The Effect of Sustainable Development Educational Program on Nursing Interns Students' Knowledge, Behavior and Attitude

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Abstract

Background: Sustainability in healthcare involves advancing the delivery of high-quality patient care for everyone by focusing on the three key aspects of sustainable development: environmental, social, and financial. Nurses are pivotal leaders in promoting environmental sustainability within this framework.. **Aim:** evaluate the effect of sustainable development educational program on nursing interns' students' knowledge, behaviors and attitudes. **Design:** A quasi experimental (one group pre-test/ post-test) design was utilized in this study. **Setting:** This study was conducted at the Faculty of Nursing, Cairo University /Egypt. **Subjects:** A systematic random sampling method used to recruit current sample (n=159) intern students who were enrolled in academic year 2022/2023. **Tools:** Two instruments were utilized: a personal characteristics data sheet and the Sustainability Consciousness Questionnaire (SCQ).**Results:** The findings indicated that the highest mean scores for the total knowledge, behavior, and attitude of nursing intern students were 80.9, 61.1, and 66.1, respectively, immediately following the program. During the follow-up after the educational intervention, these scores were 79.5, 58.14, and 65.3, respectively.. **Conclusions:** There was a highly statistically significant improvement in intern student' total and sub-dimensional knowledge, behavior, attitude regarding sustainable development after the educational intervention implementation as well as at the follow up phase. Thus, from these results the education intervention had success in achieving its objectives. Moreover, all hypotheses of the study are accepted. **Recommendations:** Incorporating sustainability education into the existing nursing curriculum, offering hands-on, practical experiences for intern nursing students to implement sustainable practices in real healthcare settings, and conducting further nursing research to examine the relationship between sustainable management knowledge, behaviors, attitudes, and patient outcomes are crucial steps.

Keywords: Attitude, Behavior, Educational Program, knowledge, Nursing Interns students, and Sustainable Development

Introduction

Sustainability is a dynamic state that necessitates the interconnection of environmental, economic, and social systems to prevent natural resource depletion and maintain environmental balance. Climate change and sustainability are linked in two key ways. Firstly, climate change affects the fundamental aspects of human and natural life, which are essential for social and economic progress. Secondly, society's sustainable development goals influence both the most vulnerable populations and the greenhouse gas emissions contributing to climate change. To effectively address climate change issues, nurses must have a comprehensive understanding of sustainability (**Shaw et al., 2021**).

Sustainability is fundamental to nursing practice, encompassing ecological, global, and holistic perspectives. Implementing sustainability can lead to innovations that protect the environment for present and future generations, as it considers environmental impacts at all levels. Addressing these implications requires significant societal changes, particularly in nursing education, to prepare new nurses for resolving complex issues. The United Nations (UN) Sustainable Development Goals (SDGs) mandate that the healthcare sector ensures healthy lives and

promotes well-being for people of all ages **(Anker et al., 2021).**

Sustainable development encompasses three dimensions: economy, environment, and society. The societal aspect includes concerns such as human rights, gender equality, peace and human security, cultural diversity, and intercultural understanding, along with addressing issues like social services, the right to health and education, and social justice (**Atmaca & Pehlivan, 2018**). Environmental sustainability involves safeguarding natural resources such as water, air, soil, energy, agriculture, and biodiversity, as well as promoting sustainable urbanization **(Wallis & Loy, 2021; UNESCO, 2006).** Economic sustainability faces challenges such as prudent resource use, maintaining the balance between income and expenses, reducing income inequality, promoting sustainable production and costs, creating reliable investment environments, and investing in high-income and essential sectors, among others **(Atmaca & Pehlivan, 2018; Moustafa & Elsabahy, 2022).**

Additionally, the three dimensions on which education for sustainability development tools is centered are knowledge, behavior, and attitude (**Biasutti, & Frate, 2017, Biasutti, 2015; Moustafa & Elsabahy, 2022).**

Knowledge is the comprehension or awareness of a subject, encompassing one's information or understanding range; behavior refers to how an individual conducts themselves, including responses to stimuli and interactions with surroundings; attitudes represent cognitive positions, feelings, or emotions towards facts or states (**Online Dictionary, 2020).**

As an integral part of the healthcare sector, nursing presents an opportunity to significantly reduce the environmental impact of healthcare practices, including active involvement in public health initiatives aimed at mitigating climate change (Cook et al., 2019). Moreover, nursing students can be prepared to act as catalysts for change, challenging conventional practices and driving progress. This underscores the need for a curriculum in nurse education that emphasizes critical thinking and the ability to effect change,

aligning with the expectations of higher education institutions. It is crucial for student nurses to be well-informed about climate change and sustainability issues to question practices related to these concerns **(Felicilda et al., 2018).** Educational initiatives rooted in research are designed specifically to underscore the significance of climate change and sustainability **(Álvarez-Nieto et al., 2018).**

