

Effect of Social-Platform-Based- Educational Program on Critical Care Nursing Students' Knowledge and Practice toward Sustainable Development Goals

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Abstract:

Background: The implications of climate change on the world include infectious diseases, food insecurity, poverty, health disparities, and resource scarcity, among other things. The main way to control those effects is through sustainable development. Nursing students should be well-prepared to fulfill the vital role that nursing plays in sustainability development. **The aim was** to determine the effect of social-platform-based educational programs on critical care nursing students' knowledge and practice toward sustainable development goals (SDG). **Research design:** A Quasi-experimental (one group pre/post-test) design was utilized in the current study. **Setting:** The study was conducted at the faculty of nursing at Sohag University, Egypt. **Subjects:** A convenient sample of the 2nd academic year **critical care nursing students** was enrolled in the academic year 2023/2024 (no. =400). **Tools for data collection:** Two instruments were used as follows: (I) **Critical care nursing students'** sustainable development knowledge questionnaire which consisted of two parts; 1: personal characteristics and 2 - sustainable development knowledge and (II) **Critical care nursing students'** sustainable development practices observational checklist. **Results:** There were statistically significant differences in **Critical care nursing students'** sustainable development total knowledge mean scores post-social-platform-based- educational program and one month later than pre- social-platform based- educational program, as well as statistically significant differences with a marked increase in all dimensions of critical care nursing students' sustainable development total practices, mean scores post- social-platform based- educational program and one month later than pre- social-platform based- educational program. Also, the current study findings revealed a negative statistical correlation between the critical nursing students' total mean scores of sustainable development knowledge and their total mean scores of sustainable development practices. **Conclusion:** The implementation of a social-platform-based- educational program has a significant effect on improving critical nursing students' knowledge as well as practice regarding sustainability development goals. **Recommendations:** Training programs regarding sustainable development and incorporating sustainable development courses at different levels of nursing curricula.

Keywords: Critical nursing students, Knowledge and practices, social-platform based- educational program, Sustainable development goals (SDG)

Introduction:

Nursing education can support students in becoming both direct and indirect change agents for a healthier community (Mahfouz et al., 2024). A moral answer to the demand for global citizenship is the sustainable development goals incorporated into nursing education (Yoder et al., 2022). Through the concept of "global," the sustainable development goals provide a framework for nurse educators globally to

develop the principles of global nursing practice and respond to demands for well-being and fairness. Students now comprehend the relationship between local and global health because nurse educators have included sustainable development goals in the educational materials. Increasing social pressure on higher education institutions (HEIs) to participate in sustainable development-related activities has made HEIs social change agents (Chung, et al., 2024).

Sustainable development was defined as "the development that meets the needs of the present without compromising the ability of future generations to meet their own needs". It is also defined as an efficient and equitable sharing of resources along generations to operate the socio-economic activities of a finite ecosystem (Turcea & Ion, 2020). Sustainable development is based on three interdependent and mutually reinforcing pillars: environmental, economic, and social development (Elshall et al., 2022). Environmental sustainability focuses on safeguarding the natural environment and resources while fostering growth, addressing issues like pollution, resource management, and sustainable urbanization (Wallis & Loy, 2021). Economic sustainability ensures that current consumption meets needs without compromising future resources. It faces challenges like responsible resource use, balancing income and expenses, reducing income inequality, promoting sustainable production and costs, creating stable investment environments, and investing in key sectors. Moreover, social sustainability emphasizes concerns that promote human rights, equity, peace, human security, empowerment, participation, accessibility, cultural diversity, and institutional stability (Saleh & Elsabahy, 2022).

Sustainability is a dynamic state that involves interactions between social, economic, and ecological systems to prevent natural resource depletion and preserve ecological equilibrium. In order to accomplish the Sustainable Development Goals (SDGs), the healthcare system has a clear mission: "to ensure healthy lives and promote well-being for everyone of all ages" (Rodríguez-Jiménez, et al., 2023). In the nursing field, sustainability is theoretically linked to the long-term objective of maintaining a secure environment for present and future generations. The implementation of a health-in-all-policies strategy (i.e., "first do not harm") is morally required, and the healthcare sector must immediately become more sustainable and ecologically responsible (Anåker et al., 2024). The way healthcare is provided affects the environment and fuels climate change. Therefore, natural resource usage and disposal in clinical practice, as well as the environmental impact of these practices, should be covered in nursing education. Nursing courses need to

incorporate sustainability problems in a way that makes them "closer to home" and more applicable to clinical practice (Richardson et al., 2021).

