

## Effect of Awareness Program regarding Climate Changes and Sustainability Development on Nursing Internship Students' Knowledge

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### Abstract

**Background:** Climate change and sustainability are commonly recognized as the two global health challenges that will have the greatest impact on people's health in the next 10 years. To both mitigate and adapt to the consequences of climate change on the healthcare sector, nurses are crucial. **Aim:** This study aimed to investigate the effect of awareness programs regarding climate change and sustainability development on nursing internship students' knowledge. **Methods:** A one-group quasi-experimental research design was used to achieve the aim of this study. **Setting:** The current study was carried out at Sohag University Hospitals. **Sample:** A convenience sample involved 200 nursing internship students who were enrolled in the current study. **Three tools were used to collect data: Tool (I):** Nursing internship students' personal data, **Tool (II):** Nursing internship students' knowledge about climate change, and **Tool (III):** Nursing internship students regarding green management and sustainability practices. **Results:** The current study results revealed that 60% of nursing internship students had poor knowledge of pre-awareness program implementation, while 85% of them had good knowledge, post post-awareness program implementation, with a highly significant difference at p-value <0.01\*\*. Also, 80% of nursing internship students with pre-awareness program implementation had unsatisfactory practices, while 70% of them had post-awareness program implementation satisfactory practices, with a highly significant difference at p-value <0.01\*\*. **Conclusion:** The awareness program has a positive effect on nursing internship students' knowledge and practices about climate change and sustainability than they did before the awareness program. **Recommendations:** Encourage nursing students to take part in continuing education programs concerning sustainability and climate change.

**Keywords:** Climate change, Nursing internship students' knowledge, Sustainability development

### Introduction:

Human health is inextricably linked to the realities of climate change. The climate crisis underscores the need for more comprehensive knowledge of the connections between climate and health, as well as emergency preparedness for climate-related disasters and resilient health systems. Health practitioners should understand that environmental health is inextricably linked to human health and should work to influence policies at the individual, group, and policy levels for the benefit of all people (Norman & Griffiths, 2021).

The World Health Organization, Sigma Theta Tau, the Alliance of Nurses for Healthy Environments, the International Council of Nurses, and others acknowledge that nurses have a significant opportunity to take action to safeguard the climate (Butterfield et al., 2021). Many nursing students lack sufficient preparation to understand the health implications of climate change and the nursing profession's reaction, despite national nursing organizations addressing the significance of education and activism (Leffers et al., 2021).

To fulfill the 2030 Sustainable Development Goals (specifically, Goal 13,

Target 3: "Improving environmental education and awareness") and cut down on emissions, nursing education must provide undergraduate students with the information and abilities necessary to sustainably advance the health and welfare of present and future generations as well as the planet (**Shaw et al., 2021**).

Students need to be prepared with information about the health risks associated with climate change and how to prevent these issues through primary prevention strategies. They also need to be given the skills necessary to use resources responsibly for their health as well as for their work. Employees act as role models for the general public. It is necessary to educate nurses and students about environmental sustainability and stewardship so they can both comprehend the need for change and be empowered to make it happen (**Butterfield et al., 2021**). Thus, to bring about the necessary revolutionary shift, integrating planetary health education into the curriculum is a crucial first step (**Guzmán et al. & Rosa et al. 2019**).

The competencies that must be covered in nursing programs are fully explained in (**Kelly and Lazenby 2019**). Conversely, 12 guidelines for educating health professionals about environmental sustainability were created by **Schwerdtle et al., (2020)**. All educational levels should prioritize teaching and learning about climate change, but higher education institutions play a crucial role in this.

The mainstreaming of this subject in curricula, according to **Thew et al., (2021)**, must guarantee that all staff members and students are knowledgeable about climate change. In general, faculty clinical educators have opposed including planetary health in their undergraduate and graduate curricula (**Walpole et al 2019**).

Climate change must be integrated into nursing education, which means curricula, practice, research, and policy must all include the information, skills, and insights necessary for clinical practice in our changing global environment (**Leffers et al., 2021**). Since knowledge of these themes is unrelated to nursing students' awareness, attitudes, and behaviors, global warming and climate change are delicate and significant concerns that cannot be managed and evaluated solely at the knowledge level (**Ergin et al., 2021**).

The globe has seen an unparalleled shift in the way we see and confront environmental issues in the last several decades. As two interrelated and unavoidable global imperatives,

sustainability, and climate change now require our immediate attention and coordinated action (**Alam, 2022**).

