- *Basic Research*

Effect of Educational Strategies on Knowledge, Perception and Attitude toward Climate Change and its Effect on Health Among Nursing Students

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Abstract

Context: One of the biggest challenges the world is dealing with right now is climate change, whose detrimental effects could be catastrophic and endanger human survival. For this reasonIt's crucial for everyone, in especially the academic community, to fully grasp the nature of climate change and the range of solutions that are now being considered. **Aim**: To assess how different educational approaches impact people's understanding, views, and attitudes about changing of climate and its health special effects. **Methods**: To achieve these aims, the study used a quasi-experimental design with pre- and post-group evaluations. . **Setting**: A college of nursing at Benha University in Egypt's Qalyubia region was the site of this research. **Subjects**: During the data collecting phase, 303 male and female second-year students were recruited to participate in the study. **Study Tool**: 3 tools for collection of data were used as follow: (1) Structured interviewing questionnaire. (2) Perception scale regarding climate change. (3) Attitudes scale regarding climate change. **Results**: The studied nursing students had good knowledge level post educational strategies implementation than pre, as regard to total perception level found that improved post educational strategies implementation with high perception level, also, total attitude level improved to positive attitude post education strategies implementation. **Conclusion**: Improved knowledge, perception, and attitude were attained by nursing students through the use of educational strategies initiatives about changing of climate and its effect on health. Attitude and Perception. **Recommendation**: To better generalize the results, A bigger sample size and more sites should be used to conduct a comparable study.

Keywords: climate change, educational strategies, perception, attitude.

Introduction

The environmental implications of the continued rise in the average surface and ocean temperatures are collectively known as climate change (CC). Government economies may suffer as a result. , vegetation, wildlife, and human health. The average worldwide temperature has increased since the beginning of the commercial revolution. Researchers predict that the world's average temperature will climb an additional 0.3 to 0.7 degrees Celsius (0.54-1.26 degrees Fahrenheit) by the year 2035. Continual warming of the Earth's surface and oceans is having serious consequences for the natural world, contributing to global warming and causing shifts in the global climate **(Bolan et al., 2023)**.

Egypt is especially at risk from climate change, largely due to its high population density. Rising sea levels will have a disproportionately negative impact on the densely populated Nile Delta. Climate change will also have an impact on the well-being of its residents **(International Journal of Environmental Studies, 2022)**. Many negative effects that eventually affect human health can be brought about by climate change. Over time, climate change (CC) may have a negative impact on human health due to several significant changes. These negative effects on human health include the resurgence of malaria, respiratory conditions, malnourishment, heat-related illnesses like heat stress and stroke, infectious diseases like waterborne and vector-borne illnesses like gastrointestinal issues, and mental health conditions like depression and stress disorders that are linked to natural disasters **(National Center for Environmental Health, 2021)**

The perceptions of young people on the causes, consequences, and possible remedies of climate change can be changed, according to experts on the subject, especially through increasing awareness in educational institutions. Increasing young people's awareness and their personal viewpoint of CC is one of the many beneficial everyday acts they can do to lessen the serious impact on the environment and their health. Egypt's ministries of education, health, and environmental affairs have recently shown a clear indication of their cooperation and coordination with one another and with other voluntary organizations. The goal of these initiatives is to raise the awareness, attitudes, and behaviors of various populations in institutions of higher learning and educational environments **(Abbas, 2019).**

In order to deal with this worldwide problem and its consequences on human and animal health, nurses are essential. The American Nurses Association (ANA) recognizes that there are numerous pressing health issues in the world today, including climate change, but emphasizes that nurses need to be aware of the close relationship between environmental and human health. Numerous measures outlined in this declaration will contribute to addressing the disturbances of Earth's natural systems brought about by human activity. For nurses working in all contexts and specializations, this position statement serves as a guide and call to action **(Association of American Nurses, 2023).**

Significance of the study:

Economic, social, and environmental resources, such as Egypt's water, food, and energy supplies, are under grave danger, making the country one of the most susceptible. According to data compiled by the Egyptian Meteorological Agency, average global temperatures rose by an abnormally high 3–4 degrees Celsius five years before the summer of 2021. To better prepare for climate change and lessen its negative effects on different economic sectors, the Egyptian government responded by enacting more thorough and efficient programmes, policies, and laws **(ACPSS, 2021).**

Aim of the study

This study aims to evaluate how educational strategies influence people's knowledge, attitudes and perceptions, about changing of climate and its effect on health.