The seventeen objectives outlined in the UN blueprint for a better world by 2030 include the following: the first is to end poverty; the second is to end hunger; the third is to promote good health and well-being; the fourth is to improve education; the fifth is to promote gender equality; furthermore, the sixth objective is to provide clean water and sanitation; the seventh is to provide affordable and clean energy; the eighth is to promote decent work and economic growth; and the ninth is to promote industry, innovation, and infrastructure; Furthermore, reducing inequality ranks 10th; sustainable cities and communities rank 11th; and responsible consumption and production rank 12th; Moreover, the thirteenth is taking action against climate change; the fourteenth is life below the surface of the ocean; the fifteenth is life on land; the sixteenth is peace, justice, and robust institutions; and the seventeenth is cooperation towards the goals (Mohamed et al., 2024).

A vital component of Sustainable Development Goal 3 is promoting health and well-being for people of all ages, and nursing is undoubtedly a significant part of achieving this goal. Nonetheless, the work of nurses also significantly influences other Sustainable Development Goals, sometimes known as the socioeconomic determinants of health (Taminato, 2023), such as increasing access to education and eradicating poverty. Integrating ecological, globalized, and holistic perspectives is sustainability, which forms the basis of nursing practice. Since its concept takes environmental factors into account at all scales, its application will lead to innovations that conserve the situation for the benefit of the present and the next generation.

Ensuring healthy lives for everyone and improving the well-being of all employees of all ages are two of the UN Sustainable Development Goals that the healthcare sector is explicitly mandated to achieve. Community-wide changes will be necessary to address these effects, especially in the area of nursing education, where new nurses should be prepared to face and resolve challenging situations (Taie, 2022).

Nursing students may be ready to challenge current practices and bring about improvements as change agents. As one might anticipate from institutions of higher learning, this necessitates a focus on critical thinking and change agency in nurse education. Furthermore, to question practice about climate change and sustainability issues, student nurses must possess the necessary information. Based on a study program, the educational intervention is specifically made to highlight to nursing students the importance of sustainability and climate change (Michel & Zwickle, 2021).

Nursing professionals, including students, need to understand the links that exist locally and globally, as well as the health inequalities and global concerns that exist (Gürgen Simsek & Erkin, 2022). Universities are increasingly seen as agents of change, helping to bring about the necessary changes to accomplish the 2030 goal and offering more than just specialized knowledge—they also help prepare students for global citizenship. Particularly in the nursing area, the Sustainable Development Goals are not well-known or utilized in higher education (Fields et al., 2022).

Social media platforms such as Facebook, Instagram, WhatsApp, Snapchat, and Twitter have made it possible to communicate consistently and efficiently by eliminating the barriers associated with in-person conversations. Social media is seen by patients as a means of learning about their conditions, facilitating rapid and efficient communication with others, and sharing medical records with other patients experiencing comparable difficulties (Alduraywish et al., 2020). The fact that social media platforms, together with mobile applications and communication technologies, are at the forefront of healthcare innovation is becoming more and more evident.

Dewi et al. (2019) state that although WhatsApp media has replaced SMS and MMS, medical practitioners can still use SMS to remind patients to take their prescriptions at a fair price. A popular app that facilitates communication is WhatsApp. The term "mobile health" or "mHealth" refers to the application of wireless and mobile communication technology to improve healthcare delivery, outcomes, and research. Traditional obstacles to knowledge of

geography, economics, and literacy can be addressed with the aid of digital technology (Ouedraogo, 2021).

Significance of the study:

The media exposure that women receive from reading newspapers, watching TV, and listening to the radio may lead them to look for maternity healthcare services. The phrase "mass media" describes any written, spoken, or broadcast communication intended for a larger audience. The media is a vital tool for integrating society (Viswanath et al., 2020). Mobile health services may be a component of innovative methods to modify behavior for improved health in addition to face-to-face interactions. Numerous apps are available on smartphones, such as Instagram, WhatsApp, email, short message service (SMS), and more, based on the needs of the user (Ouedraogo, 2021).

Education for sustainable development (ESD) hence promotes experiences and alters attitudes in addition to producing and sharing information. Students gain expanded environmental knowledge and critical thinking skills, which motivates them to create sustainable communities (Saleh & Elsabahy, 2022).

Since climate change and sustainability have historically not been covered in nursing courses in higher education, little emphasis has been placed on the skills and knowledge that nurses will need to address global sustainability issues. Furthermore, the abundance of international research on the broader topic of Higher Education for Sustainable Development offers some significant insights. In order to help nursing students understand the connection between their career aim of promoting healthy living and the global challenge of climate change, it has specifically focused on helping them acquire the basic sustainability skill of systems thinking (Richardson et al., 2021). Likewise, there is still a lot of research being done on this topic in Egypt. So, the purpose of this research was to determine the effect of social-platform-based educational programs on critical care nursing students' knowledge and practice toward sustainable development goals.