Greenhouse gas emissions have rapidly increased as a result of climate change, which has been mostly accelerated by human activity such as the burning of fossil fuels, deforestation, and industrial operations. This has therefore started a domino effect of negative environmental effects, such as increasing sea levels, increased frequency and intensity of extreme weather events, and disruptions to ecosystems. Global warming has far-reaching effects on human cultures, economy, and health in addition to the natural world (**Okada & Gray, 2023**).

Conversely, sustainability is a comprehensive strategy for preserving the future of our world. It includes social justice, economic viability, biodiversity preservation, and ethical resource usage. The goal of sustainability is to strike a delicate balance so that present needs are met without endangering the ability of future generations to meet their own needs (**Olabi & Abdelkareem, 2022**).

The necessity of sustainable practices to reduce the effects of and prepare for climate change is the link between sustainability and climate change. Transitioning to more sustainable ways of production and consumption is necessary for industries and communities to effectively address climate change. This includes cutting back on greenhouse gas emissions, switching to renewable energy, protecting the environment, endorsing eco-friendly products, and implementing sustainable land use and urban planning techniques (**Abbass et al., 2022 & Harris et al., 2022**).

Health inequities and the need for healthcare services are made worse by climate change, which is a danger to public health worldwide. The mitigation and adaptation of climate change in healthcare systems is greatly aided by nurses, who are frontline healthcare providers. However, according to research, nurses frequently lack sufficient knowledge and understanding of sustainable healthcare best practices and the effects of climate change on health. According to **Kemp et al. (2022)**, this emphasizes the necessity of including climate change and sustainability science in nursing curricula, especially during clinical training. In part because of increased funding and committed leadership for educational projects aimed at tackling the difficulties of climate

change, there has been a noticeable upswing in interest in climate change education in recent years (Shukla Aleksany, 2022).

Nursing internship students or clinical placement as a component of their nursing education or training" is the term used to describe nursing interns. Working alongside seasoned nurses and other healthcare professionals, these internships help nursing students obtain real-world experience and apply their newly learned knowledge and abilities in a hospital setting. Because they enable students to gain clinical competence and get ready for their future employment as registered nurses, these internships are a crucial part of nursing education (López-Medina et al., 2022).

In the health sector, nurses play a critical role in efforts to adapt to and mitigate the effects of climate change. They comprise the largest proportion of healthcare personnel worldwide. Notwithstanding, research has indicated that sustainability science, health effects associated with climate change, and methods for implementing "green" healthcare practices are frequently underemphasized in nursing education (Agache et al., 2022).

### **Significant of the Study:**

Health professionals should educate students about the health risks associated with climate change, primary prevention strategies to prevent these issues, and responsible resource management for both work and personal use. This is because they set an example for the public. To provide nurses and students with the information and abilities to effect change, environmental sustainability and stewardship education is essential.

To develop a workforce knowledgeable about the connections between environmental sustainability and human health, nursing courses must incorporate climate change (Pan et al., 2022). The nursing internship is a developmental phase during which newly acquired skills and knowledge can influence new nurses' practices later in their careers. A limited number of interventions have been experimentally evaluated, though, to enhance nursing interns' comprehension of the factors contributing to climate change, its numerous health implications, how to identify populations at risk from climate threats and useful tactics

that healthcare systems can use to enhance climate resilience and adaptation.

### **Aim of the Study:**

The current study aimed to investigate the effect of awareness programs regarding climate change and sustainability development on nursing internship students' knowledge through objectives:

- -Assess nursing internship students' knowledge level regarding sustainability and climate change pre-intervention.
- -Designing and applying awareness programs regarding sustainability and climate changes for nursing internship students according to their actual needs.
- -Evaluating the effect of awareness programs regarding sustainability and climate changes on nursing internship students' knowledge.

### **Hypothesis:**

H1: Nursing internship students' knowledge mean score expected to be improved post-awareness program regarding sustainability and climate change.

H2: Nursing internship students' practice mean score expected to be improved post-awareness program regarding sustainability and climate changes.

### **Materials and Methods:**

#### **Research design**

A one-group quasi-experimental research design was used to achieve the aim of this study (Cook & Wong, 2008).

#### **Setting**

The current study was carried out at Sohag University Hospital

#### **Sample:**

A convenience sample involved 200 nursing internship students who were enrolled in the current study from the previously mentioned setting.