Research Hypothesis:

H1: After implementing educational strategies, nursing students are expected to show a significant improvement in their knowledge scores regarding changing of climate and its .effect on health compared to their scores before the intervention

H2: The nursing students' will exhibit a positive attitude after implementation of educational strategies than before.

H3: Implement of educational strategies could be have positive effect on improving nursing students perception regarding changing of climate and its effect on health.

Subjects and Method

Research design:

For this study, a quasi-experimental design, involving pre- and post-tests, was used in this study. In this type of research, the independent variable is manipulated without randomly assigning participants to different conditions or sequences. The design can include one or more groups, and measurements can be taken either before and after the intervention or just after it **(Mateo & Foreman, 2014).** Quasi-experimental designs encompass various nonrandomized or partially randomized pre-post intervention studies **(Handley et al., 2018).**

Settings:

The study was carried out at Benha University's nursing faculty in the Egyptian region of Qalyubia.

Sample:

During data collection, 303 male and female second-year students were selected as a convenience sample to take part in the study in the previously mentioned conditions. Taylor (2014) states that the following formula should be used. The value of n equals the sample size (100) at this point. It stands for the entire populace (303). The symbol for the margin error is e. (0.05). Type: Convenience sample of second -year students. Dimensions: The formula below was used to determine the sample sizeThe margin error is denoted by e (0.05).

$$n = \frac{}{1 + N\,(e)^2}$$

Where n= sample size. N= population size. e= acceptable sampling error

Tools for data collection:

Tool I: knowledge of nursing students' of changing climate and its effects on health may be assessed using a structured questioning questionnaire. . After reviewing pertinent studies and scientific literature, the researcher developed this questionnaire. **(Abdel -Nabi et al, 2023: Ibrahim et al 2018 & Lorelei, 2016).** It is divided into two parts and is merely laid out in Arabic with content covering a range of subjects. section one: - socio demographic details about the students, such as age, gender, housing location, and information source. **Part Two**: 36 closed-ended questions were included in the student knowledge evaluation (before and post education strategies) to see how well students understood climate change and how it impacts their health. As an example of the following: 1. Overview of climate change: consists of five multiple-choice questions covering terms like global warming, ozone layer functions, and climate change definition. 2. Causes and general effects: It covers 21 MCQ, including the primary causes of the ozone layer hole, the most frequent sources of pollution in the environment, and the most pressing causes of climate change at the moment. 3. health effect: consists of five multiple-choice questions (MCQ) on topics including the health issues brought on by ozone layer depletion, dietary issues brought on by global

Scoring system: -

The value of each right answer was one point, whereas the value of each wrong answer was zero points. It will be given as a percentage of the total score here: 36 towards general understanding .**The score ranges from**:

- Poor < 22
- Average 22-27
- Good > 27

Tool II : perception scale regarding climate change:

The scale, which was adapted from **Lorelei (2016)** and assessed how nursing students saw climate change, with some adjustments made by the researchers. The total number of items was 24, with six items in each of the four categories: climate change worry, climate change optimism, responsibility, and commitment.

Scoring system of perception :

Each item on the perception scale had a Likert scale value between zero (strongly disagree) and five (strongly agree). Consideration was given to the total perception score. 120 is the perception score.

- Poor < 72
- Average 72-90
- Good > 90

Tool III: Attitudes scale regarding climate change: This scale, which utilizes Likert's approach, was created by **Netravatia and Chauhan (2014)** to gauge students' attitudes regarding climate change. It had twelve chosen sentences, of which nine indicated a positive attitude and three indicated an unfavorable attitude (3,7, 12). (1,2,4,5, 6,8,9,10, 11).Agree, uncertain, and disagree were the three options for the scoring system, with favorable

attitudes receiving a score of (2, 1, 0) and unfavorable attitudes receiving the opposite values. After adding together all of the attitudinal scores, the proportion that should be taken into account was calculated: **(Abdallah & Farag, 2022).**. 60 is the attitude score.

- Negative < 36
- Positive ≥ 36

Procedures

Administrative design and ethical consideration: Prior to the study's implementation, the Benha University Faculty of Nursing's Scientific Research and Ethics Committee granted preliminary approval (Code: REC-MSN-P45A). During the inquiry, all ethical considerations were taken. Aims and goals of the study, together with information about their ability to withdraw from participation at any time, were explained to all nursing students. Researchers safeguarded the privacy.