Operational definition:

Social media platforms are web-based communication tools that facilitate information sharing and consumption among users. The social media platforms mentioned in this article are WhatsApp, Messenger, and cell phones (Gonzalez-Padilla & Tortolero-Blanco, 2020).

Aim of the study

This study aimed to determine the effect of social-platform-based- educational program on critical care nursing students' knowledge and practice toward sustainable development goals.

Research hypothesis:

H1: Total mean score of critical care nursing students' knowledge in post- social-platform based- educational program phase will be higher than the mean score pre-program

H2: Total mean score of critical care nursing students' practice in post- social-platform based-educational program phase will be higher than the mean score pre-program.

Subjects and Method:

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 the medical dictionary definition (Miller, 2019).

Settings:

This study was conducted in the Faculty of Nursing at Sohag University, Egypt, using an online questionnaire via Google Forms and submitting the following link (<https://docs.google.com/forms/dle/1FWLPQKsd>)

Sample:

A convenient sample of the 2nd academic year **critical care nursing students** (no=400) in the previously mentioned setting

was recruited in the study during online link in November 2023 from 13 and 28 by using an online questionnaire via Google Form obtained from social media such as Facebook and WhatsApp groups. These **nursing students** completed an online via Google Form that was opened on 13 and 28 November 2023 for about fifteen days after the link was closed.

Tools of the study:

Tools: Two tools were used as follows:

Tool: (I) **Critical care nursing students' sustainable development knowledge questionnaire**; It was developed by the investigator based on a related literature review (Afroz, & Ilham, 2020; Sensor et al., 2021; Yu, & Wu, 2021). It was divided into two parts as follows:

Part 1: **Critical care nursing students' characteristics**: to assess the **critical care nursing students'** age, gender, educational level, years of experience and attending a previous sustainable development educational program.

Part 2: **Critical care nursing students' sustainable development knowledge questionnaire**: It consisted of 23 multiple choice questions as follows; the concept of sustainable development, importance, and barriers (7 questions), goals (3 questions), and main pillars (13 questions).

The Scoring system:

The total score of the test is 23 marks which were scored by one mark for each correct answer and zero for incorrect answer. The total score was expressed as a percentage with a cut-off point of 60%. A higher total score indicates a higher knowledge level that was calculated and transformed into three categories as follows; total score < 60% : considered poor knowledge, 60% to 80%: considered fair knowledge, and > 80% to 100%: considered good knowledge

Tool (II) critical care nursing students' sustainable development practices observational checklist

It was developed by the investigator based on a related literature review (Kallio, et al., 2018; Badea et al., 2020; Practice Green Health, 2023) to assess **critical care nursing students' sustainable development practices**. It includes 54 items that cover three dimensions categorized as

follows: environmental pillar-related practices (28 items), economic pillar-related practices (20 items), and social pillar-related practices (6 items).

The Scoring system:

The **critical nursing students'** responses for the practices were either done with (1) point or not done (zero). Total scores were expressed as a percentage with a cut-off point of 60% (Sorour et al., 2021; Ghazy, H. K., & Fathy, 2023). A score of $\geq 60\%$ was considered satisfactory while a score of $< 60\%$ was considered unsatisfactory

The procedure of data collection:

Preparatory phase:

This phase involved extensive reviewing of the recent related literature to develop data collection. Then, the sustainable development knowledge test questionnaire was translated into the Arabic language to suit the critical care nursing students' level of understanding. Furthermore, the tools' validation was done.

Validity of the tools:

A board of five expert professors, comprising two professors in community health nursing, two professors in education, and one professor in **critical nursing** with over five years of experience in the fields, evaluated the tools' face and content validity for clarity, comprehensiveness, appropriateness, and relevance. The tool's content validity index (CVI) was 87%.

Reliability of the tools:

The Cronbach's alpha reliability test was used to measure reliability. Results showed that the first tool had relatively homogeneous items, as indicated by high reliability ($\alpha=85\%$). The first tool's reliability ($\alpha=89\%$) and the second tool had correspondingly high reliability ($\alpha=913$). The Pearson correlation coefficient test was used to compare variables to determine the reliability of the tools. The variables' Pearson correlation coefficient fell between ($P. < 0.5$) to ($P. < 0.001$), indicating a highly significant positive connection between the participants' variables.

A pilot study

A pilot study was done on 10% of the sample once the tool was developed (40 Critical nursing students). It was done to detect any ambiguity in the tools, verify item transparency, and establish the time required for data gathering. The results of the pilot study were used to develop the final form of the tools, which included the clarification and testing of the practicality of the research process. Critical nursing Students included in the pilot study were included in the study.