In a context where environmental concerns intersect with economic, social, political, and ethical challenges, education for sustainable development (ESD) emerges as a critical tool for increasing awareness of environmental issues. It is essential for various academic fields and organizations to take responsibility for disseminating knowledge about sustainable development and its subdimensions **(Tekbiyik & Celik, 2019).** With the healthcare system aiming to achieve the UN Sustainable Development Goals (SDGs), particularly the objective of "ensuring healthy lives and promoting well-being for everyone of all ages" **(UN, 2020),** integrating education on how nurses utilize and manage natural resources in clinical practice, as well as their environmental impact, is vital within nursing education **(Richardson et al., 2017).**

Significance of the study

In our era, one of the most crucial challenges is ensuring the sustainability of our planet's resources while simultaneously fostering prosperity and well-being for an expanding global population. This monumental endeavor is encapsulated in the concept of sustainable development (SD). Since the release of the Brundtland Report in 1987, sustainable development has become a focal point of interest for a multitude of scholars, corporations, governments, communities, and international organizations **(Matinaro, Liu, & Poesche, 2019).**

In response to the challenges of sustainability, Education for Sustainable Development (ESD) has emerged as a strategy. Over the past couple of decades, the role of education in advocating for sustainable living and development has garnered significant attention from researchers and educators

worldwide **(Nousheen, Zai, Waseem, & Khan, 2020)**. Peter Blaze Corcoran has emphasized the necessity for substantial changes in curriculum, teaching methods, and institutional frameworks to align with sustainable development goals and prevent the risks of unsustainability **(Sterling, 2010).** Consequently, universities have the potential to catalyze change towards sustainability by fostering experiential learning and modifying behaviors through Education for Sustainable Development (ESD).

Considering this viewpoint, it was crucial to develop a program aimed at improving and expanding students' capacity by enhancing their knowledge, skills, and abilities to engage in more sustainable practices. This initiative aims to prepare them for their future roles as healthcare providers and leaders, inspiring them to contribute towards the establishment of sustainable societies in alignment with Egypt's vision for 2030.

Aim of the Study

This study aimed to evaluate the effect of sustainable development educational program on nursing interns' students' knowledge, behaviors, and attitude.

Hypotheses of the Current Study

HO (1): Total mean score of nursing intern students' knowledge in post- program and follow-up phase will be higher than mean score pre-program.

HO (2): Total mean score of nursing intern students' attitude in post- program and follow-up phase will be higher than mean score pre-program.

HO (3): Total mean score of nursing intern students' behavior in post- program and follow-up phase will be higher than mean score pre-program.

Research Design

A quasi experimental (one group pre-test/ post-test) design was utilized in this study. A quasi-experiment is an empirical study used to estimate the causal impact of an intervention on its target population. Or is a form of research where the investigator has no control over the independent variable but has power over how the dependent variable is measured according to medical dictionary definition (Miller, Smith, & Pugatch, 2019).

Sample

A systematic random sampling method used to recruit current sample. (n=160) nursing intern students who were enrolled in academic year 2021/2022 and from both genders participated in the research through the following technique:

- A list if students' names was obtained (N = 400), then the representative sample size was determined (160)
- Select a random starting point from the population (3), then a sample is taken from regular fixed interval (3) of the population depending on its size.

Setting

The present study was conducted online during the orientation period of nursing intern students. The participants are situated in various clinical settings, particularly in the emergency department of Kasr El-Aini hospital, affiliated with Cairo University Teaching Hospitals. This department specializes in handling burn and accident cases and includes different units such as first aid, CPR, various care units, short stay units, and critical care units.

Tools of Data Collection:

Data was collected using the following self-administered questionnaires.

1st tool: Personal characteristics data sheet: It was developed by the researchers and used to collect nursing intern students' personal characteristics information including age, gender, academic year, hearing about sustainability development and source of information.

2nd tool: The Sustainability Consciousness Questionnaire (SCQ). It was adopted from **Ebrahim, Samir & Mohamed (2022).** It was used to measure nursing intern students' knowledge, behaviors, and attitudes

regarding sustainable development. The SCQ instrument, classified into the following three dimensions of SD (environmental, social, and economic)**.** So, SCQ composed of three sections:

1- **The first section:** The Sustainability Knowingness Questionnaire (SNQ) was utilized to assess nursing students' knowledge regarding sustainable development. It comprises 19 items categorized into three dimensions: environmental (6 items), social (8 items), and economic (5 items). Participants were instructed to indicate their responses to SNQ items using a 5-point Likert scale ranging from "strongly disagree" to "strongly agree" (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). Scores were totaled and classified into the following categories: poor level (< 48 points of the total score), fair level (48 - <71), and good level (71 – 95 points).

2- The second section consisted of the Sustainability Attitudes Questionnaire (SAQ), which aimed to assess nursing students' attitudes towards sustainable development. This questionnaire comprised 14 items categorized into three dimensions: environmental (4 items), social (6 items), and economic (4 items). Participants were instructed to indicate their responses to the SAQ items using a 5-point Likert scale ranging from "strongly disagree" to "strongly agree" (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). Scores were totaled and classified into the following categories: poor attitude (< 35 points of the total score), neutral attitude (35 - <53 points), and good attitude (53 – 70 points).

