

Effect of Educational Program on Knowledge, Attitude and Practice of Nursing Students Toward Sustainable Development Goals

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Abstract

Background: A significant role for the Sustainable Development Goals (SDGs) is played in nursing education. The Sustainable Development Goals outline the factors that affect health, but they also give nurses recommendations for their treatments. **The aim** of the research is to evaluate the effect of educational program on knowledge, attitude and practice of nursing students toward sustainable development goals. **Research design:** A Quasi-experimental research design was utilized. **Setting:** The study was conducted at the faculty of nursing at Minia University, Egypt. **Subjects:** Systematic Random Sample which consisted of a representative sample (10%) of nursing students from the 1st, 2nd, 3rd, and 4th academic years (no. =342). **Data collection:** A knowledge, attitude, as well as practice (KAP) of Sustainable Development Goals questionnaire. **Results:** The study's findings demonstrated that nursing students had greater knowledge, attitudes, and practices related to the Sustainable Development Goals after completing the educational program than they had previously. **Conclusion** The introduction of educational programs improved nursing students' knowledge, attitudes, as well as practice regarding sustainability development goals. **Recommendation:** Sustainability development education program periodically implemented and its objectives must be refreshed and implemented frequently on regular basis for all students nursing and adding the principles of sustainability development to nursing students' curricula.

Keywords: Educational Program, Knowledge, Attitude, Practice, Sustainable Development Goals, Nursing Students.

Introduction:

The United Nations (UN) Summit on Sustainable Development in New York in September 2015 designed a global sustainable development agenda through 2030 as well as outlined list of goals to concentrate on as well as accomplish over the following fifteen years. These goals later became known as the SDGs, offering a common guide for world peace as well as prosperity for current as well as future generations. Also a 2030 Agenda with "No One Left Behind" is another name for it. 193 nations decided to work toward these objectives. They decided on 17 SDGs, all of which must be accepted right away by all nations in the world. To better the state of the world, 169 aims and 230 indicators were included in the goals ("17 SDGs", 2021).

The seventeen goals set forth in the UN blueprint for a better world by 2030 as 1st is no poverty; the 2nd is the zero hunger; the third also the 3rd is good health as well as well-being; additionally the 4th is education quality; the 5th is gender equality; moreover the 6th is the clean water as well as sanitation; additionally the 7th is affordable as well as clean energy; also the 8th is decent work as well as economic growth; additionally the 9th is industry, innovation as well as infrastructure; moreover the 10th is decrease inequalities; also the 11th is sustainable cities as well as communities; while the 12th is responsible consumption as well as production; moreover the 13th is climate action; also the 14th is life below water; additionally the 15th is life on land; also the 16th is peace, justice as well as strong institutions; and finally the 17th is partnership for the goals (Jati et al., 2019).

A crucial element of SDG 3 is ensuring healthy lives and fostering wellbeing for all ages, and nursing unquestionably has an important role to play in accomplishing this aim. But nurses' work also has a big impact on other SDGs, like boosting education and eliminating poverty, which are often referred to as the social determinants of health (**International Council of Nurses, 2017**).

As the cornerstone of nursing practice, sustainability is the merging of ecological, globalized, as well as holistic thinking. Its use will result in innovations that preserve the circumstance for the benefit of current and the next generation because its idea takes environmental considerations into account at all scales. The sector of health care has a clear mandate to accomplish the UN SDGs, which include enhancing well-being for all personnel of all ages and guaranteeing healthy lives for all. To address these consequences, community as a whole will required to go through considerable modifications, particularly in the domain of education in nursing, which should equip the new nursing class to encounter as well as handle difficult problems (**Anåker et al., 2021**).

Conceptually, sustainability in nursing refers to the long-term objective of maintaining a secure circumstance for both the present and the next generation. Depend on the moral imperative to execute a health-in-all-policies approach (as "do no damage first"), the healthcare industry urgently has to become more environmentally conscious and sustainable. Healthcare delivery has an effect on the circumstance and fuels climate modifications. Therefore, knowledge on how nurses utilize and dispose of natural supplies in clinical area, and their influence on the circumstance, should be included in nursing education. Sustainability concerns must be included into nursing curricula in a way that makes them "locally more" and more implemented to clinical area (**Richardson et al., 2017**).

Health has been shown to be aligned with each of the seventeen SDGs, making nursing a crucial profession for advancing action toward their attainment (**WHO, 2021**). Nurses, involving students, must be aware of the health disparities,

global challenges, and connections that occur in local areas and other nations on a local level (**Gürgen Simsek & Erkin, 2022**). Institutions of higher education are increasingly considered as facilitators of change in order to bring about the essential modifications to reach the 2030 aim and provide not just expertise in one field but additional the preparation for worldwide citizenship (**Tejedor et al., 2019**). The SDGs are not widely known or used in higher education, especially in the field of nursing (**Fields et al., 2022**).

Significance of the Study

Although it is agreed that higher education is interested in it, it is unknown how much student understanding of sustainability is increasing at this time (**Michael et al., 2020**). In additionally **Moganadas et al. (2020)** identified considerable disparities in university educators' degrees of awareness of the social, circumstance, as well as economic components of sustainable development. Nursing in particular is patchy, as well as where these worldwide concerns are disregarded, gaps persist (**Fields et al., 2022**).

Education in nursing can help students become agents of modifications for healthier community in both direct and indirect ways (**Lopez-Medina et al., 2019**). Also the SDG inclusion in nursing education is a moral response to the call for worldwide citizenship (**Lopez-Medina et al., 2019; Yoder et al., 2022**).

