Arch Health Sci Res. 2026;13:1-8
DOI: 10.5152/ArcHealthSciRes.2026.25280

Original Article

Climate Change Awareness and Anxiety Among Nurses in Türkiye: Predictors, Paradoxes, and Implications for Sustainable Nursing Practice - A Descriptive Study

Orkun ERKAYIRAN[1], **Necati Buğra KUDDAŞ**[2]

[1]Department of Psychiatric Nursing, Department of Nursing, Karamanoğlu Mehmetbey University Faculty of Health Sciences, Karaman, Türkiye
[2]Department of Social Work, Karamanoğlu Mehmetbey University Faculty of Health Sciences, Karaman, Türkiye

Cite this article as: Erkayıran O, Kuddaş NB. Climate change awareness and anxiety among nurses in Türkiye: predictors, paradoxes, and implications for sustainable nursing practice. *Arch Health Sci Res.* 2026, 13, 0280, doi: 10.5152/ArcHealthSciRes.2026.25280.

What is already known on this topic?

- *Climate change causes psychological distress among healthcare professionals.*
- *Nurses' awareness of climate change is critical for sustainable health practices.*

What this study adds on this topic?

- *This study identifies predictors of climate change anxiety among Turkish nurses.*
- *It reveals an awareness–anxiety paradox emphasizing the need for psychosocial interventions.*

ABSTRACT

Objective: This study aimed to assess the levels of climate change awareness and climate change–related anxiety among actively practicing nurses in Türkiye and to examine the predictors of this relationship.

Methods: A cross-sectional descriptive design was used. Data were collected online from 347 nurses using a sociodemographic form, the Climate Change Awareness Scale (CCAS), and the Climate Change Anxiety Scale (CCAnxS). Data analysis included nonparametric tests with Bonferroni adjustment and hierarchical multiple regression to identify predictors of eco-anxiety.

Results: Nurses demonstrated moderate climate change awareness mean (2.97 ± 0.57) and relatively high levels of anxiety mean (17.52 ± 5.72). Awareness was highest in the "energy consumption" domain but significantly lower regarding "international agreements." Female nurses reported significantly higher anxiety than males ($U = 4792.5$, $P < .001$), while those who had received climate-related training showed lower anxiety levels ($U = 8994.0$, $P = .001$). Regression analysis revealed that climate change awareness ($\beta = .23$, $P < .001$) and female gender ($\beta = -.35$, $P < .001$) were the strongest predictors of anxiety, explaining 20.9% of the variance.

Conclusion: The findings identify an awareness–anxiety paradox, where increased environmental literacy is associated with elevated psychological distress. To foster sustainable nursing practices in Türkiye, it is critical to integrate climate health education with psychosocial resilience-building strategies. These interventions should be gender-sensitive and institutionally supported to empower nurses as environmental health leaders.

Keywords: Anxiety, awareness, climate change, eco-anxiety, nursing, sustainability, Türkiye

Introduction

Climate change is widely recognized as one of the most pressing environmental and public health crises of the twenty-first century. The World Health Organization (WHO) and the Intergovernmental Panel on Climate Change emphasize that climate change not only exacerbates the burden of infectious and chronic diseases but also poses serious threats to mental health through both direct and indirect pathways, including extreme weather events, ecosystem degradation, and uncertainty about the future.[1-3] Increasing evidence indicates that climate-related environmental stressors contribute substantially to psychological distress at both individual and occupational levels.[4,5]

In this global context, Türkiye is situated within the Mediterranean basin, which is identified as one of the world's most vulnerable regions to climate change. The country is increasingly experiencing climate-driven

Corresponding author: Orkun Erkayıran, e-mail: orkunerkayiran@gmail.com

Received: October 30, 2025
Revision Requested: December 17, 2025
Last Revision Received: December 19, 2025
Accepted: January 22, 2026
Publication Date: March 31, 2026

hazards, including intensifying heatwaves, prolonged droughts, devastating forest fires, and extreme weather events.[1,3] These environmental stressors directly impact public health and place a unique burden on healthcare professionals, particularly nurses, who are frontline responders in climate-sensitive health crises.

Within this context, the term *eco-anxiety* has emerged to describe feelings of anxiety, fear, and helplessness experienced in response to environmental degradation and anticipated climate change impacts.[6,7] Contemporary research highlights that eco-anxiety is not inherently pathological; rather, it may represent an adaptive emotional response that can motivate engagement in pro-environmental behaviors when supported by effective coping mechanisms and institutional resources.[8,9] However, when persistent or inadequately managed, eco-anxiety may negatively affect mental well-being, occupational functioning, and professional sustainability.[10,11]

Nurses, as the largest group of healthcare professionals, are directly exposed to these climate-related impacts in clinical settings. In addition to their central role in patient care, nurses are increasingly expected to engage in health promotion, disaster preparedness, and environmentally sustainable practices.[12,13] Recent evidence from occupational and environmental health literature indicates that job content, working conditions, and environmental stressors significantly influence nurses' well-being, mental health, and professional performance.[14,15] Understanding these dynamics is essential for maintaining a resilient nursing workforce in the context of escalating environmental challenges.