#### **Tools of Data Collection:**

##### **Three tools were used to collect data:**

**Tool I: Nursing internship students' data:** It included nursing internship students, ' personal data of the nursing internship students such as age, gender, GPA, marital status, residence,

training courses

**Tool (II): Nursing internship students' knowledge about climate change:** It was developed by researchers in the Arabic language after conducting a thorough review of the existing literature as **Mustapha et al., 2019** and **Yildiz Çankaya & Sezen, 2019**. It included nursing internship students' knowledge about climate change and included 26 multiple-choice questions including the Concept of climate change (3 questions), the Concept of sustainability (3 questions), Causes of Climate Change (5 questions), Benefits and barriers of sustainability (5 questions), Mitigation Strategies (5 questions), Impacts on Human Health (5 questions).

Each correct answer was given a score of 1, while incorrect answers received a score of

0. The total knowledge score was categorized as poor (<60.0%), equal to 60% to 75% was average or satisfactory ( $\geq 75.0\%$ ).

**Tool (III): Nursing internship students regarding green management and sustainability practices.** : It was adapted by the researchers from **Ghazy & Fathy, (2023)**. This tool was employed to evaluate the daily life practices reported by the students, encompassing 11 statements assessing indoor practices and 8 statements evaluating outdoor practices. Participants indicated their responses as either "done" or "not done" for each statement. A total score was computed by summing the practices marked as "done," which was then converted into a percentage. The results were categorized into two groups: unsatisfactory practice if the score was below 70.0%, and satisfactory practice if the score was equal to or greater than 70.0%.

#### **Fieldwork:**

The researcher was present in the research setting during the morning shift from 9:00 a.m. to 1:00 p.m. The data collection phase extended for three months, starting in October 2023, and ending in December 2023. This period encompassed the pretest, the implementation of the awareness program sessions, and the posttest. The researcher introduced herself to the nursing internship students and explained the aim of the study. Data collection was carried out through group interviews with the nursing internship students, and each interview lasted for approximately 30 minutes.

**Phases of the study:** The study was conducted

through the following four phases:

#### **The procedure:**

**Assessment phase:** The researcher provided a detailed explanation of the study's objectives and introduced the components of the research tools to the nursing internship students under investigation. Subsequently, the researcher distributed a questionnaire to these students to evaluate their knowledge and practices related to climate change green management, and sustainability. The awareness program was meticulously crafted and tailored to meet the specific needs of nursing internship students, a process informed by both the pretest results and a thorough review of relevant literature.

#### **Pilot study:**

A pilot study involving 20 nursing internship students, which constituted 10% of the estimated sample size, was carried out to assess the feasibility of the research tools and the clarity of the tool questions. Additionally, the pilot study assisted in gauging the time needed for participants to complete the questionnaire. Following the analysis of the pilot study's results, it was determined that no modifications or exclusions were necessary for the questionnaire items. Furthermore, the nursing internship students who took part in the pilot study were included in the final sample.

#### **Validity and Reliability:**

The data collection tools were evaluated by a group of two experts in nursing administration, one expert in pediatric nursing, and two in community health and education to ensure that they accurately measured the concept being studied and covered all relevant aspects. To assess the reliability of the tools, the consistency of results across time, observers, and test sections was measured using Cronbach's alpha test. The reliability scores for tools I, II, and III were 0.845, 0.987, and 0.878. This indicates that the tools were reliable and consistent in measuring the targeted constructs.

#### **Ethical Considerations**

The study obtained ethical approval from the Institutional Review Board of the Faculty of Nursing at Sohag University. In addition to this, the researcher obtained oral consent from each nursing internship student after providing them with a clear understanding of the study's

objectives. Moreover, students who consented to participate were guaranteed the confidentiality of all data collected during the study, and they maintained the right to withdraw from the study at any time. The questionnaires were completed anonymously, and the data collected were handled with the utmost confidentiality, exclusively for research purposes.

## II. Planning phase:

Based on the results of the previous phase, the objectives, priorities, and expected results were defined to address the practical requirements and knowledge gaps of the nursing internship students. The researchers scheduled four sessions for the nursing internship students' under study.

### The awareness program:

The creation and revision of **the awareness program** was done. It included lessons regarding climate change and sustainability development.

### The general objective of awareness program sessions:

At the end of the sessions, the nurses were expected to acquire knowledge and practices that improve their performance regarding the care of patients undergoing humeral fracture surgery.

#### Specific objectives of the training:

- Define climate change.
- Define sustainability.
- Enumerate the Causes of Climate Change
- Enumerate Benefits and barriers of sustainability.
- Identify the Mitigation Strategies.
- Discuss Impacts on Human Health.
- Apply indoor practices and evaluate outdoor practices.

