



Original Article

**Effect of Awareness Program Regarding Climate Change on Knowledge,
Attitudes and Practices of University Students**

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ABSTRACT

Climate change is impacting human lives and health in a variety of ways. It threatens the essential ingredients of good health as; clean air, safe drinking water, nutritious food supply and safe shelter and has the potential to undermine decades of progress in global health. **Aim:** To evaluate the effect of awareness program regarding climate change on knowledge, attitude and practices of university students.

Design: A quasi-experimental design. **Setting:** Faculty of Nursing, Kafr elsheikh University. **Sampling:** A systematic random sample consists of 425 students. **Tool I:** Structured questionnaire; composed of two parts. **Part 1:** Students' personal characteristics. **Part 2:** Students' knowledge regarding climate change. **Tool II:** Students' daily life reported practices questionnaire. **Tool III:** Students' attitude regarding climate change questionnaire. **Tool IV:** Students' awareness of climate change questionnaire. **Results:** There was a highly statistical significant difference between knowledge level, attitude and daily life practices of the university students regarding climate changes pre & post awareness program implementation. There was a positive correlation between knowledge, daily life practices & attitude of university students total scores pre/post program implementation at $P<0.000$. **Conclusion:** The awareness program has a significant positive effect on the students' level of knowledge; attitude and daily life reported practices regarding the climate change. **Recommendation:** Considerable work needs to be done in the direction of integrating climate change concepts into the university curriculums in order to increase the environmental awareness among all university students irrespective of their study specialization.

Keywords: Awareness Program, Climate Change, University Students

Introduction

The climate change impact on human health; it is a ubiquitous phenomenon having wide-ranging social, economic, political, geographical, ecological and psychological implications (**WHO, 2019**). The causes of climate change are anthropogenic in nature through lifestyles, consumption and choices that pollute and exploit resources in an unsustainable manner. It is also predicted that climate change will have detrimental effects upon agriculture and fisheries, and may even result in collapsing ecosystems (**Richardson et al., 2019**).

Climate change is impacting human lives and health in a variety of ways. It threatens the essential ingredients of good health (clean air, safe drinking water, nutritious food supply and safe shelter) and has the potential to undermine decades of progress in global health. So, public awareness and knowledge on climate change constitute essential background to deal with climate change and related problems (**Buloshi, & Ramadan, 2017**). Risks of climate change to health include air pollution, forced migration, and changing patterns of infectious disease, compromising physical health and mental wellbeing; effects that are more likely to impact on vulnerable populations (**Aronsson et al. 2020**).

Climate change and global warming are a major problem in the world and for its future. National Centers for Environmental Information (**NOAA, 2022**) suggest that, actions are quickly needed to reduce global climate change. The human cause of global climate change has been

identified as increasing levels of greenhouse gases: for example, carbon dioxide (CO₂) emitted by burning fossil fuels for transport and heating; and methane emitted by cattle raised for the meat industry. The Egyptian Meteorological Service published a report that summer 2021 had seen an unprecedented rise in temperatures five years ago, with temperatures rising by an average of 3-4 degrees above normal. This prompted the Egyptian government to take more serious and effective actions, to adapt with the climate changes its negative impacts Al-Ahram center for political & strategic studies (**ACPSS 2021**).

Climate change awareness is an imperative to achieve sustainability in developing countries. Lack of awareness is a significant barrier to climate change adaptation in developing countries. Raising climate change awareness at the local level is critical as climate change impacts are exacerbating the number and extent of disasters in this disaster-prone country. Vulnerability to climate change impacts is very high ranked the 12th in the world (**Abbas, 2019**).

According to the Environmental Protection Agency (**EPA, 2021**), the global warming is defined as the recent and ongoing rise in earth surface temperature. The greenhouse gases are the most contributors to climate pattern change. The greenhouse gases (GHGs) include water vapor (H₂O), carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and fluorinated gases including hydro-fluorocarbons (HFCs), per-fluorocarbons (PFCs) and sulfur hexafluoride (SF₆). The hazard of

global warming is one of the most important and critical problems of the world (**United Nations, 2021**) & (**NASA, 2021**).

Globally, by 2030, more than 100 million people could be dragged into the negative impacts on population health. It is also projected that low- and middle-income countries will be the worst affected because they are disproportionately exposed, and also due to the weaker adaptive capacity in terms of health systems and other infrastructure (**Torre et al., 2020**). Climate change is causing rising sea levels, increased infectious disease transmission, food and water shortages, mass migration, political conflict, and financial loss for individuals and governments; all of which harm people's health physically, mentally, and socially (**Álvarez et al., 2022**).