Administrative and ethical considerations:

Approval was obtained from the ethical committee of the faculty of nursing, at Sohag University to conduct this study. Before beginning the questionnaire, the researcher told the Critical nursing students that the study was optional, that they might refuse to participate at any time, and that they could withdraw from the study at any time without giving a reason. Oral consent was obtained from the critical nursing students. They were also told that their information would be kept private and solely utilized for research purposes.

Phases of the study: The study was conducted through the following four phases:

I-Assessment phase:

From November 2023 from 13 and 28, the real fieldwork was conducted. To create the research, the researchers used an online Google form spreadsheet. To gather data, which included an online questionnaire, a link was sent by the researchers to the participants. What's App and Facebook groups displayed this link. The study's background, goals, and anticipated results were explained to critical nursing students on the first page of the questionnaire. The link; <https://docs.google.com/forms/dle/1FWLPQKsd> was sent to all the studied critical nursing students to determine their knowledge and practice toward sustainable development goals using a social-platform based- educational program. The online questionnaire was used twice. The first time, these were used as a pretest for the assessment of critical nursing students' knowledge about sustainable development goals and their reported practice of sustainable development goals. The effect of social-

platform-based- educational program on critical nursing students' knowledge and practices about their sustainable development goals was then examined using these tools once more as a follow-up after a week. The average time spent on critical nursing students' completion of the online questionnaire was approximately 15 minutes. Each critical nursing student involved in the study was informed about the purpose of the study, the components of the tools, and how to answer the online questionnaire. The researchers provided the critical nursing care students who participated in the What's App and Facebook groups with the social-platform-based-educational program contents after outlining the goal of the study. They also instructed the critical nursing students on how to use the social-platform-based- educational program.

II. Planning phase:

Based on the initial assessment data analysis, the investigator identified the critical care nursing students' educational needs and developed the social-platform-based- educational program on sustainable development in English version, translated into Arabic as well and its validity was reviewed by the nursing administration experts. Accordingly, the social-platform-based- educational program plan was established.

II-Implementation Phase:

Data were gathered for approximately 15 days, starting on November 2023 from 13 and 28, after the link was closed. The first thing the researchers did was introduce themselves to the critical nursing students and explain the purpose and nature of the study. An online-prepared Google Form was required of the participants to complete and submit. Critical nursing students' were informed about the Google form through groups on WhatsApp and Facebook. Each critical nursing student was assessed utilizing an online questionnaire as a (pretest) to gather baseline data before the online videos and presentation. On the first page of the online questionnaire, critical nursing students were notified about the purpose and anticipated results of the study, the contents of the instruments, and how to respond. During this stage, Zoom meetings were used by the researchers to

conduct virtual meetings with the study participants via chat, video, and phone calls. To guarantee that all study subjects were understood, sessions were conducted in Arabic. These sessions comprised four theoretical and one practical session. Each theoretical and practical lesson lasted between forty and fifty minutes, two days a week. Through Facebook and WhatsApp groups, critical nursing students who took part in the pre-test received the booklet through a Google Form. To better educate critical nursing students, the researchers produced posters, PowerPoint slides, and films. Additionally, the researchers produced online videos and audio that explained the booklet's contents to improve the knowledge and practices of critical nursing students about sustainable development goals

The theoretical and practical sessions were carried out as the following.

The first session (Theoretical): At the beginning of this session, the researchers introduced themselves, welcomed the **critical nursing students**, showed gratitude for their sharing in the study, and explained the objectives of these educational sessions. The 1st session covered the following items; concept, origin, and the main objective of sustainable development goals.

Second session (Theoretical): these sessions covered the items related to the role of the role of Universities in sustainable development goals sensitization.

Third session (Theoretical): this session covered the influential factors to achieving the sustainable development goals and the Importance of sustainable development goals.

Fourth session (Practical): this session covered the strategies nursing students suggested could be adopted to increase knowledge and practice about sustainable development goals.

Fifth session (Practical): Started by taking feedback about the previous sessions, and answering any questions related to sustainable development goals.

IV-Evaluation phase:

The questionnaire was re-posted to the participants on the Google Form for collecting after one month of sending the booklet, videos, PowerPoint presentation, and posters (post-test) using the same pre-test tools (tool I (part 2) and

II) to determine the effect of social-platform based- educational program on critical care nursing students' knowledge and practice of toward sustainable development goals.

Statistical analysis:

Using the SPSS version (25), the acquired data were tabulated, computerized, examined, and summarized 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 70% of the studied critical care nursing students aged ≤ 20 years with mean \pm SD 20.3 ± 1.2 , 75% were female students, and 82% lived in rural areas. Also, no one (0%) of them did not attend previous training programs regarding sustainable development goals.