3- **The third section:** The Sustainability Behavior Questionnaire (SBQ) was employed to assess nursing students' behaviors regarding sustainable development. This questionnaire consisted of 17 items categorized into three dimensions: environmental (7 items), social (6 items), and economic (4 items). Participants were instructed to indicate their responses to the SBQ items using a 5-point Likert scale ranging from "strongly disagree" to "strongly agree" (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). Scores were summed and categorized as follows: poor level (< 43 points of the total score), neutral behavior (43 - <64 points), and good level (64 – 85 points).

Validity & **Reliability of instruments:**

4- The instruments utilized in this study were adapted from **Ebrahim, Samir, and Mohamed (2022).** According to their research, the instruments demonstrated validity, and reliability was assessed using the Alpha Coefficient test (Cronbach's alpha). The internal consistency of the first part (Knowledge questionnaire) yielded a Cronbach's alpha coefficient of 0.85. For the second part (Attitude questionnaire), the internal consistency was measured at α = 0.75. Lastly, the internal consistency of the third instrument (Behavior questionnaire) was α = 0.70.

Procedure

sustainable development educational program was applied on the following phases: preparatory, assessment, planning, implementation, evaluation and follow up.

Preparatory / preliminary phase:

Firstly, official permission was obtained from the ethical research committee of the Faculty of Nursing at Cairo University to conduct the study. Subsequently, the aim and objectives of the study were communicated to the Vice Dean for Community Services and Environmental Development, as well as to the head of intern affairs, where the nursing interns are affiliated. Upon their approval, an official administrative endorsement was obtained to collect the study's data and implement the program. Following agreement, the approval letter was forwarded to the head of the nursing administration department to facilitate the process of program implementation.

Assessment phase

A Zoom meeting was convened with nursing intern students to elucidate the aim, objectives, significance, and schedule of the program. Subsequently, the questionnaires were disseminated to the participants via Google Form for assessment (pre-program). All responses from participants were collected within a two-day period before the implementation of the program, which commenced at the beginning of June. The

questionnaires were distributed through Google Form, and a two-day period was allotted to ensure completion by all participants.

Planning phase:

Upon analyzing the collected data from participants, the learning needs were discerned, leading to the formulation of program objectives and the development of its content. Following coordination with the intern coordinator, the program session duration was scheduled, and a timetable was established. The program commenced from June 1st to June 8th, 2023, and was conducted online via the Zoom application. The program content was structured to span 10 hours, distributed across five sessions, with one session held daily over five consecutive days during the orientation period. Each session was designed to last for two hours.

Implementation

Following coordination with the intern's coordinator, the program schedule was finalized, and the educational program commenced. The investigators led the first session with all participants present, during which they elucidated the study objectives and discussed how the program would be relevant to participants' work to stimulate their interest and enhance motivation to attend. Additionally, the investigators outlined the program plan, objectives, schedule, and content. Participants were informed that completing the questionnaires and attending the educational program meetings constituted consent to participate in the study, with the right to withdraw at any time during program implementation without explanation.

Each program session ran from 10 am to 12 pm, commencing with an orientation to the session's objectives. The investigators utilized formal presentations, facilitated group discussions on related issues, solicited feedback in each session, and provided handouts to participants.

General goal of the program:

Enhance the awareness of nursing intern students concerning sustainable development and provide them with the requisite knowledge and skills to advocate for sustainable development. This is achieved through education focused on sustainable development, fostering sustainable lifestyles, promoting human rights and gender equality, cultivating a culture of peace and non-violence, nurturing global citizenship, and fostering an appreciation of cultural diversity.

Specific objectives of the program

- Discuss the concept of sustainable development.

- Discuss the requirements of sustainable development.

- Mention the components of sustainable development.

- Discuss the barriers for sustainable development implementation.

- Mention the Sustainable Development Goals

- Discuss ways to implement each of the sustainable development goals.

- Discuss implementation steps to achieve sustainable development goals in health institutions.

- Discuss nursing role and sustainability.

The following topics were discussed and covered in the educational program:

- The concept of sustainable development

- Evolution of sustainable development

- The requirements of sustainable development

- The components of sustainable development

- the barriers for sustainable development implementation

- The Sustainable Development Goals

- Ways to implement each of the sustainable development goals.

• Sustainable development and health institutions

• Implementation steps to achieve sustainable development goals in health institutions.

• The nursing role and sustainability

Evaluation

At the final session, sustainable development knowledge, behavior and attitude were assessed immediately, and after two months of the program implementation **(follow up)** by the participants using the same assessment questionnaires.

Ethical Consideration

A primary official permission obtained from the ethical research committee, Faculty of Nursing, Cairo University, to conduct this study. Also, an official permission from the Vice Dean for Community Services, environment development and intern affairs in the Faculty of Nursing was obtained to carry out the study. Participation in the study is voluntary and based on the participants' agreement. The ethical considerations include explaining the purpose, nature of the study and completion of the online form considered as a written consent. Confidentiality of the information will not be accessed by any other part without taking permission of the participants.