University students' awareness of climate change, global warming, and greenhouse effect, specifically science students, is expected to be one of the highest among students in the formal educational pyramid, and an important indicator to the knowledge of the general population (**AbuQamar et al., 2018**). Education is the first defense line to spread the awareness and start impacting people's behavior and attitudes toward the environment, and higher education students should lead by example to all other educational levels (**Ayeni., 2017**).

Nurses play a central role in mitigating the effect of climate change on the healthcare sector and adapting to the phenomenon. Therefore, nursing students must be prepared for a new professional role keeping climate change in mind;

consequently, it is important to state that the concept of sustainability in nursing practice and climate change-related knowledge must be embedded in education, in both theoretical and practical courses, for enabling nurses to act as leaders and take action to build climate-safe health systems (**International Council of Nurses, 2018**).

Significance of the study:

Climate changes as a major threat to human health therefore; healthcare systems must address this issue and its global consequences. It is one of the greatest global health challenges of the 21st Century. Climate-sensitive livelihoods and prevalent health concerns; in that context, the healthcare workforce plays a critical role in addressing climate change and its health effects. While, some initiatives are underway to equip the healthcare workforce in the world, their understanding and interest to engage with this challenge was unknown (**Sambatha et al., 2022**). It affects our most basic health factors, such as access to food and water, clean air, and a safe environment (**Anåkeret al., 2021**). Egypt applied to host the 27th session of the Conference of States Parties to the United Nations Convention on Climate Change (COP 27) in 2022 as a representative of the challenges, efforts and priorities of the African continent in the face of the climate change crisis (**Enterprise,2022**).

Aim of the study:

The aim of this study was to evaluate the effect of awareness program regarding climate change on knowledge, attitude and practices of university students through:

- 1-Assessing the students' knowledge, attitude, and practices regarding climate change.
- 2- Assessing the students' awareness regarding climate change pre- post program.
- 3- Designing and implementing an awareness program about climate change (based on the identified pre assessment data of the university students).
- 4-Evaluating the effect of the awareness program on the students' knowledge, attitude and daily life practices.

Research hypotheses:

Implementation of the awareness program will positively change the university students' knowledge level, attitude and their daily life practices regarding climate change.

Subjects and Methods:

Research Design: A quasi-experimental design was used in the study.

Setting: This study was carried out in Faculty of Nursing at Kafrelsheikh University, Egypt.

Sample Size: Randomly selected 10% of all nursing student. Sample size of total student 4653 student needs to be recruited to achieve confidence level 95%. A systematic random sample; the selection of the subjects was done systematically every 4 students select one to reach 425 students. The sample size was calculated according to the following statistical formula

Type I error (α) = 0.05

Type II error (β) = 0.2

With power of test 0.80

n=sample size

z: The standard score

d: The error rate

p: Property availability and neutral ratio

N=size of population

Tools for Data Collection:

Four tools were used to collect the necessary data as follows:

Tool I: A structured questionnaire form:

It was developed by the researchers after review of relevant recent literature. It composed of two parts:

Part 1: Personal characteristics of the university students: Such as gender, academic year, residence, family size, Family Crowding Index (FCI)formula adapted from American Association of public Opinion Research, (2007) Family Crowding Index=number of persons in a household/number of rooms used for sleeping, less than 3 was considered not crowded and more than 3 was considered overcrowded. Scoring for crowding index, not crowded family (<3) and Overcrowded family (>3).

Part 2: Students' knowledge regarding climate change: It was used pre/post awareness program and included (8 items) about meaning, major environmental problems, climate change related health impact, use of solar energy, accelerated global warming, gases that contributed to aggravating climate change, dangerous of increase CO₂in the atmosphere, greenhouse gases allow solar radiation to pass back into space, ways

$$n = \frac{N \times p(1-p)}{\left[N - 1 \times \left(d^2 \div z^2 \right) \right] + p(1-p)}$$

for eliminating climate change. Related to university students' knowledge assessment pre & post program a correct answer scored one and incorrect answer scored zero, a total of 60% and above were considered satisfactory knowledge and less than 60% were considered unsatisfactory.

Tool II: Students' daily life reported practices questionnaire (pre/post):

It was developed by the researchers depending on the recent literature to assess the university students' daily life reported practices. It consisted of 11 statements measuring the indoor and 8 statements measuring the outdoor daily life practices. The scoring responses to each statement was "done" or "not done". A total score was calculated by the sum of done practices and then converted into a percent resulted in: Poor practices <60% & good practices >60%.

