

Climate Change Related Depression, Anxiety and Stress among Faculty of Nursing Students at Assiut University

Mahmoud Antar Mohamed¹, Nadia Abd El-Ghany Abd El-Hameed², Romany Hosny Gabra³ & Azaa Mohamed Abd El-Aziz⁴

¹ Demonstrator of Psychiatric & Mental Health Nursing, Faculty of Nursing, Assiut University, Egypt.

² Professor of Psychiatric & Mental Health Nursing, Faculty of Nursing, Assiut University, Egypt.

³ Professor of Psychiatry, Faculty of Medicine, Assiut University, Egypt.

⁴ Lecturer of Psychiatric & Mental Health Nursing, Faculty of Nursing, Assiut University, Egypt.

Abstract

Background: Nursing students may be particularly exposed to the psychological consequences of climate change due to their emphasis on the future and the chance that climate change would alter their career paths. **Aim:** To assess climate change related depression, anxiety, and stress among nursing students. **Research design:** A descriptive correlational research design was used in this study. **Setting:** The study was carried out at faculty of nursing, Assiut University. **Sample:** A random, stratified sample of 330 students was included in the study. **Tools:** Demographic characteristics and clinical data questionnaire, climate change awareness and attitude questionnaire, patient health questionnaire, generalized anxiety disorder scale, and perceived stress scale were used to assess study variables. **Results:** Students responded to climate change awareness and attitude three dimensions with mean= (72.9, 74.4 and 68.2) sequentially. Nearly half of students (49.1%) had mild depression, 43.9% had mild anxiety and 40.3% had moderate stress. Highly statistically significant positive correlation found between climate change awareness and attitude with depression, anxiety and stress. **Conclusion:** The majority of students demonstrated acceptable levels of awareness and a relatively positive attitude towards climate change, also experiencing moderate levels of stress and only mild levels of anxiety and depression. A strong positive correlation between heightened awareness and attitude regarding climate change and elevated levels of depression, anxiety and stress. **Recommendation:** Integrating information about effects of climate change on health in curriculum and educational materials for healthcare professionals.

Keywords: Anxiety, Climate change, Depression, Stress & Students.

Introduction:

Climate change poses a significant global challenge with far-reaching consequences for both biological systems and vulnerable human societies. The scientific community is increasingly concerned about the impacts of rising global temperatures, including extreme weather events such as heatwaves, floods, tornadoes, droughts, wildfires, and the loss of critical ecosystems like forests and glaciers. These climatic changes can directly or indirectly lead to a range of physical and mental health issues in human populations (Cianconi et al., 2020).

Climate change, as defined by the United Nations (2011), is a change in climate that can be directly or indirectly attributed to human activity, altering the composition of the atmosphere and leading to changes beyond natural climate variability observed over comparable time periods (Kalogirou et al., 2020). The World Health Organization predicts that climate change will claim approximately 400,000 lives annually between 2030 and 2050. Consequently, it's unsurprising that climate change and related environmental disasters are significantly affecting

global physical and mental health. Extreme weather events and rising temperatures directly contribute to both physical and mental health issues (Koder et al., 2023).

Effects of climate change on physical health associated with increasing mean temperatures are reflected in increased heat-related mortality, more frequent infectious diseases, impaired wound healing, the proliferation of vector-borne illnesses, and a growing number of individuals suffering from food insecurity and malnutrition. (Schwaab et al., 2022). Extreme weather events such as storms, floods, heavy rains, and heatwaves can lead to accidents, injuries, and even fatalities. Additionally, climate change can exacerbate the prevalence of allergic diseases and respiratory problems (Bugaj et al., 2021).

Effects of climate change on mental health associated with the increasing frequency, intensity, and complexity of extreme weather events, exacerbated by climate change, these events can trigger a range of mental health disorders, including post-traumatic stress disorder (PTSD), major depressive disorder (MDD), anxiety, depression, complicated grief,

survivor's guilt, substance abuse, and suicidal ideation (Gawrych, 2022).

Climate change induces a variety of stressors, including extreme weather events, food insecurity, and biodiversity loss. These stressors, coupled with social unrest and uncertainty about the future, can lead to feelings of anxiety, sadness, hopelessness, and helplessness, ultimately contributing to depression. Furthermore, the physical health consequences of climate change, such as heat stress and respiratory problems, can further exacerbate the risk of depression (Cianconi et al., 2020).