Validity of tools: A group of five experts from Benha University's medical-surgical nursing department and the nursing faculty assessed the instruments for validity. Based on the panel's assessment of the sentence's clarity, completeness, and appropriateness, the modification was made. 92% of the perception scale, 95% of the attitude scale, and 95% of the attitude scale were all agreed upon by experts.

The reliability of the knowledge questionnaire tested with a reliability value of 0.733 according to Cronbach's alpha. Additionally, the reliability of the second tool (perception and attitude) was 0.797, and for the third tool (knowledge) it was 0.809. All it proves is that this instrument is incredibly dependable**.** .

A pilot study was carried out to confirm the research protocol feasibility. In this study, ten percent of the selected individuals were enrolled, amounting to 25 students. These students constituted the initial research sample, as well as the comprehensibility, relevance, and duration needed to finish every study item.

The preparatory phase was doing a literature evaluation of relevant works and publications that added to our theoretical understanding of the study subject. Books, papers with supporting evidence, journals, and internet periodicals were all part of the research process.

Following an extensive review of relevant literature, the researcher developed educational techniques in response to the needs identified during nursing students' introductory assessments **(Tuna et al., 2022 & Reddy et al., 2022).** The event aimed to improve the mindset, perspective, and understanding of aspiring nurses. An instructional poster and accompanying smartphone app were developed using the teaching-learning technique to raise awareness about the link between climate change and health risks.

Field of work:

The faculty director and vice dean of education and student affairs formally approved the data collection of the study which was conducted over a 6 month period, from October 2023 to March 2024. There were four groups of pupils, each consisting of sixty individuals. First,

the researcher briefed the students about the study's goals and objectives before assuring them that their data would be treated with the utmost confidentiality and utilised only for the research. Four distinct phases made up the research. . I- **Phase of assessment** (baseline data): Students were given structured questionnaires (tool I) that asked questions about their knowledge and sociodemographic characteristics. Tool II questioned students of their perception finally, the researcher utilized tool III to ask the patient about their attitude in order to collect baseline data before the program was implemented. Using the following URL, participants completed the electronic questionnaire using these tools: https://docs.google.com/forms/d/e/1FAIpQLScH_oN9BxoI0xp3A0a86AVht2bvRuBBCa3Ms2K7KX8YGQxtXw/viewform?usp=sf.

II- planning phases: Following the completion of the initial assessment, the educational strategies handout was developed with the needs of the students in mind. The researcher recorded videos on the students' smartphones and developed teaching strategies in the form of a poster. Additionally, the researcher created an education plan that addressed both general and specialized goals.

III- implementation phase: The teaching strategies were put into action through group-classified sessions. The pamphlet was distributed to each student, and over the course of three 30-minute sessions, its contents were reviewed. Each session started with an outline of the topics that were discussed in the previous one and the objectives for this one. Following these sessions, the participants were told that the researcher would examine them three months later**. The first session** covers orientation, the importance of teaching methodologies, and general information regarding climate change, such as its definition, the concept of global warming, the functions of the ozone layer, etc**. Second session**: An overview of common understanding on causes, effects in general, and effects on health. Third meeting: An explanation. **Third session**: An explanation of the control and prevention measures that are preventive.

Different methods of education, including one-on-one guidance and group discussions, were used during the sessions. Posters, smartphone movies, and printed handouts with images are examples of instructional materials. A copy of the record was sent to each study patient via Telegram or WhatsApp, enabling them to assess and add to the information provided. **Phase of evaluation**: By comparing the results before and after (after three months) the implementation of the strategies, the impact of education strategies on student awareness was assessed. The same data collection tool was used, an electronic questionnaire available at this link:
https://docs.google.com/forms/d/e/1FAIpQLScH_oN9BxoI0xp3A0a86AVht2bvRuBBCa3Ms2K7KX8YGQxtXw/viewform?usp=sf.