Tool III: Students' attitude regarding climate change questionnaire (pre/post):

It was developed by (**Netravathia & Chauhan 2014**) and modified by the researchers to assess the students' attitude regarding climate change. It consisted of 11 statements and a Likert scale was used. Scoring responses to each statement were (agree, disagree) by score (1, 0). Total attitude score was summed up and converted into a percent to be considered positive attitude >60% & negative <60%.

Tool IV: Students' awareness of climate change questionnaire (pre/post):

It was developed by the researchers to collect the necessary data from the subjects. This

instrument composed of 14 item and was rated on a 3-point Likert-type scale with such category as agree, uncertain; disagree in order to efficiently elicit the exact responses from the respondent. Scoring responses to each statement by score (2, 1,0). The low level of awareness respondents in this category if score <50%. The medium level of awareness respondents in this category if score from (50%-75 %) and high level of awareness if score >75 % were considered highly aware of climate change.

Pilot Study: The pilot study was conducted before beginning of data collection. It was carried out on 10% of the total sample to investigate the tools' feasibility, clarity, applicability, and simplicity then carrying out any needed modifications and included in the study sample.

Validity and reliability:

The research instrument was validated by three experts in community health nursing. Content and construct validity was obtained by the help of other experts. All corrections and constructive criticism raised by the experts were taken into consideration in the preparation of the final version of the instrument. Reliability was applied by the researchers for testing the internal consistency of the instruments; these instruments were tested for reliability to estimate the consistency of measurement. It was obtained by calculating the correlation coefficient for each scale. The Cronbach's alpha coefficient is used for knowledge and practice and ranges from 0.69 to 0.78.

Ethical consideration: An official approval from ethical committee and Dean of Faculty of Nursing, Kafrelsheikh University to carry out the current study. Each student was informed about the purpose and benefits of the study; they also were informed about their right to refuse participation in the study; strict confidentiality was ensured for all information provided. Oral consent was obtained from each student who agreed to participate before starting the data collection. The ethical aspects were considered during data collecting process.

Statistical design:

Data entry and statistical analysis were done using SPSS 20.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables and mean and standard deviation for the quantitative variables. Chi-square test (χ^2) was used to compare the qualitative categorical variables. Pearson rank correlation coefficient analysis was used to assess the inter-relationships among ranked quantitative variables, at p-value <0.05 was considered significant.

The awareness program regarding climate change was divided into four stages: Assessment, planning, implementation, and evaluation.

Assessment phase:

The data was collected by the previously mentioned tools through interviewing the students in the pre-determined setting to collect the baseline data as a pre-intervention assessment.

Planning phase: started by designing the awareness program by the researchers based on the results of the pre-test. The program used to improve the knowledge, attitude and daily life reported practices of the students regarding meaning, major environmental problems, climate change related health impact, use of solar energy, accelerated global warming, gases that contributed to aggravating climate change, dangers of increase carbon dioxide (CO₂) in the atmosphere, greenhouse gases allow solar radiation to pass back into space, ways for eliminating climate change.

- By using a variety of teaching methods as; lectures, group discussion and brain storming. Also, different audiovisual aids such as; sharing pictures, posters, and videos.

Implementation phase:

The field work of this study was carried out from the beginning of March 2022 to the end of May 2022 covered three months.

It was carried out through seven sessions over two weeks with two hours for each session. The total duration of all sessions was 14 hours for each group.

The content of the awareness program was covering the university students' knowledge regarding basic facts about climate change as meaning, factors contributing to climate change, effects of climate change on environment. Also, the university students' attitude toward concerns on climate change, optimism on climate change, sense of responsibility and commitment on climate

change. As well as, the university students' daily life reported practices as indoor and outdoor practices that could lead to climate change.

Evaluation phase: It was applied through pre/post the awareness program implementation by using the same study questionnaires in order to appraise differences, similarities, and areas of improvement, as well as defects. It also used to assess level of university students' knowledge about climate change pre and post awareness program for study group. At the end of the three months post implementation using the same tools.

Results:

Table 1: Shows that 59.5% of studied students female, regarding the academic year of faculty 27.5% of them were at second year. More than half 57.6% were living in rural areas, 51.3% their family size ranged between 2-4 and 60.9% regarding family crowding index.