The healthcare system plays a crucial role in addressing climate change. Firstly, as a significant emitter of greenhouse gases, it must reduce its carbon footprint. Secondly, it will directly confront the physical and mental health consequences of climate change. Lastly, healthcare professionals, as trusted figures, are well-positioned to bridge the gap between science, policy, and public health practice (Wabnitz et al., 2020). Consequently, it is highly likely that climate change will significantly impact the future of healthcare professions.

Significance of the study:

Egypt is particularly vulnerable to the adverse effects of climate change. With projected increases in heatwaves and dust storms, the country has experienced significant warming over the past 30 years, with average annual temperatures rising by 0.53 degrees Celsius per decade (Rabia et al., 2024).

Young people are disproportionately distressed and concerned about climate change, often experiencing strong emotional reactions, even if they have not yet been directly impacted (Da Fonte et al., 2023). Health professional students demonstrate a higher level of awareness regarding the health hazards associated with climate change (Bugaj et al., 2021). Therefore, it is crucial to understand how nursing students perceive climate change, their comprehension of its health implications, and their perceived responsibilities in addressing this global challenge.

Aim of the study:

This study aims to assess climate change related depression, anxiety and stress among faculty of nursing students at Assiut University.

Research Questions:

1. Do nursing faculty students suffer from climate change related depression, anxiety and stress?
2. Is there a relationship between students' depression, stress and anxiety experienced and their level of awareness and attitude regarding climate change?

Subjects and Methods

Research design:

A descriptive correlational research design was used in the study.

Study setting:

The study was conducted at the Faculty of Nursing, Assiut University.

Study sample:

The study population was the third and fourth academic years (2023-2024) students of the nursing faculty at Assiut university. Senior-years students were chosen as the study population due to their increased knowledge of climate change and anticipated concerns about its impact on their future healthcare careers.

The total numbers of students in the third year are 1055, and the total numbers of students in the fourth year are 1200. Using the software EPI/Info, version 7, with a 95% confidence interval (CI), the estimated sample size was 330 students.

A random, stratified sample of 330 students were included in the study, with 154 students from the third academic year and 176 from the fourth academic year.

This equation was used to calculate the sample for each academic year:

$$\frac{\text{Total number of students in a particular academic year} \times \text{sample size}}{\text{Total number of students in third and fourth years}}$$

Total number of students in third and fourth years

Tools of data collection:

Each participant was evaluated through the following tools:

Tool (1): Demographic characteristics and clinical data questionnaire: This tool was developed by the researcher, and it includes two parts:

Part1: Demographic data: Includes age (years), academic year, sex, residence, and marital status.

Part2: Clinical data: Includes questions about student's health (if they are currently diagnosed with psychiatric disorder, are currently taking psychotropic medication, or are currently diagnosed with physical disease).

Tool (2): Climate change awareness and attitude questionnaire: This tool was developed by Bugaj et al., (2021) to assess medical students' awareness and attitude towards climate change, in the current study the tool was modified by the researcher to be used for nursing students after content validity had been tested by experts. The tool consists of three dimensions: the first dimension consists of 4 items exploring students' knowledge of the expected consequences of climate change, the second dimension consists of 3 items assessing students' sense of individual responsibility for climate change, and the third dimension consists of 5 items assessing students' sense of professional responsibility for climate change.

The tool was translated into Arabic and validated by a panel of seven experts in psychiatric and mental health nursing and psychiatric medicine. The tool's reliability was measured by Cronbach's alpha ($\alpha = 0.90$).

Scoring system: For all items, a graphic rating scale was used (0-100). The anchor points in the scale were labeled not applicable at all (0) versus absolutely applicable (100).

Tool (3): Patient Health Questionnaire (PHQ-9):

To assess climate change-related depression, this study employed a modified version of the Patient Health Questionnaire-9 (PHQ-9) to specifically inquire about depression symptoms linked to climate change. The PHQ-9, a well-established self-report screening tool for depression, is a nine-item questionnaire that evaluates depressive symptoms experienced within the past two weeks (Kroenke et al., 2001). The modification of this tool (To ask about depression symptoms related to climate change) was adapted from the work of Schwaab et al., (2022). The tool was translated into Arabic and validated by a panel of seven experts in psychiatric and mental health nursing and psychiatric medicine. The tool's reliability was measured by Cronbach's alpha, which was ($\alpha = 0.88$).