Data analysis

Applying SPSS advanced statistics, version 25, on an IBM computer, the gathered data was tabulated and statistically evaluated (SPSS Inc., Chicago, IL). The mean and standard deviation were used to display numerical data. Frequency and percentage were the ways in which qualitative data were expressed. Exact test of Fisher's, a replacement to the test of

chi-square in cases when the frequency count is less than five for more than 20% of cells, was utilized on lower sample sizes to assess differences between qualitative variables. To investigate the variation between quantitative variables, a paired t test was employed. To check for association among numerical variables, The Pearson test was used. We considered p-values below 0.05 to be statistically substantial, and p-values below 0.001 to be extremely so.

Result

This table (1) shows that the studied nursing distribution according to their socio demographic characteristics .it reveals that, 71.6% of them their age ranged from 19-20 years old with mean age of 19.14 ± 0.51, 70.0% of them were female and 55.1% were lived in rural. Concerning to their sources of information regarding climate change 50.2% of them had the information from Social media.

Table (2): This table: shows how the nursing students surveyed were distributed in terms of their knowledge pre and post educational strategies. As it is clear in the table (95.0%) of the studied nursing student had level of poor knowledge about prevention and control measure, pre educational strategies implementation and improved post educational strategies implementation to good level knowledge 62.7%.

Figure (1): The figure compares the entire knowledge level of the nursing students before and after instructional tactics about climate change and its effects on health. it revealed that the studied nursing student had poor knowledge level (82.8%) pre educational strategies.on the other hand the studied nursing students had good knowledge level (62%) post educational strategies implementation .

Table (3): This table shows the difference between level of total perception among the studied nursing students about changing of climate pre and post educational strategies. It revealed that 90.4% & 86.8% of the studied nursing students had low level of perception pre educational strategies about commitment on climate change and sense of responsibility respectively , while this percentage improved to (61.6& 61.4%) of student had good level of knowledge post educational strategies implementation respectively. There were highly statistically significance regarding the knowledge about commitment on climate change and sense of responsibility pre, post education strategies implementation at p ‹0.001.

Table (4): This table clarifies total mean score and standard deviation of students' attitude regarding climate change and its effect in health pre and post education strategies implementation. It noticed that, improved from 28.00 ± 4. .53 pre education strategies implementation to 53.08 ± 5.57 implementation of post education strategies . Further, their mean scores before and after the adoption of instructional initiatives showed substantial statistical changes ($p<0.001$).

Figure (2): this figure illustrated the difference between level of total attitude among the studied nursing students about changing of climate during pre and post educational strategies. As it is clear in this figure total attitude level among the studied nursing students about climate change pre educational strategies had negative attitude 88.1% while improved to positive attitude 80.9 post education strategies implementation.

Table (5) demonstrates that a highly substantial positive association is noticed among knowledge of total nurses' and attitude of total nurses' with their perception at pre and post educational strategies implementation where $p < 0.001$. In addition, a highly substantial positive association is found among perception of total nurses' and knowledge of total nurses' at pre and post educational strategies implementation where $p < 0.001$.

Table (1): Distribution of the studied nursing students according to their socio demographic characteristics (n = 303).

Students' socio demographic characteristics	(n = 303)	
	No.	%
Age / years		
18 - <19	21	6.9
19 - 20	217	71.6
> 20	65	21.5
Mean ± SD	**19.14 ± 0.51**	
Gender		
Male	91	30.0
Female	212	70.0
Residence		
Urban	136	44.9
Rural	167	55.1
Source if information		
TV or radio	61	20.1
Social media	152	50.2
School colleagues	90	29.7

Table (2): Difference between total knowledge level among the studied nursing students about climate change and its effect on health pre and post educational strategies (n=303).

Students' knowledge about climate change and its effect on health	Knowledge level	Knowledge (pre educational strategies) (n= 303)		Knowledge (post educational strategies) (n= 303)		X^2 test P value
		(No.)	%	(No.)	%	
General information about climate change	Poor < 50%	237	78.2	11	3.6	15.883 0.003*
	Average 50%-75%	65	21.5	37	12.2	
	Good > 75%	1	0.3	255	84.2	
Causes and general effects	Poor < 50%	280	92.4	22	7.3	15.723 0.003*
	Average 50%-75%	16	5.3	29	9.6	
	Good > 75%	7	2.3	252	83.2	
Health effects of climate changes	Poor < 50%	256	84.5	13	4.3	108.137 <0.001**
	Average 50%-75%	36	11.9	43	14.2	
	Good > 75%	11	3.6	247	81.5	
Prevention and Control Measure	Poor < 50%	288	95.0	6	2.0	28.908 <0.001**
	Average 50%-75%	0	0.0	107	35.3	
	Good > 75%	15	5.0	190	62.7	

X^2) chi square test (**) Highly statistically significant at ≤0.001

Figure (1): Difference among level of total knowledge among the studied nursing students about changing of climate and its effect on health pre and post educational strategies (n=303).

