

Nursing Students' Awareness regarding Climate Change

Esraa Abdel Rahman Abdel Nabi⁽¹⁾, Sahar Ahmad Shafik⁽²⁾ and Amany
Mohamed Saad⁽³⁾

(1) Assistant Lecturer of Community Health Nursing - Faculty of Nursing, Helwan University,

(2) Professor of Community Health Nursing - Faculty of Nursing, El Fayom University,

(3) Assistant Professor of Community Health Nursing - Faculty of Nursing, Helwan University.

Abstract

Background: Climate change is one of the greatest threats facing humankind today and great challenge for the health sector. **Aim:** The study aims to assess nursing students' awareness regarding climate change. **Study Design:** Descriptive design was utilized. **Setting:** This study conducted in Faculty of Nursing, Helwan University. **Sample:** A convenience sample of 200 nursing students from 4th year. **Results:** 42% of studied nursing students had satisfactory knowledge, 63% of them had negative attitudes and 39.5% of them had inadequate reported practices regarding climate change. **Conclusion:** More than two fifths of the studied nursing students had satisfactory knowledge, near two thirds of them had negative attitudes and about two fifths of them had inadequate reported practices regarding climate change. Also there was a highly statistical significant correlation between nursing students' total level of knowledge, their attitudes & reported practices regarding climate change **Recommendations:** Implement an educational program to raise awareness about climate change and its adverse health effects.

Key words: Awareness, climate change, nursing students.

Introduction

Climate change is a process of changing the climate system over a long period and over a wide area due to natural processes or as a consequence of human activity has become a global issue. Natural processes have a small contribution to climate change, whereas human activity is the most significant contributor [1].

Global warming is just one aspect of climate change. In fact, global warming refers to the rise in global temperatures due mainly to the increasing concentrations of greenhouse gases in the atmosphere. On the other hand, climate change refers to the increasing changes in the measures of climate over a long period of time including precipitation, temperature, and wind [2].

In Egypt, the increase in extreme weather events, particularly heat waves and dust storms are likely to have a significant impact on human health. The combination of increasing temperatures and longer heat waves can be expected to increase heat-related deaths. The intensity and frequency of dust and sand storms, already a common feature of Egyptian weather, are associated with numerous infectious diseases (e.g., influenza and pneumonia) and non-infectious diseases (e.g., asthma and pulmonary fibrosis) [3].

The health impacts of climate change include: Temperature-related impacts which lead to an increase in cardiovascular diseases. Air quality impacts also lead to asthma attacks and other respiratory health effects. Vector borne diseases spread by vectors can lead to illnesses. Water-related illnesses may include gastrointestinal illness like diarrhea, malaria or liver and kidney damage. Men's violence against female include: Sexualized harassment, prostitution, human trafficking (for sexual purpose) and rape as well as other forms of harassment form a web of actual and potential exposure to harassment for a majority of the females [4].

Nursing student's awareness on climate change must be considered in climate change adaptation in the country and integrated even in the formulation of disaster risk reduction plan. University education is a good starting point for preparing health professionals. Mitigation and adaptation strategies in response to climate change can be taught in universities [5].

Community health nurse should be aware of climate change and put it as a progressing significant public health consequence that needed to be addressed in practice and research. Knowledge about climate change is important for integration into basic and advanced nursing education, as well as professional education for nurses to prevent adverse health impacts [6].

Significance of the Study

Worldwide, between 2030 and 2050, climate change is expected to cause approximately 250.000 additional deaths per year, from malnutrition, malaria, diarrhea and heat stress alone. The direct damage costs to health are estimated to be 2-4 billion dollars per year by 2030 [7].

In Egypt, with its almost 100 million citizens, threats posed by extreme weather conditions are already a reality. In 2015, the Egyptian Ministry of Health registered more than 100 deaths due to extreme summer heat waves. In that same year, news reported that 11 citizens had lost their lives in the abnormal winter floods. Around 1.000 children are predicted to die annually from diarrhea related to infectious diseases from climate change by 2050. Between 2070 and 2100, floods are expected to affect 2.4 million Egyptian citizens [8].

So, climate change has adverse health effects on human health in Egypt, which will be aggravated by high population densities and presence of many factories especially in Helwan district. These may include increases in severity of asthma, and infectious diseases, vector borne diseases, skin cancer, eye cataracts, and heat strokes. Extra deaths from cardiovascular, respiratory illness, dysenteric infections and mortality rate are expected to be more frequent. This may be due to decrease knowledge, practice and attitude about this problem and adverse health effect, so we need a study to improve awareness of nursing students about adverse health effects of climate change.

Aim of the study

The aim of this study is to: Assess nursing students' awareness regarding climate change.