Through the idea of "global," the SDGs give nurse teacher around the world a framework to advance the fundamentals of worldwide nursing as well as react to calls for equity in well-being (**Upvall & Luzincourt, 2019**). Because nurse educators have incorporated the SDGs into the education contents, students now understand the connection among local as well as worldwide health (**Thornton & Persaud, 2018**).

The increased social pressure on higher education institutions (HEIs) to engage in activity that promotes sustainable development has led to HEIs acting as social change agents. The global appeal of HEIs and their increased awareness of their role in developing and implementing a sustainable model might hasten the process of

sustainable development. In order to produce the human resource needed to enable the transition to sustainable development from local community to the worldwide arena, HEIs are therefore becoming high important for the development of academic as well as professional abilities. Therefore, in addition to creating and disseminating knowledge, education for sustainable development (ESD) encourages experiences and modifies attitudes. Students benefit from increased environmental knowledge as well as thinking in the critical manner, which inspires them to build sustainable societies (Saleh & Elsabahy, 2022).

Aim of the Study:

The aim of this study was to evaluate the effect of educational program on knowledge, attitude and practice of nursing students toward sustainable development goals.

Research hypothesis:

1. Nursing students' knowledge toward SDG will be higher after the educational program than before.
2. Nursing students' attitude toward SDG will be higher after the educational program than before.
3. Nursing students' practice toward SDG will be higher after the educational program than before.

Subjects and Methods:

Research design:

A quasi-experimental design was used in this research.

Setting:

This study was conducted at the faculty of nursing at Minia University, Egypt.

Subjects:

The study subject was selected by using Systematic Random Sample from all undergraduate nursing students of the Faculty of

Nursing- Minia University. It consisted of a representative sample (10%) of nursing students from the 1st, 2nd, 3rd, and 4th academic years during the "1st semester" of the education year 2022 - 2023 (total number 342). According to (Isaac & Micheal 1995), $N=n \times 10-30/100$ (N= sample size n=total number of population).the subjects were distributed as follows:

Academic year	Total No. of Students	10% (study number)
1st year	839	84
2nd year	974	97
3rd year	1019	102
4th year	591	59
Total	3429 students	342 students

Data collection tools

Data were collected by using one tool as following:

Tool (I): Sustainable Developments Goals questionnaire: The KAP questionnaire was designed by the researchers based on the previous researches **Omisore et al. (2017); Ahmad & Arifin (2018);** as well as **Borges (2019);**. It was classified into four parts. Part 1 was about the demographic data of the respondents. Part 2, 3, and 4 involved KAP towards the SDGs.

Part 1: Demographic data: This included data such as (code, age, gender, residence, and academic year).

Part 2: Knowledge on Sustainable Development Goals: It included (10 items) and (6 questions multiple choice questions). It composed of 16 questions regard to the term of SDGs, numbers of SDG Goals, How many Targets in SDG ...etc. The questions scored as correct answer taken one degree as well as zero for the incorrect answer.

The Scoring system: of this part was classified as:

(a) < 60%: considered poor knowledge 9.5

(b) 60% to 80%: considered moderate knowledge 9.6 – 12.7

(c) > 80% to 100%: considered high knowledge 12.8 - 16

Part 3: Attitudes on Sustainable Development Goals: It included (14 items). the items were measured by a 3-point Likert scale (Agree equal 3, but the Neutral equal 2 as well as Disagree equal 1).

The Scoring system: of this part was classified as follows:

(a) < 60%: considered poor attitude 25.1

(b) 60% to 80%: considered moderate attitude 25.2 – 33.5

(c) > 80% to 100%: considered high attitude 33.6 - 42

Part 4: Practice levels on Sustainable Development Goals: It included (14 items) ranging from always 4, sometimes 3, seldom 2, and never 1.

The Scoring system: of this part was classified as:

(a) < 60%: considered poor practice 33.5

(b) 60% to 80%: considered moderate practice 33.6-44.7

(c) > 80% to 100%: considered high practice 44.8-56

Validity of the tool:

Each expert panel was asked to review the instruments for their content validity, coverage, clarity, phrasing, length, format, applicability, and overall appearance. The tools were presented to a jury of 5 members in the administration of nursing and education professionals. There was no adjustment made.

Reliability of the tool:

To ensure that the tools are consistent, reliability testing was done. To determine the degree to which the tool's components measured what they were designed to measure, internal consistency was measured. Additionally, the Cronbach alpha test was employed to assess the

tool's dependability; the results demonstrated that knowledge of the SDGs' objectives, attitudes toward them, and practice levels were all (0.729), (0.876), and (0.932), respectively.

Pilot study:

Prior to beginning the fieldwork, a pilot research was applied on 34 nursing students (10% of the total study subjects) to assess the usefulness and clarity of the instruments' components. The tools were estimated to take 15 minutes to complete for each sheet, and the findings of the pilot study showed that they were appropriate, didn't require modification, and were included in the final outcomes.

Procedure

The steps of assessment as well as planning, implementation, and finally the evaluation were used to carry out the research.

1. Stage of Assessment as well as Planning

- Prior to beginning the research, official approval from the relevant parties to perform the study was obtained.
- Oral agreement of sharing from nursing students was taken.
- Before the educational program began to evaluate the nursing students concerning SDGs to assess level of students' KAP, and the time required to respond to the tool was nearly 30 minutes, data collected in one month from the starting of October to the finishing of October 2022.
- The schedule for the instructional program was created by researchers.
- The researchers set up the seminar rooms and data display technology needed for this study's required learning environment.