Table 2: Reveals that there was a highly statistically significant at $p < 0.000$. An increasing the correct answer in knowledge of the studied students regarding meaning, major problem of climate change, related health impact the correct answer were 84.2% of studied student post program compared to 39.8% of them preprogram, 96.9% & 86.1% of studied student post program respectively had correct answer about gases and dangerous of carbon dioxide on climate change compared to 21.7% & 18.4% of them preprogram. In addition, 87.8% of them had correct answer post program.

Figure 1: Illustrates that, increasing in the total good knowledge score level of the studied students regarding climate change from 20.9% in preprogram to

89.4% in post program, with a highly statistical significant difference ($p < 0.000$).

Table 3: Clarifies improving in most aspects of studied students' daily life reported practices regarding climate change in indoor daily life practices such as turn off lights, buy energy efficient light bulbs, switching-off home appliances, not keeping the laptop/computer encourage recyclable products and separate the wet & dry household waste 76.2%, 93.4%, 82.8%, 93.2% & 84.2% respectively, with a highly statistical significant difference between pre-test and post-test phase at $p < 0.000$. As regards outdoor also this table showed improving in most aspects of studied students' daily life reported practices. Furthermore, total practices of studied students found 80% of them had good practices post program implementation compared to 24% preprogram with highly statistical significant difference between pre-test and post-test phase ($p < 0.000$)

Table 4: Noticed that improving in the nursing students' attitudes regarding climate change regarding, green transformation, inevitable, reduce energy consumption, human activities impact on global temperatures and climate change is something that frightens post program from 85.2%, 80%, 90.6% & 86.8% respectively compared to preprogram to 41.4%, 24.2%, 22.6% & 25.9% & 17.6% respectively with a highly statistical significant difference at $p < 0.000$.

Figure 2: Indicates a highly statistical significant improvement in the total university students' positive attitudes from 64% preprogram to 88% post program at $p < 0.000$.

Table 5: Clarifies improving in most aspects of studied students' awareness regarding climate change is happening, experiencing, immediate and urgent, threat to sustainable development, harmful, increases surface

temperature, climate change leads to coastal erosion, threats to food security and climate change causes economic depression 64.9%, 84%, 77.2%, 90.6%, 76.9%, 84.2% respectively post program compared 27.8%, 11.5%, 25.9%, 31.3%, 19.5%, 21.4%, 19.3% & 19.1% respectively with highly statistical significant difference between pre-test and post-test phase at $p < 0.000$.

Figure 3: Shows improving in the total nursing students' high awareness regarding climate changes from 12% in pre-program to 84% in post-program with a highly statistical significant difference at $p < 0.000$.

Table 6: Reflects a highly positive correlation between the post-program total nursing students' knowledge score level and total daily life practices & attitudes ($r=.980$ & $r=.839$) at $p < 0.001$, but there was no relation through the preprogram.

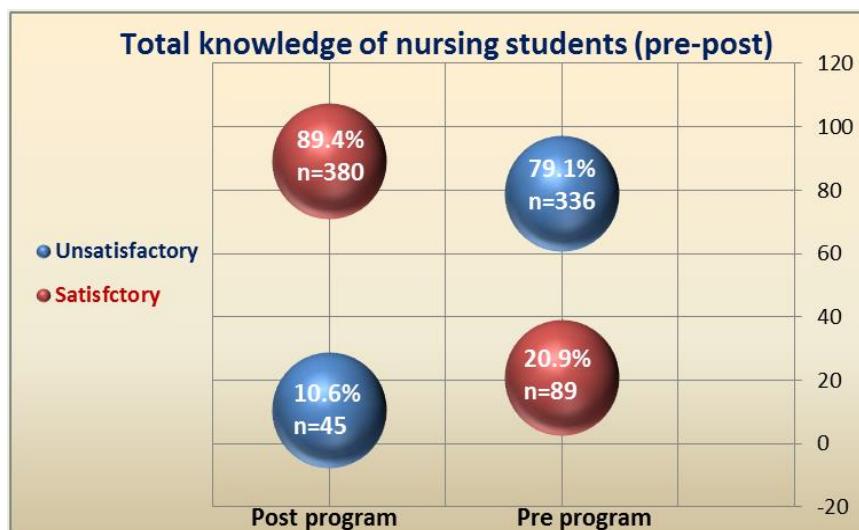
Table 1: Distribution of studied students regarding to socio-demographic characteristics (n=425)

