

## Effect of Educational Program Regarding Greenhouse and Global Warming Consequences on Knowledge and Daily Life Practices among University Nursing Students

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### Abstract

**Background:** Globally, an average temperature of the surface of the planet has increased. The main source of this problem was the rise in greenhouse gas concentrations brought by human activity. As a result, education of global warming becomes a key topic for students. **Aim of the study:** to evaluate the effect of educational program about greenhouse and global warming consequences on knowledge and daily life practices among university nursing students. **Design:** A quasi-experimental design was used. **Setting:** Faculty of Nursing, Tanta University. **Subjects:** A simple randomized sample of 200 nursing students from the first level of the faculty was chosen to make up the sample size. **Tools:** In order to gather the required data, the researcher used two tools, which were as follows: **Tool I: Self-administered questionnaire** which composed of two parts, **part I:** Socio-demographic characteristics, **Part II:** Students' knowledge regarding greenhouse effect and global warming. **Tool II:** Daily living practices questionnaire. **Results:** There was significant improvement in the total mean knowledge and daily living practices immediately post and one month after intervention. There was a statistically significant positive correlation between total knowledge mean and total daily living practices mean regarding global warming. **Conclusion:** The majority of studied university students had better overall understanding and practices, which is evidence of successful and beneficial of educational program. **Recommendations:** To raise the level of environmental awareness among all university students, it can be advised to incorporate climate change topics into the nursing student's curricula.

**Key words:** climate change, global warming, greenhouse.

### Introduction

The Sun produces energy at very short wavelengths that affect the planet's environment. Approximately one-third of solar energy is directly reflected into space at the top of the earth's atmosphere. <sup>(1)</sup> The atmosphere and the surface absorb the remainder. The planet emits longer wavelength energy to balance the incoming energy that has been absorbed. The atmosphere absorbs this energy and radiates

it back to the earth, this is called greenhouse effect. <sup>(2)</sup>

Surface of the earth warms naturally because of the greenhouse effect, which occurs when certain chemicals in the atmosphere trap solar radiation. <sup>(3)</sup> Typically, these gases are referred to as greenhouse gases. The greenhouse effect is a crucial phenomenon because without it, the earth would not be

warm enough to support life for people, animals, and plants. <sup>(4)</sup>

Among the numerous greenhouse gases are hydro fluorocarbons (HFCs), perfluorocarbons (PFCs), hexafluoride (SF<sub>6</sub>), carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and other fluorinated gases. that naturally present in the environment. <sup>(5)</sup> The greenhouse effect is mostly caused by CO<sub>2</sub>, which is responsible for 80% of the effects. Fossil fuel combustion, industrial processes, energy use, fertilizer use, and agricultural operations all consider rich sources of CO<sub>2</sub> and other gases. <sup>(6)</sup>

There are several factors that contributing to the disproportionate increase in greenhouse gas emissions, including those caused by human activities such burning fossil fuels for transportation, heating, and power. Other factors like increased industrialization, the use of fertilizers, and deforestation (the act of cutting down trees) in addition to natural gas are also to blame. <sup>(7, 8)</sup>

The rate at which greenhouse gas emissions are growing causes the earth's temperature to rise above average. This is known as global warming, and it is a danger to the ecosystem. A yearly temperature increase in the atmosphere close to the earth's surface is referred to as global warming, and it can affect the patterns of the world's climate. <sup>(9)</sup> According to the World Health Organization (2021), the spread of diseases, various disturbances to human existence, and an estimated 1,50,000 yearly deaths have all been attributed to global temperature increases. <sup>(10)</sup>

The average world temperature 1.27 degrees Celsius and 2.29 degrees Fahrenheit. higher

in 2020 than it was in the late 19th century before the industrial revolution <sup>(11)</sup> and is projected to increase to 5.4 degrees Celsius by 2100 <sup>(1)</sup>. In 2023, humans and human activities are to blame for an increase in the global average temperature, according to a special study from the Intergovernmental Panel on Climate Change (IPCC). of 1.1°C over 1850-1900 between 2011 and 2020. <sup>(12)</sup> The serious threat facing humanity in the 21st century is global warming. It is a pervasive phenomenon with extensive negative social, economic, political, geographical, ecological, and psychological effects, including degrading the environment, changing the agricultural system, changing the availability of safe water, contaminating the soil, and raising sea levels, which submerges small islands <sup>(13)</sup>. Extreme weather will also increase the severity of hurricanes, droughts, landslides, floods, fires, and heat waves. <sup>(14)</sup>