2. Stage of Implementation

- The educational program was created based on a literature review, teaching sessions, and timetables that were prepared after the

assessment and planning stages. program under discussion.

- The program discussed the term of sustainability as well as sustainable development and SDGs.
- The nursing role in the development of sustainability; the impediments to sustainability among nursing students.
- The basic knowledge about sustainability development ,Positive attitude and practice toward Sustainability development
- The researchers separated the nursing students into seven categories, implementing the instructional program for each cohort separately.
- Sessions were held in the nursing faculty's classrooms and were scheduled in accordance with the participants' study schedules.
- The researchers went over the schedule and content of the educational program's goals with the nursing students.
- The learning objectives are stated at the start of each session.
- Participants received information and feedback regarding the previous session prior to each session, and the current session was reviewed after each session.
- The following teaching techniques were used: lecture, group discussion, brainstorming, homework, and case studies.
- A PowerPoint presentation and a film were utilized as instructional materials.
- From the beginning of November 2022 until the end of December 2022, the instructional program was completed.

3. Stage of Evaluation

Evaluating the immediate impact of educational program on KAP of nursing students toward SDGs by using the same sheet which used in pre-program implementation It was finished in a

period from the beginning of January to the end of January 2023.

Ethical Consideration:

The Faculty Dean and the Ethical Committee of Research both sent an official letter. Oral agreement was gained from the participants after outlining the study's objectives prior to conducting the actual study as well as the pilot study. The subjects of the study have the ability to decline participation or leave the research at any time without providing a causes. The privacy of the study participants was taken into account when data were collected. Participants were given the assurance that all of their information was kept in strict confidence, and anonymity was ensured by giving each nursing student a number in place of their names to preserve their privacy.

Statistical analysis:

Using the SPSS version (25), the acquired data were tabulated, computerized, examined, and summarized in order to test the study questions. Frequency and percentage were used to express qualitative data. Less than 0.05 was regarded as significant, and probability (P-value) is the measure of significance. For the study of numerical data, the chi-square test, Fisher exact, and correlation analysis were utilized as statistical tests.

Results:

Table (1): shows that 49.4% of the studied sample aged between 20 - 21 years with mean \pm SD 20.4 ± 1.3 , 59.1% was female students, 75.1% lives in rural area, and 29.8% of them in the 2nd academic year.

Figure (1): illustrates that 28.1% of the studied students had poor knowledge about SDGs pre-educational program decreased to 0.0% post educational program and 98.5% of them had high knowledge level post program with statistically significance differences $P < 0.0001$.

Figure (2): illustrates that 82.7% of the studied students had poor positive attitude toward SDGs pre-educational program decreased to 0.0% post educational program and that 1.2% of the studied students had high positive attitude toward

SDGs pre-educational program increased to 99.4% post educational program with statistically significance differences $P < 0.0001$.

Figure (3): illustrates that 55.0% of the studied students had poor practice toward SDGs pre-educational program decreased to 6.4% post educational program and 12.9% of the studied students had high practice toward SDGs pre-educational program increased to 47.4% post educational program with statistically significance differences $P < 0.0001$.

Table (2): presents that 33.0% and 35.4% of the studied students aged between 18 – 19 years and in the 2nd year had high knowledge about SDGs than other age and academic year pre-educational program with statistically significance differences $P < 0.044$ & 0.0001 , respectively. On the other hand, not statistically significance differences with demographic data and student knowledge post educational program.

Table (3): Clarifies that not statistically significance differences total attitude levels of the studied sample regarding SDGs pre and post teaching program and their demographic data.

Table (4): evidence that moderate association ($r = 0.541$, P - value < 0.0001) between knowledge of the studied sample and attitude regarding SDGs pre-educational program, fair association ($r = 0.255$, P - value < 0.0001) between knowledge of the studied sample and practice regarding SDGs pre-educational program and association ($r = 0.279$, P - value < 0.0001) between attitude of the studied sample and practice regarding SDGs pre-educational program. Also, there association between knowledge of the studied sample with attitude and practice regarding SDGs post educational program ($r = 0.218$, P - value < 0.0001 & $r = 0.127$, P - value < 0.019 , respectively), and between attitude and practice regarding SDGs post educational program ($r = 0.181$, P - value < 0.001).

Table (1): Distribution of the studied sample regarding their demographic data (n = 342)

Items	No.	%
Age		
18 -19	91	26.6
20- 21	169	49.4
22- 23	82	24.0
Mean \pm SD	20.4 \pm 1.3	
Gender		
Male	140	40.9
Female	202	59.1
Residence		
Rural	257	75.1
Urban	85	24.9
Academic year		
1st year	84	24.6
2nd year	99	28.9
3rd year	102	29.8
4th year	57	16.7

Figure (1): Total knowledge levels of the studied sample about SDGs pre and post program (n=342).

