

Developing and Implementing an Educational Program about Sustainable Development Goals for Nurse Managers

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Abstract:

Background: Sustainability in nursing is essential for promoting long-term environmental and public health, ensuring safe and healthy future for current and upcoming generations. Nurse managers are key to implement sustainable practices within healthcare institutions, and make their understanding of the Sustainable Development Goals vital to fostering a culture of sustainability. **Aim:** To develop, implement, and evaluate an educational program about the Sustainable Development Goals for nurse managers. **Study design:** A quasi-experimental design was employed in this study. **Setting:** The study was conducted at Al-Azhar University Hospital and Assiut University Hospitals. **Study sample:** Convenience sample included all nurse managers at Al-Azhar University Hospital (n=54) and Assiut University Hospitals (n=218). Data were collected with a questionnaire that consists of two parts, one part related to personal characteristics as department, hospital name, age, years of experience, gender, educational qualification, and previous training) second part includes knowledge of Sustainable Development Goals scale: An open-ended questionnaire consisted of seven questions to assess understanding of the Sustainable Development Goals in nursing. **Results:** Prior to the educational program, nurse managers in both groups exhibited low levels of knowledge about Sustainable Development Goals. Post-program assessment revealed significant improvement in their knowledge, indicating the effectiveness of the educational intervention. **Recommendations:** Ongoing evaluation and follow-up assessment are recommended to monitor the retention and application of Sustainable Development Goals knowledge. Further research should investigate the long-term effects of Sustainable Development Goals education on sustainable healthcare practices and leadership.

Keywords: Educational Program, Nurse Managers & Sustainable Development Goals

Introduction:

Sustainability is an evolving concept that involves the interconnections between ecological, economic, and systemic factors to ensure the preservation of natural resources and maintain ecological balance. The healthcare system plays a crucial role in advancing the UN Sustainable Development Goals (SDGs), particularly in promoting health and well-being for people of all ages, among other objectives (Elshall et al., 2022). Given this, the healthcare sector must urgently adopt more environmentally responsible and sustainable practices, guided by the ethical responsibility to implement a health-in-all-policies approach (i.e., "first do no harm") (Mekawy, 2023). Sustainability is a process of development and adaptation in response to the needs of both the organization and patients (Borges de Oliveira and de Oliveira, 2022). Hospitals must shift their focus on sustainability from a short-term to a long-term outlook to ensure their survival and continued viability (Saviano, 2018).

Sustainability is defined by its economic, environmental, and social pillars, and effective management of these pillars is crucial for hospitals to remain resilient and fulfill their mission of treating

and saving lives. The 2030 Agenda for Sustainable Development, established by the United Nations (UN) in 2015, outlines the Sustainable Development Goals (SDGs) as an action plan for people, the planet, and prosperity. These 17 goals are comprehensive and indivisible, balancing the three dimensions of sustainable development: economic, social, and environmental (Verdejo Espinosa et al., 2021). The SDGs serve as a collection of interconnected global objectives aimed at being a "blueprint for a better and more sustainable future for all" (United Nations, 2017). This new set of goals not only highlights the urgency of development but also underscores that this development must be sustainable and promote equality. While acknowledging different national realities, the development goals are designed to be universally applicable and to leave no one behind (Vinuesa, 2020).

The 17 Sustainable Development Goals (SDGs) are: Eradicating Poverty, Ending Hunger, Ensuring Good Health and Well-being, Providing Quality Education, Achieving Gender Equality, Ensuring Clean Water and Sanitation, Promoting Affordable and Clean Energy, Supporting Decent Work and Economic Growth, Advancing Industry, Innovation, and

Infrastructure, Reducing Inequalities, Building Sustainable Cities and Communities, Encouraging Responsible Consumption and Production, Taking Climate Action, Protecting Life Below Water, Preserving Life on Land, Promoting Peace, Justice, and Strong Institutions, and Fostering Global Partnerships for the Goals (Cutter, 2020).

Nurses as leaders in both the community and healthcare, possess a powerful and influential voice. By adopting sustainable practices and advocating for a more climate-resilient future, which has a significant detrimental impact on both human health and environmental sustainability. Furthermore, it is crucial to educate nurses and enhance their awareness of potential global health risks (Greenwalt et al., 2020).

Goal 3 of good health and well-being is closely linked to the nursing profession. The nurse's role includes the promotion of health, prevention of illness, and care for individuals who are physically ill, mentally ill, or disabled, across all ages, in healthcare and community settings (Fields et al., 2021). Nurses and midwives make up nearly half of the global healthcare workforce and have significant potential that lead to SDGs achievement (Rosa et al., 2021).