Table (2) illustrates that there was a highly statistically significant difference between critical care nursing students' knowledge scores regarding sustainable development goals pre and post-social-platform-based- educational program **implementation** at ($P < 0.001$).

Figure (1): illustrates that 96% of the studied **critical care** nursing students had poor knowledge about sustainable development goals pre-social-platform based- educational program implementation decreased to 0.0% post-social-platform based- educational program implementation and 92% of them had good knowledge level post-social-platform

based- educational program implementation with statistically significant differences $P - < 0.0001$.

Table (3) shows that there was a highly statistically significant difference between critical care nursing students' practice scores regarding sustainable development goals pre and post-social-platform-based- educational program **implementation** at ($P < 0.001$).

Figure (2): illustrates that 98% of the studied **critical care** nursing students had unsatisfactory practices about sustainable development goals pre-social-platform based- educational program implementation decreased to 0.0% post-social-platform based- educational program implementation and 96% of them had satisfactory practices level post- **social-platform based- educational program** implementation with statistically significant differences $P - < 0.001$.

Table (4) reveals that there was a highly significant statistical correlation between critical care nursing students' total knowledge score and their age, gender, and previous training programs.

Table 5 reveals that there was a highly significant statistical correlation between critical care nursing students' total practice score and their age, gender, and previous training programs.

Table (6) shows a correlation between the critical care nursing students' knowledge and practice scores before and after the social platform-based educational program was implemented. The knowledge and practice scores showed statistically significant differences ($p < 0.05$).

Table (1): Demographic data of the studied critical nursing students (n = 400)

Items	No	%
Age		
≤20	280	70.0
≥20	90	30.0
Mean ± SD	20.3 ± 1.2	
Gender		
Male	100	25.0
Female	300	75.0
Residence		
Rural	316	79.0
Urban	84	21.0
Previous attendance training program regarding sustainable development goals		
Yes	0	0.0
No	400	100.0

Table (2): Differences in knowledge scores regarding sustainable development goals among the studied critical care nursing Students' pre and post-social-platform based- educational program implementation (N = 400)

Critical care nursing Students' knowledge of sustainable development goals	Study Group (n= 400)				X2	P-value
	Pre- social-platform based-educational program		Post- social-platform based-educational program			
	No	%	No	%		
Concept of sustainable development, importance and barriers (7 questions)	88	22.0	392	98.0	F=99.6 P<0.001	
Goals (3 questions)	72	18.0	384	96.0		
Main pillars (13 questions).	76	19.0	376	94.0		

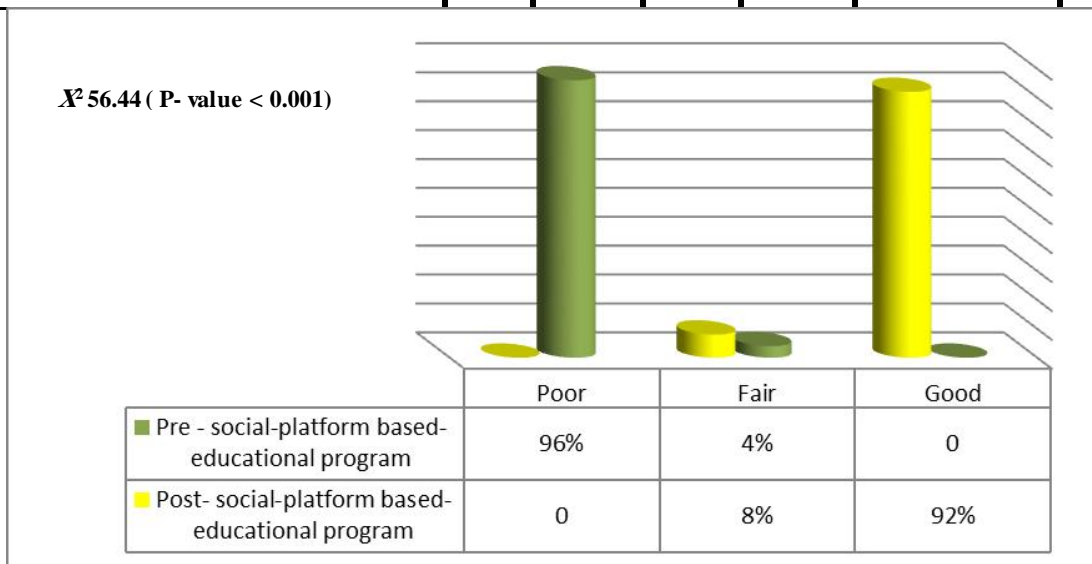


Figure (1): Total knowledge levels of the studied critical care nursing students about sustainable development goals pre and post-social-platform based- educational program (n=400).