Research Questions:

Q 1 –What is the level of nursing students knowledge regarding climate change?

Q 2 –What are the attitudes of nursing students toward climate change?

Q 3 –What are reported practices of nursing students regarding climate change?

Q 4 – Is there a relation between nursing students total knowledge, attitudes and reported practices regarding climate change?

Subjects and Method

Research design: A descriptive study was applied to achieve the aim of the current study.

Research setting: The study was conducted in Faculty of Nursing, Helwan University.

Subjects:

The subjects of the existing study were 200 nursing students who were selected by a convenience sample technique.

Sampling technique:

A convenience sample of 200 nursing students from 4th year of the academic year 2021-2022, Helwan University was selected.

Tools of data collection

The following tool was used:

A self-administered questionnaire sheet that consists of four parts as the following:

First part: Demographic data, which include data regarding age, sex, place of residence, father and mother education and source of information.

Second part: Nursing students' general knowledge about climate change, which includes 15 items as: The weather is changing, meaning of climate change, the community is in danger from any of the following natural disasters etc. And knowledge related to effect of climate change, which includes: Adverse health effects of climate change on adult health, effect on children's health...etc.

Scoring system of knowledge

The knowledge consisted of 15 items with a total 30 grades. Two grades were given for each complete correct answer, one grade was given for incomplete correct answer and zero grade was given for incorrect or don't know. The grades for each item were summed up and then converted into a percent score.

- Satisfactory level $\geq 60\%$ (≥ 18 point)
- Un-satisfactory level was $< 60\%$ (< 18 point)

Third part: Nursing students' general attitudes toward climate change which includes 30 items: Concerning about climate change ...etc. Attitudes toward effect of climate change, which include: Thinking that climate change could affect people in Egypt....etc. Attitudes toward mitigation of climate change as environment which include: Willing to share in supporting health facilities to be more safer and environmentally friendly...etc. Attitudes toward water saving and sanitation which include: Able to collect and use rainwater...etc. Attitudes toward plants which include:Tend to keep plants and trees in the yard and garden...etc. Attitudes toward building which include: Can get home/property insurance...etc. Attitudes toward energy saving which include: Tend to use energy-efficient cars...etc.

Scoring system of attitudes

The attitude consisted of 30 items with a total 60 grades. This instrument uses a 3-point Likert scale from 2 for agree, 1 for neutral and zero for disagree. The grades for each item were summed up and then converted into a percent score

- Positive attitudes $\geq 60\%$ (≥ 36 point)
- Negative attitudes were $< 60\%$ (< 36 point)

Fourth part: Nursing students' reported practices about climate change which include data as: Practices to prevent the adverse effects of climate change: First: Prevention of heat stroke: Stay hydrated, drink water and fluids, take care to wear light and loose clothing...etc. Second: Prevention of dust storm hazards: Avoid leaving the house except in the most urgent cases, when having to go out, a medical mask or a tissue moistened with water must be worn and glasses to protect the eyes....etc. Third: Prevention of heavy rains hazards: Use emergency phone numbers in case of heavy rains and preparing first aid and emergency kits at home....etc.

Scoring system of reported practices

The practices consisted of 18 items with a total 36 grades. This instrument uses a 3-point Likert scale from 2 for always, 1 for sometimes and zero for never. The grades for each item were summed up and then converted into a percent score

- Adequate reported practices $\geq 60\%$ (≥ 22 point)
- In-adequate reported practices were $< 60\%$ (< 22 point)

Validity:

The tools validity was done by five of Faculty's staff nursing experts in the field of Community Health Nursing, Faculty of Nursing, Helwan University, specialties reviewed the tools for clarity, relevance, comprehensiveness and applicability.

Reliability

To assess reliability, the study tools were tested by the pilot subjects at first session and retested after 2 weeks as test-retest reliability for calculating Cronbach's Alpha coefficient test, which revealed that each of the two tools consisted of relatively homogenous items as indicated high reliability of each part of the tool. For knowledge was 0.925, attitudes was 0.990 and reported practices was 0.983.

Pilot study:

A pilot study was carried out on 10% (20) nursing students to examine the clarity of questions and time needed to complete the study tools consumed about 10 to 15 minutes. Based on the results no modifications were done, so the pilot study sample was included in the total sample

Fieldwork

- Official permission was obtained from the dean of Faculty of Nursing, Helwan University to conduct this study, the researcher met the nursing students.
- An informal consent was obtained from students after the researcher introduced herself for them after explaining the purpose of the study.
- Data was collected within two semesters of academic year (2021-2022) from beginning of November to end of May and the researcher was available two days per week (Tuesday and Wednesday) from 2pm-3pm in the study setting till completion of the questionnaire.

