0.949
p*		1	**0.000**	**0.000**
Cognitive Impairment (3)				
r				0.842
p*			1	**0.000**
Functional Impairment (4)				
r				
p*				1

PAI: Prenatal Attachment Inventory; CCAS: Climate Change Anxiety Scale; *Pearson correlation analysis was used.

In the comparison of the sociodemographic characteristics of the pregnant women with the mean scores of the total and subscale scores of the CCAS, it was determined that the mean scores of the total and subscale scores of the CCAS were higher in the 19-27 age range, university graduates, and employed pregnant women. It was found that there was a significant difference between the subscale of cognitive impairment and training status ($p<0.05$). In the comparison of the total and subscales of the CCAS with the variables, it was found that there was a significant difference between the subscale of the CCAS cognitive impairment and the status of the importance of climate change for human health ($p<0.05$) (Table 2).

According to the correlation analysis between the total and sub-dimensions of the scales, the highest correlation was found between the cognitive impairment, one of the sub-dimensions of the CCAS, and the total score of the CCAS, and a very high, significant and positive correlation was found. The lowest correlation was found between the functional impairment sub-dimension of the CCAS and the total score of the PAI, and it was determined that there was a very weak, negative and insignificant relationship. It was determined that there was a very weak, negative and significant correlation ($p<0.05$) between the CCAS and PAI, and it was determined that climate change anxiety decreased as prenatal attachment increased (Table 3). As a result of the analysis conducted to reveal how the variables thought to

have an effect on prenatal attachment predicted PAI scores in pregnant women, it was determined that these predictor variables showed a significant relationship with prenatal attachment ($F=12.293$; $p<0.05$). These variables explain 0.19% of the level of prenatal attachment. When the order of importance of these variables on the dependent variable was evaluated according to the standardized regression coefficients, it was determined that the number of living children ($\beta=4.698$) had the highest importance and the number of pregnancies ($\beta=-2.414$) had the lowest importance. When the significance tests of the regression coefficients were evaluated, it was found that age, number of living children, the importance of climate change in terms of women's health, and the total variables of the CCAS were significant predictors of the prenatal attachment inventory ($p<0.05$) (Table 4).

Discussion

Positive prenatal attachment facilitates parental role adaptation during pregnancy and psychological adjustment to pregnancy, which in turn forms the basis of postnatal attachment (Yuen et al., 2022). In the studies conducted, the prenatal attachment score range of pregnant women (43.84±9.71- 63.98±9.57) was determined to be above average (Badem & Zeyneloğlu, 2021; Özkan et al., 2020; Öztürk & Erbaş, 2021). In our study, PAI score (37.65±9.76) was determined below the average. Camarneiro and de Miranda Justo (2017) found that age, training, socioeconomic status, planning of pregnancy, and previous pregnancies were effective on prenatal attachment. In some studies, it was determined that women who were working, who expressed their economic status as good, whose first pregnancy and pregnancy was planned, who had 26 or more weeks of gestation, and who felt fetal movements intensely during the day had high levels of prenatal attachment (Elkin, 2015; Malm et al., 2016; Öztürk & Erbaş, 2021).

In our study, prenatal attachment levels were found to be higher in women who were 28 years of age or older, had 2 or more pregnancies and living children, and whose pregnancies were not planned (Table 2). This suggests that expectant mothers experienced higher levels of prenatal attachment in these pregnancies depending on their past obstetcic experiences. Climate change negatively affects the balance of risks for women's sexual and reproductive health and for newborn and child health. Half of the pregnant women who participated in our study reported that climate change will be a major health concern for human and women's health (Table 2). Increasing evidence suggests that a changing climate affects pregnancy health directly through discrete environmental disasters (i.e. wildfire, extreme heat, hurricanes, floods and drought) and indirectly through change in the natural and social environment (Ha, 2022).