Respondents rated items on a 4-point Likert scale, ranging from 0 (not at all) to 3 (nearly every day).

Scoring system:

1-4 Minimal depression	5-9 Mild depression
10-14 Moderate depression	15-19 Moderately severe depression
20-27 Severe depression	

Tool (4): Generalized Anxiety Disorder Scale-7 (GAD-7):

To assess climate change-related anxiety, this study employed a modified version of the Generalized Anxiety Disorder-7 (GAD-7) to specifically inquire about anxiety symptoms linked to climate change. The GAD-7, a well-established self-report screening tool for generalized anxiety disorder, is a seven-item questionnaire that evaluates anxiety symptoms experienced within the past two weeks (Spitzer et al., 2006). The modified version of the tool (To ask about anxiety symptoms related to climate change) was done by Schwaab et al., (2022). The tool was translated into Arabic and validated by a panel of seven experts in psychiatric and mental health nursing and psychiatric medicine. The tool's reliability was measured by Cronbach's alpha, which was ($\alpha = 0.83$).

Respondents rated items on a 4-point Likert scale, ranging from 0 (not at all) to 3 (nearly every day).

Scoring system:

0-4: minimal anxiety	5-9: mild anxiety
10-14: moderate anxiety	15-21: severe anxiety

Tool (5): Perceived Stress Scale (PSS-10): To assess climate change-related stress, this study used a modified version of PSS-10 to specifically ask about the respective stress symptoms related to climate change. (PSS-10) is a reliable and valid 10-items scale developed by Cohen et al., (1983). The tool was modified (To ask about stress symptoms related to climate change), translated into Arabic, and validated by a panel of seven experts in psychiatric and mental health nursing and psychiatric medicine. The tool's reliability was measured by Cronbach's alpha, which was ($\alpha = 0.78$).

For each question student chose from the following alternatives: (Never, almost never, sometimes, fairly often, or very often), on a Likert scale (0 – 4).

Scoring system:

Scores ranging from 0-13 low stress.

Scores ranging from 14-26 moderate stress.

Scores ranging from 27-40 high stress.

Pilot study:

A pilot study was conducted on 10% (33) of the students to assess the feasibility, consistency, and clarity of the tools, as well as to estimate the time required for completion. No modifications were made to the tools based on the pilot study results. The participants from the pilot study were subsequently included in the overall sample.

Validity of the tools:

The tools were translated into Arabic and validated by a panel of seven experts in psychiatric and mental health nursing and psychiatric medicine. The panel reviewed the tools for clarity, relevance, comprehensiveness, understanding, and applicability. Necessary modifications were made based on the experts' feedback.

Reliability of the tools:

-Climate change awareness and attitude questionnaire: ($\alpha = 0.90$).

- Patient Health Questionnaire (PHQ-9): ($\alpha = 0.88$).

- Generalized Anxiety Disorder Scale-7 (GAD-7): ($\alpha = 0.83$).

- Perceived Stress Scale (PSS-10): ($\alpha = 0.78$).

Ethical considerations:

The research proposal was approved by the Ethical Committee of the Faculty of Nursing, Assiut University on 22, October 2023 with ID approval (1120230690). The study posed no risk to participants. The researcher ensured the confidentiality and privacy of all participants. Participants were informed of the study's aim and nature, and their right to decline participation was emphasized. Written consent was obtained from all participating students.

Filed work:

Official permission to conduct the study was obtained from the relevant authorities after explaining the

study's objectives. Data collection was conducted over a two-month period, from mid-November 2023 to mid-January 2024. Data was collected two days per week, with 20-25 students participating each day. The researcher obtained verbal consent from the instructors responsible for the lectures or sections to meet with students at the beginning of their sessions. The researcher provided an overview of the study, outlining its objectives, methods, and instruments. Participants were then given the tool sheet, which took an average of 15-20 minutes to complete. The researcher concluded by thanking the students and teaching staff for their cooperation.

Statistical design:

The study utilized IBM SPSS Statistics version 26 for both data entry and analysis. Data was presented as numerical values, percentages, means, and standard deviations. Pearson correlation was employed to examine the relationships between variables. Statistical significance was determined when p-value <0.05.