Ethical considerations:

An official permission to conduct the proposed study was obtained from the Scientific Research Ethics Committee, Faculty of Nursing, Helwan University. Participation in the study is voluntary and subjects were given complete full information about the study and their role. The ethical considerations was include explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information where it will not be accessed by any other person without taking permission of the participants. Oral consent from students to conduct the study. Objectives, tools and study technique were illustrated to gain their cooperation. Ethics, values, culture and beliefs will be respected.

Statistical analysis:

Data entry and analysis were performed using SPSS statistical package version 25. Categorical variables were expressed as number and percentage while continuous variables were expressed as (mean \pm SD). Chi-Square (χ^2) was used to test the association between row and column variable of qualitative data. Comparison of quantitative variables between the study groups was carried out using the student t-test for independent samples to compare two groups when normally distributed. Pearson correlation was done to measure correlation between quantitative variables.

Pearson correlation was done to measure correlation between quantitative variables. For all tests, a two-tailed p-value ≤ 0.05 was considered statistically significant, P-value ≤ 0.01 was considered highly statistically significant. While p-value > 0.05 was considered not significant.

III. Results:

Table 1: Shows that, 57% of nursing students age was 21 years old, with a mean age of 21.39 ± 0.670 . Considering sex 59% of them were females. Regarding to place of residence 71% were from urban. Concerning parent's education (51% and 35%) respectively of parent (father and mother) of studied nursing student had university education and above.

Figure 1: Illustrates that, the source of information regarding climate change, (93% and 73%) respectively of the studied nursing students were from internet and television. While 3% and 6% of them considered libraries and academic journals/special publications respectively as a source of information regarding climate change.

Table 2: Clarifies that, 42% of nursing students had complete correct knowledge regarding meaning of climate change. Also, 38% of them had complete correct knowledge regarding causes of climate change. 22% of nursing students had complete correct knowledge regarding adverse health effects on adult. 42% of them had complete correct knowledge regarding adverse health effects on children.

Table 3: Reveals that, 42% of the studied nursing students had satisfactory knowledge regarding climate change. Also, 58% of them had unsatisfactory knowledge regarding climate change.

Table 4: Presents that, 39% of studied nursing student agreed about attitude toward climate change could affect people in Egypt. Also, 38.5% of them agreed about attitude toward climate change could affect public health . 37% of them agreed about attitude toward climate change increase spread of infectious diseases.

Figure 2: Illustrates that, 37% of studied nursing students gained a positive attitude toward climate change. While, 63% of them gained a negative attitude toward climate change.

Table 5: Showed that, 60% of studied nursing students had adequate reported practices regarding climate change. While, 39.5% of them had inadequate reported practices regarding climate change.

Table 6: Illustrates that, there was a highly statistically significant positive correlation between total knowledge, attitudes and reported practices regarding climate change among studied nursing students P= 0.000.

Table (1): Frequency Distribution of Demographic Data among the Studied Nursing Student (n=200)

Demographic data	No	%
Age (year)		
19-≤20	8	4.0
21	114	57.0
≥ 22	78	39.0
Mean ± SD 21.39 ± 0.670		
Sex		
Male	82	41.0
Female	118	59.0
Place of residence		
Rural	46	23.0
Urban	142	71.0
Slum area	12	6.0
Father education		
No read and write	8	4.0
Read and write	18	9.0
Basic education	12	6.0
Secondary	30	15.0
Technical institute	30	15.0
University and above	102	51.0
Mother education		
No read and write	10	5.0
Read and write	18	9.0
Basic education	24	12.0
Secondary	44	22.0
Technical institute	34	17.0
University and above	70	35.0