Furthermore, increased environmental awareness among nurses has been associated with greater ethical sensitivity, professional engagement, and pro-environmental behavior. However, this awareness exhibits a dual nature. While heightened awareness may motivate sustainable practices, it can simultaneously intensify climate-related anxiety and psychological distress.[16,17] This phenomenon, often described as the "awareness–anxiety paradox," underscores the complex interplay between cognitive understanding of environmental risks and emotional responses among healthcare professionals.[18] A nuanced examination of this relationship is therefore necessary, particularly within nursing, a profession characterized by high caregiving demands and ethical responsibility.

Despite growing international attention to the intersection of climate change, mental health, and healthcare professionals, empirical evidence from Türkiye remains limited. Existing studies have largely focused on nursing students rather than actively practicing nurses.[19,20] This gap restricts understanding of how climate change awareness and anxiety manifest among nurses who face real-world clinical responsibilities, institutional constraints, and continuous exposure to climate-related health risks.

Addressing this knowledge gap among actively practicing nurses is significant at theoretical, practical, and policy levels. Theoretically, it contributes to understanding the relationship between environmental literacy and mental health outcomes among healthcare professionals. Practically, it provides an empirical basis for designing resilience-focused educational and psychosocial support programs tailored to nurses. At the policy level, such evidence can inform institutional strategies aimed at promoting sustainable nursing practice and strengthening psychosocial support systems within healthcare settings.[21,22]

Accordingly, the present study aimed to determine the levels of climate change awareness and climate change–related anxiety among nurses actively working in Türkiye and to examine the associations between these variables and selected sociodemographic and professional characteristics. By clarifying this relationship, the study seeks to inform nursing education, practice, and policy initiatives that promote both environmental sustainability and nurses' psychological well-being.

Building upon the identified knowledge gap and the study aim, the present research was guided by the following questions:

1. What are the levels of climate change awareness and climate change–related anxiety among nurses in Türkiye?
2. Is there a significant relationship between nurses' climate change awareness and their climate change–related anxiety?
3. Do sociodemographic and professional characteristics (such as gender, education level, years of experience, and participation in climate-related training) significantly predict nurses' levels of climate change–related anxiety?

Methods

Study Design

This study employed a quantitative, cross-sectional, descriptive-analytical design to examine climate change awareness and climate change–related anxiety among actively practicing nurses in Türkiye.

Participants and Sampling

The study population consisted of actively practicing nurses working in Türkiye. Data were collected between May and September 2025 using an online survey distributed via Google Forms. A convenience sampling approach was employed due to the absence of a centralized national registry providing direct access to actively practicing nurses across different healthcare settings, as well as practical constraints related to time, accessibility, and geographic dispersion.

The survey link was disseminated through professional WhatsApp groups and social media platforms commonly used by nurses. Although the exact number of nurses who received the survey invitation could not be determined, a total of 347 nurses completed the questionnaire and were included in the final analysis. Given the online and voluntary nature of recruitment, a formal response rate could not be calculated; this limitation is acknowledged.

Inclusion criteria were (1) being actively employed as a nurse in Türkiye at the time of data collection, (2) voluntary participation, and (3) completion of the questionnaire in full. Nurses who were not actively working in clinical practice (e.g., retired nurses, those on long-term leave, or those working outside nursing roles) and incomplete questionnaires were excluded from the study.

Post hoc power analysis conducted using G*Power, version 3.1 indicated that the final sample size provided more than 95% power to detect medium effect sizes at an alpha level of .05.

Data Collection Procedure

Data were collected between May and September 2025 through an anonymous online questionnaire. Prior to accessing the survey, participants were provided with detailed information regarding the purpose of the study, voluntary participation, confidentiality, and data protection. Electronic informed consent was obtained before proceeding to the questionnaire. The survey required approximately 10-15 minutes to complete, and all responses were submitted anonymously.

Instruments

Sociodemographic Information Form: Collected data on age, gender, education level, years of professional experience, income status, climate change-related training, type of training, material use habits, and unit-level preventive measures.

Climate Change Awareness Scale (CCAS): Developed by Deniz et al (2021), this 21-item, 4-factor scale measures awareness of climate change in 4 domains: environmental impacts, global organizations and agreements, energy consumption, and causes.[23] Higher scores indicate greater awareness. In the current study, Cronbach's α was .926, demonstrating excellent internal consistency for this nursing sample.

Climate Change Anxiety Scale (CCAnxS): Originally developed by Clayton and Karazsia (2020) and adapted into Turkish by Cebeci et al (2022), this 13-item unidimensional scale measures anxiety related to climate change.[24,25] Responses are rated on a 5-point Likert scale, with higher scores indicating higher anxiety. In the current study, Cronbach's α was .920, confirming the scale's reliability for use among Turkish nurses.