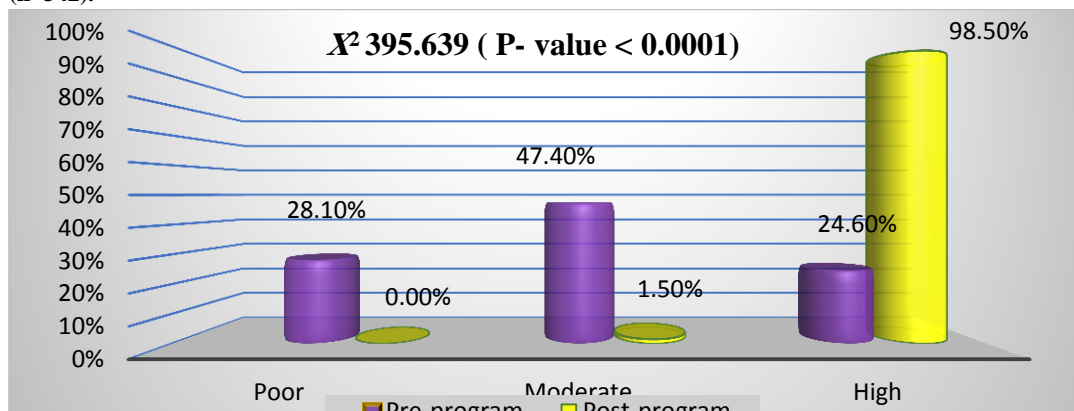


Figure (2): Total attitude levels of the studied sample about SDGs pre and post program (n=342).

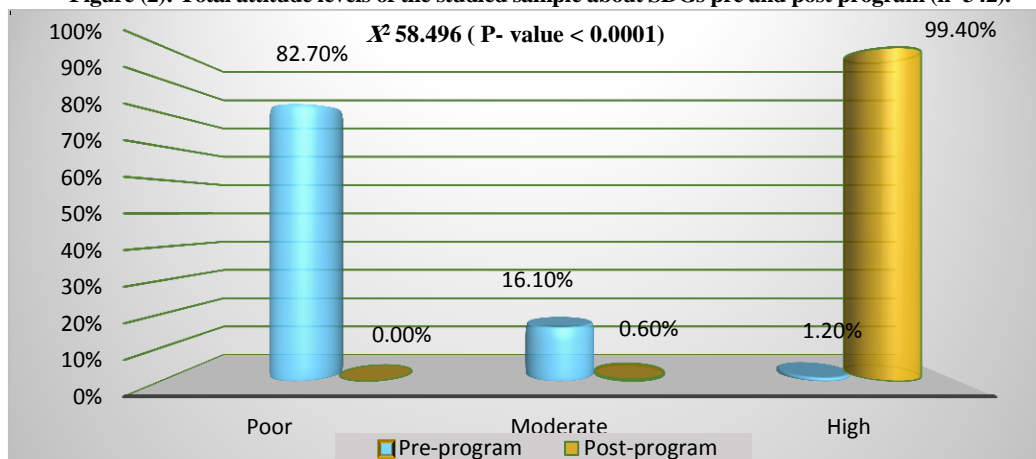


Figure (3): Total practice levels of the studied sample about SDGs pre and post program (n=342).

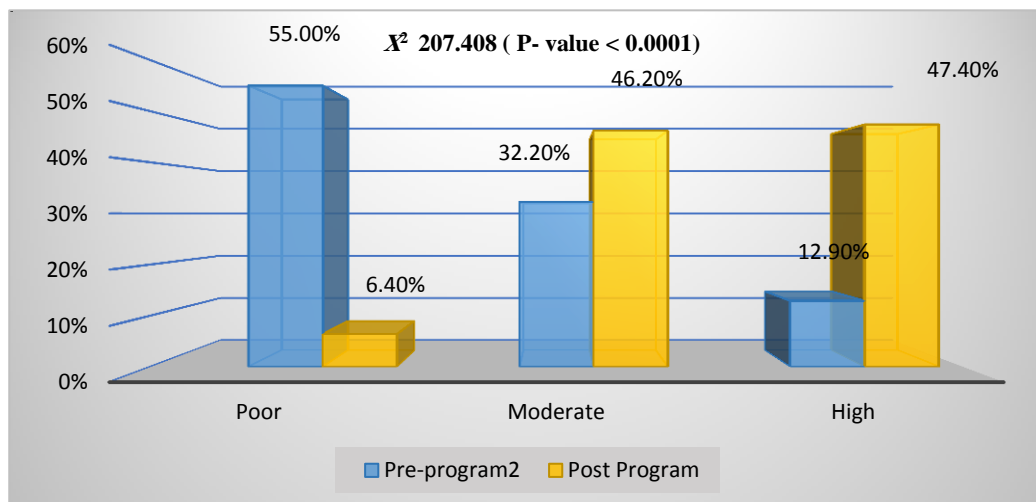


Table (2): Relation between total knowledge levels of the studied sample regarding SDGs pre and post teaching program and their demographic data (n = 342).

Items	Total Knowledge levels (Pre)						Total Knowledge levels (Post)				
	Poor (n = 96)		Moderate (n= 162)		High (n= 84)		Moderate (n= 5)		High (n= 337)		
	No.	%	No.	%	No.	%	No.	%	No.	%	
Age											
18 -19	91	25	27.5	36	39.6	30	33.0	3	3.3	88	96.7
20- 21	169	47	27.8	79	46.7	43	25.4	1	0.6	168	99.4
22- 23	82	24	29.3	47	57.3	11	13.4	1	1.2	81	98.8
X ² / fisher (P value)	6.776 (0.044) *						3.048 (0.218)				
Gender											
Male	140	40	28.6	66	47.1	34	24.3	2	1.4	138	98.6
Female	202	56	27.7	96	47.5	50	24.8	3	1.5	199	98.5
X ² / fisher (P value)	0.031 (0.985)						0.002 (0.966)				
Residence											
Rural	257	76	29.6	123	47.9	58	22.6	4	1.6	253	98.4
Urban	85	20	23.5	39	45.9	26	30.6	1	1.2	84	98.8
X ² / fisher (P value)	2.556 (0.279)						0.064 (0.800)				
Academic year											
1st year	84	27	32.1	33	39.3	24	28.6	2	2.4	82	97.6
2nd year	99	13	13.1	51	51.5	35	35.4	3	3.0	96	97.0
3rd year	102	42	41.2	44	43.1	16	15.7	0	0.0	102	100.0
4th year	57	14	24.6	34	59.6	9	15.8	0	0.0	57	100.0
X ² / fisher (P value)	28.879 (0.0001) **						4.542 (0.209)				