Items	N	%
Gender		
Female	253	59.5
Male	172	40.5
Academic-year level:		
1 st year	105	24.7
2 nd year	117	27.5
3 rd year	123	29.0
4 th year	80	18.8
Residence		
Urban	180	42.4
Rural	245	57.6
Family Size		
2 – 4	218	51.3
≥5	207	48.7
Family Crowding Index		
Not crowded (<3)	166	39.1
Over Crowded (>3)	259	60.9

Table 2: Distribution of the nursing students according to their knowledge about climate change pre and post program (n=425)

Items	Pre		Post		Chi – Square	
	N	%	N	%	X ²	P value
Meaning of climate change						
Correct	154	36.2	364	85.6	217.966	0000**
Incorrect	271	63.8	61	14.4		
Major environmental problems						
Correct	147	34.6	345	81.2	194.962	0000**
Incorrect	278	65.4	80	18.8		
Climate change related health-impacts						
Correct	169	39.8	358	84.2	178.373	0000**
Incorrect	256	60.2	67	15.8		
Use of solar energy accelerate global warming						
Correct	61	14.48	367	86.4	440.662	0000**
Incorrect	364	5.6	58	13.6		
Gases that contributed to aggravating climate change						
Correct	92	21.7	412	96.9	499.128	0000**
Incorrect	333	78.3	13	3.1		
Dangers of increase Carbon dioxide in the atmosphere						
Correct	78	18.4	398	86.1	488.923	0000**
Incorrect	347	81.6	27	13.9		
Greenhouse gases allow solar radiation to pass back into space						
Correct	85	20.0	366	86.1	372.9	0000**
Incorrect	340	80.0	59	13.9	77	
Ways for eliminating climate change						
Correct	67	15.8	373	87.8	441.190	0000**
Incorrect	358	84.2	52	12.2		

HS: P=0.001



$\chi^2 = 17.152$ P =0000 dr. 1

Figure 1: Pre-post total knowledge score level of nursing students regarding climate Change (n=425)

Table 3: Distribution of the nursing students according to their daily life practices pre - post program (n=425)

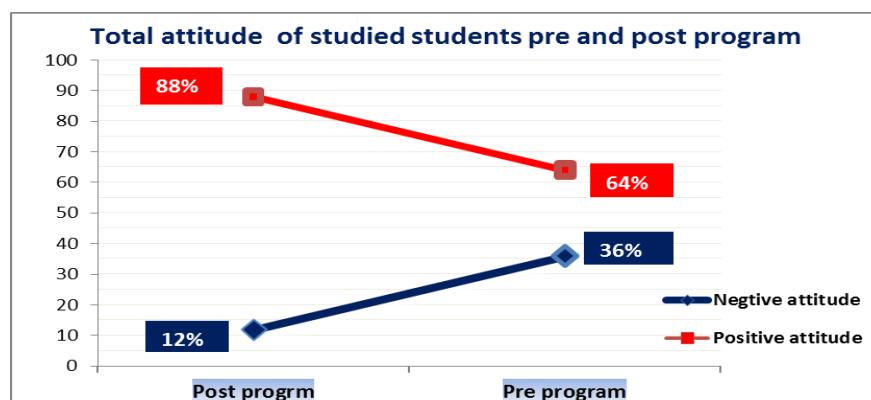
Daily life practices	Pre		Post		Chi – Square	
	N	%	N	%	χ^2	P value
Indoor daily life practices						
Turn off lights I'm not using	36	8.5	324	76.2	399.673	0000**
Buy energy efficient light bulbs	45	10.6	397	93.4	584.012	0000**
Switching-off home appliances	65	15.3	352	82.8	387.756	0000**
Not keeping the laptop/ computer on stand-by or screensaver mode.	43	10.1	396	93.2	5870.32	0000**
Buy organic food	26	6.1	175	41.2	144.661	0000**
Replacement of regular lights with compact fluorescent.	37	8.7	329	77.4	409.127	0000**
Set air condition temperature at 24°C.(n=126)	24	19.0	111	88.1	66.653	0000**
Use rechargeable batteries	62	14.6	347	81.6	382.778	0000**
Decrease plastic products	58	13.6	341	80.2	378.305	0000**
Encourage and use recyclable products	42	9.9	358	84.2	4710.542	0000**
Separate the wet & dry household waste.	11	2.6	236	55.5	288.915	0000**
Outdoor daily life practices						
Walk or ride cycle to work	34	8.0	93	21.9	32.224	0000**
Use stairs instead of elevators.	72	16.9	289	68.0	226.737	0000**
Walking for short distances rather than vehicles.	51	12.0	224	52.7	160.883	0000**
Minimum use of papers	63	14.8	236	55.5	154.415	0000**
Use cloth/cartoon bags in shopping not plastic	21	4.9	214	50.4	219.074	0000**
Reduction in consumption of packaged foods	48	11.3	229	53.9	175.445	0000**
Participation in tree plantation drives	32	7.5	216	50.8	209.220	0000**
Participation in cleanliness drives	22	5.2	154	36.2	124.852	0000**
Total						
Good	102	24.0	340	80.0	266.987	0000**
Poor	323	76.0	85	20.0		