Data Analysis

Data were analyzed using SPSS, version 27. Descriptive statistics (frequency, percentage, mean, and standard deviation) were used for sociodemographic characteristics. As normality assumptions were not met, non-parametric tests were applied. The Mann–Whitney *U*-test was used for 2-group comparisons, and the Kruskal–Wallis *H*-test was used for multiple groups. To control for Type 1 error across multiple comparisons, Bonferroni-adjusted *P*-values were reported for all post hoc analyses.

Hierarchical multiple regression was conducted to identify predictors of climate change anxiety. Multicollinearity was assessed using Variance Inflation Factor (VIF) values, all of which were below 2.0, indicating no significant collinearity issues. Residual diagnostics (visual inspection of P-P plots and scatterplots) confirmed that the assumptions of linearity and homoscedasticity were met. Standardized coefficients (β), adjusted R^2, and 95% CI were reported, with significance set at $P < .05$.

Ethical Considerations

The study was approved by the Ethics Committee of Karamanoğlu Mehmetbey University, (Health Sciences Scientific Research and Publication Ethics Committee) (Decision No: 03-2024/38, Date: November 6, 2024). The study adhered to the principles of the Declaration of Helsinki, and informed consent was obtained electronically from all participants.

Results

The results are presented to describe nurses' levels of climate change awareness and climate change–related anxiety and to examine their associations with selected sociodemographic and professional variables. Given the cross-sectional nature of the study, findings are interpreted as associations rather than causal relationships.

Sociodemographic and Professional Characteristics

The final sample consisted of 347 nurses who completed the survey in full; no missing data were identified as only complete submissions were included in the analysis. The mean age of the participants was 31.38 ± 5.92 years, with an average professional experience of 8.86 ± 6.06 years. A majority of the sample was female (69.2%, n = 240) and held a bachelor's degree (90.8%, n = 315). Notably, the PhD-holding subgroup was relatively small (2.3%, n = 8), which was considered during statistical comparisons. Approximately one-fourth (25.9%, n = 90) of the nurses had received climate change–related training, and nearly half (48.4%, n = 168) expressed a high level of interest in the topic (Table 1).

Table 1. Sociodemographic and Professional Characteristics of the Participants (N = 347)

Characteristic	$\bar{x}$ ± ss	Min-Max
Age (years)	31.38 ± 5.92	22-52
Professional experience (years)	8.86 ± 6.06	1-30
Gender	n	%
Female	240	69.2
Male	107	30.8
Educational level		
Bachelor's degree	315	90.8
Master's degree	24	6.9
PhD	8	2.3
Income status		
Insufficient	133	38.3
Moderately sufficient	121	34.9
Sufficient	93	26.8
Climate change–related training		
Yes	90	25.9
No	257	74.1
Type of training received		
In-service training	31	8.9
Conference	35	10.1
Climate change awareness training	24	6.9
Level of interest in climate change		
Slightly interested	25	7.2
Moderately interested	154	44.4
Highly interested	168	48.4
Regular renewal of non-sterile medical supplies		
Yes	24	6.9
No	323	93.1
Type of regularly renewed medical supplies		
Gloves	16	4.6
Masks	5	1.4
Gowns	3	0.9
Taking climate change–related measures in the ward		
Yes	146	42.1
No	201	57.9
Measures reported		
Turning off lights	35	10.1
Using recycling	38	11.0
Avoiding material waste	39	11.2
Waste separation	16	4.6
Turning off water	18	5.2
Perception of material waste in nursing interventions		
Yes	37	10.7
No	310	89.3

Levels of Climate Change Awareness and Anxiety

As shown in Table 2, the total mean score for the CCAS was 2.97 ± 0.57, corresponding to a moderate level of awareness for the majority of participants (78.1%, n = 271). A detailed subdimension analysis revealed a clear disparity in awareness domains: the highest awareness was observed in "Energy Consumption Relationship" (4.15 ± 0.60), where 91.4% of nurses scored in the high range. Conversely, awareness was lowest in "Emerging Causes" (1.82 ± 0.97) and "Awareness of International Agreements" (1.99 ± 0.82), with approximately 80% of participants scoring in the low range for these areas.

Regarding psychological impact, the total mean score for the CCAnxS was 17.52 ± 5.72. Cognitive symptoms (11.19 ± 3.52) were more prominent than functional symptoms (6.32 ± 2.54), indicating a notable level of psychological distress related to environmental changes among the cohort.