## II: Implementation phase:

The researcher organized the studied nursing internship students into four groups and conducted a series of four one-hour training sessions for each group, consisting of both lectures and seminars. Students were informed of their respective group assignments through invitation letters that also detailed the training schedule and venue. The theoretical sessions took place in the hospital conference hall over eight weeks, with sessions held from 9 a.m. to 10 a.m. The awareness program was designed by the researcher after a comprehensive literature review, aiming to enhance the student's understanding and implementation of climate change and green management and sustainability principles.

After analyzing the relevant literature and taking into account the actual needs of the nursing internship students under study, a simplified booklet was created and distributed to nursing internship students in Arabic. It covered every topic about knowledge and practice relating to climate change and sustainability development.

Applying an awareness program was utilized by a variety of teaching methods, such as lectures, brainstorming sessions, and small-group discussions. The use of a range of teaching aids, such as figures, PowerPoint, handouts, flipcharts, and animated movies, enhanced nursing internship students' knowledge regarding climate change and sustainability development.

### Awareness Program regarding Climate Change and Sustainability included these sessions:

**The first session** began with the researchers introducing themselves, extending their gratitude to the nurses for participating in the study, and outlining the goals of these training sessions. The first session's topics included an introduction to Sustainability and Climate Change: Introductions and expectations from the training, Definition, and principles of sustainability, Importance of sustainable practices, Causes and consequences of climate change, and Overview of global climate change agreements. At the end of the session, encourage participants to ask questions and engage in a group discussion.

**The second session** addressed topics about **Sustainable Practices and Solutions**: A brief review of key concepts from the first session, Sustainable Energy and Resource Management, Renewable energy sources, Efficient resource management, Reducing food waste and promoting sustainable diets, Strategies for waste reduction and recycling, Encourage participants to ask questions and share insights.

**Third (Practical) Session:** During this session, the nursing internship students under study received instruction on **Climate Action and Personal Commitment** which Summarized key takeaways from the previous sessions, Climate Action at the Individual Level, Personal carbon footprint reduction, How organizations can integrate sustainability into their strategies, Green certifications and initiatives.

**The fourth session,** This session focused on implementation of climate change and green management and sustainability principles. Also, asking participants about their past experiences and answered any concerns they had about climate change and sustainability development. After that, she administered the post-test and thanked each participant for their participation in the study.

**IV-Evaluation phase:** The effect of the awareness program regarding climate change and sustainability development on nursing internship students' knowledge was evaluated by reevaluating the nursing internship students using the aforementioned tools following the implementation of the awareness program (posttest) and one month later.

### **Statistical Analysis:**

The collected data were meticulously organized and categorized, with the results presented in tabular format for clarity. Data analysis was carried out on a compatible personal computer using SPSS; version 21). The ANOVA test was utilized to compare mean scores before, after, and during the follow-up intervention, following the methodology described by Franke et al. (2012). The correlation coefficient was employed as a numerical indicator of statistical relationships between various variables, revealing the extent of their correlation. Additionally, linear regression analysis was utilized to predict the value of one variable based on the value of another. Results were considered significant if  $p < 0.05$  and highly significant if  $p < 0.01$ . Furthermore, the developed research tools were subjected to reliability testing using Cronbach's alpha test, as outlined by Nayak and Hazra (2011), to ensure their consistency and accuracy in measuring the intended constructs.

### **Results:**

Table (1) shows that the mean age of nursing internship students was 22.44 (0.56) years, with 70% of them being female. According to residents, 60% of them were from rural areas. Also, 30% of nursing internship students had a 3.75 – 4.0 GPA.

Figure (1) shows that only 10% of nursing internship students participated in climate change and sustainable development training programs.

According to Figure (2), eighty percent of the

nursing internship students under study said that doctors were the primary source of information about sustainability and climate change.

Table (2) displays the total knowledge scores of nursing intern students on sustainability and climate change. There was a substantial improvement and difference between the pre-and post-awareness programs (P-value:  $< 0.01^{**}$ ). The nursing internship students' pre-awareness program mean score was  $16.88 \pm 7.22$ , and their post-program mean score climbed to  $55.22 \pm 1.31$ , with statistically significant changes.

According to Figure (3), 66% of nursing intern students had a poor total knowledge level regarding sustainability and climate change before participating in an awareness program, and 8% had poor knowledge regarding these topics following their participation in a program. Significant progress was also made in the pre-and post-awareness programs on sustainability and climate change.

Table (3) displays the total practice mean scores of nursing internship students concerning sustainability and climate change. There was a substantial improvement and difference between the pre-and post-awareness programs (P-value:  $< 0.01^{**}$ ). The nursing internship students' pre-awareness program mean score was  $20.33 \pm 6.12$ , and their post-program mean score climbed to  $40.35 \pm 1.89$ , with highly statistically significant changes.