Several significant changes in human health can be brought about by global warming. Diseases both contagious and non-contagious, incapacity, inadequate dietary security, lack of water security, and other social upheavals are among the health effects. <sup>(15)</sup> Additionally, prolonged exposure to high temperatures is linked to an increase in morbidity and mortality, including cases of heatstroke, behavioral abnormalities, poor work output, myocardial infarction, stroke, and death are all possible outcomes. Because of this, the exceedingly high hazards result in the ecosystem changing in a way that is potentially catastrophic. <sup>(16)</sup>

The World Health Organization (2021) estimates that between 2030 and 2050, there would be an additional 250 000 fatalities

annually as a result of global warming, with 38 000 of those deaths attributed to old persons hyperthermia, 95 000 cases of under-nutrition in children, 60 000 cases of malaria, and 48,000 cases of diarrhea.<sup>(17)</sup> When the temperature in Egypt reached roughly 47°C (116F) in three days during the 2018 heat wave, 65 people died.<sup>(18)</sup>

Egypt is one of the most delicate nations to the dangers of global warming, due to its excessive population and density, which raises the likelihood of adverse effects of global warming, including a rise in water levels, drought, food and water shortages, and deterioration in coastal zones.<sup>(19)</sup> In order to combat its harmful effects on numerous living sectors, more serious and successful initiatives, programs, and policies have been implemented by the Egyptian government.<sup>(20)</sup>

The necessity of increasing understanding and enhancing community adaptability methods to lessen the effects of global warming has been highlighted by the destructive effects relating to global warming and climate change. Young people and the elderly are more susceptible to the detrimental effects of global warming.<sup>(21)</sup>

Young people are expected to be more affected by climate change in poor countries than in industrialized ones. Develop global, national, and local mitigation and adaptation measures that include youth participation as a result.<sup>(22)</sup> UNDP, the United Nations Development Program (2022) advocated encouraging young people to actively participate in environmental conservation and making environmental education accessible to all young people across the curriculum. Another suggestion to encourage

active participation at all levels of the community in addressing the effects of global warming is to raise people's knowledge through education.<sup>(23)</sup>

In order to support the execution of programs and legislation to improve the physical and social environments at the local, national, and international levels, community health nurses have worked to develop a wide perspective on population health. Consequently, health practitioners' capacity to respond to global warming is crucial. University education may be a good place to start in educating health professionals.<sup>(24,25)</sup>

Most of the time, community health nurses are providing healthcare on the front lines by actively taking part in public health campaigns to lessen the effects of global warming. Additionally, nurses should educate patients on helpful lifestyle choices that limit global warming, such as recycling materials, switching to renewable energy sources, and turning off lights when not in use.<sup>(26,27)</sup>

#### **Significance of the study:**

With an anticipated 269.5 million metric tons of CO<sub>2</sub>e in 2020, Egypt is one of the nations with the highest overall greenhouse gas emissions, or carbon emissions. According to forecasts, Egypt's emissions would expand faster than its population by 2030, more than doubling the country's overall emissions and increasing its contribution to global emissions by 50%.<sup>(28)</sup> All educational levels' curricula must include competencies in environmental sustainability. for nursing higher education to advance. In order to combat the negative consequences of global warming through

creative tactics, it is imperative that the current and future generations of nurses be equipped with the necessary core competences. <sup>(29)</sup>

#### **Aim of the study:**

To evaluate the effect of educational program regarding greenhouse and global warming consequences on knowledge and daily life practices among university nursing students

#### **Subjects and Method**

##### **Subjects**

##### **Design:**

Quasi-experimental research design was used for this investigation.

##### **Setting:**

The research was done at faculty of nursing, Tanta University.

##### **Subjects:**

The nursing students were divided into four levels according to BSN nursing program. The final sample size, estimated to be 200 students, By using simple randomized sampling technique, 20 % of the first level of nursing faculty being chosen randomly as they may not have knowledge about greenhouse effect and global warming as well as, healthy daily living practices that play important role in reduction the serious consequences of global warming and this may be different to other levels of nursing faculty. Using the Raosoft sample size calculation software: Sample Size "n = N \* [Z2 \* p \* (1-p)/e2] / [N - 1 + (Z2 \* p \* (1-p)/e2]" where N is the population size, which was 1000 students enrolled in the first level during the academic year 2022–2023, and Z2 is the value of the normal distribution, which was 50% at /2 with (95%) is confidence level. where the sample

fraction is p and e is the margin of error (5%).