Table 2. Scores of Nurses on Climate Change Awareness and Anxiety Scales and Their Subdimensions

			Low*		Moderate*		High*	
Scale/Subdimension	$\bar{x} \pm SS$	**Min-Max**	**n**	**%**	**n**	**%**	**n**	**%**
Natural and anthropogenic impacts	3.93 ± 0.57	1.89-5.00	7	2.0	59	17.0	281	81.0
Awareness of international agreements	1.99 ± 0.82	1.00-5.00	277	79.8	52	15.0	18	5.2
Emerging causes	1.82 ± 0.97	1.00-5.00	279	80.4	38	11.0	30	8.6
Energy consumption relationship	4.15 ± 0.60	1.00-5.00	5	1.4	25	7.2	317	91.4
Climate change awareness (total)	2.97 ± 0.57	1.67-5.00	37	10.7	271	78.1	39	11.2
Cognitive symptoms	11.19 ± 3.52	8.00-24.00						
Functional symptoms	6.32 ± 2.54	5.00-15.00						
Climate change anxiety (total)	17.52 ± 5.72	13.00-39.00						

*Low = 1.00-2.33, Moderate = 2.34-3.66, High = 3.67-5.00 (for awareness scale classification).

Comparative Analyses of Awareness and Anxiety

Mann–Whitney *U*-tests revealed significant differences in anxiety levels by gender; female nurses reported significantly higher climate change anxiety compared to males ($U = 4792.5$, $P < .001$), despite no significant difference in awareness scores ($P = .271$). Nurses who had received climate-related training demonstrated significantly lower anxiety levels than those without training ($U = 8994.0$, $P = .001$). Furthermore, those who perceived no material waste in their nursing interventions showed both higher awareness ($U = 4497.0$, $P = .032$) and higher anxiety ($U = 3107.0$, $P < .001$)(Table 3).

Kruskal–Wallis *H* tests followed by Bonferroni-adjusted post hoc comparisons showed that education level significantly influenced awareness (KWχ^2= 10.341, $P = .006$), with nurses holding a master's degree exhibiting higher awareness than those with a bachelor's degree ($P = .003$) or a PhD ($P = .036$). Interest in climate change was a strong differentiator for anxiety (KWχ^2= 90.595, $P < .001$); nurses with "high interest" had significantly higher anxiety scores than those with moderate or low interest. Additionally, nurses involved in waste separation reported higher anxiety levels compared to those engaging in other preventive measures ($P < .001$) (Table 4).

Predictors of Climate Change Anxiety

Hierarchical multiple regression was performed to identify the predictors of climate change anxiety (Table 5). Preliminary checks confirmed that the assumptions of normality, linearity, and homoscedasticity were met, and multicollinearity was not a concern, with all VIF values being below 2.0.

The results of the multiple linear regression analyses (Table 5) showed that both models were statistically significant (Model 1: $F(4, 342) = 22.47$, $P < .001$; Model 2: $F(4, 342) = 22.61$, $P < .001$), explaining approximately 21% of the variance in climate change anxiety (Model 1: $R^2 = .208$, Adj. $R^2 = .199$; Model 2: $R^2 = .209$, Adj. $R^2 = .200$).

In both models, climate change awareness ($\beta = .23$, $P < .001$), gender (female) ($\beta = -.35$, $P < .001$), and climate change training ($\beta = .11$, $P = .03$) emerged as significant predictors of anxiety. These findings indicate that higher awareness was associated with greater anxiety, female nurses reported higher anxiety than males, and nurses who had received climate change training also demonstrated slightly higher anxiety. In contrast, professional experience (Model 1; $P = .996$) and age (Model 2; $P = .496$) were not significant predictors of climate change anxiety.

Discussion

This study evaluated nurses' levels of climate change awareness (CCAS) and climate change–related anxiety (CCAnxS) and examined differences according to sociodemographic and professional variables.

Table 3. Mann–Whitney *U*-Test Results of Nurses' CCAS and CCAnxS Scores by Sociodemographic and Professional Characteristics

Variable	Scale Total Score	Group	n	Mean Rank	MWU	Z	*P*
Gender	CCAS	Female	240	177.96	11890.5	−1.10	.271
		Male	107	165.13			
	CCAnxS	Female	240	207.53	4792.5	−9.46	.001
		Male	107	98.79			
Climate change training	CCAS	Yes	90	157.06	10040.5	−1.86	.063
		No	257	179.93			
	CCAnxS	Yes	90	145.43	8994.0	−3.18	.001
		No	257	184.00			
Regular renewal of non-sterile medical materials	CCAS	Yes	24	201.81	3208.5	−1.41	.159
		No	323	171.93			
	CCAnxS	Yes	24	128.77	2790.5	−2.32	.020
		No	323	177.36			
Measures against climate change in the ward	CCAS	Yes	146	208.18	9682.5	−5.41	.001
		No	201	149.17			
	CCAnxS	Yes	146	164.75	13322.0	−1.49	.137
		No	201	180.72			
Perception of material waste in nursing practices	CCAS	Yes	37	207.46	4497.0	−2.15	.032
		No	310	170.01			
	CCAnxS	Yes	37	245.03	3107.0	−4.62	.001
		No	310	165.52			

$P < .05$.
CCAnxS, Climate Change Anxiety Scale; CCAS, Climate Change Awareness Scale; MWU: Mann-Whitney U test.