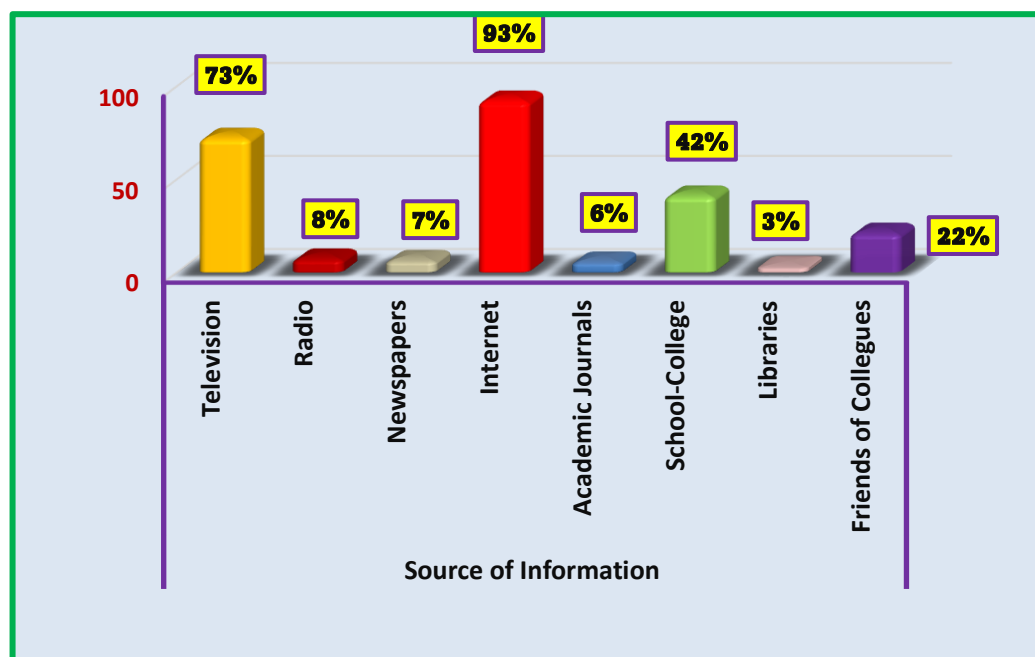


Figure (1): Percentage Distribution of Studied Nursing Student Source of Information regarding Climate Change (n=200).

Table (2): Frequency Distribution of Knowledge regarding Climate Change among Studied Nursing Students (n=200).

Items	Incorrect or don't know		Incomplete correct		Complete correct	
	No	%	No	%	No	%
General knowledge						
Meaning of climate change	5	2.5	111	55.5	84	42.0
Causes of climate change (Human activities)	11	5.5	113	56.5	76	38.0
High risk people	3	1.5	108	54.0	89	44.5
Knowledge related to effect of climate change						
Adverse health effects on adult	8	4.0	148	74.0	44	22.0
Adverse health effects on children	4	2.0	112	56.0	84	42.0
Measures to prevent adverse effect on human health	14	7.0	132	66.0	54	27.0
Total ($\bar{x} \pm SD$)	8.32 ± 3.21					

**Highly significant $p \leq 0.01$

Table (3): Total Knowledge Score regarding Climate Change among Studied Nursing Students (n=200).

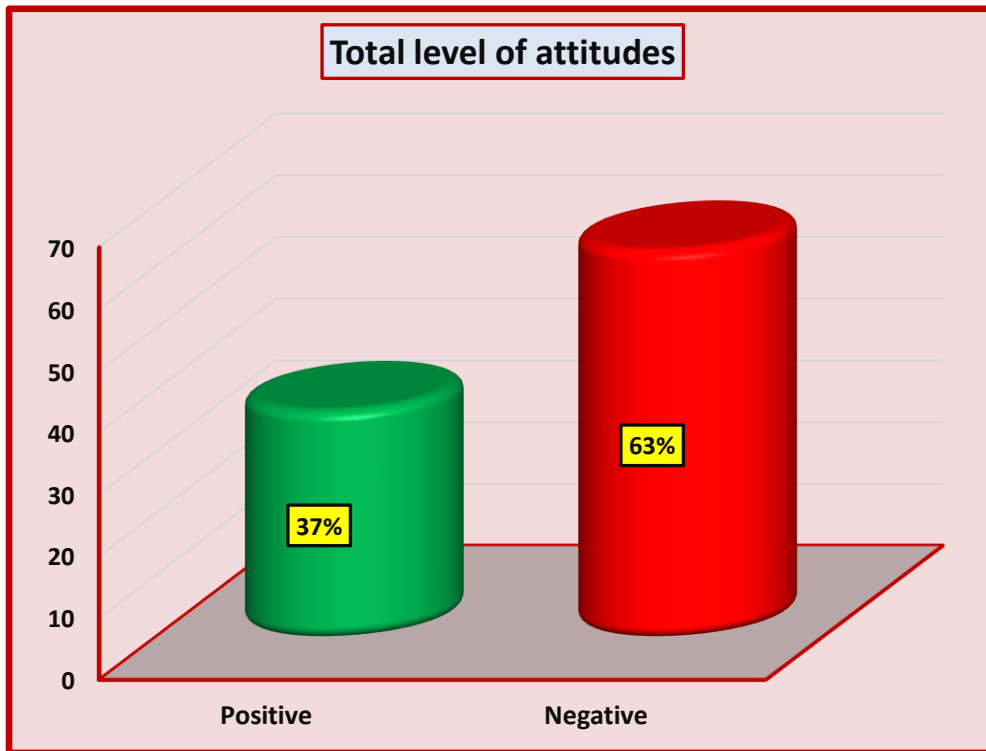
Items	Total of knowledge				Chi square	
	Satisfactory		Un-Satisfactory		χ^2	P- value
	No	%	No	%		
General knowledge	84	42.0	116	58.0	104.2	0.000**
Knowledge related to effect	124	62.0	76	38.0	36.92	0.000**
Total	84	42.0	116	58.0	127.1	0.000**

**Highly significant $p \leq 0.01$

Table (4): Frequency Distribution of Attitudes toward Effect of Climate Change among Studied Nursing Students (n=200).