Results:

Table (1): Distribution of demographic characteristics of students (N=330)

Demographic data	No. (330)	%
Age: (years)		
20	42	12.7
21	134	40.6
22	122	37.0
23	32	9.7
Mean \pm SD	21.44 \pm 0.83	
Sex		
Male	146	44.2
Female	184	55.8
Academic year		
Third	154	46.7
Fourth	176	53.3
Residence		
Urban	129	39.1
Rural	201	60.9
Marital status		
Single	327	99.1
Married	3	0.9

Table (2): Climate change awareness and attitude of students (N=330)

Dimension	Item	Mean	SD
Dimension I: Expected consequences of climate change	I expect that the consequences of climate change will directly damage people's health.	75.1	25.6
	I expect that the consequences of climate change will directly harm the health of the patients I will take care of in the coming years.	74.1	26.4
	I expect the consequences of climate change to lead to an increase in the number of infectious diseases in humans.	73.9	22.6
	I expect the consequences of climate change to affect human health by changing the quality and availability of drinking water and food.	68.6	25.1
	Total: Dimension I	72.9	22.4
Dimension II: Individual responsibility for climate change	I believe that the rise in temperature is almost entirely due to man-made greenhouse gas emissions.	80.9	18.7
	A party's ecopolitical program influences my decision whether to vote for a party.	69.5	20.9
	I try to avoid plastic waste because of climate change.	72.7	19.8
	Total: Dimension II	74.4	14.1
Dimension III: Professional responsibility for climate change	I feel that as a nurse, I have a high degree of social responsibility with regard to climate change.	73.4	25.8
	I feel that as a nurse, I function as a social role model with regard to climate change.	67.1	26.1
	I feel that as a nurse, I have a social educational role with regard to climate change.	70.9	27.7
	I feel that as a nurse, I have an informational role for my patients with regard to climate change.	65.6	28.7
	I feel that as a nurse, I function as a role model for my patients with regard to climate change.	63.9	28.7
	Total: Dimension III	68.2	26.5