Table (3): Differences in practice scores regarding sustainable development goals among the studied critical care nursing students pre and post-social-platform based- educational program implementation (N = 400)

Critical nursing Students' practices of sustainable development goals	Study Group (n= 400)				X2	P-value
	Pre- social- platform based- educational program		Post- social- platform based- educational program			
	No	%	No	%		
Environmental pillar-related practices (28 items)	80	20.0	392	98.0	F=76.54 P<0.001	
Economic pillar-related practices (20 items)	64	16.0	376	94.0		
social pillar related practices (6 items)	52	13.0	384	96.0		

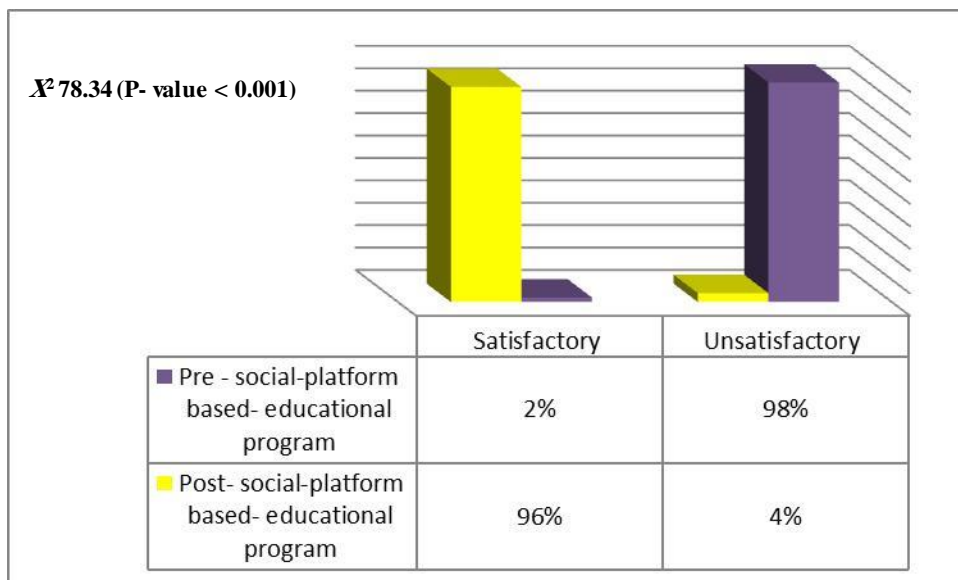


Figure (2): Total practice levels of the studied critical care nursing students about sustainable development goals pre and post-social-platform based- educational program (n=400).

Table (4): Correlation between personal data of critical care nursing students and the total knowledge scores n=50

Variables	r	X2	P value
Age and total knowledge scores	0.32		0. 01*
Gender and total knowledge scores		7.42	0.02*
Previous training course and total knowledge scores	0.35		0.01*

Table (5): Correlation between personal data of critical care nursing students and the total practice (n= 50)

Variables	r	χ^2	P value
Age and total practice scores	0.21		0.00*
Gender and total practice scores		9.19	0.02*
Previous training course and total practice scores	0.43		0.00*

Table (6): Correlation Co-efficient between total knowledge scores and practice scores pre and post-educational guidelines implementation

Correlation	Practice scores	
	R	P
Knowledge score		
Pre-social-platform based- educational program	0.176	0.359
Post-social-platform based- educational program	0.385	0.048*

Correlation is significant at the 0.05 level **

Discussion

Due to the significant effects of climate change and sustainability on the environment, society, and economy, higher education is in great demand worldwide (**Shaw et al., 2021**). Hence, the study was conducted to determine the effect of social-platform-based-educational programs on critical nursing students' knowledge and practice toward sustainable development goals.

According to the current study's findings, the majority of the critical nursing students under study are from rural areas, and almost three-quarters of them are female. Their mean age was 20.3 ± 1.2 years. These findings might be the consequence of more students recently enrolling in nursing programs due to the advantages of working in the human services field, including job responsibilities, high compensation, and helping others.

According to the current study's findings, females made up over half of critical nursing students. The fact that women still make up the majority of nurses and that male enrollment at our faculties is still relatively low may be used to address it. The majority of their nursing students were female, according to **Ebrahim et al. (2022)**, which is in line with this finding. These results could be explained by the fact that nursing is historically and predominantly a female profession with relatively low male enrollment at nursing academic institutions compared to females, leading to females dominating the nursing workforce at healthcare institutions. In the same line, some studies reported that the majority of the sample were females (**Saleh et al., 2023; Lai et al., 2021**).