**Tools of data collection:** The researcher employed two tools to get the required data, which comprise the following: **Tool I: Self-administered questionnaire** <sup>(19, 20, 30)</sup>. The researchers created it after looking over relevant and recent literature in order to gauge students' socio-demographic traits and awareness of the greenhouse effect and global warming. It was divided into two parts:

**Part (1): Socio-demographic characteristics** of nursing students such as age, gender, residence, income, father's occupation, Siblings numbers, fuel type, transport, and electricity usage per month.

**Part (2): Students' Knowledge regarding greenhouse effect and global warming, developed by Goucher (2019),** <sup>(30)</sup> but the researcher adapted it to collect the necessary Students' Knowledge regarding greenhouse effect and global warming. The questionnaire involved 26 questions ( 3questions true and false, 2 questions complete and 11 questions multiple choices. 16 questions related to general information of greenhouse effect and global warming (meaning, greenhouse gases, common sources of increase greenhouse gases in the earths, causes of global warming dangers and consequences of global warming and global target of reducing earth's temperature by 2050), Five questions focused on health impacts and five more on preventative and corrective actions.

**The students' knowledge was scored as following:**

-Correct response received (1)

-Wrong response or unknown was scored (0)

**The total scores of studied university Students' knowledge was scored as following:**

- Poor knowledge < 50% of the total score.
- Average knowledge 50-<75% of the total score.
- Good knowledge  $\geq 75\%$  of the total score.

**Tool II: Students reported Daily Life Activities regarding greenhouse and global warming Questionnaire:** It was created by researchers based on recent literature<sup>(8, 16)</sup> to evaluate the stated daily practices of studied university students. There were 11 statements measuring daily living practices conducted indoors and 8 measuring daily life practices conducted outdoors. Each sentence has two score options: "done" or "not done." The sum of completed practices was used to calculate a final score, which was then transformed into a percentage.

**The Scoring System of university Students' daily life reported practices was scored as following:**

- Unsatisfactory level of practices <60% of the total score.
- Satisfactory level of practices  $\geq 60\%$  of the total score.

**Method:**

- 1. Obtaining approval:** The Dean of Tanta University's Faculty of Nursing granted official approval for the study to be carried out.
- 2. Ethical and legal considerations:** Obtaining ethical committee permission from the faculty of nursing ethical committee before conducting the study with number of approval (181-12-2022).

- a. The complete sample was not harmed or inconvenienced in any way by the nature of the study.
- b. Privacy and confidentiality were considered when gathering the data.
- c. Oral agreement was received from students in order to take part in the research, with the ability to opt out at any time.

**3. Content validity:** The face validity of the questionnaire was calculated based on experts' opinion in Community Health Nursing after calculating content validity index (%) of its items and it was 94%.

**4- Content reliability:** To assess reliability, the study tool was tested by the pilot subjects at first session for calculating Cronbach's Alpha which was 0.891.

**5. Pilot research:** To assess the tool's clarity, applicability, and feasibility, a pilot study including 10% (20 students) of the students was conducted. After the required adjustments, the pilot study was excluded from the study's entire sample.

**6. Tools development:** The researchers created and altered the study tools after reviewing pertinent literature. The study employed two tools.

**Stages of the research:** The research was done in four phases:

**1- Assessment phase:** In order to test understanding of the greenhouse effect and global warming as a pre intervention evaluation, the researcher used the predesigned study tools and interviewed each student separately in the specified setting (**Tool I**). In the previously indicated environment, the researchers were available four days a week in accordance with the faculty's timetable to evaluate the real students' knowledge and reported daily

routines prior to, immediately following, and one month after the adoption of the educational program. (**Tool I part 1 and 2, tool II**)

**2- Planning phase:** included the following actions:

- Setting objectives
- Preparing the content to cover the justifications for using the session.
- There were 20 students in each of the ten groups that were formed from the student body.

**3) Implementation phase:** The six-month fieldwork period for this study ran from the beginning of October 2022 to the end of April 2023. The steps were as follows:

- The educational program was implemented for each group independently by holding subsequent sessions in accordance with the actual need assessment of the understudied student.
- Three sessions of nursing interventions were given. Each session lasted from 20-30 minutes, including discussion times based on the students' development and feedback.
- A variety of teaching techniques and media, such as lectures and group discussions, will be employed.