Figure (4) shows that there was a significant improvement in the practice regarding climate change and sustainability before and after the awareness program. 88% of nursing internship students had unsatisfactory total practice about climate change and sustainability, pre awareness program, and 12% of them had unsatisfactory total practice about climate change and sustainability, post awareness program.

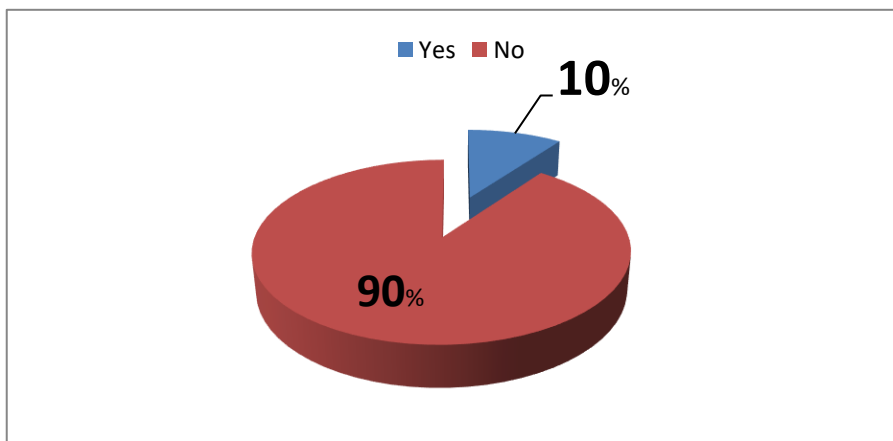
Table (4) shows a strong positive correlation between the total knowledge and practice levels pre and post-awareness program, with a p-value of  $< 0.001^{**}$ , indicating statistical significance  $> 0.05$ . 88% of nursing internship students had unsatisfactory total practice about climate change and sustainability, pre awareness program, and 12% of them had unsatisfactory total practice about climate change and sustainability, post awareness program.

The high-significant model's F-test value was 9.660, and the p-value was 0.000, according to Table (5). The R2 score of 0.46 indicates that this model explains 46% of the variation in total knowledge. Moreover, a strong GPA with a p-value of  $^{***}<0.001^{***}$ . However, with a p-value of less than 0.05\*, age exhibited a minor frequency of favorable impacts. Conversely, p value $<0.001^{***}$  for gender and residence. The

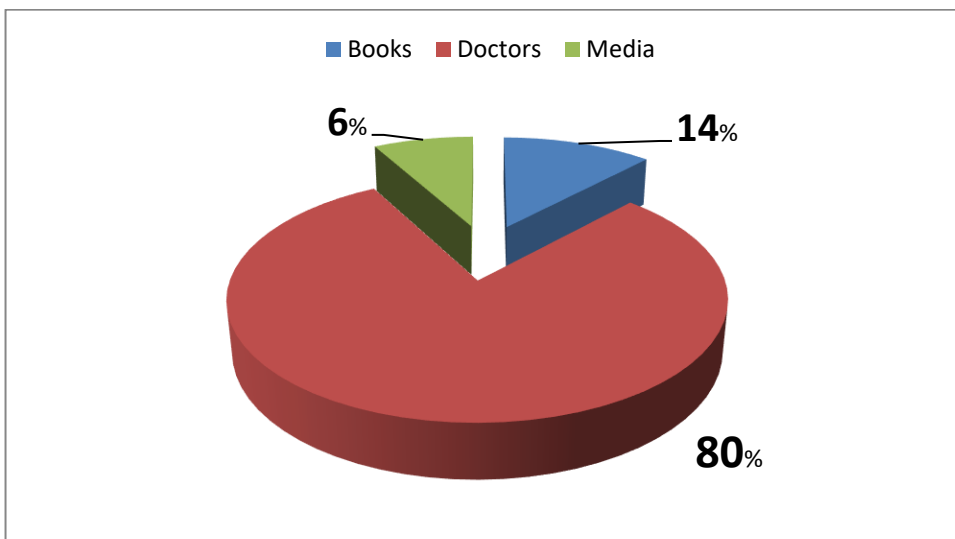
high-significant model's F-test value was 7.800, with a p-value of 0.000, according to Table (6). The R2 value of 0.39 with a p-value of  $<0.01^{**}$  indicates that 39% of the variation in total practice can be explained by this model. However, there was a little frequency of increasing GPA, residence, age, and gender had a slight frequency of positive effects, with a p-value of  $<0.05^*$ .