Most of the students studying critical nursing were from rural areas. Rural residents are trying to raise their income because, according to research, their socioeconomic status is poor and their income is decreasing. According to

Almaty (2019), rising unemployment, falling wages, and rising living expenses were the main causes of the increase in poverty and overall decline in rural living circumstances, especially for rural women. To improve socioeconomic standing, these improvements have resulted in rising wages and job searching for government jobs.

The current study's findings demonstrated that none of them had participated in a prior training session on sustainable development goals. The researchers believed that this demonstrated the urgent need to implement a social-platform-based- educational program on sustainable development goals. This could be explained by the fact that the concept of sustainable development is relatively new and was not covered in the current study nursing curricula. Another study reported that the vast majority of the sample did not attend sustainability sessions, with only a small percentage having attended a few educational sessions during their studies (**Álvarez-Nieto et al., 2022**).

The current study's findings demonstrated that the mean scores of critical nursing students' total knowledge of sustainable development goals before and after the social-platform-based- educational program differed in a highly statistically significant way. From the researchers' perspective, it demonstrated how important it is to implement a social-platform-based- educational program to improve the knowledge of critical nursing students.

On the same line, a study revealed a higher mean score of participants' knowledge and attitude toward sustainability development after the intervention of a similar program. Moreover, there was results indicated a significant improvement in nurses' knowledge of climate change, sustainable development, and healthcare sustainability goals following instructional guidelines. In addition, other studies highlighted statistically significant

differences in students' scores on economic and environmental sustainability (**Mahfouz et al., 2024**). Nearby results were reported, that most nurses were unaware and lacked knowledge about sustainable development goals but were eager to learn more (**Hawkins et al., 2024**). Accordingly, there was an emphasis on the importance of raising awareness of SDGs among healthcare providers (**Kitt-Lewis et al., 2020**).

Regarding knowledge levels, a study depicted that more than half of the nursing internship students exhibited poor knowledge levels before the intervention, whereas post-intervention, about three-quarters, demonstrated a significant improvement (**Saleh et al., 2023**). In the same line, another study reported an improvement in total environmental, social, and economic knowledge levels following immediate and follow-up educational intervention. Also, a study (2024), reported that more than two-thirds of participants had inadequate knowledge level pre-program, but this improved to over three-quarters post-intervention (**Mahfouz et al., 2024**). Similarly, another study found that nursing students demonstrated excellent knowledge after scenario-based learning and augmented reality training on sustainability and climate change (**Álvarez-Nieto et al., 2021**). Additionally, there were increased knowledge levels about climate change from pre- to post-test (**Abdallah & Farag, 2022**).

The current study's findings showed that the majority of critical nursing students had poor levels of knowledge about the Sustainable Development Goals before the implementation of a social-platform-based-educational program. This knowledge level dropped to zero after the social-platform-based- educational program was implemented, and once the social-platform-based-educational program was implemented, the majority of the students had good levels of knowledge, which was statistically significant. Although the notion of sustainability development is widely recognized, nursing students may still be unfamiliar with it, which could explain this conclusion. Their nursing education also did not address this knowledge. Most of them also said that they had no idea what the Sustainable Development Goals were. Another explanation for this could be that

nursing education is more difficult and intimidating for students, leaving them with little free time to attend workshops or training sessions.

According to **Anåker et al. (2021)**, nursing students found it challenging to implement sustainability and came to the conclusion that further education was necessary. The study also noted that the inability to connect or balance the many viewpoints on sustainability and climate change was another factor contributing to the conflict between these opposing viewpoints. More attention should be paid to global issues in nursing education, with a particular emphasis on the detrimental effects of climate change on human health (**Tiitta et al., 2021**).

According to **Shaw et al. (2021)** and **Aronsson et al. (2020)**, education plays a significant role in achieving sustainable development goals. Therefore, teaching aspiring nurses how to provide sustainable healthcare must be a primary focus of nursing education.

The researchers speculate that these results might be explained by nursing students' low sustainability understanding, which they found resulted in low sustainability practices. The students were unable to comprehend the principles of sustainable development since they were unclear about them. They were not sufficiently equipped to embrace sustainable practices by comprehending their roles and responsibilities in climate change management and putting sustainable development principles into effect.

These findings are in line with those of **Ebrahim et al. (2022)**, who found that most students at the pre-educational intervention had low mean scores for knowledge, attitude, and conduct related to sustainable development.