- **Each group attended the following sessions:**

**The first session:** It focused on the program orientations, objectives, and expectations, as well as meaning, common greenhouse gases and primary source of greenhouse gas emissions.

**The second session:**

It started with a review of the previously taught concepts and then concentrated on facts regarding global warming, including its

causes and effects on the environment and human health.

**The third session:** It focused on preventive and control measures, human daily living practices that reduce the negative consequences of global warming and finally the world's target for reducing the earth's temperature by 2050.

**4-Evaluation Phase:** Evaluation of students' knowledge and daily living practices was conducted utilizing the same evaluation techniques just after (post-test) and one month following the educational program's implementation (follow-up) and these were compared to pre-test levels. **Statistical analysis:**

The collected data were organized, tabulated, and statistically analyzed using the SPSS version 23 program. For numerical data, the range, mean, and standard deviation were calculated. The t-test was used to compare the two means. For categorical data, the total and percentage were calculated. The link between the variables was evaluated using the Pearson correlation coefficient. The significance level was set at ( $p < 0.05$ ).

**Results**

**Table (1):** represents the distribution of the studied students regarding their socio-demographic characteristics. The age of the students ranged from 18- 21 years old, with a mean of 19.32 +1.5 years, and nearly two-fifths (39%) of them whose age under the age of 19. About three quarters (77.5) of the studied students were females, 64.5% of them from rural area. As regards income, 58 % of the students had enough income compared with 20.5% had enough and save income. 35% of the students father's

occupation was free work compared with 15 % had professional work, while 35% of students mother's occupation was housewife compared with 7% of them were technicians and associate professionals. Concerning sibling's numbers, 43.5% & 39% of the students had one and four siblings respectively. While half (50.5%) of them used firewood as the fuel type. As regards to transport, the majority (88.5%) of the studied students used public transport compared with 2 % used hire and auto as methods of transport. Additionally, 52% of the student's family electricity consumption per month was below 200 units.

**Table (2):** This table reveals a statistically significant increase in the students understanding of general global warming from before the educational program to one month after its implementation ( $p = 0.001$ ). The mean scores were 6.30 2.17 before the educational program's implementation compared to 13.83 1.78 and 12.09 2.92, respectively. The mean difference and standard deviation between pretest and immediately posttest was  $-7.75 \pm 2.5$  compared with  $-6.66 \pm 1.75$  and  $0.879 \pm 2.65$  pretest, immediate posttest and one month posttest. Concerning student's knowledge regarding health effects of global warming, the mean scores saw statistically significant improvement of the studied students' knowledge regarding health effects of global warming from pre-educational program when compared with one month after the educational program's implementation ( $p < 0.001$ ), it was  $2.08 \pm 1.6$  before its introduction and  $4.18 \pm 1.4$ ,  $3.99 \pm 1.5$  respectively. Regarding students' knowledge of preventive and control measures, the total

mean of preventive and control measures increased from  $2.11 \pm 1.3$  pre-educational intervention to  $4.55 \pm 1.2$  and  $4.02 \pm 1.6$  immediately post and one month later respectively having a difference that is statistically significant ( $p = 0.001$ ).

**Table (3):** Reveals the distribution of the students in terms of their knowledge about greenhouse gases and global warming. It demonstrates that 66% of the studied students had poor levels of total knowledge pre-educational intervention, whereas just 6% of them had high levels. Immediately after, the majority of the study group 83.5% had high levels of knowledge while 7.5% had average levels. After the educational intervention had been in place for one month, roughly (70.9%) of the study group had high levels of total knowledge, while just 10.6% had an average level. Between before and one month following the execution of the educational intervention, the overall mean showed a statistically significant difference. of knowledge ( $p = 0.001$ ); it was  $10.48 \pm 7.06$  before intervention and  $22.61 \pm 3.826$ ,  $21.01 \pm 5.38$ , respectively.

**Table (4):** It was discovered that the total mean indoor daily living practices increased from  $4.42 \pm 3.632$  pre intervention to  $9.56$   $1.409$  and  $8.13$   $3.087$  immediately after and one months later respectively with statistically significant difference ( $p = 0.001$ ). Self-reported outdoor practice was observed to increase from  $3.16$   $0.648$  pre intervention to  $7.75 \pm 0.831$  and  $6.33 \pm 2.018$  immediately after and one month later with a statistically significant difference from pre-intervention to one months following the implementation of the educational intervention ( $p = 0.001$ ).