Attitudes items	Disagree		Neutral		Agree		Chi square	
	No	%	No	%	No	%	χ^2	P- value
Climate change could affect people in Egypt	36	18.0	86	43.0	78	39.0	12.7	0.000**
Heavy rains and heat waves, can increase mortality	32	16.0	96	48.0	72	36.0	12.2	0.000**
Climate change could affect the daily life	35	17.5	95	47.5	70	35.0	13.9	0.000**
Climate change affect work	29	14.5	104	52.0	67	33.5	12.6	0.000**
Climate change could affect public health	31	15.5	92	46.0	77	38.5	12.3	0.000**
Climate change influences humans' mental health	35	17.5	96	48.0	69	34.5	13.0	0.000**
Climate change increase spread of infectious diseases	27	13.5	99	49.5	74	37.0	11.3	0.000**
Total ($\bar{x} \pm SD$)	8.41 \pm 4.77						13.6	0.000**

**Highly significant $p \leq 0.01$



Positive to negative ratio= 0.6:1
 $\chi^2=90.2, P=0.000$

Figure (2): Percentage Distribution of Total Attitudes regarding Climate Change during among the Studied Nursing Students (n=200)

Table (5): Frequency Distribution of Total Reported Practices regarding Climate Change among Studied Nursing Students (n=200).

Variables	Adequate		In-adequate		Chi square	
	No	%	No	%	χ^2	P value
Prevention of heat stroke	117	58.5	83	41.5	67.67	0.000**
Prevention of dust storm hazards	120	60.0	80	40.0	54.47	0.000**
Prevention of heavy rains hazards	121	60.5	79	39.5	71.88	0.000**
Total	121	60.0	79	39.5	61.96	0.000**

**Highly significant $p \leq 0.01$

Table (6): Correlation between Total Knowledge, Attitudes and Reported Practices regarding Climate Change among Studied Nursing Students (n=200)

Items		Total knowledge	Total attitudes	Total reported practice
Total knowledge	r		0.927	0.903
	p-value		0.000**	0.000**
Total attitudes	r	0.927		0.984
	p-value	0.000**		0.000**
Total reported practices	r	0.903	0.984	
	p-value	0.000**	0.000**	

**Highly significant $p \leq 0.01$

r-Pearson Correlation Coefficient;

Discussion

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). 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 [9].

According to demographic data of studied nursing students. The finding of the present study revealed that, the mean age was 21.39 ± 0.670 . This result was supported by [10] in Egypt who conducted a study entitled “Impact of awareness program regarding health consequences of climate change on knowledge, perception and daily life practices among nursing students” found that the mean age of nursing students was 20.2 ± 1.58 . While, this finding in disagreement with [11] in Gambia, who studied “Awareness of the causes, impact and solutions to global warming among undergraduate students from different schools in the university” found that only 46% of the respondents in the study were between the ages of 21 and 25. This may be due to the sample of students had enrolled in the fourth academic year at Faculty of Nursing.

Related to sex, the current study showed that near three fifth of nursing students were females. This result was in agreement with [12] in Egypt, who conducted a study entitled “Effect of awareness program regarding climate change on knowledge, attitudes and practices of university students” and found that 59.5% of studied students were females. While, this result was in disagreement with [13] in Turkey, who conducted a study entitled “Public awareness and perceptions of climate change: Difference in concerns about climate change” and found that 36.7% of participants were women. From the researcher point of view, this result may be due to the number of students from girls is more than boys, as the parents’ point of view, the Faculty of Nursing provides a guaranteed job and a secure future for the girl. So the demand for college is large, especially among girls.

Related to place of residence the current study showed that near three quarters were from urban. This result was in disagreement with [10] who found that 50.7% were living in rural areas. From the researcher point of view, this result may be due to almost all nursing students were from Helwan City which is considered an urban area.

According to parent’s education, the current study showed that more than half of father education were university education and above and more than one third of mother education were university education and above. Conversely, this result was in disagreement with [14] in Nigeria, who conducted a study entitled “Assessing the senior school students knowledge, attitude and practices related to climate change: Implications for curriculum preparation” and found that only 31.7% of participants’ parents had a senior school certificate as the highest

educational qualification held. From the researcher point of view, this result may be due to parent's awareness of the importance of higher education.