Table 4. Kruskal–Wallis Test Results of Nurses' Sociodemographic Characteristics and Climate Change–Related Preventive Measures on Climate Change Awareness (CCAS) and Anxiety (CCAnxS) Scores

Scale	Sociodemographic Status	n	Mean Rank	KWχ^2	*P*	Post Hoc
	Income status					
CCAS	Insufficient[a]	133	172.73	3.217	.200	—
	Moderately Sufficient[b]	121	185.51			
	Sufficient[c]	93	160.84			
CCAnxS	Insufficient[a]	133	160.79	6.668	.036	c > b (*P* = .009)
	Moderately Sufficient[b]	121	172.26			
	Sufficient[c]	93	195.15			
	Educational level					
CCAS	Bachelor's degree[a]	315	170.77	10.341	.006	b > a(*P* = .003) b > c(*P* = .036)
	Master's degree[b]	24	232.46			
	PhD[c]	8	125.63			
CCAnxS	Bachelor's degree[a]	315	174.43	1.695	.428	—
	Master's degree[b]	24	156.90			
	PhD[c]	8	208.44			
	Type of training received					
CCAS	In-service training[a]	31	47.03	1.140	.566	—
	Conference[b]	35	41.91			
	Climate change awareness training[c]	24	48.75			
CCAnxS	In-service training[a]	31	50.31	1.930	.381	—
	Conference[b]	35	41.76			
	Climate change awareness training[c]	24	44.75			
	Level of interest in climate change					
CCAS	Slightly interested[a]	25	176.54	1.145	.564	—
	Moderately interested[b]	154	180.00			
	Highly interested[c]	168	168.12			
CCAnxS	Slightly interested[a]	25	143.12	90.595	.000	c > a (*P* = .001) c > b(*P* = .000)
	Moderately interested[b]	154	122.43			
	Highly interested[c]	168	225.87			
	Preventive measures taken in the ward/unit					
CCAS	Turning off lights[a]	35	88.84	8.892	.064	—
	Using recycling[b]	38	65.13			
	Avoiding material waste[c]	39	71.79			
	Waste separation[d]	16	80.78			
	Turning off water[e]	18	58.56			
CCAnxS	Turning off lights[a]	35	77.84	31.342	.000	a > c (*P* = .004) d > a (*P* = .000) b > c (*P* = .002) d > b (*P* = .000) d > c (*P* = .000) d > e (*P* = .000)
	Using recycling[b]	38	75.88			
	Avoiding material waste[c]	39	51.08			
	Waste separation[d]	16	119.25			
	Turning off water[e]	18	67.94			

p<.05.
CCAnxS, Climate Change Anxiety Scale; CCAS, Climate Change Awareness Scale.

Table 5. Associations of Climate Change Anxiety: Results of Multiple Linear Regression Analyses

Model	Variable	B	SE	β	t	*P*	VIF
Model 1	(Constant)	12.45	1.10		11.32	<.001	
	Awareness score	2.25	0.48	.23	4.68	<.001	1.05
	Gender (Female = 1)	−4.33	0.60	−.35	−7.17	<.001	1.02
	Climate change training (Yes = 1)	1.38	0.63	.11	2.17	.031	1.04
	Professional experience (years)	0.00	0.05	.00	0.01	.996	1.10
(R^2 = .208, Adj. R^2 = .199, F(4, 342) = 22.47, P < .001).							
Model 2	**Variable**	**B**	**SE**	***β***	**t**	***P***	
	(Constant)	11.85	1.25		9.48	<.001	
	Awareness score	2.26	0.48	.23	4.70	<.001	1.05
	Age	0.03	0.05	.03	0.68	.496	1.02
	Gender (Female = 1)	−4.31	0.60	−.35	−7.15	<.001	1.05
	Climate change training (Yes = 1)	1.39	0.63	.11	2.19	.029	1.12

R^2 = .209, Adj. R^2 = .200, F(4, 342) = 22.61, *P* < .001).
VIF, variance inflation factor; SE: Standard error.

Consistent with the global literature, the findings revealed that nurses in Türkiye demonstrated moderate levels of awareness and relatively high levels of climate-related anxiety, indicating that climate change has become not only a public health challenge but also a psychological concern for health professionals.[1-3] This finding aligns with recent international evidence suggesting that healthcare workers increasingly experience emotional strain related to perceived environmental threats and professional responsibility in the context of climate change.[26]

Among the awareness subdimensions, the highest scores were observed in the Energy Consumption domain, whereas Awareness of International Agreements yielded the lowest scores. This pattern suggests that nurses may be more familiar with climate change issues directly connected to everyday clinical practices and personal responsibility than with broader policy-level or global governance frameworks, a finding also reported in studies conducted among nurses and health sciences students in different cultural contexts.[27,28] Such domain-specific gaps highlight the need for integrating climate policy literacy into nursing education and professional development.