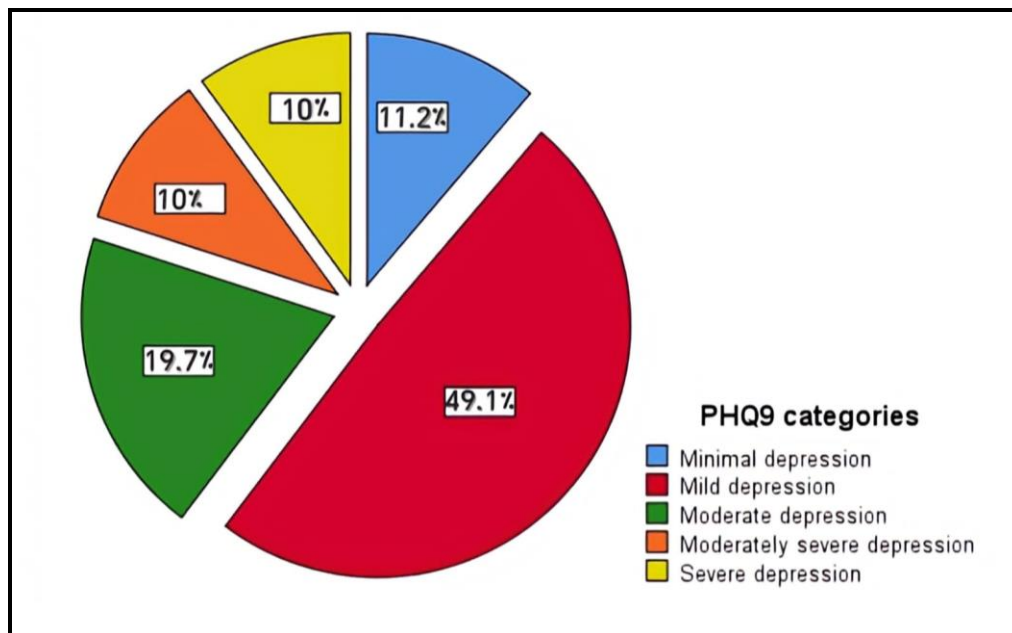


Figure (1): Percentage Distribution of depression levels among students

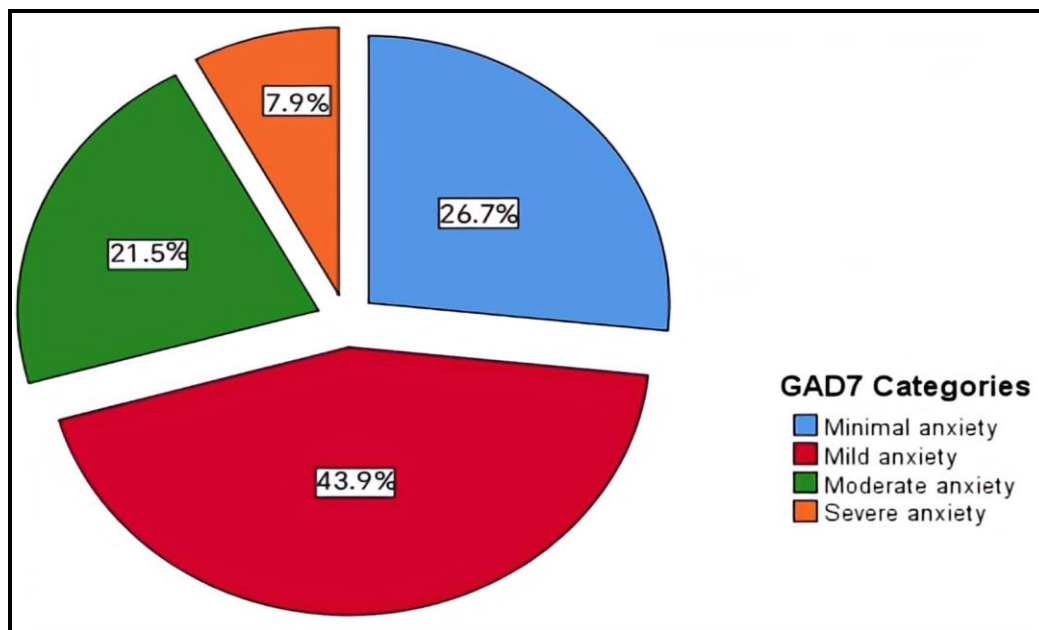


Figure (2): Percentage Distribution of anxiety levels among students

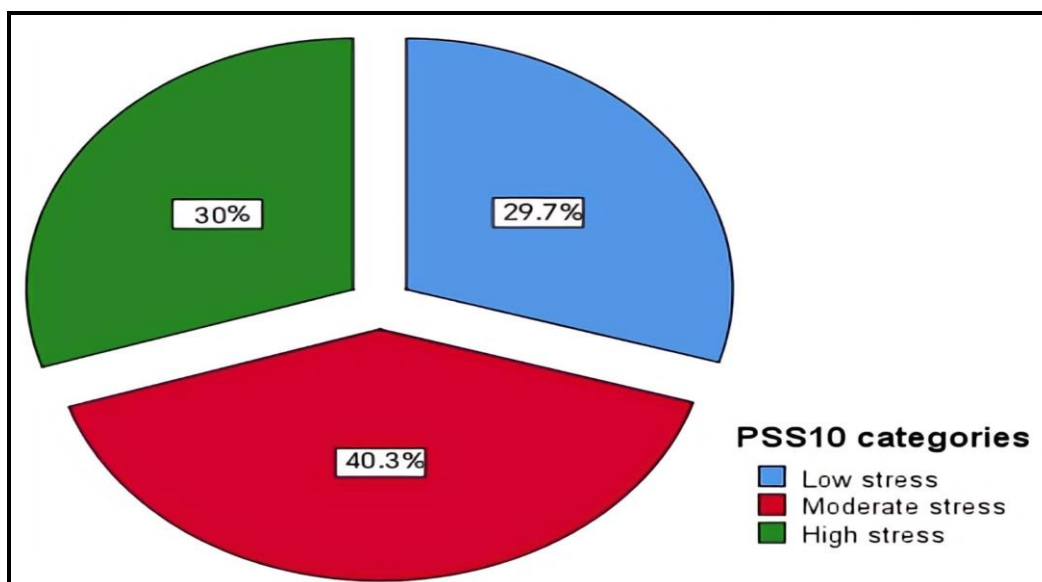


Figure (3): Percentage Distribution of stress levels among students

Table (3): Correlations between Climate change awareness and attitude, depression, stress and anxiety among students (N=330)