Results

Table (1) illustrates that the majority (96.2%) of nursing intern students were in the age group (22-25) and the highest percentage (56.0%) of them were female. Moreover, the highest percent (64.2%) of them heard about sustainable development before, and 68.8% of them heard from TV.

Table (2) displays the lowest overall mean score for knowledge among nursing intern students observed during the pre-educational intervention period (59.58 ± 30.08). Conversely, the highest overall mean score for knowledge was recorded post-educational intervention (80.92 ± 12.41), followed by the follow-up assessment (79.53 ± 15.04). Moreover, there was a significant improvement in the mean scores for knowledge across all dimensions—environmental (26.25 & 25.72), economic (21.13 & 20.82), and social (33.54 & 32.99)—for nursing intern students following the intervention program and during the follow-up period (P < 0.00*).

Table (3) presents the findings regarding knowledge sub-dimensions, indicating notable improvements in good environmental knowledge levels from (46.5%) pre-intervention to (91.2%) immediate post-intervention, followed by (88.7%) at the follow-up assessment. Similarly, good social knowledge levels saw enhancements from (45.9%) pre-intervention to (84.3%) immediate post-intervention, followed by (82.4%) at the follow-up assessment. Moreover, good economic knowledge levels exhibited increases from (59.1%) pre-intervention to (87.4%) immediate post-intervention, followed by (85.5%) at the follow-up assessment, reflecting highly statistically significant improvements (P < 0.00*).

Table (4) illustrates the lowest overall mean score for behavior among nursing intern students observed during the pre-educational intervention period (48.30 ± 24.00). Conversely, the highest overall mean score for behavior was recorded post-educational intervention (61.60 ± 10.9), followed by the follow-up assessment (58.14 ± 12.3). Additionally, the highest mean score for behavior dimensions—environmental (27.50 & 27.2), economic (15.69 & 15.26), and social (18.39 & 15.65)—was noted among nursing intern students post-intervention and during the follow-up period, with a highly significant improvement (P < 0.00*).

Table (5) regarding behavior levels, it indicates that the good environmental behavior levels were improved with a range of (38.9%) at pre to (67.9.2%) at immediate post followed by (66.6%) at follow up educational intervention. Good social knowledge levels were improved with a range of (40.9%) at pre to (62.9%) at immediate post followed by (57.9%) at follow up educational intervention. Furthermore, good economic behavior levels were increased with a range of (34.6%) at pre to (58.5%) at immediate post followed by (55.3%) at follow up

educational intervention with a highly statistically significant improvement (P<0.00*).

Table (6) illustrates the lowest total mean score of attitudes (49.96± 25.24) of nursing intern students at pre-educational intervention. However, the highest total mean score of attitudes (66.15± 11.91) of them at post-educational intervention followed by the follow up intervention (65.38± 13.04). Moreover, the highest mean score regarding attitude dimensions (environmental:16.99 & 16.82), economics (12.43& 12.26), and (social (36.72& 36.30) for nursing intern students' post and follow up intervention program respectively with a highly significant improvement (P<0.00*).

Table (7) regarding attitude sub-dimension, it shows that the good environmental attitude levels were increased with a range of (57.9%) at pre to (84.9%) at immediate post followed by (84.3%) at follow up educational intervention. Good social attitude levels were improved with a range of

(49.7%) at pre to (77.4%) at immediate post followed by (76.7%) at follow up. Moreover, good economic attitude levels were increased with a range of (47.2%) at pre to (77.4%) at immediate post followed by (76.1%) at follow up educational intervention with a highly statistically significant improvement (P<0.00*).

Figure (1) depicts the highest mean scores for the total mean of knowledge, behavior, and attitude among nursing intern students, which were (80.9, 61.1, and 66.1) respectively immediately post-intervention, followed by (79.5, 58.14, and 65.3) during the follow-up period of the educational intervention.

Table (8) proves that there were a highly statistically significant relations between nursing intern students' personal characteristics data and total knowledge, behavior, and attitude dimensions(P<0.00*).

Table (1): Frequency distribution of nursing intern students' personal characteristic data (n=159)

Nursing intern students' personal characteristic data	No.	%
Age		
22-25	153	96.2
>25	6	3.8
Gender		
Female	89	56.0
male	70	44.0
Heard about sustainable development?		
Yes	102	64.2
No	57	35.8
If yes, Source of information		
College	10	9.9
Radio	5	4.9
TV	70	68.8
Gatherings	5	4.9
Internet	10	9.8
Others	2	1.96

Table (2): comparing of mean scores of nursing intern students' knowledge test scores regarding to sustainable development during different period of assessment (pre-program, immediate post program and follow up educational program) (n=159)

Knowledge dimensions	Pre		Immediate post		Follow up		Max	F	P
	Mean	SD	Mean	SD	Mean	SD			
Environmental	18.85	9.68	26.25	3.36	25.72	4.70	30.00	63.44	0.00*
Social	24.36	12.96	33.54	5.67	32.99	6.72	40.00	51.08	0.00*
Economic	16.37	8.44	21.13	4.12	20.82	4.49	25.00	30.99	0.00*
Total	59.58	30.08	80.92	12.41	79.53	15.04	95.00	52.45	0.00*

*Significant at p-value<0.05

Table (3): comparison of nursing intern students' knowledge sub-dimensions levels of sustainable development during different period of assessment (no. =159).