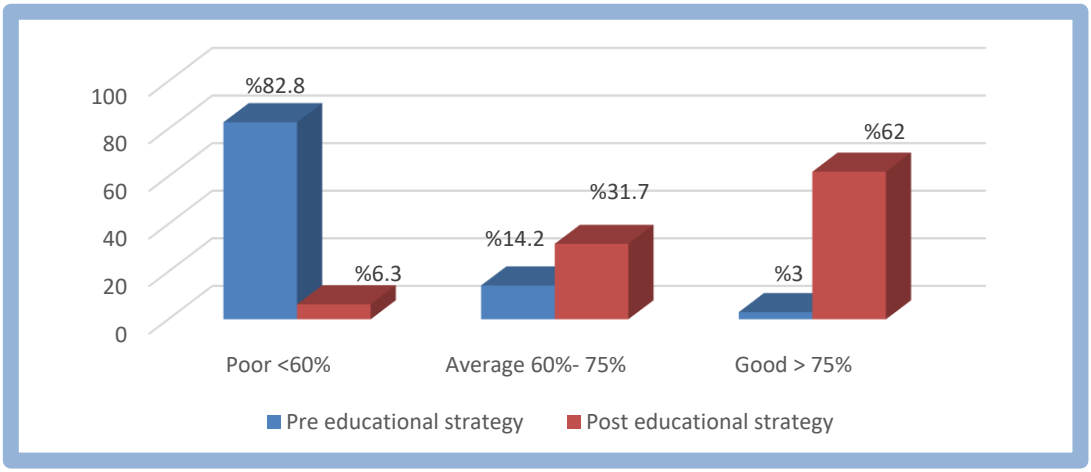

Table (3): Difference between total perception level among the studied nursing students about climate change during pre and post educational strategies (n=303).

Students' perception about climate change	Perception level	Perception (pre educational strategies) (n= 303)		Perception (post educational strategies) (n= 303)		X^2 test P value
		(No.)	%	(No.)	%	
Concern on climate change	Low < 60 %	225	74.3	18	5.9	10.902 0.028*
	Average 60%- 75%	65	21.5	36	11.9	
	High > 75%	13	4.3	249	82.2	
Optimism on climate change	Low < 60 %	213	70.3	18	5.9	10.523 0.032*
	Average 60%- 75%	70	23.1	24	7.9	
	High > 75%	20	6.6	261	86.2	
Sense of responsibility	Low < 60 %	263	86.8	16	5.3	111.945 <0.001**
	Average 60%- 75%	28	9.2	101	33.3	
	High > 75%	12	4.0	186	61.4	
Commitment on climate change	Low < 60 %	274	90.4	19	6.0	20.007 <0.001**
	Average 60%- 75%	17	5.6	98	32.4	
	High > 75%	12	4.0	186	61.6	

(X^2) chi square test (*) Statistically substantial at ≤0.05 (**) Highly statistically substantial at ≤0.00

Table (4): Difference between total at level attitude among the studied nursing students about climate change during pre and post educational strategies (n=303).