HS: P=0.001

Table 4: Distribution of the studied students according to their attitude regarding climate change pre and post program (N=425)

Attitude	Pre		Post		Chi – Square	
	N	%	N	%	X²	P value
We can express the green transformation						
Agree	176	41.4	362	85.2		
Disagree	249	58.6	63	14.8	175.189	0000**
Climate change is inevitable because of the way modern society works						
Agree	103	24.2	340	80.0		
Disagree	322	75.8	85	20.0	264.800	0000**
People should be made to reduce their energy consumption						
Agree	96	22.6	385	90.6		
Disagree	320	77.4	40	9.4	391.367	0000**
Climate change will improve the weather						
Agree	165	38.8	379	89.2		
Disagree	260	61.2	46	10.8	233.844	0000**
Climate change is just a natural fluctuation in earth's temperatures						
Agree	79	18.6	342	80.4		
Disagree	346	81.4	83	19.6	325.530	0000**
I would only do my bit to reduce climate change if everyone else did as well						
Agree	120	28.2	376	88.5		
Disagree	305	71.8	49	11.5	317.259	0000**
The government should provide incentives for people to look after the environment						
Agree	110	25.9	408	96.0		
Disagree	315	74.1	17	4.0	438.918	0000**
It is already too late to do anything about climate change						
Agree	217	51.1	187	44.0		
Disagree	208	48.9	238	56.0	4.246	.0394
Human activities have no significant impact on global temperatures						
Agree	75	17.6	369	86.8		
Disagree	350	82.4	56	13.2	407.572	0000**
Climate change is something that frightens me						
Agree	97	22.8	385	90.6		
Disagree	328	77.2	40	9.4	397.474	0000**
Developing countries should take most of the blame for climate change						
Agree	117	27.5	402	94.6		
Disagree	308	72.5	26	5.4	394.593	0000**

HS: P=0.001



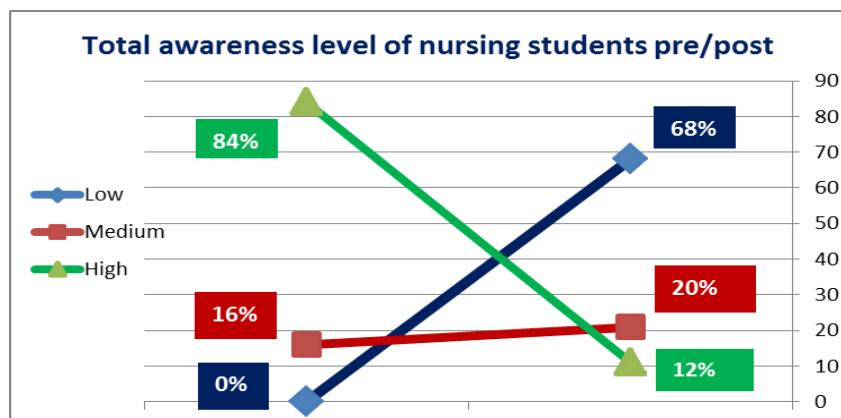
X² 67.105 P =0000 dr. 1

Figure 2: Pre-post total attitude score level of nursing students regarding climate Change (n=425)

Table 5: Distribution of the studied students according to their awareness regarding climate change pre & post program (n=425)