Table 4. PAI regression analysis

Prenatal Attachment Inventory Independent Variables	β	S.E.	p*	95% CL Lower	95% CL Upper
Age	3.661	1.171	**0.002**	1.357	5.966
Number of pregnancies	-2.414	1.870	0.198	-6.095	1.268
Number of living children	4.698	1.278	**0.000**	2.182	7.213
Planned pregnancy status	1.618	1.373	0.239	-1.084	4.320
The importance of climate change for women's health	1.079	0.411	**0.009**	0.271	1.888
CCAS total	-0.156	0.071	**0.028**	-0.296	-0.017

$R^2 = 0.192$ $F = 12.293$ $p = 0.000$

PAI: Prenatal Attachment Inventory; CCAS: Climate Change Anxiety Scale; *Multiple linear regression analysis was used.

In our study, more than half of the women stated that climate change affects pregnancy the most in women's life stages (Table 2). According to research conducted in Gambia, pregnant women working in agriculture use heat adaptation techniques to protect themselves and their pregnancies from heat stress (resting in the shade while working, completing their work in multiple short time intervals, taking medication to reduce symptoms such as headaches, using water to cool down, and reducing the amount of land they cultivate) to protect themselves and their pregnancies from heat stress, and that they are highly aware of the effects of climate change on pregnancy health (Spencer et al., 2022). Another study conducted in Canada found that women planning to become pregnant experienced anxiety and sadness about climate change, and that all but two participants said this affected their decision to have children, which was related to social and environmental factors such as the cost of living (Smith et al., 2023).

Climate change is one of the greatest global health threats to the world's population (Giudice et al., 2021). At the same time, the climate crisis is an unprecedented existential threat that causes disturbing emotions such as anxiety (Wullenkord et al., 2021). A study has determined that anxiety related to climate change is low across Türkiye (Sezgin, 2024). In our study, it was determined that the level of climate change-related anxiety among pregnant women was low (19.64±7.38) (Table 1). While this supports that climate change-related anxiety decreases as prenatal attachment increases as a result of the analysis (Table 3), Türkiye is among the countries most affected by climate change, seasonal changes, rising temperatures, heat waves, floods, storms, fires, etc. are increasing in a way that everyone is aware of. However, knowledge and awareness of the fact that these are caused by climate change may be low.

In our study, our pregnant women who were university graduates and stated that climate change was an insignificant problem for human health had high scores in the cognitive impairment subscale of the CCAS (Table 2). It was determined that this increased the anxiety score related to climate change (Table 3). It has been determined that anxiety related to climate change increases as the level of cognitive impairment increases.

Conclusion

As a result of our study, the mean PAI total score was 37.65±9.76. When the total and subscale mean scores of the CCAS were evaluated, the mean total score of the CCAS was 19.64±7.38; the mean score of the Cognitive Impairment subscale was 12.19±4.32; and the mean score of the Functional Impairment subscale was 7.44±3.36. It was determined that there was a significant difference between age, training status, number of pregnancies, number of living children, planned pregnancy, and the importance of climate change in terms of women's health and the total PAI score ($p<0.05$). It was determined that the mean scores of the total and subscale scores of the CCAS were higher in the 19-27 age range, university graduates, and employed pregnant women. It was found that climate change anxiety decreased as prenatal attachment increased and age, number of living children, the importance of climate change in terms of women's health, and the total variables of the PAI had a significant relationship with prenatal attachment ($p<0.05$).

Half of the pregnant women who participated in our study stated that climate change will be a significant health issue for humans and women, and more than half of the women stated that climate change has the most significant impact on pregnancy among the stages of women's lives. It has been determined that the level of concern about climate change is low among pregnant women and that concern about climate change decreases as prenatal bonding increases.

It is recommended that more studies and informational activities should be carried out in our country to raise awareness of the effects of climate change on human, women's and newborn health. It is important that midwives, who play a primary role in women's health training and care, support pregnant women with low prenatal attachment, prioritize their care and refer them for professional support.

References

Abid, Z., Abid, M., Zafar, Q., & Mehmood, S. (2018). Detrimental effects of climate change on women. *Earth Systems and Environment, 2,* 537-551.

Badem, A. & Zeyneloğlu, S. (2021). Gebelerin prenatal bağlanma düzeyleri ve etkileyen faktörlerin belirlenmesi [Determination of prenatal attachment levels of pregnant women and and affecting factors]. *Kırşehir Ahi Evran Üniversitesi Sağlık Bilimleri Dergisi, 1*(1), 37-47.