**Table (1): Nursing internship students' distribution regarding their data (n=200)**

Items	n	%
Age:		
< 23	160	80.0
23 - 24	40	20.0
Mean (SD)	22.44 (0.56)	
Gender:		
Male	60	30.0
Female	140	70.0
Residence:		
Rural	120	60.0
Urban	80	40.0
Training program about sustainability and climate change		
Yes	20	10
No	180	90
GPA		
<2	16	8.0
2 – 2.74	36	18.0
2.75 – 3.74	56	28.0
3.75 – 4.49	60	30.0
>4.49	28	14.0



**Figure (1): Training program about sustainability and climate change**

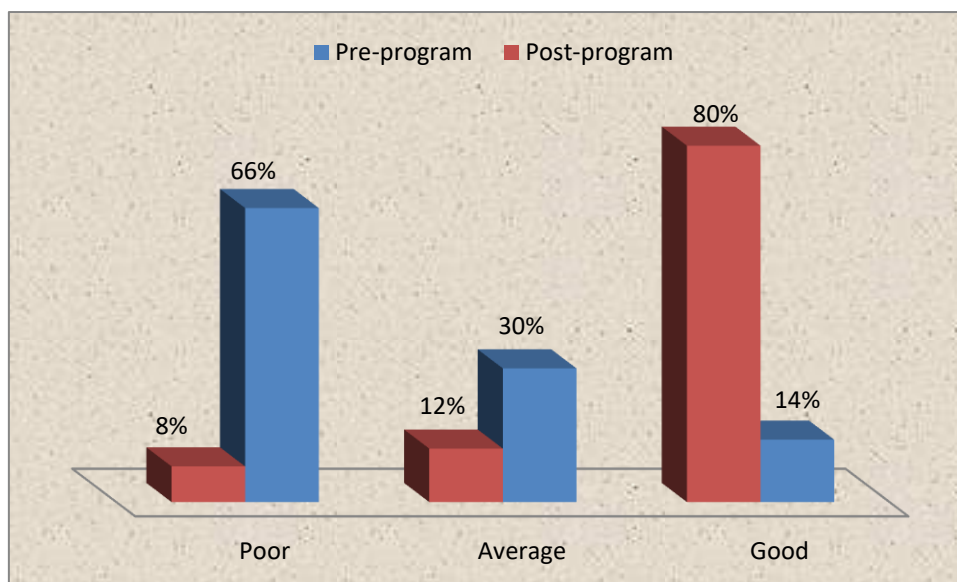


**Figure (2):** Nursing internship students' source of knowledge regarding climate change and sustainability (n=200)

**Table (2):** Mean Score Differences in the Nursing Internship Students' Knowledge Regarding Climate Change and Sustainability Pre and Post awareness Program (n=200)

Knowledge items	Pre awareness program	Post-awareness program	t-test	P-value
Total knowledge scores	16.88±7.22	55.22±1.31	23.56	<0.001**

(\*\*) highly statistical significance at  $p < 0.001$



**Figure (3):** Total nursing internship students' Knowledge Level regarding climate change and sustainability Pre and Post awareness program (n=200)



Table (3): Mean Scores Differences in the nursing internship students' practice regarding climate change and sustainability Pre and Post awareness program (n=200)

Knowledge items	Pre awareness program	Post-awareness program	t-test	P-value
Total knowledge scores	20.33±6.12	40.35±1.89	8.890	<0.001**

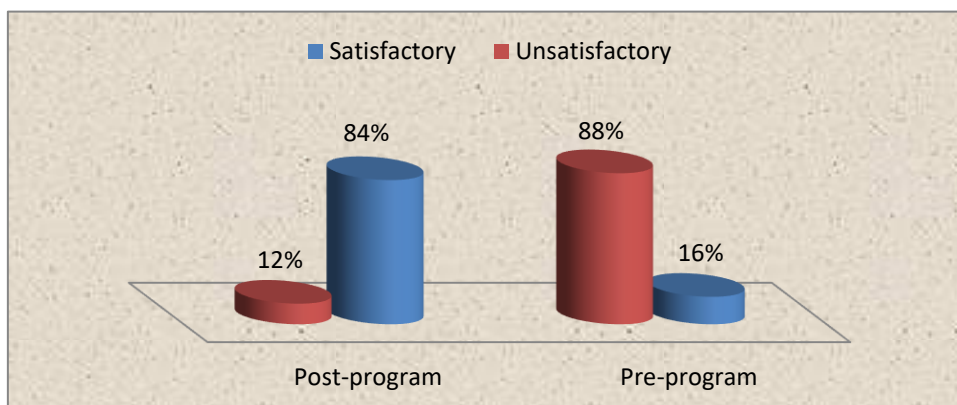


Figure (4): Total nursing internship students' practice Level regarding climate change and sustainability Pre and Post awareness program (n=200)