Awareness regarding climate change	Pre		Post		Chi – Square	
	N	%	N	%	X ²	P-value
Climate change is happening	118	27.8	276	64.9	118.106	0000**
Climate change manifests in diverse ways in the world	81	19.1	295	69.4	218.414	0000**
We are already experiencing the impacts of climatic change	49	11.5	357	84.0	447.313	0000**
I see climate change to be of immediate and urgent concern	110	25.9	328	77.2	223.852	0000**
Climate change is a threat to sustainable development	133	31.3	385	90.6	313.872	0000**
There are climate change research agencies at both National and global levels that I know	124	29.2	362	85.2	272.167	0000**
Climate change is more harmful than beneficial	83	19.5	327	76.9	280.519	0000**
Climate change is caused mostly by human activities, not natural changes in the environment	75	17.6	383	90.1	449.127	0000**
Climate change increases surface temperature	91	21.4	358	84.2	336.551	0000**
Climate change causes rise in sea levels	76	17.9	347	81.6	345.612	0000**
Climate change leads to coastal erosion	82	19.3	253	59.5	144.065	0000**
Climate change influences agricultural yields	78	18.4	369	86.8	399.570	0000**
Climate change poses threats to food security	102	24.0	398	93.6	425.563	0000**
Climate change causes economic depression	81	19.1	248	58.4	138.299	0000**

HS:P=0.001



X² 60.047 P =0000 dr. 2

Figure 3: Pre-post total awareness score level of nursing students regarding climate change (n=425)

Table (6): Correlation between pre/post total knowledge of the studied students and their practices & attitude (n=425).

Items	Total score of knowledge			
	Pre		Post	
	r	P	r	P
Total score of attitude	.079	.416	.980	0.00**
Total score of practice	.097-	596	.839	0.00**

Correlation is highly significant at p<0.001** r-Pearson Correlation Coefficient

Discussion:

Climate change is one of the most important challenges currently facing the world. The adverse impacts of climate change can be catastrophic and a potential threat to the humanity existence. Therefore, it is essential for everyone, especially those in the scientific community to have a full appreciation of the issue as well as the potential solutions to the problem so that they can initiate the necessary changes to the economies, resource utilization, behavior, and general approach to nature (**Yang et al, 2018**).

Regarding to socio-demographic characteristics of the current sample shows that more than half of them were female this explained the faculty of nursing is considered recent in having male student. This result may be consequence of constantly increasing the number of students who enrolled in nursing faculties recently due to its advantages of human field, employment, high income, helping people and others.

Regarding the academic year of students more than quarter of them were at the second year and less than two thirds were living in rural areas outside of the great Cairo governorate which reflects the culture level of the Egyptian rural with their own traditions, norms beliefs, and other environmental violating practices. This result were incongruent to the results of **Kah et al., (2021)** who studied "Awareness of the causes, impact and solutions to global warming among undergraduate students" from different schools in the University of the Gambia and mentioned that four academic year students were more than other levels and more than two thirds of them were males.

On assessing university students' knowledge about climate change this result cleared that, there was a highly statistically significant difference at $p<0.000$ post awareness program compared to preprogram in relation to meaning of climate changes, major environmental problem, health impact, solar energy, gases and dangerous of carbon dioxide on climate change and another items after implementation of the current study related awareness program regarding climate changes, the university students' total knowledge were increased to be good for the majority of them, which reflects the success and effective the awareness educational program. These findings were similar to the results of **Almulhim, (2021)** who conducted a study entitled "Knowledge and perception of climate change and global warming in the context of environmental challenges and policies" in Dammam Saudi Arabia; who reported that one third of the study participants had poor knowledge about the causes and impacts of climate change. Also more than one quarter of the studied sample had good knowledge and awareness of climate change at posttest.

Furthermore, the study results is consistent with several studies which have found that students lack the necessary knowledge to support and participate in climate change for instance **Reynaldo et al., (2018)** who studied "Knowledge of and attitudes toward climate change and its effects on health among nursing students: A multi-Arab country study" who found that students are more aware of the environment and climate change through media coverage, political channels, and direct experience with catastrophes in local communities and around the world. Also, students become more accepting that the nursing profession

could have a greater role in environmental health issues in their communities.

The present study revealed that, an increasing in the good knowledge score level of the university students regarding climate change in preprogram compared to post program implementation, with a highly statistical significant difference ($p < 0.000$). This finding were supported by **Tiitta et al., (2021)** who studied "Finnish studied nurses' perceptions of the health impacts of climate change and their preparation to address those impacts" and mentioned that the nurses lack their necessary knowledge to support and participate in climate change and sustainability development strategies.

In the same line, the study results are supported by **Ibrahim et al., (2022)** entitled "The effectiveness of educational interventions about sustainability development among nursing students" in Egypt the study concluded that the majority of students had insufficient knowledge climate change at pre-educational intervention. While, post intervention revealed a highly significant improvement of knowledge on climate change and sustainability developments. The researcher belief that; learning about environmental themes in nursing faculties, being aware of climate change, and attending environment-related seminars and trainings so the university students received proper education to understand the link between climate change and global health issues.