**Table (5):** 74.3 of the students had unsatisfactory daily living practices prior to intervention compared with 7% and 27.5 % immediately post and one month after. 93% and 72.5% of the studied students had satisfactory levels of daily living practices immediately after and one month after the educational program, there was a statistically significant difference from the prior to one month into the educational program ( $p=0.001$ ). Prior to the educational program, the overall mean score for daily living activities was  $7.580 \pm 5.89$ ; then changed to  $17.31 \pm 1.73$  and  $14.45 \pm 5.42$  immediately after and after one month of the program, respectively.

**Table (6):** demonstrates the association between the students' overall knowledge score and the overall score for daily activities. Prior to, immediately following, and one month a statistically significant positive correlation increase occurred after the start of the instructional course between the two scores ( $r=0.484$ ,  $p=0.001$ ,  $r=-0.348$ ,  $p=0.001$ , and  $r=-0.700$ ,  $p=0.001$ , respectively).



**Table (1): Distribution of the studied students regarding their socio demographic characteristics (Total Studied Students (n=200))**

Socio-Demographic Characteristics of The Students	no	%
<b>Age</b>		
18 to <19	78	39
19 to ≤ 20	62	31
>20 years	60	30
Range and Mean ±SD	18-21(19. 32 +1.5)	
<b>Gender</b>		
Male	45	22.5
Female	155	77.5
<b>Residence</b>		
a-Urban	71	35.5
b-Rural	129	64.5
<b>Income</b>		
Enough	116	58
Enough And Save	41	20.5
Not Enough	43	21.5
<b>Father's occupation</b>		
Professional Work	30	15
Craft Work	40	20
Hand Work	60	30
Free Work	70	35
<b>Mother's Occupation</b>		
House wife	70	35
Craft and related trade workers	25	12
Agricultural and fishery workers	40	20
Shop and market sale worker	30	15
Clerks	20	10
Technicians and associate professionals	15	7
<b>Siblings' numbers</b>		
One	87	43.5
Two	14	7
Three	21	10.5
Four	78	39
<b>Fuel Type</b>		
Gas	12	6
Kerosine	79	39.5
Firewood	101	50.5

Others	8	4
Transport		
Public	177	88.5
Own Vehicle	19	9.5
Hire\ Auto	4	2
Family Electricity usage per Month (Units)		
Below200	104	52
200- 400	73	36.5
400-600	23	11.5

**Table (2): Mean and Standard Deviation of the students' knowledge regarding greenhouse and global warming**

The studied students (n=200)								
Time	Range	Mean ± SD	COMP.	Differences		Paired Test		
				Mean	SD	t	P-value	
<b>Students' general knowledge regarding global warming</b>								
Pre	0 - 14	6.30 ± 2.17	Pre-IM	-7.75	2.5	23.65	<b>0.001*</b>	
Immediately post	5 - 15	13.83 ± 1.78	Pre-Post	-6.66	1.75	17.35	<b>0.001*</b>	
One month after	5 - 15	12.09 ± 2.92	IM-Post	0.879	2.65	4.79	<b>0.001*</b>	
<b>Students' knowledge regarding Health effects of global warming</b>								
Pre	0-0-5	2.08± 1.6	Pre-IM	-2.105	2.06	14.67	<b>0.001*</b>	
Immediate	0-5	4.18±1.4	Pre-Post	-1.90	2.26	11.89	<b>0.001*</b>	
Post	0-5	3.99±1.5	IM-Post	0.189	1.23	2.11	<b>0.034*</b>	
<b>Preventive and control measures</b>								
Pre	0-5	2.11± 1.3	Pre-IM	-2.45	2.04	16.93	<b>0.001*</b>	
Immediate	0-5	4.55 ±1.2	Pre-Post	-1.925	2.44	11.11	<b>0.001*</b>	
Post	0-5	4.02 ± 1.6	IM-Post	0.525	1.63	4.55	<b>0.001*</b>	

\*Significant at p< 0.05 (2 tailed)