Gender-based analyses revealed that female nurses reported significantly higher levels of climate change–related anxiety than their male counterparts, while no significant gender differences were observed in awareness. This dissociation between cognitive awareness and emotional response supports prior findings indicating that women, particularly in caregiving professions, tend to report stronger affective reactions to environmental and health-related threats.[10,11] Similar gender patterns have also been reported among other healthcare populations, including physicians and health sciences students, suggesting that this phenomenon extends beyond nursing and reflects broader psychosocial dynamics within healthcare professions.[29]

In contrast, nurses who had received climate change–related education reported significantly lower anxiety levels. This finding supports the buffering role of structured educational exposure, which may enhance perceived self-efficacy, coping capacity, and professional agency in the face of climate-related risks.[13,30] Rather than merely increasing awareness, education that incorporates problem-solving skills and institutional pathways for action appears critical for mitigating eco-anxiety among nurses.

Kruskal–Wallis analyses further demonstrated that education level and personal interest in climate change were associated with awareness and anxiety outcomes. Nurses holding a master's degree exhibited higher awareness levels, consistent with findings from South Korea and Saudi Arabia indicating that advanced education fosters environmental literacy and sustainability-oriented attitudes.[27-29] Conversely, nurses reporting higher levels of interest in climate change also exhibited higher anxiety. This pattern suggests that deeper cognitive and emotional engagement with climate issues may intensify perceived threat and emotional burden, particularly when actionable solutions are perceived as limited.[9]

Hierarchical regression analyses indicated that climate change awareness and gender were significantly associated with climate-related anxiety, collectively explaining approximately 21% of the variance. These results are consistent with the conceptualization of an "awareness–anxiety paradox," whereby increased understanding of environmental crises coincides with heightened psychological distress.[8,9,31] Importantly, this association should not be interpreted causally, given the cross-sectional design. Eco-anxiety should also not be viewed solely as pathological; emerging literature conceptualizes it as a potentially adaptive emotional response that may motivate ethical reflection and pro-environmental engagement when supported by adequate coping resources and institutional support.[6,7]

Nurses who reported implementing climate-related preventive measures within their clinical units demonstrated higher awareness levels, underscoring the potential for "green nursing" initiatives to translate knowledge into practice.[12,13] However, engagement in certain preventive actions was also associated with higher anxiety levels, suggesting that active involvement in sustainability efforts may heighten emotional awareness of environmental risks. This finding reinforces the importance of institutional responsibility, emphasizing that climate action should be embedded within organizational structures rather than relying solely on individual nurses' efforts.[12]

Implications For Practice, Education, and Policy

These findings have several implications for nursing practice, education, and policy. The coexistence of moderate awareness and elevated anxiety highlights the necessity of integrated interventions that combine climate-health education with psychosocial support and resilience-building strategies.[5,26,32] Educational programs that incorporate stress management, peer support, and adaptive coping strategies may help transform climate-related concern into constructive professional engagement.

At the organizational level, nurses' awareness of energy use and material conservation presents an opportunity to strengthen sustainable healthcare practices. Institutional policies promoting waste reduction, recycling, and energy efficiency not only reduce environmental impact but may also enhance nurses' sense of collective efficacy and professional empowerment.[2,12] Evidence increasingly suggests that visible organizational commitment to sustainability can mitigate feelings of helplessness and psychological burden among healthcare workers.[26]

At the policy level, integrating climate change and health content into nursing curricula remains essential. The WHO and the International Council of Nurses advocate for the systematic inclusion of climate-health education in nursing programs worldwide.[3,33] In line with these recommendations, the present findings support embedding psychological resilience and climate-anxiety management modules within both undergraduate curricula and in-service training programs, thereby addressing eco-anxiety from a preventive and empowering perspective.

Finally, the observation that female nurses experience higher levels of climate-related anxiety underscores the need for gender-sensitive workplace interventions. Targeted psychosocial support, mentorship programs, and leadership opportunities in environmental health initiatives may help address gender-based vulnerabilities while strengthening professional capacity and well-being.[5,34]

Strengths And Limitations

This study provides one of the first large-scale examinations of climate change awareness and climate change–related anxiety among actively practicing nurses in Türkiye. Its strengths include the use of validated measurement instruments with high internal consistency, a relatively robust sample size (n = 347), and the inclusion of diverse sociodemographic and professional variables. Together, these features enhance the study's analytical robustness and its relevance for educational, organizational, and policy-level discussions in nursing.