Nurse leaders play a crucial role in achieving the (SDGs), particularly in the areas of health and well-being. As frontline healthcare providers, nurse leaders are integral in shaping policies and practices that promote equitable and accessible healthcare for all, which directly aligns with SDG 3 ensuring healthy lives and promoting well-being for all at all ages (World Health Organization [WHO], 2020). Moreover, nurse leaders influence the broader health system through their leadership in infection control, patient safety, health promotion, and advocacy for marginalized communities (Borges de Oliveira & de Oliveira, 2022). Their expertise in managing healthcare teams and resources also contributes to achieving SDG 5 on gender equality, as nursing is a predominantly female profession, and empowering nurse leaders can help address gender disparities in the workforce (Rosa et al., 2021). By fostering collaboration and advocating for policies that promote sustainability, nurse leaders can drive significant progress in realizing the SDGs, demonstrating their vital role in building a healthier, more equitable world (Osingada & Porta, 2020).

Billions of people worldwide live in poverty, with increasing inequalities both within and between countries. Issues such as disparities in wealth and power, gender inequality, unemployment, global health threats, natural disasters, climate change, conflicts, terrorism, humanitarian crises, and forced displacement of people all pose significant challenges

to the ability of nations to achieve sustainable development (Şimşek & Erkin, 2022).

Nursing homes and other healthcare facilities must play a crucial role in addressing these phenomenon, which negatively impacts both human health and the environment's ability to sustain itself (Mcalister et al., 2022). Another significant challenge arises from disruptions in the supply of essential healthcare resources during natural disasters and other geographical events, caused by resource scarcity. The Arab world faces the threat of healthcare resource depletion, which could jeopardize human survival in the future and have a considerable impact on the provision of safe, high-quality care (Mekawy, 2023). Professional development through education and training is crucial for enhancing individual capabilities and improving workforce productivity. It contributes to the quality of the workforce across various sectors, including education, healthcare, economics, the environment, and human rights. As such, it plays a vital role in building a strong human resource foundation for sustainable development. Without adequate professional development, the achievement of the SDGs outlined in the 2030 Development Agenda could be at risk by 2030. Sustainable Development Goal 4, which focuses on "Quality Education," aims to "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all." Professional development in education not only enhances the quality of education but also helps achieve the targets set for the SDGs (Havea & Mohanty, 2020).

Significance of the study:

As programs and activities related to sustainability are being developed, it is essential to find effective methods for maintaining the engagement of hospital staff. Despite the considerable research on the benefits of sustainable healthcare delivery programs, there is a lack of studies focused on strategies to keep hospitals actively involved (Mousa, & Othman, 2020). It is noticed that there has been limited attention to the knowledge and competencies nurses will need to respond to global sustainability challenges in Upper Egypt. While it is known that managerial education and the development of leaders may help spread the best practices for fulfilling the SDGs, so that the researchers were inspired to create and administer a training program about Sustainable Development Goals at for nurse managers working at Assiut University Hospitals and Al-Azhar University Hospital.

Aim of the study:

To develop, implement, and evaluate an educational program focused on the SDGs, for nurse managers.

Specific objectives:

1. Assess the knowledge, and behavior of nursing managers related to (SDGs).
2. Develop and Implement an educational program about sustainable development for nurse managers.
3. Examine the changes in knowledge and behavior regarding (SDGs) before and after the educational intervention in the study groups.
4. Evaluate the effect of educational intervention about sustainability development among nursing managers.

Research hypothesis:

- H1:** A significant difference exists between the study groups from Al-Azhar University Hospital and Assiut University Hospitals in terms of knowledge and behavior related to sustainable development prior to the educational intervention.
- H2:** A significant difference is observed in knowledge and behavior regarding sustainable development before and after the educational intervention within the study groups.
- H3:** Nurse managers who participate in the sustainability development educational intervention improve in both their knowledge and behavior towards sustainable development.

Subjects and Method:

Research design: A quasi-experimental (Pre & posttest) research design was utilized for the current study.

Setting: The research was conducted at Al-Azhar University Hospital and Assiut University Hospitals. The training program was conducted in a classroom setting at El Azhar University Hospital and at the continuing education training center at Main Assiut University Hospital.