**Table (3) Distribution of the students' levels of knowledge regarding global warming**

Total studied students n=200											
Total students' knowledge score											
items	Pre		Immediately post		One month		Comp	Difference		Paired T test	
	N	%	N	%	n	%		Mean	SD	T	p
Poor	132	66	18	9	37	18.6	Pre-IM	-12.13	5.34	21.45	0.001*
Average	56	28	15	7.5	21	10.6	Pre-Post	10.77	4.39	15.73	0.001*
High	12	6	167	83.5	141	70.9	IM-Post	1.59	0.456	2.05	0.001*
Mean &SD	10.48±7.06		22.62 ± 3.82		21.01± 5.38						

\*Significant at p&lt; 0.05 (2 tailed)

**Table (4): Mean and Standard Deviation of the student s' daily living practices regarding global warming**

The studied students (n=200)							
Total mean of daily living practices	Range	Mean & SD	Comp	Difference		Paired t test	
				Mean	SD	t	p
<b>Self-reported indoor practice</b>							
Pre	0-10	4.42 ± 3.632	Pre-IM	-5.15	1.98	19.26	0.001*
Immediate	0-10	9.56 ± 1.409	Pre-Post	-3.68	0.89	-10.26	0.001*
Post	0-10	8.13 ± 3.087	IM-Post	1.427	0.560	6.488	0.001*
<b>Self-reported outdoor practice</b>							
Pre	0-8	3.16 ± 0.648	Pre-IM	-4.59	0.86	23.01	0.001*
Immediate	0-8	7.75 ± 0.831	Pre-Post	-3.156	0.97	11.67	0.001*
Post	0-8	6.33 ± 2.018	IM-Post	1.245	0.51	8.001	0.001*

\*Significant at p&lt; 0.05 (2 tailed)

**Table (5) Distribution of the students' levels of daily practices regarding global warming**

Total studied students n=200											
Total daily living practice scores											
Items	Pre		Immediately post		One month		Comp	Difference		Paired T test	
	n	%	N	%	n	%		Mean	SD	T	P
Un Satisfied	148	74.3	14	7	55	27.5	Pre-IM	-9.73	3.081	22.69	<b>0.001</b> *
Satisfied	52	25.7	186	93	145	72.5	Pre-Post	-6.87	2.379	11.61	<b>0.001</b> *
Range	0-18		0-18		0-18						
Mean &SD	7.58±5.89		17.31 ± 1.73		14.45 ± 5.42		IM-Post	2.86	0.365	7.86	<b>0.001</b> *

\*Significant at p&lt; 0.05 (2 tailed)

**Table (6): Correlation Between total students' Knowledge score and total daily living practice score**

The studied students (n=200)						
Total students' knowledge score						
	Pre		Immediately post		One month	
	r	P	R	p	r	P
Total daily practice score	<b>0.484</b>	<b>0.001</b> *	<b>0.348</b>	<b>0.001</b> *	<b>0.700</b>	<b>0.001</b> *

\*Significant at p&lt; 0.05 (2 tailed)

## Discussion

One of the most significant challenges that the world is currently experiencing is the global temperature increase which has the potential to be catastrophic and a great threat to human life. <sup>(31)</sup>. Consequently, it is imperative that everyone, especially those in the scientific field, to have effective understanding and healthy life practices to lesson of the problem severity. Academic institutions of higher learning play vital role in diminish the bad consequences of global warming.<sup>(32)</sup> the

faculty of nursing should be taught about sustainability concerns and support environmentally friendly growth <sup>(33)</sup>

Approximately three quarters of the students in this study were female, and more than half of them were from rural areas. Their ages ranged from 18 to 23, with a mean of 19.32 +1.5 years **(Table 1)**. There were more female nursing students than male nursing students in the faculty's first level. This outcome is consistent with a study by **Tuna I (2022)** <sup>(34)</sup>, which found that the study's participants were mostly women, with an average age of 20.58 1.42. <sup>(32)</sup>.

The findings of the study contrast with those of **Moselhy M et al., (2022)** <sup>(35)</sup>, who discovered that the majority of the observable students were male. More than half of them were revealed to be residing in rural areas at a middle socioeconomic level in other research conducted by **Ibrahim et al., (2018)** <sup>(8)</sup> and **Ghazy and Fathy (2023)**. <sup>(36)</sup>, they reported that more than half of them were living in rural areas in a middle socio-economic level.

Future consumers and decision-makers will be among today's youth. Their current knowledge, outlook, and actions will have a significant impact on how the world will respond to global warming in the future. <sup>(37)</sup>.