Students' attitude of climate change	Attitude (pre educational strategies) (n= 303) $\bar{X}$ ± SD	Attitude (post educational strategies) (n= 303) $\bar{X}$ ± SD	t- test	P value
Believe that climate change is universal phenomena	2.03 ± 1.46	4.56 ± 0.95	-24.045	<0.001**
Assume that climate change situation has created shortage of food	2.22 ± 0.79	4.30 ± 0.99	-28.725	<0.001**
Feel that a climate change phenomenon is only propaganda	4.67 ± 0.60	2.81 ± 0.45	38.802	<0.001**
Feel that a climate change phenomenon has affected human health	1.70 ± 0.96	4.06 ± 1.32	- 26.654	<0.001**
Feel study on climate change situation is the necessary for growth of agriculture	2.25 ± 1.10	4.42 ± 0.70	- 29.988	<0.001**
Think that occurrence of climate change has increased soil evaporation rate	2.20 ± 0.89	4.37 ± 0.93	- 31.178	<0.001**
think no need to waste resources on climate change issue	3.93 ± 1.65	1.99 ± 0.96	- 19.578	<0.001**
think climate change phenomena have increased natural calamities	2.42 ± 1.10	4.60 ± 0.92	- 26.829	<0.001**
feel that change in rainfall pattern is mainly due to climate change	2.19 ± 0.88	4.75 ± 0.71	- 39.302	<0.001**
Think lack of sensitivity towards climate change creates vulnerability in agriculture	2.25 ± 1.14	4.53 ± 1.04	- 26.518	<0.001**
Feel that because of climate change there is need to adopt innovative methods in farming	1.93 ± 1.17	4.59 ± 0.90	- 30.995	<0.001**
Feel climate change is the natural phenomena so man has nothing to do with it	4.31 ± 1.15	2.19 ± 1.10	- 22.629	<0.001**
Total	28.00 ± 4.53	53.08 ± 5.57	- 68.023	<0.001**

Figure (2): Difference between total attitude level among the studied nursing students about climate change during pre and post educational strategies (n=303).

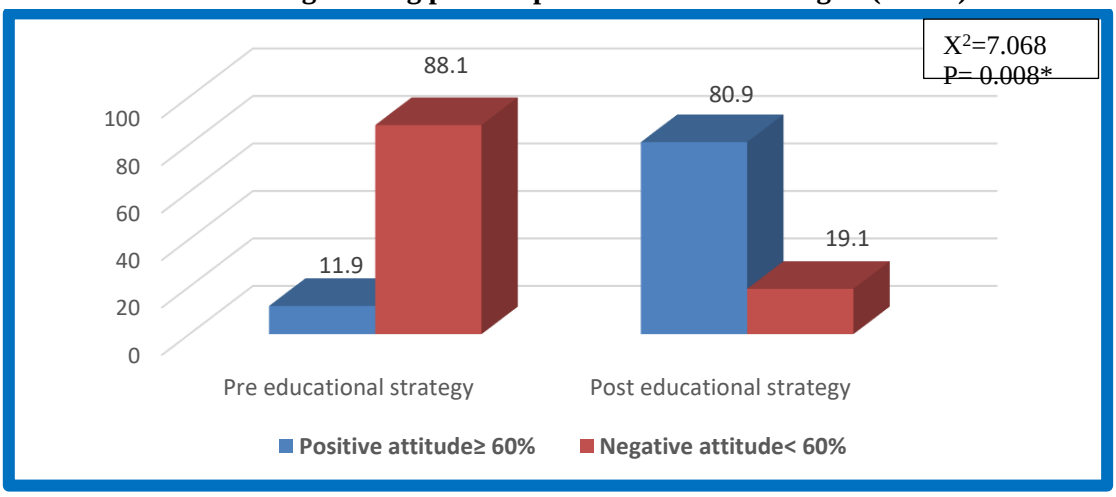

Table (5) Correlation between total knowledge, perception and attitude among the studied nursing students pre and post educational strategies (n=303).

r-\ p values / *Variable*	Periods	*Total knowledge*		*Total perception*	
		r	***p***	**r**	***P***
Total knowledge	*Pre educational strategy*	-	-	0.189	0.001**
	Post educational strategy	-	-	0.280	<0.001**
Total perception	*Pre educational strategy*	0.189	0.001**	-	-
	Post educational strategy	0.131	0.022*	-	-
Total attitude	*Pre educational strategy*	0.122	0.033*	0.120	0.037*
	Post educational strategy	0.152	0.008*	0.485	<0.001**

(*) Statistically Substantial at ≤0.05 (**) Highly statistically substantial at ≤0.001

Discussion

Climate change is a significant global concern that is likely having severe effects on people's health. In order to effectively advocate and persuade policy makers, A comprehensive knowledge of climate change and practical solutions is essential for the scientific community and, more specifically, for health care providers. Healthcare providers, nurses, and public health workers must be prepared to fight for policies that lessen the production of greenhouse gases if their communities are to survive the catastrophic consequences of climate change **(Ghazy & Fathy, 2023).** Consequently, this study aims to

assess how different instructional approaches influence students' understanding of climate change and its consequences for their health.