Knowledge Sub-dimension levels	Pre		Immediate post		Follow up		X2	P
	No.	%	No.	%	No.	%		
A-Environmental Knowledge levels								
Poor	48.0	30.2	4	2.5	3.0	1.9	122.2	0.00*
Fair	37.0	23.3	10	6.3	15.0	9.4		
Good	74.0	46.5	145	91.2	141.0	88.7		
B-Social Knowledge levels								
Poor	54.0	34.0	4	2.5	4.0	2.5	106.9	0.00*
Fair	32.0	20.1	21	13.2	24.0	15.1		
Good	73.0	45.9	134	84.3	131.0	82.4		
C-Economic Knowledge levels								
Poor	46.0	28.9	5	3.1	5.0	3.1	73.3	0.00*
Fair	19.0	11.9	15	9.4	18.0	11.3		
Good	94.0	59.1	139	87.4	136.0	85.5		

*Significant at p-value<0.05

Table (4): comparing of mean scores of nursing intern students' behavior test scores regarding to sustainable development during different period of assessment (n=159)

Behavior dimensions	Pre		Immediate post		Follow up		Max	F	P
	Mean	SD	Mean	SD	Mean	SD			
Environmental	20.60	11.0	27.50	5.8	27.2	6.29	35.00	37.21	0.00*
Social	15.47	8.76	18.39	5.17	15.65	3.99	30.00	10.53	0.00*
Economic	12.25	5.78	15.69	2.86	15.26	3.40	20.00	31.32	0.00*
Total	48.30	24.00	61.60	10.9	58.14	12.3	85.00	26.50	0.00*

*Significant at p-value<0.05

Table (5): comparison of nursing intern students' behavior sub-dimensions levels of sustainable development during different period of assessment (no. =159).

Behavior sub-dimensions	Pre		Immediate post		Follow up		X2	P
	No.	%	No.	%	No.	%		
A-Environmental level								
Poor	52	32.7	5	3.7	7	4.4	80.4	0.00*
Neutral	45	28.3	44	28.3	46	28.9		
Good	62	38.9	107	67.9	106	66.6		
B-Social								
Poor	48.0	30.2	5	3.1	8.0	5.0	68.1	0.00*
Neutral	46.0	28.9	54	34.0	59.0	37.1		
Good	65.0	40.9	100	62.9	92.0	57.9		
C-Economic								
Poor	44.0	27.7	5	3.1	9.0	5.7	60.1	0.00*
Neutral	60.0	37.7	61	38.4	62.0	39.0		
Good	55.0	34.6	93	58.5	88.0	55.3		

*Significant at p-value<0.05

Table (6): comparing of mean scores of nursing intern students' attitude test scores regarding to sustainable development during different period of assessment (n=159)

| Attitude dimensions	Pre		Immediate post		Follow up		Max	F	P
	Mean	SD	Mean	SD	Mean	SD			
Environmental	13.30	6.70	16.99	3.09	16.82	3.36	20.00	31.397	0.00*
Social	27.86	14.24	36.72	7.13	36.30	7.77	45.00	37.725	0.00*
Economic	8.81	5.46	12.43	2.47	12.26	2.68	15.00	46.053	0.00*
Total	49.96	25.24	66.15	11.91	65.38	13.04	80.00	41.646	0.00*

*Significant at p-value<0.05

Table (7): comparison of nursing intern students' attitude sub-dimensions levels of sustainable development during different period of assessment (no. =159).

Attitude sub dimensions levels	Pre		Immediate post		Follow up		X2	P
	No.	%	No.	%	No.	%		
A-Environmental levels								
Poor	48.0	30.2	6	3.8	6.0	3.8	70.9	0.00*
Neutral	19.0	11.9	18	11.3	19.0	11.9		
Good	92.0	57.9	135	84.9	134.0	84.3		
B-Social levels								
Poor	48.0	30.2	6	3.8	7.0	4.4	70.2	0.00*
Neutral	32.0	20.1	30	18.9	30.0	18.9		
Good	79.0	49.7	123	77.4	122.0	76.7		
C-Economic levels								
Poor	56.0	35.2	6	3.8	6.0	3.8	89.7	0.00*
Neutral	28.0	17.6	30	18.9	32.0	20.1		
Good	75.0	47.2	123	77.4	121.0	76.1		