* Significantly differences 0.05 **Highly significantly differences 0.01 Percentage calculated by raw.

Table (3): Relation between total attitude levels of the studied sample regarding SDGs pre and post teaching program and their demographic data (n = 342).

Items	Total Attitude levels (Pre)						Total Attitude levels (Post)				
	Poor (n = 283)		Moderate (n= 55)		High (n= 4)		Moderate (n= 2)		High (n= 340)		
	No.	%	No.	%	No.	%	No.	%	No.	%	
Age											
18 -19	91	73	80.2	18	19.8	0	0.0	1	1.1	90	98.9
20- 21	169	142	84.0	25	14.8	2	1.2	1	0.6	168	99.4
22- 23	82	68	82.9	12	14.6	2	2.4	0	0.0	82	100.0
X ² / fisher (P value)	3.354 (0.500)						0.896 (0.639)				
Gender											
Male	140	112	80.0	26	18.6	2	1.4	2	1.4	138	98.6
Female	202	171	84.6	29	14.4	2	1.0	0	0.0	202	100.0
X ² / fisher (P value)	1.266 (0.531)						2.903 (0.088)				
Residence											
Rural	257	214	83.3	41	16.0	2	0.8	2	0.8	255	99.2
Urban	85	69	81.2	14	16.5	2	2.4	0	0.0	85	100.0
X ² / fisher (P value)	1.399 (0.497)						0.665 (0.415)				
Academic year											
1st year	84	65	77.4	19	22.6	0	0.0	0	0.0	84	100.0
2nd year	99	88	88.9	11	11.1	0	0.0	2	2.0	97	98.0
3rd year	102	82	80.4	18	17.6	2	2.0	0	0.0	102	100.0
4th year	57	48	84.2	7	12.3	2	3.5	0	0.0	57	100.0
X ² / fisher (P value)	10.600 (0.102)						4.938 (0.176)				

Percentage calculated by raw.

Table (4): Correlation matrix between knowledge, attitude, and practices of the studied sample regarding SDGs pre and post educational program.

Items		Knowledge scores (pre)	Total attitude scores (pre)	Total Knowledge scores (Post)	Total attitude scores (Post)
Total Knowledge scores (pre)	r				
	P - value				
Total attitude scores (pre)	r	0.541			
	P - value	0.0001**			
Total practice scores (pre)	r	0.255	0.279		
	P - value	0.0001**	0.0001**		
Total Knowledge scores (Post)	r				
	P - value				
Total attitude scores (Post)	r			0.218	
	P - value			0.0001**	
Total practice scores (Post)	r			0.127	0.181
	P - value			0.019*	0.001**

*Correlation is significant at the 0.05 level **Correlation is significant at the 0.01 level

Discussion

In addressing and minimizing the impact of climate modifications on the healthcare industry, nurses play a crucial role. It is crucial to evaluate students' perspectives on climate modifications as well as sustainability since nursing students should be willing for a novel professional role for sustainability development **Anaker et al., (2021)**. As the serious environmental, social, as well as economic ramifications of climate willing and sustainability, higher education is highly sought after all around the world **Shaw et al., (2021)**.

The actual research aimed to investigate the effect of educational program on knowledge, attitude, as well as practice of nursing students toward SDGs. The result showed that with approximately half of students in nursing were in the age group between 20 - 21 years with mean \pm SD 20.4 ± 1.3 , 59.1% and the large number of nursing student in the 2nd and 3rd academic year. These findings may be a result of the growing student's number enrolling in nursing colleges recently to the benefits of the human services profession, job duties, high pay, and assisting others.

The study documented that more than half of nursing students were female. It may be discussed by the reality that male enrollment at our faculties is still relatively low and that females continue to dominate the nursing workforce. This finding is consistent with

Ebrahim et al., (2022) also reported that most of their nursing students was females.

More than three quarters of the study participants were from rural areas. According to studies, the rural population has a low socioeconomic position and declining income, thus they are attempting to increase their income. This result was consistent with **Almaty, (2016)** who explained that a rise in poverty as well as a general deterioration in the living conditions of the rural area, particularly of rural females, had been caused by growing unemployment, declining earnings, and rising costs of living. These changes had led to increasing earnings and job hunting for government positions to raise socioeconomic standing.

Finding of the actual research indicated that the majority of nursing students had low knowledge levels prior to the program, and this knowledge level significantly increased as a result of the program's implementation of the SDGs. This finding may be because the concept of sustainability development is still relatively new to nursing students, even though it is well-known worldwide. Additionally, this information wasn't covered in their nursing education. The majority of them also stated that they were unaware of the SDGs and this may be explained by the fact that studying nursing is more demanding and overwhelming for students, leaving them with little free time to attend training sessions or workshops on sustainable development.