Item	Expected consequences of climate change		Individual responsibility for climate change		Professional responsibility for climate change	
	R	P	R	P	R	P
Patient Health Questionnaire	0.411	0.001*	0.239	0.001*	0.530	0.001*
Generalized Anxiety Disorder Scale	0.395	0.001*	0.156	0.004*	0.523	0.001*
Perceived Stress Scale	0.736	0.001*	0.347	0.001*	0.897	0.001*

Pearson correlation

* Highly statistically significant difference (p<0.01)

Table (1): Shows the demographic characteristics of 330 nursing faculty students: 53.3% of students are in the fourth academic year, while 46.7% are in the third academic year of the faculty of nursing. The results also reveal that 40.6% of students are 21 years old, and the mean age is 21.4 ± 0.8 . More than half of students (55.8%) are females. Also, 60.9% of students are found to reside in rural areas.

Table (2): Demonstrates nursing students' responses to the three dimensions of climate change awareness and attitude questionnaire. The items of second dimension (individual responsibility) showed the highest levels of agreement (mean = 74.4, SD = 14.1), followed by the first dimension (expected consequences) (mean = 72.9, SD = 22.4), while the third dimension (professional responsibility) showed the lowest level of agreement (mean = 68.2, SD = 26.5).

Figure (1): Demonstrates that 49.1% of students have mild depression, 10% have moderately severe depression, and 10% have severe depression.

Figure (2): Illustrates that 43.9% of students have mild anxiety, and 7.9% have severe anxiety.

Figure (3) Reveals that 40.3% of students have moderate stress, 30.0% have high stress, and 29.7% have low stress.

Table (3): Shows the correlations between climate change awareness and attitude, depression, anxiety and stress. The table reveals that there is a highly statistically significant positive correlation found between the first dimension (Expected consequences) and stress ($r=0.736$, $p= 0.001$) as well as depression ($r=0.411$, $p= 0.001$) and anxiety ($r=0.395$, $p= 0.001$). Also, a highly statistically significant positive correlation between the second dimension (Individual responsibility) and stress ($r=0.347$, $p= 0.001$) as well as depression ($r=0.239$, $p= 0.001$) and anxiety ($r=0.156$, $p= 0.004$). A highly statistically significant positive correlation was found between the third dimension (professional responsibility) and stress ($r=0.897$, $p= 0.001$), as well as depression ($r=0.530$, $p= 0.001$) and anxiety ($r=0.523$, $p= 0.001$).

Discussion:

Climate change is one of the most significant challenges facing the world today. Given their future-oriented perspective and potential career impacts, nursing students may be particularly vulnerable to the psychological effects of climate change. As future healthcare providers, they will play a significant role in addressing the health consequences of climate change. However, it is important to recognize that nursing students' awareness of and attitudes towards climate change issues may also contribute to the development of psychological symptoms (Abousoliman et al., 2024).

This suggests that addressing the mental health impacts of climate change on nursing students can improve their well-being and contribute to the advancement of sustainable healthcare practices (Álvarez-Nieto et al., 2022). The present study is one of the first studies to explore the mental health aspect of climate change on nursing students.

Regarding climate change awareness and attitude, this study assessed three dimensions, expected consequences of climate change, individual responsibility for climate change and professional responsibility for climate change. According to the study findings, nursing students have a satisfactory level of awareness and attitude regarding climate change. The third dimension (professional responsibility) had the lowest level of agreement compared to the other two dimensions.

The outcomes of the study reflect that the majority of nursing students have relatively acceptable levels of awareness and attitudes regarding climate change. Still, students are more aware of climate change consequences on health and their personal responsibilities as individuals in the community than their professional responsibilities towards climate change as future generations of nurses. This can be explained by that nursing students had relatively high knowledge about climate change consequences and their individual responsibilities regarding climate change. This knowledge is likely derived from climate change and sustainability topics covered in their curriculums, as well as exposure to media coverage and university conferences on climate change, green environment and sustainability actions, which have gained significant prominence in recent years, while there is still limited information about the specific professional responsibilities of future nurses regarding climate change.

This finding was similar to previous study on faculty of medicine students by Bugaj et al., (2021) who found that medical students had a higher level of agreement regarding first dimension (expected consequences) and second dimension (individual responsibility) than the third dimension (professional responsibility).