Socio demographic information about the studied nursing students: according to the current study, less than 3 quarters of the studied nursing students were found to be in the 20–21 age range. According to the researcher, these results could be the result of surveying second-year nursing students at Benha University, whose ages vary from twenty-one to twenty-two. This finding is consistent with a study by **Mohammed et al. (2022)** on "nursing students knowledge, attitude, and practise related health effect of climate change," the mean age of the students was 22(0.7) years, and most of them were between the ages of 20 and under 22.

Concerning to gender, less than 3 quarters of the nursing students in the study were female. This might be because there were more female students enrolled in the nursing faculty than male students. The results of **Kilic et al.'s (2024),** "Climate change knowledge among nursing students: A descriptive and cross-sectional research," which stated that 62.58% of the participants were female, are consistent with this finding.

However, the same results contrast with those of **Abdallah & Farag (2022),** who observed that in the study titled "Impact of awareness programme about health consequences of climate change on knowledge, perception and daily life activities among nursing students," the researchers found that there were more male nursing students than female nursing students at MTI. ."

In relation to residence, the study's findings showed that over half of the nursing students under study stay in rural areas. This result was in agreemnent with that of **Elsharkawy et al. (2023),** who discovered that 51.4% of students at Al Azhar University for Girls in Cairo were from rural regions. Their study focused on "Knowledge, Perception and Practices regarding Climate Change."

In relation to source of information about changing of climate and their impact on health, this study results reported that, about half of them had the information from Social media. This finding supported with **Tuna et al (2022)** who discovered this while doing research on "Determination of Nursing Students' Awareness of the Health Effects of Climate Change " who reported that 63.5% of the students' information sources about climate change and global warming came from internet.

As regard to total percent score of student nursing knowledge The results of this study demonstrated that most nursing students lacked enough understanding of the causes, general impacts, preventative and control methods, and pre- and post-educational strategies for dealing with climate change and its consequences on health. However, these levels of knowledge improved to good levels after the implementation of these strategies.

In regard to overall knowledge, most of them had poor knowledge levels prior to education, but their knowledge improved after using educational strategy, with a greatly

substantial difference (p <0.000). According to the researcher, the session's simplicity and clarity of language, together with the employment of an appropriate teaching strategy and instructional resources, are all responsible for this outcome.

This finding was further supported by a study by **Esringü & Toy (2022)** titled "Impact of climate change education on students' understanding and consciousness at Atatürk University." They discovered that 77.3% of the students had accurate knowledge about the causes of climate change prior to the program, which improved to 93.6% after the program, and that 65.2% of them had accurate knowledge about the detrimental health effects on future generations prior to the program, which improved to 78.7% after the program.

This result is consistent with that of **Ghazy and Fathy (2023),** who found in a study titled "Impact of a climate change awareness programme on college students' understanding, perspective, and behaviour " that the awareness level of the studied students regarding change of climate both before and after the program is improving in most aspects, with a greatly statistically substantial difference at p <0.000 among the pre- and post-program periods.However, these results contrast with those of **Freije et al. (2016),** who investigated scientific students at the University of Bahrain's awareness of global warming and discovered that more than half of the students provided accurate responses on the program's pre-educational component.

Concerning the amount of research on how nursing students see climate change. This study indicated that before starting nursing school, most students had a low impression of their own commitment to climate change. . However, this score increased over time, with less than two thirds of them having high perception levels of strategy after school. Pre- and post-implementation of teaching initiatives reported greatly substantial statistical differences at p 0.001. The researcher suggests that the rise in nursing students' favourable attitudes about the environment may be associated with their growing understanding of climate change, which in turn alters their perspective on environmental acts and fosters an appreciation for environmental concerns.

This result is consistent with **Abdallah & Farag's (2022)** findings, which showed that most of them had a highly statistically significant difference in their CC concern positive perceptions, responsibility sense, and commitment on CC between the pre- and post-test results. Also, this result aligns with **Mohammed et al.'s (2024)** study, "Impact of Climate Change The conclusion of the "Education Program on Nursing Students' Knowledge, Attitude, and Practices at Suez Canal University" showed that the students' evaluations of the health-related consequences of climate change differed significantly (P<0.001) before and after the intervention.

Owing to the attitudes of the student nurses, the current study found that most of them had negative attitudes prior to education methods (88.1%), but that these attitudes altered to the point where most of them had positive attitudes after program strategies were implemented. Furthermore, there were significant statistical changes (p<0.001) between their

mean scores before and after the adoption of education measures. From the researcher point of views, the attitudes of nursing students are greatly affected by what they studied.