Concerning the university students' daily life reported practices related to decrease the climate change, the present study recorded improving in studied students' good daily life practices

regarding climate change in indoor daily life practices with a highly statistical significant difference between pre and post program phases at $p<0.000$. As regards outdoor also this table showed improving in most aspects of studied students' done daily life practices. Furthermore, total practices of studied students found most of them of them had good practices post program implementation compared to less than one quarter preprogram with highly statistical significant difference between pre-test and post-test phase ($p <0.000$). This adequate level of daily life practices will enable them to eliminate the hazards of climate change and detraction the health consequences. The researcher suggested; encourage the students to planting more trees which on absorption of carbon dioxide and decrease its levels in atmosphere also try to use the clean energy, use public transportation to minimize the carbon dioxide.

These study results are supported by **Tiong et al., (2020)** who study entitled "Knowledge, perceptions of risks, attitudes and practices of environmental health among university students" in northern Malaysia, and reported that to more than half of studied students' practices were save the electricity and daily using of water and papers and the less than quarter of them their activities in recycling and participation in gardening or planting trees. In the same line **Kurup et al., (2021)** entitled "Informed-decision regarding global warming and climate change among high school students" in United Kingdom and reported that the majority of studied students co-operative in trees plantation and cleanliness drives, use carton page, use public transports and walked rather than driving cars.

According to their attitude about climate change pre and post program noticed that improving in the nursing students' attitudes regarding climate change post program from majority compared to preprogram to less than half with a highly statistical significant difference improvement in the total nursing students' positive attitudes from more than two third to majority at $p < 0.00$. This study in the same line with **Ibrahim et al., (2018)** study entitled "Knowledge and attitude regarding global warming phenomenon among Assiut University Students" in Egypt and reported that the majority of their studied students had a total positive attitude regarding global warming and climate change. Another results agreed with these findings by **Tiong et al., (2020)**, who detected that the majority of their study participants had a highly supportive level of pro-environmental attitudes, depending on strongly belief of more than two thirds of them in negative impact of pollution on human health with significant at $p < 0.00$. In addition to agreement in changing values which would help in solving some of environmental problems

As regarding level of awareness of regarding climate change of studied student pre & post program is clarifies improving in most aspects of studied students' awareness regarding climate change is happening, experiencing, immediate and urgent, threat to sustainable development, harmful, increases surface temperature, climate change leads to coastal erosion, threats to food security and climate change causes economic depression post program compared preprogram with highly statistical significant difference at $p < 0.000$. Also the current study showed there was a highly statistical significant difference improving in the

total awareness regarding climate changes in pre& post program implementation.

These study results are supported with **Anåker et al., (2021)** study entitled " Nursing students' perception of climate change and sustainability actions - A mismatched discourse: A qualitative, descriptive exploratory study" who revealed that climate change and sustainability was complex to apply and opined that further education is needed according to nursing students' awareness. Also, the study stated that these different views amounted to a discrepancy as a result of the inability to correlate or balance the various perspectives on climate change and sustainability. This may have an effect on the development of new curricula and courses to address such significant global challenges, with a particular focus on the relationship between climate change, sustainability, and their higher role as student nurses. Stronger attention on global issues is needed in the creation of nursing curricula, with the effects of climate change on health being more explicitly underlined. Also **Freije et al., (2016)** primary survey study to assess "Global warming awareness among the University of Bahrain science students" in Bahrain and reported that in the fourth year students of the faculty of science were more knowledgeable regarding causes, effects and different solutions for climate change more than other students.

Based on the current study Correlation between pre/post total knowledge of studied students and practices & attitude it was found a highly positive correlation between the post-program as regards total knowledge score level and total daily life practices & attitudes ($r=.980$ &

$r=.839$ at $p < 0.001$, but there was no relation through the preprogram. This result agrees with result of **Freij et al., (2016)** in Bahrain& **Sah et al., (2018)** who studied "Assessment of the knowledge and attitude regarding global warming among high school students of rammagar, belagavi city: A cross-sectional study" in India were similar to the current study results.

Conclusion: The awareness program has a significant positive effect on the university students' total knowledge; attitude and daily life reported practices regarding climate change. There was a positive correlation between the pre/post program university students' total knowledge score level and total daily life reported practices & their attitudes.

Recommendations:

Considerable work needs to be done in the direction of integrating climate change concepts into the university curriculum in order to increase environmental awareness of all university students irrespective of their academic study specialization.

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