One study by Er et al., (2024) to determine the level of eco-anxiety among nursing students, found that three quarters of participants were aware of climate change and related global environmental effects. In addition, Çelik Eren & Kabataş Yildiz (2024) found that more than half of the nursing students were sufficiently knowledgeable about climate change. Also, another study assessed hope levels of nursing students regarding climate change conducted by Baykara Mat (2024) stated that more than the half of participants were knowledgeable about the effects of climate change on health.

A study by Nzeobi et al., (2020) explored the knowledge of health impact of climate change among students at college of health science found that all the students were aware of climate change and more than three quarters of them knew about the effect of climate change on health. Also, Kalogirou et al., (2020) assessed nurses' perspectives on climate change. The findings revealed that while nurses are knowledgeable about climate change, they lack specific information on actionable steps they can take and have a limited understanding of their professional role as nurses regarding climate change.

Research has linked environmental concerns, particularly climate change, to psychological problems, especially among healthcare workers. Nursing students, in particular, may experience heightened levels of psychological distress due to climate change, which may be exacerbated by the demands of their profession, including heavy workloads, clinical experiences, and academic pressures (Hwang & Kim, 2022).

According to depression, anxiety, and stress related to climate change, the study results reflect that nursing students have a potential risk of suffering from mental health problems regarding climate change and most of them had experienced significant perceived stress regarding climate change. However, the reported stress had only translated into depressive symptoms in a few students (one fifth), while more students (almost the third) suffered from anxiety related to climate change. These findings align with a previous study by Schwaab et al., (2022) which found that medical students experience significant perceived stress related to climate change. However, this perceived stress has not yet manifested in depressive, anxious, or traumatic symptoms.

Another study was conducted to assess the effect of climate anxiety on nursing students by Er et al., (2024) found that more than half of students had anxiety related to climate change.

According to correlation between climate change awareness and attitude three dimensions and depression, anxiety and stress, the current study findings reflect that, students with higher awareness and attitude toward climate change had a higher level of climate depression, anxiety or stress. These findings are congruent with a previous study by Er et al., (2024) who found that nursing students who thought that climate change and related global environmental problems can affect people health had higher levels of climate anxiety, depression and stress. Stanley et al., (2021) found that students with a higher level of awareness and concern about climate change and climate-related behaviors exhibited increased levels of climate-related anxiety and depression. Additionally, previous research by

Stevenson & Peterson (2015) suggests that awareness and knowledge of climate change, coupled with excessive consumption of climate change news, can contribute to increased anxiety and concern about climate change.

Baykara Mat (2024) reported on a study conducted by Kleffel (1991) that analyzed nursing students' knowledge of climate change. The study found that most students perceived the impact of climate change as less significant, and therefore have less worry about its impact.

A study by Akbulut & Kaya (2021) explored the psychological impact of climate change on students. Found that students exhibited a moderate level of worry about climate change. Furthermore, students with a higher level of knowledge about climate change, its effects on human health, and those who followed national climate change studies reported higher levels of worry, anxiety, and feelings of helplessness.

Another study conducted by Berry & Peel (2015) mentioned that individuals with greater knowledge about climate change, its health impacts, and the work of national organizations addressing climate-related health issues exhibited higher levels of climate anxiety and depression.

Regarding having the third dimension (professional responsibility for climate change) with the strongest correlation to depression, anxiety and stress. This finding reflects that students who feel a sense of responsibility for climate change consequences as a future nurse or a health team member has higher levels of depression, stress and anxiety regarding climate change. This may be due to the perception that climate change poses significant challenges to future healthcare environments, potentially affecting both human health and environmental resources.

Limitation of the study:

There is no limitation for the current study.

Conclusion:

Based on the findings of this study, it can be concluded that the majority of nursing students demonstrated acceptable levels of awareness and a positive attitude towards climate change. However, a significant proportion experienced moderate levels of climate change-related stress, mild levels of climate change-related anxiety, and mild levels of climate change-related depression. A strong positive correlation was found between the three dimensions of climate change awareness and attitude and climate change-related depression, anxiety, and stress.

Recommendations:

Based on the current study findings, the following recommendations are suggested:

1. Integrating more information about climate change effects on health into curricula and

educational materials for healthcare professionals, emphasizing their role in mitigating climate change's impact.

2. Further studies are needed to investigate climate change related depression, anxiety and stress in different settings with different tools.
3. Psychoeducational programs are essential for students who suffered from depression, anxiety or stress.

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