This finding was in accordance with **Anåker et al., (2021)** they showed that applying sustainability was difficult, and nursing students concluded that more education was required. The study added that the lack to link or balance the numerous opinions on climate modifications as well as sustainability was another reason why these divergent points of view amounted to a disagreement. With a specific concern on the connection between climate modifications, sustainability, and their higher position as nurses, this may have an impact on the development of recent curriculum as well as courses to appear as critical worldwide concerns. The development of nursing courses must pay more emphasis to global challenges, with the negative consequences of climate modifications on wellbeing being highlighted more strongly. Additionally, the study's findings are comparable with those of other research that have determined that nurses lack the knowledge required to support and engage in measures for sustainable development and climate change. **Tiitta et al.,(2021)**. Similarly, **Aronsson et al., (2020) & Otto et al., 2020; Shaw et al., (2021)** who claimed that accomplishing the SDGs depends in large part on education. Nursing education must therefore concentrate on teaching future nurses how to deliver sustainable healthcare.

The actual research showed that, the majority of nursing students had poor attitudes prior to the implementation of the SDGs program, but their attitudes considerably improved afterward. The explanation for this finding, according to the researchers, may be that nursing students had a low level of sustainability knowledge, which the findings show led to a low level of attitude. Because it is unclear to them, the students didn't understand the fundamentals of sustainable development. They weren't adequately prepared to adopt a positive attitude toward sustainability by understanding their roles and responsibilities in managing climate change and implementing the principles of sustainable development. These agreed with **Ebrahim et al., (2022)** findings indicating the majority of students had low mean scores related knowledge, attitude, and behavior toward sustainable development during pre-educational intervention are consistent with these findings. Also **Cruz et al., (2018)** evaluated nursing students' views about the

environment and sustainability in healthcare as influenced by a variety of factors in Saudi Arabia, and their findings corroborate the findings of the study. According to the study, knowing about environmental topics in nursing school, being aware of climate change, and participating in environmental seminars and trainings strongly predict nursing students' attitudes.

Regarding Total practice levels of the studied sample about SDGs pre and post program; this study showed that that more than fifty-percent of the studied students had bad practice toward SDGs pre-educational program reduced to 6.4% post educational program as well as 12.9% of the studied students had high practice toward SDGs before-educational program increased to 47.4% aftereducational program with statistically significance differences $P < 0.0001$.

This is supported by **Saleh & Elsabahy, (2022)** who at the time of the pre-educational intervention reported the low mean for challenge practice. The greatest mean scores for challenge practice were also seen in the post-intervention program for SNI as well as ENI, with a highly significant improvement for both study groups ($P .0001$).

This finding is in line with the findings of **Aronsson et al., (2020)** who claimed that climate change affects both the health of individuals and the ability of healthcare providers. Nurses will need to be prepared to address new challenges on both a practical and policy level. This study found that clinically applicable sustainability sessions taught as part of nursing undergraduate curricula can assist nurses in making changes and challenging unsustainable practices. But challenges still existed that necessitate raising pupils' self-esteem and generally raising workforce understanding.

Regarding to the relation between total knowledge levels of the studied sample regarding SDGs pre and post teaching program and their demographic data; this study showed that 33.0% and 35.4% of the studied students aged between 18 – 19 years and in the 2nd, year had high knowledge about SDGs than other age and academic year pre-educational program with statistically significance differences $P < 0.044$ & 0.0001 , respectively.

Students in their second year reported having more knowledge than respondents in their first, third, and fourth years. One could assume that people with greater education and experience would also have more awareness and knowledge.

This result is congruent with **Sunthonkanokpong & Murphy, (2019)** who exhibits a notable difference in awareness between years. Students in year 2 reported being more alert than those in years 1, 3, 4, and 5.

Regarding to the relation between total attitude levels of the studied sample regarding SDGs and their demographic data; this study showed that not statistically significance differences total attitude levels of the studied sample regarding SDGs pre and post teaching program and their demographic data.

This finding was in accordance with **Priyanka & Sarate, (2019)** they revealed that there is no statistically significant correlation between demographic factors and attitude score. Also, consistent with **Tuncer, (2018)** who claimed there were no discernible variations amongst pupils in terms of academic standing, GPA, and SDGs.

while was contrary to this finding of **Abd Elhamed et al., (2022)** there are statistically significant disparities between students' opinions about the SDGs and their academic years and age,. Furthermore, disagree with this finding of **He et al., (2020)** who came to the conclusion that residents of places with greater standards of living are more likely to pay for environmental preservation.

The present study illustrated that there was moderate association ($r = 0.541$, P - value < 0.0001) between knowledge of the studied sample and attitude regarding SDGs pre-educational program, fair association ($r = 0.255$, P - value < 0.0001) between knowledge of the studied sample and practice regarding SDGs pre-educational program and association ($r = 0.279$, P - value < 0.0001) between attitude of the studied sample and practice regarding SDGs pre-educational program. Also, there association between knowledge of the studied sample with attitude and practice regarding SDGs post educational program ($r = 0.218$, P - value $<$

0.0001 & $r = 0.127$, P - value < 0.019 , respectively), and between attitude and practice regarding SDGs post educational program ($r = 0.181$, P - value < 0.001)

This results were in contrast with **Afroz & Ilham (April 2020)** : who assessed university students' knowledge, attitudes, and practices with regard to the SDGs and found that there was Students' knowledge of and practice with regard to the SDGs have a weak negative correlation ($r = -0.264$, $N = 382$, $p = .00$), indicating that while they are well-informed about the goals, they are not practicing them enough. The connection between student attitude and practice level toward SDGs, on the other hand, was statistically significant and highly positive ($r = .440$, $n = 382$, $p = .00$), suggesting that a favorable attitude toward SDGs will motivate students to have a high level of practice.