*Significant at p-value<0.05

Figure 1: Comparison between pre, immediate post and follow up the educational intervention about Sustainable development on total mean of knowledge, behavior, and attitude on nursing intern students (No. =179)
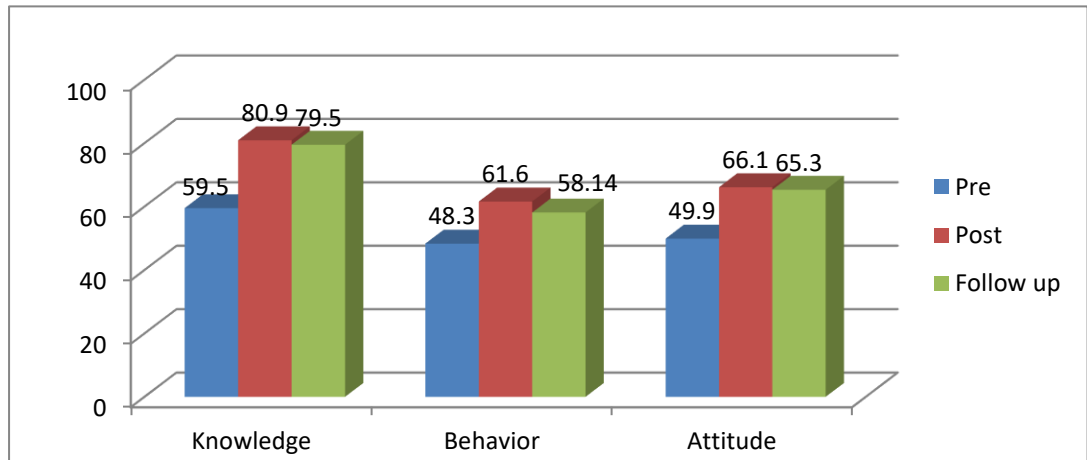
Table (8): Relations between nursing intern students' personal characteristics data and total knowledge, behavior, and attitude dimensions.

Personal characteristics data	Knowledge dimension		Behavior dimension		Attitude dimension	
	Mean	SD	Mean	SD	Mean	SD
Age						
20-25	59.31	30.03	41.79	23.98	49.49	25.09
>25	65.50	36.15	44.16	27.50	59.50	31.25
T	**5.9**		**5.3**		**5.3**	
p	**0.00***		**0.00***		**0.00***	
Gender						
Female	65.41	26.89	41.79	23.98	53.93	23.19
male	52.17	32.40	33.21	23.80	44.90	26.95
T	**7.8**		**6.9**		**6.8**	
p	**0.00***		**0.00***		**0.00***	
Heard about sustainable development?						
Yes	62.70	25.09	41.40	23.44	53.77	21.55
no	57.84	32.53	36.12	24.53	47.82	26.95
T	**7.3**		**6.7**		**6.6**	
p	**0.00***		**0.00***		**0.00***	
If yes, Source of information						
college	63.33	33.47	32.16	19.70	60.83	30.90
radio	61.0	0.01	51.0	0.01	53.0	0.02
TV	74.0	0.01	69.0	0.02	64.0	0.01
Gatherings	71.80	24.56	46.75	23.62	57.65	21.17
Internet	59.40	32.30	64.0	0.01	53.30	28.60
Did not hear	43.50	37.17	40.33	31.67	53.00	31.04
other	59.40	32.30	33.20	25.34	62.59	17.42
F	**4.6**		**3.5**		**3.1**	
p	**0.00***		**0.00***		**0.00***	

*Significant at p-value<0.05

Discussion

Nurses are pivotal in addressing and mitigating the impact of climate change on the healthcare sector. Therefore, it is essential to assess students' viewpoints on sustainability to equip nursing students for their evolving professional responsibilities within the framework of sustainable development. However, there has been limited examination of sustainability education strategies within nursing curricula, and the level of preparedness among nursing students regarding sustainability issues remains relatively unknown. Recently, there has been a growing interest in exploring the integration of sustainability education into nursing programs (**Anker et al., 2021**).

The findings of the current study indicated that the majority of nursing intern students fell within the age group of 22-25 years. This trend could be attributed to the common pathway wherein most intern nursing students enroll in nursing faculty after completing secondary school at around 18 years of age, undergo a 4-year study program, and subsequently commence their internship year. Additionally, a significant proportion of the participants were female, potentially reflecting the longstanding interest of females in pursuing careers in the nursing profession. This observation aligns with the findings of a study by **Elshall et al. (2022),** which aimed to evaluate the effectiveness of educational interventions on sustainable development. In their study, it was reported that a majority of students, approximately three quarters in both study and control groups, were female.

The findings of the current study indicated that over half of the intern students had prior awareness of sustainable development. This observation is consistent with the results of a study by **Zainordin, Wahi, Petrus, & Koh (2017),** where approximately 90% of respondents reported having heard about sustainable development previously, compared to 10% who had not. However, these results contrast with those of **Gürgen & Erkin (2022),** who found that more than half of their participants acknowledged not having heard about the concept of sustainable development before.

Furthermore, a majority of the participants reported acquiring knowledge about sustainable development from television. This trend may be attributed to Egypt's focus on comprehensive sustainable development and balanced regional development as outlined in Egypt Vision 2030. Consequently, there is heightened awareness and coverage of sustainable development topics across various television programs. This finding contrasts with the study conducted by **Moustafa Saleh & Elsabahy (2022),** which found that most nursing students primarily obtained information about sustainable development from their college or university.