However, the results of the current study revealed that two thirds of students had low levels of overall knowledge regarding (general knowledge, health effects, and preventive measures) with a mean of 10.48 7.06 prior to educational intervention. This might be because nursing curriculum doesn't provide condensed and detailed information about climate change and global warming. In nursing courses, the community health department is typically the only nursing department to study the notion of environmental health in depth. In addition, the absence of environmental priority in the nation's national policy may have a role, as it was concluded by **El-Gamal, (2021)** <sup>(38)</sup>., who found that until a few years ago, environmental issues and climate change were not at the top of the Egyptian state's priorities. Additionally, more than half of the participants in the study came from rural areas, and more than one-third of their fathers' education was in manual labor, which may have contributed to their lack of understanding of the greenhouse effect and global warming.

The results of this study were somewhat similar to those of **Almulhim (2021)** <sup>(5)</sup>, who declared that the studied participants had in adequate knowledge compared with one

quarter of them had good knowledge about climate change.

This finding is harmony with **Tiitta et al., (2021)** <sup>(39)</sup>, studied Finnish nurses' perceptions of the health impacts of climate change and demonstrated that nurses lack of the essential information to help them to be engaged into sustainable development plans, While the mean scores of the studied students' knowledge regarding general knowledge, health effects, and preventive measures improved statistically significantly from before the educational program to one month after its implementation (**Table 2**). Additionally, the majority of them saw an improvement in their total knowledge score almost away, and approximately three quarters of them saw an improvement one month following the intervention, with a remarkable significant growth in total knowledge scores, which illustrates the effectiveness of the educational program. (**Table3**). This outcome is similar to a study by **Abdallah et al. (2022)** <sup>(16)</sup> who discovered that the implementation of the awareness program increased the number of students who scored well on measuring their knowledge regarding facts, causes, impacts on human health, and preventative measures, Also other studies **done by Goucher (2019)** <sup>(30)</sup>., **Kurup et al., (2021)** <sup>(40)</sup>., and **Ghazy and Fathy (2023)**, <sup>(36)</sup> and they demonstrated that after educational intervention, students gained a solid understanding of climate change (CC) and its effects, with a highly significant difference between pre\posttest.

It was observed that there was an apparently substantial progress in the overall mean of outdoor practices from pre intervention to one month later, with regard to self-reported outdoor practice. Nursing students will be more equipped to manage the adverse implications of the climate crisis on society as a whole especially those with a bearing on the

well-being of people. The study finding is corroborated with a study done by **Atifnigar (2023)** <sup>(41)</sup>., They said that the majority of Omani students took measures to reduce the effects of global warming, including recycling, turning off spent electrical gadgets, taking public transportation, and purchasing small automobiles. They were adamant that the community played a crucial part in reducing the effects of global warming, while study done by **Abdallah et al., (2022)** <sup>(16)</sup> who shown an improvement in the majority of everyday activities, both indoor and outdoor, with a highly statistically significant difference between the pre-test and post-test phases. Also, other studies done by **Dewi and Khoirunisa, (2018)** <sup>(42)</sup>., and **kah et al., (2021)** <sup>(43)</sup>., They claimed that every student agreed that switching from fossil fuels to alternative energy sources, planting trees, and reducing deforestation could help to slow global warming. Additionally, almost two thirds of the students said they would rather use public transport than drive their own cars and waste less food. <sup>(16)</sup>

Regarding the association between the total knowledge score and total daily life activities score, there was a significant positive relationship between two scores prior to, immediately after, and one month after the completion of the intervention. This may be due to students' interest in this subject and their subsequent engagement with precise understanding of the greenhouse effect and global warming, which lead to an improvement in their overall daily routines following the intervention. This result is the line with **Sah et al., (2018)** <sup>(44)</sup>, who discovered a statistically significant positive association between knowledge score and score of everyday activities. Also, a study made by **Ibrahim et al., (2018)** <sup>(8)</sup>., resulted in an association between CC and a good global

warming knowledge and attitude score. According to outcomes of the current study (**Table2:5**), The execution of an educational program regarding the greenhouse effect and its impacts, enhanced the vast majority of university nursing students' knowledge and daily activities. It shows how effectively the educational program operated.

### **Conclusion**

The awareness raising program indicated a very good influence on the nursing students' knowledge and daily life behaviors about greenhouse and global warming. Furthermore, there was an incredibly substantial association between the entire knowledge score level and their daily life score level.

### **Recommendations**

**Depending on the study's findings, the following suggestions are made:**

-Incorporating climate change and global warming topics into university curricula.

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