Camarneiro, A. P. F., & de Miranda Justo, J. M. R. (2017). Prenatal attachment and sociodemographic and clinical factors in Portuguese couples. *Journal of Reproductive and Infant Psychology, 35*(3), 212-222.

Cebeci, F., Karaman, M., Öztürk, A. F., Uzun, K., Altın, O., Arıcı, A., & Artan, T. (2022). İklim Değişikliği Anksiyetesi Ölçeği'nin Türkçe uyarlaması: Geçerlik ve güvenirlik çalışması [Turkish adaptation of the Climate Change Anxiety Scale: A validity and reliability study]. *Beyond the Horizon of Scientific Journal, 22*(1), 20-42.

Clayton, S., & Karazsia, B. T. (2020). Development and validation of a measure of climate change anxiety. *Journal of Environmental Psychology, 69*, 101434.

Dimitrov, B. G. (2019). Effects of climate change on women. *International Journal of Multidisciplinary Research Review, 4*(5), 201-215.

Elkin, N. (2015). Prenatal attachment levels of pregnant women and factors affecting them. *Journal of Continuing Medical Education, 24*(6), 230-237.

Fan, W., & Zlatnik, M. G. (2023). Climate change and pregnancy: Risks, mitigation, adaptation, and resilience. *Obstetrical & Gynecological Survey, 78*(4), 223-236.

Faul, F., Erdfelder, E., Lang, A.G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*(2), 175–191.

Gok, E. & Ertem, G. (2022, September 14-16). *Changing climate and pregnancy*. II. International Health and Climate Change Congress, Türkiye.

Giudice, L. C., Llamas-Clark, E. F., DeNicola, N., Pandipati, S., Zlatnik, M. G., Decena, D. C. D., Woodruff, T. J., Conry, J. A., & FIGO Committee on Climate Change and Toxic Environmental Exposures (2021). Climate change, women's health, and the role of obstetricians and gynecologists in leadership. *International Journal of Gynecology & Obstetrics, 155*(3), 345-356.

Ha, S. (2022). The changing climate and pregnancy health. *Current Environmental Health Reports, 9*(2), 263-275.

Howells, M., Palmquist, A. E., Josefson, C., Dancause, K., Quinn, E., Daniels, L., & Blair, A. F. O. (2025). Climate change, evolution, and reproductive health: The impact of water insecurity and heat stress on pregnancy and lactation. *Evolution, Medicine, and Public Health, 13*(1), 125-139.

Karabulutlu, Ö., Beydağ, K. D., & Lazoğlu, M. (2020). Prenatal attachment levels and affecting factors of pregnant women living in İstanbul and Kars. *Kafkas Journal of Medical Sciences, 10*(1), 24-31. https://doi.org/10.5505/kjms.2020.35002

Lieber, M., Chin-Hong, P., Whittle, H. J., Hogg, R., & Weiser, S. D. (2021). The synergistic relationship between climate change and the HIV/AIDS epidemic: A conceptual framework. *AIDS and Behavior*, *25*(7), 2266–2277. https://doi.org/10.1007/s10461-020-03155-y

Logie, C. H., Toccalino, D., Reed, A. C., Malama, K., Newman, P. A., Weiser, S., Harris, O., Berry, I., & Adedimeji, A. (2021). Exploring linkages between climate change and sexual health: A scoping review protocol. *BMJ*, *11*(10), e054720. https://doi.org/10.1136/bmjopen-2021-054720

Malm, M. C., Hildingsson, I., Rubertsson, C., Rådestad, I., & Lindgren, H. (2016). Prenatal attachment and its association with foetal movement during pregnancy–A population based survey. *Women and Birth*, *29*(6), 482-486. https://doi.org/10.1016/j.wombi.2016.04.005

Özdemir, K., Çevirme, A., & Başkaya, Y. (2020). Anxiety and prenatal attachment levels in pregnancy and influencing factors. *Cukurova Medical Journal,* 45(2), 502-510. https://doi.org/10.17826/cumj.661828