Conclusion

According to the results of the actual research, the educational program on sustainable development was effective in improving the knowledge, attitude, and practice characteristics of the nursing students who were the subject of the study. Nursing students' knowledge, attitudes, and levels of practice towards sustainability were effectively enlightened by an educational program about sustainable development. The results showed that the majority of the nursing students who were studied had low levels of knowledge, attitudes, and practices related to sustainability development prior to their educational implementation and had high levels following their educational program's implementation. This improvement in knowledge, attitudes, and practices was highly significant for the nursing students who were studied.

Recommendations

The following suggestions are put forth in light of the study's findings and the literature review:

- Raise awareness of teaching nursing students about sustainable development as well as refresh their competences related this to encourage students to adopt a sustainable development mindset.

- Periodic training should be encouraged for every nursing educators, to equip them with necessary update information (training and re-training).
- Sustainability development education program periodically implemented and its purpose must be refreshed as well as implemented continuously for all nursing students on a consistent basis.
- Trying to spread concept as well as purposes of sustainability development among many nurses and nursing students by using social media as well as the internet.
- Including sustainability development and its objectives in nursing students' curricula.
- Encourage all nursing students attend education interventions and workshops about sustainability development and its goals, which should be updated and held continuously on a regular basis.
- Prepare nursing students for their professional role in sustainability development, through addressed sustainability development in curriculum by using various educational methodologies.

Limitations:

The fact that only one nursing faculty provided the research data for this study is its most significant drawback. In order to generalize the results, it is advised that future research select a sample from other nursing faculties.

References

- Abd Elhamed, S. M., Rashed, S. A., & Ali, H. M. (2022):** Faculty of Nursing Students' Attitudes toward Sustainable Development Goals. *Assiut Scientific Nursing Journal*, 10(32), 199-206.
- Afroz and Iham (April 2020):** Assessment of Knowledge, Attitude and Practice of University Students towards Sustainable Development Goals (SDGs), JISDeP – The Journal of Indonesia Sustainable Development Planning (p. 31—44) Vol. I No.1-

Ahamad, N. R., & Ariffin, M. (2018): Assessment of knowledge, attitude and practice towards sustainable consumption among university students in Selangor, Malaysia. *Sustainable Production and Consumption*, 16, 88-98. doi: Doi: 10.1016/j.spc.2018.06.006.

Almaty, K., (2016): Report of the Expert Group Meeting on Strengthening Generating Opportunities for Rural in Selected Central Asian Republics, P.62.

Anåker, A., Spante, M., & Elf, M. (2021): Nursing students' perception of climate change and sustainability actions - A mismatched discourse: A qualitative, descriptive exploratory study. *Nurse Education Today*, 105. Published. <https://doi.org/10.1016/j.nedt.2021.105028>

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), pp. 803-811 View PDF -CrossRefView- Record in Scopus- Google Scholar

Borges, F. (2019): Knowledge, Attitudes and Behaviours Concerning Sustainable Development: A Study among Prospective Elementary Teachers. *Higher Education Studies*, 9(2), 22. Doi: 10.5539/hesv9n2p22

Cruz, J.P. , Felicilda-Reynaldo, R.F.D. , Alshammari, F. Alquwez, . Alicante, J.G, Obaid, K.B., Silang. J.(2018): Factors influencing Arab nursing students' attitudes toward climate change and environmental sustainability and their inclusion in nursing curricula *Public Health Nurs.*, *International Nursing Review*. 35 (6), pp. 598-605. 65. 10.1111/inr.12432. View PDF- CrossRefView Record in Scopus-Google

Ebrahim Elshall, S., Samir Darwish, S., & Mohamed Shokry, W. (2022): The effectiveness of educational interventions about sustainability development among nursing students. *Egyptian Journal of Health Care*, 13(1), 294-310