Regarding total and subdimensions of knowledgee results, the current study indicated that the lowest total mean of knowledge of nursing intern students was at pre-educational intervention. The results also revealed a highly significant improvement in intern students' total and sub-dimensional knowledge regarding sustainability development after the program implementation. This result could be due to most intern nursing student had never participated in a sustainable development training program and that their nursing curriculum did not address this topic. Therefore, prior to this study, they lacked any formal knowledge of the sustainable development concept.

These results are consistent with several studies which have found that nurses lack the necessary knowledge to support and participate in sustainability development strategies before joining educational programs (**Kangasniemi et al., 2014, Anåker et al., 2015; Tiitta et al., 2021**). In contrast the result of the current study is not consistent with Mai, 2015, which revealed that, most of the surveyed students were well oriented with all sustainability-related topics.

Furthermore, the social sustainable dimension had the highest percentage of poor knowledge among the other dimensions at the pre-program phase, which improved after the program implementation. In addition, economic and environmental knowledge levels were increased at immediate post followed by follow up educational intervention with a highly

statistically significant improvement. This result might be due to that they didn't know the basic dimensions of sustainable development. They also didn't graduate yet and fully concentrated on finishing the internship year and they may have no time to increase their knowledge on sustainable development, as the majority of them may be work in private hospitals during their internship year. Also, the students in that stage focus on improve their skills and don't pay attention to other fields and concepts and one of such concepts is SDGs.

Regarding the total and sub-dimensions knowledge levels, the result of the current study shows that the total, environmental, social, and economical knowledge levels were improved at immediate and follow up educational intervention. Along with this study findings, **Ovais (2023)** illustrated that the nursing students had a low level of knowledge about sustainability, which emphasized the necessary to increase consciousness of the advantages and risks of sustainability. **Taie (2022)** also observed a poor knowledge of SD principles among perioperative nurses that were justified due to high quality models of patient care but did not include elements of SD. **Fields and Cunningham-Williams (2021)** also implied that nurses were not aware of many of the goals or even aware of the existence of the SDGs.

Behaviours changing is very complicated, it must be done based on in-depth, interdisciplinary knowledge, and understanding. Regarding the total and subdimensions of behaviour results, the current study showed that the lowest total mean of SD behaviours of intern nursing students was at pre-educational intervention. These results are consistent with **Saiz & Donald study (2017)** which indicated that the behavioral aspect of social and economic dimensions in SD has not been given priority. Thus, there should be firm efforts from the educators to bring these issues to the foreground and educate undergraduates on these aspects to fulfill the agenda of SDG 2030.

The current study results showed that the highest total mean score of behavior was at post-educational intervention followed by the follow up intervention. Additionally, for the post- and follow-up intervention program for nursing intern students, the behavior aspect with the highest mean score was the environmental, followed by economics, and finally social, with a highly significant improvement. This could result from how the educational intervention affected their knowledge, which improved how they behaved with sustainability development.

Regarding sustainable development behavior levels, the current study indicated that, environmental behavior was the highly improved dimension at immediate post and follow up educational intervention. This might be due to that, the environmental sustainability are topics very close to the participant's daily lives, also the recurrent media focus on importance of environmental sustainability to preserve resources like clean air, water and wildlife for future generations, this may help in increase the readiness of the participants to change their behaviors toward the environmental sustainability.

The current study revealed that good social behavior level was improved from only one third of the participants have good behavior in pre- program to about two third in post educational intervention. Furthermore, good economic behavior level was the lowest improved dimension at immediate post and follow up educational intervention. This might be due to that intern nursing student is still far from the nursing economic issues as they didn't have experience in nursing administration. Thus, they don't have complete picture about the economic concepts. This result is congruent with the study of **Ismail & AbdElkhalek (2021)** which revealed that economical behavioral plays a minimal role in developing sustainable development policies and environmental interventions in Egypt, which is a developing country, and a general willingness to change one's way of thinking towards more environmentally friendly choices, particularly if policy interventions derive the behaviors in that direction.

The above mentioned results are congruent with the study conducted by **Ratiu and Anderson (2014)** to find out words or phrases associated with sustainability among students, found out that the environment was

identified more often than economy. In other previous studies have reported that nursing students are poorly prepared to understand the connections among resources, climate change, environmental sustainability, and health (**Richardson et al., 2014, 2015**).In the same line with the current study's findings, **Sorour and Elkholy (2021)** also guaranteed that the majority of participants, who were nursing staff, exhibited moderate levels of SD behaviors across a variety of categories.

To learn more about sustainabile development, it is suggested that nurses should have positive attitudes towards these concepts, a sense of responsibility, a will to change, and confidence about the future (**Cruz et al., 2018; Lopezmedina et al., 2019).** intern nursing student' attitudes towards sustainability will inevitably impact on their use of resources, so it is important to measure attitudes and assess any changes in attitudes that follow interventions. Regarding the attitude toward sustainable development, the lowest total mean of the participants sustainable attitude was at pre-educational intervention. This finding is contradicted with results of **Idris, Kanemitsu, & Tochinai 2020,** which indicate that the Malaysian undergraduates have positive perceptions and attitudes towards SD.