Özkan, T. K., Küçükkelepçe, D. Ş., & Özkan, S. A. (2020). Gebelikte prenatal bağlanma ve vücut algısı arasındaki ilişki ve etkileyen faktörler [Relationship between prenatal attachment and body sense in pregnancy and affecting factors]. *Manisa Celal Bayar Üniversitesi Sağlık Bilimleri Enstitüsü Dergisi, 7*(1), 49-54. https://doi.org/10.34087/cbusbed.587467

Öztürk, B., & Erbaş, N. (2021). Gebelerde prenatal bağlanma ve durumluk anksiyete düzeyinin belirlenmesi [Determination of prenatal attachment and state anxiety level in pregnants]. *Jinekoloji-Obstetrik ve Neonatoloji Tıp Dergisi*, *18*(3), 873-882. https://doi.org/10.38136/jgon.717129

Rollè, L., Giordano, M., Santoniccolo, F., & Trombetta, T. (2020). Prenatal attachment and perinatal depression: A systematic review. *International Journal of Environmental Research and Public Health, 17*(8), 2644. https://doi.org/10.3390/ijerph17082644

Romanello, M., McGushin, A., Di Napoli, C., Drummond, P., Hughes, N., Jamart, L., Kennard, H., Lampard, P., Solano Rodriguez, B., Arnell, N., Ayeb-Karlsson, S., Belesova, K., Cai, W., Campbell-Lendrum, D., Capstick, S., Chambers, J., Chu, L., Ciampi, L., Dalin, C., Dasandi, N., … Hamilton, I. (2021). The 2021 report of the Lancet Countdown on health and climate change: Code red for a healthy future. *The Lancet, 398*(10311), 1619–1662. https://doi.org/10.1016/S0140-6736(21)01787-6

Sezgin, S. (2024). Türkiye'de vatandaşların iklim değişikliği anksiyetesinin değerlendirilmesi [Assessment of climate change anxiety of citizens in Turkey]. *Kent Akademisi, 17*(1), 1-21. https://doi.org/10.35674/kent.1388925

Smith, D. M., Sales, J., Williams, A., & Munro, S. (2023). Pregnancy intentions of young women in Canada in the era of climate change: A qualitative auto-photography study. *BMC Public Health, 23*(1), 766.

Spencer, S., Samateh, T., Wabnitz, K., Mayhew, S., Allen, H., & Bonell, A. (2022). The challenges of working in the heat whilst pregnant: Insights from Gambian women farmers in the face of climate change. *Frontiers in Public Health, 10*, 785254.

Stone, K., Blinn, N., & Spencer, R. (2022). Mental health impacts of climate change on women: A scoping review. *Current Environmental Health Reports, 9*(2), 228-243.

Tabachnick, B. G. & Fidell, L. S. (2013). *Using multivariate statistics.* Pearson.

Veras, M. M., & Saldiva, P. H. N. (2025). Impact of air pollution and climate change on maternal, fetal and postnatal health. *Jornal de Pediatria*, *101*, 48-55.

Yilmaz, S. & Beji, N. K. (2013). Prenatal bağlanma envanterinin Türkçe'ye uyarlanması: Güvenilirlik ve geçerlilik çalışması [Turkish version of prenatal attachment inventory: A study of reliability and validity]. *Anadolu Hemşirelik ve Sağlık Bilimleri Dergisi, 16*(2), 103-109.

Yuen, W. S., Lo, H. C., Wong, W. N., & Ngai, F. W. (2022). The effectiveness of psychoeducation interventions on prenatal attachment: A systematic review. *Midwifery, 104*, 103184. https://doi.org/10.1016/j.midw.2021.103184

Yuzen, D., Graf, I., Diemert, A., & Arck, P.C. (2023). Climate change and pregnancy complications: From hormones to the immune response. *Frontiers in Endocrinology, 14*, 1149284. https://doi.org/10.3389/fendo.2023.1149284

Wullenkord, M.C., Tröger, J., Hamann, K.R., Loy, L.S., & Reese, G. (2021). Anxiety and climate change: A validation of the climate anxiety scale in a German-speaking quota sample and an investigation of psychological correlates. *Climatic Change, 168*(3), 20. https://doi.org/10.1007/s10584-021-03234-6