- Fields, L., Dean, B.A., Perkiss, S., Moroney, T., (2022):** Education on the sustainable development goals for nursing students: is Freire the answer. *Nurs. Inq.* e12493, 1–10. <https://doi.org/10.1111/nin.12493>.
- Gürgen Şimşek, H., & Erkin, Ö. (2022):** Sustainable development awareness and related factors in nursing students: A correlational descriptive study. *Nurse Education in Practice*, 64, 103420. doi:<https://doi.org/10.1016/j.nepr.2022.103420>
- He, X., Hong, T., Liu, L. & Tiefenbacher, J. (2020):** “A comparative study of environmental knowledge, attitudes and behaviors among university students in China”, *International Research in Geographical and Environmental Education*, Vol. 20, No. 2, Pp. 91-104.
- International Council of Nurses. (2017):** *Nurses’ role in achieving the Sustainable Development Goals. International Nurses Day resources and evidence.* Geneva, Switzerland; Nurses: a voice to lead: achieving the SDGS; https://www.icnvoice.tolead.com/wp-content/uploads/2017/04/ICN_AVoiceToLead_guidancePack-9.pdf.
- Isaac, S., & Michael, W. B. (1995):** *Handbook in research and evaluation: A collection of principles, methods, and strategies useful in the planning, design, and evaluation of studies in education and the behavioral sciences (3rd ed.)*. EdITS Publishers
- Jati, H. F., Darsono, S. N. A. C., Hermawan, T., Yudhi, W. A. S., & Rahman, F. F. (2019):** Awareness and Knowledge Assessment of Sustainable Development Goals Among University Students. *Jurnal Ekonomi & Studi Pembangunan*, 20(2), 163-175.
- Lopez-Medina, I.M., Alvarez-Nieto, C., Grose, J., Elsbernd, A., Huss, N., Huynen, M., Richardson, J., (2019):** Competencies on environmental health and pedagogical approaches in the nursing curriculum: a systematic review of the literature. *Nurse Educ. Pract.* 37, 1–8. <https://doi.org/10.1016/j.nepr.2019.04.004>.
- Michael, F.L., Sumilan, H., Bandar, N.F.A., Hamidi, H., Jonathan, V., Nor, N.N.M., (2020):** Sustainable development concept awareness among students in higher education: a preliminary study. *J. Sustain. Sci. Manag.* 15 (7), 113–122.
- Moganadas, S.R., Subramaniam, S., Nun, S.H., Bahaman, A.S., (2020):** Campus sustainability: measuring awareness of sustainable development dimensions among educators in Malaysian University. *Int. J. Educ., Psychol. Couns.* 5 (37), 10–26. <https://doi.org/10.35631/IJEPC.537002>
- Omisore, A. G., et al. (2017):** "Awareness and Knowledge of the Sustainable Development Goals in a University Community in Southwestern Nigeria." *Ethiopian Journal of Health Sciences*, 27(6): 669-676.
- Otto, I.M. , Donges, J.F. , Cremades, R., Bhowmik, A., Hewitt, R.J. , Lucht, W. , Schellnhuber. H.J. (2020):** Social tipping dynamics for stabilizing Earth’s climate by 2050 *Proceedings of the National Academy of Sciences U S A*, 117 (5), pp. 2354-2365. View PDF- Cross Ref View- Record in Scopus- Google Scholar
- Priyanka G. Talpada, & Sarate, S. (2019):** A Study to Assess the Knowledge and Attitude Regarding Selected Sustainable Development Goals among Peripheral Health Workers Working in Selected PHCs of Anand District. *Scientific Research An Academic Publisher*, 6(1).Retrieved from <https://sustainabledevelopment.un.org/memberrstates/malaysia>.
- Richardson, J., Grose, J., Bradbury, M., & Kelsey, J. (2017).** Developing awareness of sustainability in nursing and midwifery using a scenario-based approach: Evidence from a pre and post educational intervention study. *Journal of Nurse Education Today* ·Jul; 54: 52-55. <https://www.researchgate.net/publication/316589584>

- Saleh, M. S., & Elsabahy, H. E. s., (2022):** Integrating sustainability development education program in nursing to challenge practice among nursing interns in health care. *Journal of Nursing Management*, 30(8), 4419-4429. doi:<https://doi.org/10.1111/jonm.13869>
- Shaw, E., Walpole, S., M. McLean, C. Alvarez-Nieto, Barna, Bazin, Woollard (2021):** AMEE Consensus Statement: Planetary Health and Education for Sustainable Healthcare. *Medical Teacher*, pp. 1-15. View Record in Scopus-Google Scholar
- Sunthonkanokpong, W. & Murphy, E. (2019):** Sustainability awareness, attitudes and actions: A survey of pre-service teachers. *Issues in Educational Research*, 29(2), 562-582. <http://www.iier.org.au/iier29/sunthonkanokpong.pdf>
- Sustainabledevelopment.un.org. (2021):** Malaysian Sustainable Development Knowledge Platform.
- Tejedor, G., Segal'as, J., Barr'on, 'A., Fern'andez-Morilla, M., Fuertes, M., Ruiz-Morales, et al.,)2019(.** Didactic strategies to promote competencies in sustainability. *Sustainability* 11 (7), 2086. <https://doi.org/10.3390/su11072086>.
- Thornton, M., & Persaud, S. (2018):** Preparing today's nurses: Social determinants of health and nursing education. *OJIN; The Online Journal of Issues in Nursing*, 23(3). doi: 10.3912/OJIN.Vol23No03Man05. Manuscript 5.
- Tiitta, I., McDermott-Levy, R., Turunen, H., Jaakkola, J., Kuosmanen, L. (2021):** Finnish nurses' perceptions of the health impacts of climate change and their preparation to address those impacts. *Nurs. Forum*, 56 (2), pp. 365-371. Google Scholar
- Tuncer, G. (2018):** "University students' perception on sustainable development: a case study from Turkey", *International Research in Geographical and Environmental Education*, Vol. 17 No. 3, Pp. 212-226.
- Upvall, M. J., & Luzincourt, G. (2019):** Global citizens, healthy communities: Integrating the sustainable development goals into the nursing curriculum. *Nursing Outlook*, 67(6), 649-657. doi:<https://doi.org/10.1016/j.outlook.2019.04.004>
- World Health Organization ,(2021):** Global Strategic Directions for Nursing and Midwifery 2021–2025. (<https://www.who.int/publications/i/item/9789240033863>. (Accessed May 2022).
- Yoder, C.M., Soule, I., Nguyen, C., Saluta, I., (2022):** Ethical global health in nursing education: an integrative review. *Nurse Educ. Pract.* 58, 103263 <https://doi.org/10.1016/j.nepr.2021.103263>.