However, several limitations should be acknowledged. First, the cross-sectional design does not allow for causal inferences, and the observed associations should be interpreted cautiously. Second, data were collected through self-reported online questionnaires, which may be subject to response bias and social desirability effects. Third,

the use of convenience sampling limits the representativeness of the sample, and a formal response rate could not be calculated, restricting the generalizability of the findings to the broader nursing population in Türkiye. In addition, small sample sizes in certain subgroups, particularly nurses with doctoral degrees, may have reduced statistical power and stability in subgroup comparisons. Finally, the study did not account for contextual factors such as regional exposure to climate-related events or prior disaster experiences, which may influence levels of climate change–related anxiety.

Recommendations For Future Research

Future studies should employ longitudinal designs to explore how awareness and anxiety interact over time and whether targeted education mitigates eco-anxiety in the long term. Randomized controlled interventions evaluating the effects of climate-health education on awareness, resilience, and anxiety would provide stronger causal evidence.[32] Comparative research across professional groups (physicians, midwives, paramedics) could clarify interprofessional differences and inform multidisciplinary education and policy frameworks.[13,30] Finally, qualitative explorations of nurses' personal narratives and institutional barriers could enrich understanding of their lived experiences and emotional adaptation to climate change.

Conclusion

This study contributes to the emerging evidence on nurses' psychological and professional responses to climate change. Nurses in Türkiye exhibited moderate awareness and elevated anxiety, with gender and educational factors playing critical roles. The positive correlation between awareness and anxiety highlights the importance of balancing knowledge acquisition with psychological support. Embedding climate-health content and resilience-building strategies into nursing curricula, professional development, and institutional policy can promote both environmental sustainability and emotional well-being. Ultimately, empowering nurses as environmental health leaders is essential for achieving climate-resilient healthcare systems.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author.

Ethics Committee Approval: Ethical committee approval was received from the Ethics Committee of Karamanoğlu Mehmetbey University (Health Sciences Scientific Research and Publication Ethics Committee), (Approval No: 03-2024/38, Document No: E-15466469-100-224897, Date: November 6, 2024).

Informed Consent: Online informed consent was obtained from all nurses who participated in the study..

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – O.E., N.B.K.; Design – O.E., N.B.K.; Supervision – O.E.; Resources – O.E.; Materials – N.B.K.; Data Collection and/or Processing – O.E., N.B.K.; Analysis and/or Interpretation – O.E.; Literature Search – O.E.; Writing Manuscript – O.E.; Critical Review – O.E., N.B.K.; Other – O.E., N.B.K.

Acknowledgment: The authors sincerely thank all the nurses who voluntarily participated in this study for their valuable time, openness, and contributions. Their commitment to advancing nursing knowledge and sustainable healthcare practices made this research possible.

Declaration of Interests: The authors declare that they have no competing interests.

Funding: The authors declared that this study has received no financial support.