Table (4): Correlation between nursing internship students' knowledge and practice Pre and Post awareness program

	r.	p. value
Knowledge and Practice Pre-awareness program	0.612	<0.001**
Knowledge and Practice post-awareness program	0.632	<0.001**

Table (5): Multiple Linear regression model for nursing internship students' knowledge post awareness program (n=200).

	Coefficients		T	P. value
	Unstandardized B	standardized B		
Age	.179	.126	2.612	<0.01**
Gender (Male)	.094	.036	0.886	<0.01**
GPA	.262	.214	4.014	<0.01**
Residence (Urban)	.067	.023	0.625	<0.01**
<b>Model</b>	<b>R<sup>2</sup></b>	<b>Df.</b>	<b>F</b>	<b>P. value</b>
Regression	0.46	7	9.673	.000**

Table (6): Multiple Linear regression model for nursing internship students' practice post awareness program (n=200).

	Coefficients		T	P. value
	Unstandardized B	standardized B		
Age	.184	.173	2.456	<0.01**
Gender (Male)	.082	.024	0.674	<0.01**
GPA	.187	.163	2.876	<0.01**
Residence (Urban)	.075	.027	0.745	<0.01**
<b>Model</b>	<b>R<sup>2</sup></b>	<b>Df.</b>	<b>F</b>	<b>P. value</b>
Regression	0.39	7	7.789	.000**

## Discussion:

Incorporating sustainability and climate change education into nursing internship programs will not only equip aspiring nurses to tackle environmental health concerns but will also build a more resilient and sustainable healthcare system. The future generation of healthcare professionals must be prepared to handle the complicated health issues connected with environmental challenges by raising an understanding of sustainability and climate change (La Torre et al., 2023).

According to the personal data of the current sample, less than three-quarters of the students enrolled in nursing internships were female. This finding helps to explain why the nursing faculty is seen to be relatively new to having male students. Due to the benefits of working in the human sector, earning a high salary, assisting others, and other factors, more students may have lately enrolled in nursing programs, which could explain this outcome.

It was noted that, of the nursing internship students, three-fifths resided in rural areas. This observation speaks to the Egyptian rural culture, which is characterized by its customs, norms, beliefs, and unlawful environmental practices. The results of a study conducted by Kah et al. (2021) on "Awareness of the causes, impact, and solutions to global warming among undergraduate students" from various schools at the University of the Gambia were not consistent with these findings. The study found that over two-thirds of the participants were male and lived in urban areas.

According to the most recent data, just ten percent of nursing internship students took part in training programs related to sustainable development and climate change. Researchers found that nursing internship students must take part in programs that raise knowledge of climate change and sustainable development.

According to the current data, the majority of the study's nursing internship students believed that doctors were the best sources of information regarding climate change and sustainability. According to the researchers, this indicated that the nursing internship

students had learned their information from reliable sources.

The results showed that, in terms of nursing interns' and students' knowledge of climate change, there was a highly statistically significant improvement and difference post-awareness program compared to the pre-program. Following the implementation of the current study-related awareness program regarding climate change, the majority of nursing interns' and students' total knowledge increased, indicating the success and effectiveness of the awareness program. The results of a study named "Knowledge and Perception of Climate Change and Global Warming in the Context of Environmental Challenges and Policies" conducted in Dammam, Saudi Arabia by Almulhim (2021) were comparable to these findings. According to the study, one-third of the participants had inadequate knowledge about the causes and effects of climate change. Furthermore, more than one-quarter of the studied sample had good knowledge and awareness of climate change at post-test.

Additionally, the findings of the study align with other research that has demonstrated that students lack the knowledge required to support and engage in climate change initiatives. For example, Reynaldo et al. (2018) found that students have a greater awareness of the environment and climate change due to media coverage, political channels, and firsthand experience with natural disasters both locally and globally.

The current findings showed that before taking part in an awareness program, over three-fifths of nursing intern students had poor knowledge overall regarding sustainability and climate change, and, after the program, less than ten percent had poor knowledge overall regarding these topics. The results of the study "Finnish studied nurses' perceptions of the health impacts of climate change and their preparation to address those impacts" by Tiitta et al. (2021) corroborated these findings by pointing out that nurses lacked the knowledge required to support and engage in strategies for climate change and sustainability development. According to Ibrahim et al. (2022), "The effectiveness of educational interventions about sustainability development among nursing students" in Egypt, the study results are

corroborated and concluded that the majority of students had insufficient knowledge of climate change at pre-educational intervention.