Related to source of information about climate change, the current study showed that majority of studied nursing students their source of information regarding climate change were from internet and near three quarters from television. While, minority of the studied nursing students their source of information regarding climate change were from academic journals/special publications respectively. This result was supported by [15] in Thailand who conducted a study entitled "Knowledge, attitudes, and practices on climate change and dengue" and found that 74.4% of participants were using the internet as a main source of information. Also, this finding was supported by [16] in China who conducted a study entitled "Knowledge, attitude, risk perception and health related adaptive behavior of primary school children towards climate change: A cross-sectional study" and stated that 57% of the studied sample gets information from television.

Conversely, this result was in disagreement with [5] in Indonesia who conducted a study entitled "Assessment of knowledge regarding climate change and health among adolescents" and stated that the primary source of information about climate change participants is from family. Also, this result was in disagreement with [17] in India, who conducted a study entitled "Assessment of secondary school student's awareness of climate change: An empirical study" and found that the source of information among 95% of respondents was newspapers. This is because the internet and television have become available to everyone and are considered the fastest and easiest means of communication and main sources of information.

According to frequency distribution of knowledge regarding climate change among studied nursing students. The current study revealed that, more than two fifths of nursing students had complete correct knowledge regarding meaning of climate change. Also, less than one third of them had complete correct knowledge regarding causes of climate change. More than one fifth of nursing students had complete correct knowledge regarding adverse health effects on adult.

This result was supported by [18] in Turkey, who conducted a study entitled "The effect of climate change education on the knowledge and awareness levels of Atatürk University student" and found that 23.4% of participants had correct knowledge regarding meaning of climate change. Also, 77.3% of them had correct knowledge regarding causes of climate change. 65.2% of them had correct knowledge regarding adverse health effects on generations.

The current study indicated that, more than two fifths of the studied nursing students had a satisfactory knowledge regarding climate. While, near three fifths of them had unsatisfactory knowledge regarding climate change. This result was supported by [18], who revealed that training was supposed that 23.4% of participants have a satisfactory knowledge about climate change.

The current study indicated that, about two fifths of studied nursing students had a positive attitude toward climate change. While, near two thirds of them had a negative attitude toward climate change with a highly statistically significant difference $P=0.000$. This result was accordance with [19] in Japan, who constructed a study about "What triggers climate action: The impact of a climate change education program on students' climate literacy and their willingness to act." and found that the participants' attitude toward climate change more significantly, and the p-value was 0.024. From the researcher point of views, the attitudes of the student are greatly affected by what he studies and what he receives of information and knowledge regarding the issue of climate change, especially as it is a very important topic and is considered the talk of the hour these days and also affects people's lives on a daily basis.

Regarding to frequency distribution of reported practices regarding climate change related to prevention of heat stroke, one fifth of studied nursing student always practice stay hydrated. While, near two third of them always practice choose light colors for clothes.

Conversely, this result was in disagreement with [20] in Pakistan who conducted a study entitled "Impact of community education on heat-related health outcomes and heat literacy among low-income communities: a randomized controlled trial" and stated that, 15.7% of participants had practices related to prevention of heat stroke related to the item

of stay wet should be considered and 14% of them practice heavy clothing should be removed. From the researcher point of view, this is due to decreasing knowledge about the preventive practices regarding heat stroke that affect their practices.

Regarding frequency distribution of total level of reported practices regarding climate change. The current study indicated that, three fifth of studied nursing students had adequate practices regarding climate change. While, near two fifth of them had inadequate practices regarding climate change. This result was supported by [21] in Pakistan who done a study entitled “The impact of climate change awareness on behavioral changes: Changing minds or changing behavior?” and found that 69.9% of participants had adequate practices related to monitoring and mitigation of climate change.

According to correlation between total knowledge, attitudes and reported practices regarding climate change among studied nursing students, the current study indicated that, there was a highly statistically significant positive correlation between total knowledge, attitudes and reported practices regarding climate change among studied nursing students $P= 0.000$. This result was in agreement with [12] who found that there was a highly positive correlation between total nursing students' knowledge score level and total daily life practices & attitudes ($r=.980$ & $r=.839$) at $p < 0.001$. This result was accordance with [19] who found that studied sample exhibited significantly higher levels of climate change knowledge, attitude and practices.