In addition, the highest total mean of attitude was at post-educational intervention followed by the follow up intervention Moreover, regarding the attitude sub-dimension, the results show that the good environmental attitude level was the most increased dimension after the educational intervention. Good social and economic attitude levels were also improved at immediate post and at follow-up. So, the educational intervention was having a highly statistically significant improvement.

The observed shifts in attitude among nursing intern students could be attributed to their increased understanding of their role in providing sustainable healthcare and implementing the objectives of sustainable development following their participation in the educational intervention. These findings align with a study by **Cruz et al. (2018),** which aimed to evaluate nursing students' attitudes towards

the environment and sustainability in healthcare within the context of various influencing factors in Saudi Arabia. The study revealed that nursing students' attitudes were significantly influenced by exposure to environmental topics during nursing education, awareness of climate change issues, and participation in seminars and training related to environmental issues.

Regarding the relations between nursing intern students' personal characteristics data and total knowledge, behavior, and attitude dimensions. The results proved that there were a highly statistically significant relations between nursing intern students' personal characteristics data and total knowledge, behavior, and attitude dimensions. Intern nursing students who aged more than 25 years have higher SD knowledge, behavior, and attitude mean score than who less than 25 years old, this might be due to having more experiences related to SD.

The majority of the respondents were females, and they were having higher SD knowledge, behavior, and attitude mean score than males, this might be due to females' experiences gained from their roles in their home management which include managing all resources. The intern nursing students who heard about sustainable development before were having higher SD knowledge, behavior, and attitude scores than who didn't heard. There was a significant difference between nursing intern students' ssource of information about SD and total knowledge, behavior, and attitude dimensions.

Conclusion

Evaluating sustainability knowledge, attitudes, and behaviors is crucial in preparing nursing intern students for their future professional roles. Based on the findings of the current study, it can be inferred that the participation of nursing intern students in sustainable development educational interventions positively impacted their levels of knowledge, behavior, and attitude. The study revealed that the lowest total mean scores for intern nursing students' knowledge, behavior, and attitude were observed prior to the educational intervention. Furthermore, significant improvements were observed in the

total and sub-dimensional knowledge, behavior, and attitude of intern students following the implementation of the educational intervention, as well as during the follow-up phase. Consequently, the educational intervention can be deemed successful in achieving its objectives, with all hypotheses of the study being supported by the results

Recommendations

Based on the findings of this study, the following recommendations are proposed: **For nursing Education**

To realize the objectives of SDG 2030 across all dimensions of sustainable development, it is imperative to incorporate sustainability education into the undergraduate curriculum of nursing programs in higher education institutions. This integration can be accomplished by incorporating sustainability topics and issues as integral components of their educational framework. This may involve the inclusion of dedicated courses, workshops, or the integration of sustainability content into existing courses.

Furthermore, engaging nursing students in community outreach programs centered on sustainability and healthcare is essential. This could entail involvement in initiatives such as health education campaigns promoting sustainable practices, participation in community clean-up activities, or collaboration with local environmental organizations to address sustainability challenges in healthcare settings.

For intern nursing students

- Continue offering the sustainable development educational program to future intern nursing students to ensure a continued positive impact on their knowledge, behaviour, and attitude.
- Incorporate hands-on, practical experiences that allow intern nursing students to apply sustainable practices in real healthcare settings. This can include clinical rotations, simulation exercises, or field trips to healthcare facilities that prioritize sustainability.

- Provide intern nursing students during their internship year with practical tools, guidelines, and resources they can use to implement sustainable practices in their clinical settings. This can include checklists, guidelines for waste reduction, and resources on energy conservation.
- Invite guest speakers who are experts in sustainable healthcare practices to share their knowledge and experiences with the intern nursing students. This can provide valuable insights and inspiration for implementing sustainability in their future careers.
- Encourage nursing students to continue their education in sustainable healthcare practices even after graduation. Provide opportunities for further training, certifications, and continuing education courses.

For nursing internship students training places: -
Administrators should: -

- Develop policies and strategies that promote nursing staff sustainable competences.
- link rewards and compensation with nursing staff sustainability management practices.
- Similar educational interventions need to be integrated into clinical environments. This can be by way of induction programs for new staff and continuing professional development sessions.
- Enhancing the awareness of nurse managers regarding sustainable development and updating their competencies in this area is essential to foster a culture of sustainability development among nursing interns.

For nursing research

- Conduct further nursing research can be done to identify the nature of relationship between sustainable management knowledge behaviors, attitude, and patients' outcomes.
- Encourage nursing students to engage in research projects related to sustainable healthcare practices. This can contribute to

the body of knowledge in this field and promote innovative solutions.

Limitations

▪ An important drawback of this study is that it relied solely on data from a single Nursing faculty. Therefore, future research should aim to select samples from multiple nursing faculties to ensure the broader applicability of these findings.

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