On the other hand, post-intervention analysis showed a significantly substantial improvement in understanding of sustainability and climate change developments. The researcher holds that for nursing intern students to receive the necessary instruction to comprehend the connection between climate change and global health issues, they should learn about environmental themes in nursing faculties, be aware of climate change, and attend seminars and trainings related to the environment.

These results are consistent with a study by **Nousheen et al. (2020)** that showed a significant improvement in student-teacher knowledge about sustainable development (SD) after an intervention. Furthermore, **Breakey et al.'s, (2023)** study showed that a sizable percentage of students had little to no understanding of climate change, highlighting the importance of teaching aspiring medical professionals about the relationship between climate change and health. The importance of treatments and educational initiatives in addressing these pressing concerns is highlighted by the body of evidence. Additionally, **Olsson et al., (2022)** found that following the intervention, students' understanding of sustainability increased. Additionally, **Esringü & Süleyman, (2020)** noted that following training, university students had great awareness and good knowledge. Moreover, **Ayanlade, A., & Jegede, 2016** showed that most of the students had poor knowledge about sustainability and climate change and recommended continuous training programs related to these vital topics.

In terms of sustainability and climate change, the current results showed that nursing internship students' overall practice mean scores. The pre-and post-awareness programs showed a significant improvement and difference. These findings, which were corroborated by **Grandisoli & Jacobi's (2020)** study, showed that, in comparison to a control group, the participating students had significant changes in both knowledge and habits. Additionally, it was demonstrated by **Badea et al. (2020)** that sustainable development enhanced the subjects' practices. Furthermore, a program for teaching

about climate change enhanced university students' motivation to take action (**Kelenatý et al., 2022**). Furthermore, **Ghazy & Fathy, (2023)** found that students' knowledge, attitudes, and day-to-day practices about climate change had been significantly and favorably impacted by the educational program.

Additionally, the current results showed that, both before and after the awareness, there was a considerable improvement in the overall practice level addressing climate change and sustainability. Less than one-fifth of nursing internship students reported unacceptable overall practice regarding climate change and sustainability following a post-awareness session, while the majority had unsatisfactory total practice regarding these topics before the awareness program. They will be able to remove the risks associated with climate change and mitigate its negative health effects once they have reached a suitable standard of daily living.

A very strong positive correlation was discovered between the post-program total knowledge score level and total practices, according to the current study. Correlation between pre/post total knowledge of investigated students and practices. For healthcare practitioners, this expanded knowledge is essential because it gives them the tools to address health issues related to climate change and advance sustainable healthcare practices. These results highlight how crucial educational programs are in equipping aspiring medical professionals to address the pressing problems related to sustainability and climate change.

The findings of **Sah et al. (2018)**, who investigated "Assessment of the knowledge and practice regarding global warming among high school students of Ramnagar, Belgaum City: A cross-sectional study," in India, and **Freij et al. (2016)** in Bahrain concur with this finding. According to **Michel and Zwickle's research (2021)**, training programs improved students' understanding of sustainability. These results corroborate their findings. Furthermore, **Zhang and colleagues (2022)** discovered a favorable association between the degree of actual application and knowledge.

This finding is in line with the findings of two previous studies: **Sah et al. (2018)** and **Freij et al. (2016)** in Bahrain, which assessed high school students' knowledge and knowledge about global warming in Ramnagar, Belgaum

City, India, using a cross-sectional survey design. These results are consistent with the study done by Michel and Zwickle, (2021) who found that training programs improved students' understanding of sustainability. Furthermore, Zhang et al. (2022) discovered a favorable relationship between knowledge and the degree of practical application.

### Conclusion:

Based on the current study's findings, the study concluded that the awareness program significantly improved the level of climate change and sustainability knowledge and practices among nursing internship students.

### Recommendations:

**Based on the current study's findings, the following recommendations were made:**

1. Encourage nursing interns to take part in continuing education programs about climate change and sustainability.
2. Use constructive comments and frequent evaluations to monitor nursing interns' development in knowledge and behaviors related to sustainability and climate change.
3. Promote multidisciplinary cooperation to improve knowledge sharing and real-world applications between nursing and programs in environmental science or sustainability.
4. Involve nursing interns in climate change and sustainability-related community initiatives.

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