Conversely, this result was in disagreement with [22] in Pakistan who conducted a study entitled “Impact of climate change awareness on climate change adaptations and climate change adaptation issues” and stated that the study also reflects negative relation between climate change awareness and climate change practices with R-value (-.564) and P-value (.000). From the researcher point of view, this result may be due to participants think that without governmental, departmental and institutional support, climate change awareness alone without addressing related constraints cannot overcome the serious issues related to climate change behaviors and cannot make a difference. Also, logically the knowledge level affects on attitudes and practices of any person.

Conclusion

The present study answered the research questions that related to first, knowledge of nursing students regarding climate change, more than two fifths of the studied nursing students had a satisfactory knowledge regarding climate change. While, near three fifths of them had unsatisfactory knowledge regarding climate change. And second research questions that related to attitudes toward climate change, near two fifths of studied nursing students had a positive attitude toward climate change. While, near two third of them had a negative attitude toward climate change with a highly statistically significant difference $P=0.000$

As well; the third question, which related to reported practices regarding climate change, three fifths of studied nursing students had adequate practices regarding climate change. While, about two fifths of them had inadequate reported practices regarding climate change. There was a highly statistically significant positive correlation between total knowledge, attitudes and reported practices regarding climate change among studied nursing students $P= 0.000$.

Recommendations

- 1- It is recommended for university decision makers to add climate change course in the University of Helwan faculty curriculum to elevate student's climate change consciousness more academically rather than obtaining the awareness from other sources.
- 2- Green educational programs including seminars, conferences and workshops should be organized especially in universities to increase the student's awareness level.
- 3- The University can assign a specific day as “climate change day” so as to aware the students toward environmental protection from climate change.
- 4- Provide public education at schools, families, religious institutions, social groups, and media to promote people readiness for effects of climate change.

For further research:

- 1- Ongoing researches were required for enhancing students' awareness about climate change, its mitigation and adaptation on a large scale for generalization.
- 2- Dissemination of health educational booklet about adverse health effect of climate change among university students.

References

- 1- **Ilevbare Femi Monday (2019):** Investigating Effects of Climate Change on Health Risks in Nigeria [Online First], Intech Open, DOI: 10.5772/intechopen.86912. Available from: <https://www.intechopen.com/online-first/investigating-effects-of-climate-change-on-health-risks-in-nigeria> .
- 2- **Watts N, Amann M, Arnell N, et al. (2021):** The 2020 report of the Lancet Countdown on health and climate change: responding to converging crises. *Lancet*. 2021;397:129-170.
- 3- **Abutaleb Kh, Mohammed A and Hussien M. (2018):** Climate Change Impacts, Vulnerabilities and Adaption Measures for Egypt's Nile Delta. DOI: 10.1007/s41748-018-0047-9. *Earth Systems and Environment*. Available at: <https://link.springer.com/article/10.1007/s41748-018-0047-9>. Access date: 4/2/2020 at 11pm.
- 4- **Ciesielski T. (2017):** Climate change and public health: a small frame obscures the picture. *NEW Solut J Environ Occup Health Policy* 2017 Jan 31; 104829111769107. Available at: <https://journals.sagepub.com/doi/full/10.1177/1048291117691075>. Access date: 24/5/2020 at 8pm.
- 5- **Barreda A. (2018):** Assessing the Level of Awareness on Climate Change and Sustainable Development among Students of Partido State University, Camarines Sur, Philippines. *The Journal of Sustainability Education*. Retrieved December 13, 2018. Available at http://www.susted.com/wordpress/content/assessing-the-level-of-awareness-on-climate-change-and-sustainable-development-among-students-of-partido-state-university-camarines-sur-philippines_2018_03/ . Access date: 16/9/2020 at 6.43pm.
- 6- **Leffers J, Levy RM, Nicholas PK and Sweeney CF. (2017):** Mandate for the Nursing Profession to Address Climate Change through Nursing Education. *J Nurs Scholarsh*. 2017 Nov;49(6):679-687. doi: 10.1111/jnu.12331. Epub 2017 Aug 14. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/28806483> . Access date: 24/3/2020 at 12pm.
- 7- **Environmental Protection Agency (EPA). (2020):** Climate Impacts on Human Health. Available at: <file:///E:/climate%20change/Climate%20Impacts%20on%20Human%20Health%20Climate%20Change%20Impacts%20US%20EPA.htm> . Access date 14/6/2020 at 4.30pm.
- 8- **World Health Organization (WHO). (2018):** Climate change and health. Available at: <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>. Access date: 24/2/2020 at 10pm.
- 9- **Aronsson J., Clarke D., Grose J., Richardson J. (2020):** Student nurses exposed to sustainability education can challenge practice: a cohort study. *Nurse Health Science Journal*, 22 (3) (2020), pp. 803-811 View PDF - CrossRefView- Record in Scopus- Google Scholar. <https://doi.org/10.1111/nhs.12734>.
- 10- **Abdallah Z. and Farag A. (2022):** Impact of Awareness Program Regarding Health Consequences of Climate Change on Knowledge, Perception and Daily Life practices among Nursing Students. *EJNHS Vol.3, No.1 367*. *EJNHS | ISSN 2682-2563 Egyptian Journal of Nursing & Health Sciences*.
- 11- **kah M., Kargbo A., Mendy P., Jawo E. and Mendy E. (2021):** Awareness of the causes, impact and solutions to global warming among undergraduate students from different schools in the University of The Gambia. *Ghana Journal of Geography Vol. 13 (3), 2021 pages 258-277*. Doi:<https://dx.doi.org/10.4314/gjg.v13i3.12>.
- 12- **Ghazy H. and Fathy D. (2023):** Effect of Awareness Program Regarding Climate Change on Knowledge, Attitudes and Practices of University Students. *International Egyptian Journal of Nursing Sciences and Research (IEJNSR)*. *IEJNSR. Vol. 3 (2), 2023*.
- 13- **Korkmaz N. (2018):** Public awareness and perceptions of climate change: Difference in Concerns about Climate Change in The West Mediterranean Region of Turkey. *APPLIED ECOLOGY AND ENVIRONMENTAL RESEARCH* 16(4):4039-4050. DOI: http://dx.doi.org/10.15666/aeer/1604_40394050.
- 14- **Falaye F. and Okwilagwe E. (2016):** Assessing the Senior School Students Knowledge, Attitude and Practices related to Climate Change: Implications for Curriculum Preparation. *JISTE*, Vol. 20, No. 1, 2016.
- 15- **Siddikur R., Overgaard H., Pientong Ch., Mayxay M., Tipaya E., Sirinart A., Supranee Ph., Sumaira Z., Oleg Sh., Richard E., Sysavanh Ph., Tiengkham P., Nanthasane V. and Ubydul H. (2021):** Knowledge, attitudes, and practices on climate change and dengue in Lao People's Democratic Republic and Thailand. *Environmental Research* 193 (2021) 110509. www.elsevier.com/locate/envres.
- 16- **Wang Y., Zhang X., Li Y., Liu Y., Sun B., Wang Y., Zhou Z., Zheng L., Zhang L., Yao X., Cheng X. (2022):** Knowledge, Attitude, Risk Perception, and Health Related Adaptive Behavior of Primary School Children towards Climate Change: A Cross-Sectional Study in China. *Int. J. Environ. Res. Public Health* 2022, 19, 15648. <https://doi.org/10.3390/ijerph192315648>.