References

1. IPCC. *Climate Change*. 1st ed. Cambridge University Press; Cambridge; 2023. [CrossRef].
2. Romanello M, McGushin A, Di Napoli C, et al. The 2021 report of the Lancet Countdown on health and climate change: code red for a healthy future. *Lancet*. 2021;398(10311):1619-1662. [CrossRef]
3. World Health Organization (WHO). Climate change and health; 2023. https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health.
4. Gifford E, Gifford R. The largely unacknowledged impact of climate change on mental health. *Bull At Sci*. 2016;72(5):292-297. [CrossRef]
5. Kennedy AM, Gislason MK. Intergenerational approaches to climate change mitigation for environmental and mental health co-benefits. *J Clim Change Health*. 2022;8:100173. [CrossRef]
6. Clayton S. Climate anxiety: psychological responses to climate change. *J Anxiety Disord*. 2020;74:102263. [CrossRef]
7. Cunsolo A, Harper SL, Minor K, Hayes K, Williams KG, Howard C. Ecological grief and anxiety: the start of a healthy response to climate change? *Lancet Planet Health*. 2020;4(7):e261-e263. [CrossRef]
8. Coffey Y, Bhullar N, Durkin J, Islam MS, Usher K. Understanding eco-anxiety: a systematic scoping review of current literature and identified knowledge gaps. *J Clim Change Health*. 2021;3:100047. [CrossRef]
9. Mathers-Jones J, Todd J. Ecological anxiety and pro-environmental behaviour: the role of attention. *J Anxiety Disord*. 2023;98:102745. [CrossRef]
10. Ogunbode CA. *Climate Anxiety, Pro-environmental Action and Wellbeing: Antecedents and Outcomes of Negative Emotional Responses to Climate Change in 28 Countries. Published Online January 20, 2022*. [CrossRef]
11. Hickman C, Marks E, Pihkala P, et al. Climate anxiety in children and young people and their beliefs about government responses to climate change: a global survey. *Lancet Planet Health*. 2021;5(12):e863-e873. [CrossRef]
12. Butterfield P, Leffers J, Vásquez MD. Nursing's pivotal role in global climate action. *BMJ*. 2021:n1049. [CrossRef]
13. Harris OO, Bialous SA, Muench U, Chapman S, Dawson-Rose C. Climate change, public health, health policy, and nurses training. *Am J Public Health*. 2022;112(suppl 3):S321-S327. [CrossRef]
14. Sohrabi Y, Yarmohammadi H, Pouya AB, Arefi MF, Hassanipour S, Poursadeqiyan M. Prevalence of job burnout in Iranian nurses: a systematic review and meta-analysis. *Work*. 2022;73(3):937-943. [CrossRef]
15. Vatani J, Arami M, Khanikosarkhizi Z, et al. Safety climate and related factors in rehabilitation nurses of hospitals in Iran. *Work*. 2021;68(1):189-196. [CrossRef]
16. Maleki Roveshti M, Khajehnasiri F, Akhlaghi Pirposhteh E, et al. A systematic review on the climate and ecosystem change associated with the COVID-19 epidemic: global challenges. *Avicenna J Environ Health Eng*. 2022;9(2):117-123. [CrossRef]
17. Porsadeqiyan M, Askari A, Akhlaghi Pirposhteh E, Salehi Sahlabadi A, Amanat N. Social inequalities of climate change with a regional and global approach. *Health Emerg Disasters Q*. 2023;8(4):219-222. [CrossRef]
18. Mazhin SA, Khankeh H, Farrokhi M, Aminizadeh M, Poursadeqiyan M. Migration health crisis associated with climate change: a systematic review. *J Educ Health Promot*. 2020;9(1):97. [CrossRef]
19. Çolak M, Dogan R, Dogan S. Effect of climate change and health course on global warming knowledge and attitudes, environmental literacy, and eco-anxiety level of nursing students: a quasi-experimental study. *Public Health Nurs*. 2025;42(3):1315-1324. [CrossRef]
20. Kocoglu-Tanyer D, Dengiz KS, Sacikara Z. Nursing students' conceptualization of environmental problems: a descriptive cross-sectional study. *Nurse Educ Today*. 2024;140:106296. [CrossRef]
21. Amanat N, Valinejadi A, Mehrifar Y, Poursadeqiyan M. A systematic literature review protocol on climate change perception models. *J Adv Environ Health Res*. 2022;10(3):197-204. [CrossRef]
22. Poursadeqiyan M, Arefi MF, Khaleghi S, et al. Investigation of the relationship between the safety climate and occupational fatigue among the nurses of educational hospitals in Zabol. *J Educ Health Promot*. 2020;9(1):238. [CrossRef]
23. Deniz M, İnel Y, Sezer A. Awareness scale of university students about global climate change. *Int J Geogr Geogr Educ*. 2021;43:(252-264).
24. Clayton S, Karazsia BT. Development and validation of a measure of climate change anxiety. *J Environ Psychol*. 2020;69:101434. [CrossRef]
25. Cebeci F, Karaman M, Öztürk AF, et al. İklim değişikliği anksiyetesi ölçeği'nin Türkçe uyarlaması: geçerlik ve güvenirlik çalışması. *Ufkun Ötesi Bilim Derg*. 2022;22(1):20-42. [CrossRef]
26. Atta MHR, Zoromba MA, El-Gazar HE, et al. Climate anxiety, environmental attitude, and job engagement among nursing university colleagues: a multicenter descriptive study. *BMC Nurs*. 2024;23(1):133. [CrossRef]

27. Cruz JP, Alshammari F, Felicilda-Reynaldo RFD. Predictors of Saudi nursing students' attitudes towards environment and sustainability in health care. *Int Nurs Rev*. 2018;65(3):408-416. [CrossRef]
28. Incesu O, Yas MA. The relationship between nursing students' environmental literacy and awareness of Global Climate Change. *Public Health Nurs*. 2024;41(1):67-76. [CrossRef]
29. Chung SJ, Jang SJ, Lee H. Eco-anxiety and environmental sustainability interest: a secondary data analysis. *Int J Ment Health Nurs*. 2023;32(6):1462-1472. [CrossRef]
30. Tiitta I, Cubelo F, McDermott-Levy R, Jaakkola JJK, Kuosmanen L. Climate change integration in nursing education: a scoping review. *Nurse Educ Today*. 2024;139:106210. [CrossRef]
31. Baykara Mat ST, Yilmaz BN. Is awareness of climate change a predictor of eco-anxiety? Research within the scope of nursing students. *Nurse Educ Today*. 2024;140:106274. [CrossRef]
32. Moustafa Saleh MS, Elsabahy HES. Integrating sustainability development education program in nursing to challenge practice among nursing interns in health care. *J Nurs Manag*. 2022;30(8):4419-4429. [CrossRef]
33. International Council of Nurses. How ICN is addressing climate change and planetary health; 2022. https://www.icn.ch/news/cop27-november-2022-how-icn-addressing-climate-change-and-planetary-health.
34. Kalogirou MR, Dahlke S, Davidson S, Yamamoto S. Nurses' perspectives on climate change, health and nursing practice. *J Clin Nurs*. 2020;29(23-24):4759-4768. [CrossRef]