The present study's findings demonstrated a highly statistically significant improvement and difference between the mean scores of critical nursing students' overall practices concerning sustainable development goals before and after the adoption of educational guidelines. It confirmed the efficacy of the application of the social-platform-based-

educational program, according to the researchers. Results of other studies found that educational programs on sustainable development increased participants' willingness to practice sustainably, and positively impacted students' knowledge, attitudes, and daily practices (**Badea et al., 2020; Kolenatý et al., 2022; Ghazy & Fathy, 2023**). Similar studies observed a significant improvement in student-teacher attitudes toward sustainable development following an intervention [53]. The result is also, matched with those who found a highly significant improvement in participants' daily activities to reduce climate change post-training program, with nearly half of the sample showing improved indoor and outdoor practices (**Abdallah & Farag, 2022**).

In addition, studies like (**Faltas et al., 2022; Grandisoli & Jacobi, 2020**) found a significant improvement to a satisfactory level regarding practices and behaviors level post-intervention. Also, a study found that the majority of nursing staff had moderate sustainable development behaviors while another one noted that the majority of nurses had unsatisfactory practices regarding green practices before the guideline program, but post-intervention, most had satisfactory practices, with a slight decrease at follow-up (**Faltas et al., 2022; Sorour et al., 2021**).

According to the current study's findings, nearly all critical nursing students had unsatisfactory practices regarding the sustainable development goals before the implementation of a social-platform based-educational program, and nearly all of them had good practices following the implementation of a social-platform based-educational program, with statistically significant differences. It demonstrated the benefits of using a social-platform based-educational program, according to the researchers. This is corroborated by **Saleh & Elsabahy (2022)**, who noted the low mean for challenge practice at the time of the pre-educational intervention. With a highly significant improvement for both research groups, the post-intervention program for SNI and ENI also showed the highest mean scores for challenge practice.

This result is consistent with that of **Aronsson et al. (2020)**, who asserted that climate change

impacts medical professionals' capacity as well as people's health. On a practical and policy level, nurses will need to be ready to tackle new difficulties. Nursing undergraduate programs that include clinically relevant sustainability sessions can help nurses challenge unsustainable behaviors and make changes, according to one study. However, there were still issues that needed to be addressed to improve students' self-esteem and workforce comprehension in general.

The current study's findings showed that critical nursing students' previous training, gender, and place of residency are significantly correlated. This can be explained by the fact that critical care students reported knowing less than those in previous academic years. People with more education and experience should naturally be more knowledgeable and conscious. Similar results were found by **Sunthonganokpong & Murphy (2019)**, who show a discernible variation in awareness throughout time. More alertness was indicated by second-year students than by those in the first, third, fourth, and fifth years. There are statistically significant differences between students' perspectives regarding sustainable development goals and their age, which is verified by the findings of **Abd Elhamed et al. (2022)**. Moreover, 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 findings of the present study showed a correlation between statistically significant differences in nurses' knowledge and practice scores and their overall scores before and after the application of a social-platform-based-educational program. It validated the effectiveness of the application of the social-platform-based- educational program, according to the researchers. Also, it was reflected that bettering critical nursing students' practices is linked to bettering knowledge. This correlation clarifies why more information results in more practices. Furthermore, the study's critical nursing students were able to practice successfully after gaining sufficient knowledge.

Afroz & Ilham (2020) evaluated university students' knowledge, attitudes, and practices regarding sustainable development goals and discovered that there was a difference between these results. Students are well-informed about the sustainability development goals, but they are not practicing them enough, as seen by the modest negative association between their knowledge and practice of the goals. Conversely, there was a statistically significant and highly positive correlation between students' practice level and sustainability development goals, indicating that students will be more motivated to practice at a high level if they have a positive understanding of these goals. This could be due to nurses facing some challenges in applying some practices in real-world settings, such as institutional constraints, lack of supportive policies, inadequate supervision, and not including sustainable practices in routine work.

Conclusion:

From the findings of the present study, it can be concluded that the implementation of a social-platform-based- educational program has a significant effect on improving critical nursing students' knowledge as well as practice regarding sustainability development goals. Also, there was a significant correlation between knowledge and practices among critical nursing students.

Recommendations:

Based on the current study findings, it can be recommended that:

- Training programs regarding sustainable development and incorporating sustainable development courses at different levels of nursing curricula.
- It is imperative that written standards pertaining to sustainability development goals be periodically reviewed and updated. Diagrams and clear instructions should be included in these resources.
- Using social media and the internet, nursing students are being educated about the concept and goals of sustainability development.
- Using a variety of teaching

approaches, address sustainability development in the curriculum to prepare nursing students for their professional role in sustainability development.

- To generalize the findings, more research is needed, including a replication of the current study with a large sample of students in various situations.

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