Vol. 2, Issue 1, Month: June 2023, Available at: <https://hijnrp.journals.ekb.eg/>

- 17- **Suresh B. (2017):** Assessment of Secondary School Student's Awareness of Climate Change: An Empirical Study in Warangal of Telangana State- India. The Indian Economic Journal Special Issue, December 2017: ISSN.0019-4662.
- 18- **Esringü A. and Toy S. (2022):** The Effect of Climate Change Education on the Knowledge and Awareness Levels of Atatürk University Student. Kent Akademisi Dergisi, 15(2):595-610. <https://doi.org/10.35674/kent.1041157> .
- 19- **Kolenatý, M., Kroufek, R., Cincera, J. (2022):** What Triggers Climate Action: The Impact of a Climate Change Education Program on Students' Climate Literacy and Their Willingness to Act. Sustainability 2022, 14, 10365. <https://doi.org/10.3390/su141610365>.
- 20- **Abdul Razzak J., Agrawal P., Chand Z., Quraishy S., Ghaffar A. and Hyder A. (2022):** Impact of community education on heat-related health outcomes and heat literacy among low-income communities in Karachi, Pakistan: a randomised controlled trial. BMJ Glob Health. 2022; 7(1): e006845. Published online 2022 Jan 31. doi:10.1136/bmjgh-2021-006845.
- 21- **Abbasi Z. and Nawaz A. (2020):** Impact of climate change awareness on climate change adaptations and climate change adaptation issues. Pakistan Journal of Agricultural Research, 33(3): 619-636. DOI | <http://dx.doi.org/10.17582/journal.pjar/2020/33.3.619.636>.
- 22- **Chiang Y., Xian L., Chun-Y., Jia R., Chiung-W., Hao-J., Szu-Ch., Tianmu Ch., Yanhua S., Chung-Y., and Shao-Ch. (2021):** Protective equipment and health education program could benefit students from dust pollution. Air Qual Atmos Health. 2021; 14(3): 371–380. Published online 2020 Sep 18. doi: 10.1007/s11869-020-00942-3.