The study by **Abdel Naabi et al. (2023**) titled "Educational program to improve nursing students awareness about adverse health impacts of changing of climate " corroborated these findings, stating that a greatly statistically substantial difference was found in the overall attitude level toward changing of climate among the nursing students under study before and after the educational program. After undergoing an educational program, the percentage of nursing students who had a positive attitude towards climate change increased from approximately two-fifths to over four-fifths.

However, these results conflict with those of **Adio-Moses & Aladejana (2015),** who found that only 25% of study participants had positive attitudes. The study was titled "Assessing the degree to which urban residents in the industrial areas of emerging countries are aware of and worried about climate change ."

Finally, the study's results indicated a greatly substantial positive association ($p < 0.001$) among the knowledge and attitude of total nurses' and with their perception at the pre- and post- educational strategies implementation. This correlation was found among the nursing students under study, with respect to perception, attitude, and knowledge. Moreover, there is a highly significant positive correlation ($p < 0.001$) among the overall nurses perception and their knowledge at pre- and post-implementation of instructional strategies .

This result is consistent with **Abdel Nabi et al.'s (2023)** emphasis on the "Educational Program to Improve Nursing Students Awareness About Adverse Health Effects of Changing Climate " and their finding that respondents' perceptions and attitudes regarding climate change had a moderately high positive correlation ($r = 0.69$). Conversely, there is a weak positive association ($r = 0.11$) between respondents' perceptions of climate change and their knowledge, as well as between their attitude and knowledge.

Conclusion:

Improved knowledge, perception, and attitude were attained by nursing students through the use of educational strategies initiatives about changing of climate and its effect on health.

Recommendations:

- To enhance environmental awareness among all university students, regardless of their major, substantial efforts are required to integrate climate change concepts into university curricula.

- To generalize the findings, a similar study should be replicated on a large sample and in other locations.

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الملخص العربى

تأثير استراتيجيات التعلم على معلومات وادراك وسلوك طلاب التمريض تجاه التغير المناخي وتأثيره علي الصحه.

مقدمه: التغير المناخي (CC) هو تأثير بيئي بسبب الزيادة الأخيرة والمستمرة في متوسط درجة حرارة سطح الأرض والمحيطات. ويمكن أن يؤثر على صحة الإنسان والنبات والحيوانات وكذلك الاقتصادات الحكومية مما يؤدي إلى العديد من النتائج السلبية.

الهدف من البحث : تهدف هذه الدراسة إلى تقييم تأثير الاستراتيجيات التعليمية على المعرفة والإدراك والموقف تجاه تغير المناخ وتأثيره على الصحة

نوع البحث : تم استخدام تصميم شبه تجريبي.

مكان البحث : اجريت هذه الدراسه في كليه التمريض جامعه بنها .

العينه :العينه المتاحه من طلاب الفرقه الثانيه

الادوات : تم استخدام ثلاث أدوات لجمع البيانات على النحو التالي: (1) استبيان المقابلة المنظم. (2) مقياس الادراك فيما يتعلق بتغير المناخ. (3) مقياس السلوك تجاه تغير المناخ.

النتائج: اوضحت الدراسه انه كان لدى طلاب التمريض الذين تمت دراستهم مستوى معرفة جيد بعد تنفيذ الاستراتيجيات التعليمية عما قبلها، فيما يتعلق بمستوى الإدراك وجد أن بعد تنفيذ الاستراتيجيات التعليمية تحسن مع مستوى إدراك مرتفع، كما تحسن مستوى السلوك إلى الاتجاه الإيجابي بعد تنفيذ استراتيجيات التعليم.

الاستنتاج: تنفيذ استراتيجيات التعليم لطلاب التمريض حول تغير المناخ وتأثيره على الصحة أدى إلى تحسين المعرفة والإدراك والسلوك .

التوصيات:

- يجب القيام بعمل كبير في اتجاه دمج مفاهيم تغير المناخ في المناهج الجامعية من أجل تعزيز الوعي البيئي لدى جميع طلاب الجامعة بغض النظر عن تخصصهم الدراسي.
- يجب تكرار دراسة مماثلة على عينة كبيرة ومكان آخر لتعميم النتائج