Subjects: The study sample included a convenience sample of all nurses manager fulfilled line management in first line, mid line, and top line managers working at Al-Azhar University Hospital (No= 54), and all nurses managers working at all Assiut University Hospitals (No= 218). With a total number (272) as follows:

Hospitals	No
1- Al-Azhar University Hospital	54
2- Assiut University Hospitals	
Main Assiut University Hospital	44
Children Hospital	30
Urology Hospital	28
Neurologic & Psychiatric Hospital	36
Women Health Hospital	20
Al rahjhy Hospital	20
Heart Hospital	40
Total at Assiut University Hospitals	218
Total number of the sample	272

Data collection tools: The data were collected by the researchers which including two parts:

Part (I): Demographic data form:

Which include: department, hospital name, age and years of experience, gender, educational qualification, and number of educational programs about SDG.

Part (II): SDGs knowledge scale:

An open ended questionnaire was developed by the researchers based on reviewing the available literature **WHO, (2020), Aronsson, et al., (2020) & Bennett, et al., (2020)** to measure nurse manager's knowledge about SDGs. It consisted of 7 open ended questions.

Scoring system:

Correct answer for each question was given (2), the answer that is incomplete was given (1), and incorrect answer was given (0). The total score ranged from 0-14. Low level of knowledge (<7), moderate level of knowledge (7), high level of knowledge (>7).

Study procedures:**Validity of the study tool:**

By distributing the tool to a panel of experts comprising two professors from Community Health Nursing Departments and three professors of Nursing Administration, the study's instruments were examined for face and content validity. Experts deemed the study tools to be valid. The content validity was examined and evaluated using the confirmatory factor analysis test to ensure the importance, clarity, and accountability of each item. The results showed that all of the study tools items were ≥ 0.90 . The results showed that all items of the (SDGs) Scale had acceptable loadings, confirming their validity.

The pilot study:

The pilot study was conducted by the researchers to evaluate the internal consistency of the measurement instruments used in the larger study. This pilot involved 10% of the nurse managers, and aimed to assess the reliability of the instruments through Cronbach's Alpha Coefficient. The results indicated that the alpha value was greater than or equal to 0.80 for each item of the (SDGs) tool, demonstrating good internal consistency. Nurse managers who participated in the pilot study (no=27) were subsequently excluded from the main study to avoid bias in the results. Following the pilot study, necessary modifications to the instruments were made based on the feedback received from the pilot study, and this process took approximately one week

Field Work:

An official permission was obtained from the hospital director, the director nursing service administration, and the head of each department at both Al-Azhar University Hospital and at Assiut University Hospitals before initiating on the data collection.

Ethical Considerations:

Research proposal was approved by Ethical Committee at the Faculty of Nursing, Assiut University. Confidentiality and anonymity assured. The study posed no risks to participants during its implementation. It adhered to established ethical standards in clinical research. Oral and written consent were obtained from all participants, who were informed of their right to refuse participation or withdraw from the study at any time without explanation. Confidentiality and anonymity were ensured, and participants' privacy was respected throughout the study.

Collection of data.

Data collection began at the end of October 2023 and continued until the end of February 2024. During this period, a training program was conducted to educate participants about the (SDGs). The researchers met with the nurse managers to clarify the study's purpose and received their oral consent at first to take part. The training program was conducted over a period of more than three months.

For the nurse managers at Al-Azhar University, the program lasted 2 days, divided into 4 sessions, with 2 sessions each day from 9 AM to 1 PM. In contrast, the nurse managers at Assiut University Hospitals attended the program for 4 days, with a total of 8 sessions, also consisting of 2 sessions each day during the same time frame. All sessions were scheduled to accommodate the working hours of the participants.

The actual time of the sessions:

At the start of the first session, the researcher gave each group an explanation of the study's purpose, program goals, contents, and schedule. The objectives of the session were outlined at the start of each one. Feedback on the sessions was completed every day, and a summary of the current session was given at the conclusion of each session.

During the program's implementation, the researchers employed a variety of teaching techniques, including lectures, brainstorming sessions, and small-group discussions. They also used instructional aids, including power point presentations, flip charts, posters, brochures and video presentations.

A pretest about SDGs was administered before the beginning of the program and after the completion of the educational program, participants were assessed with a post-test to measure the immediate impact of the training on their knowledge and understanding of the (SDGs).

A comparison between before and after program's implementation was made. All participants received their attendance certificates at the conclusion of the training session.

Follow-Up Assessment:

Three months after the educational program (in February 2024), a follow-up assessment was conducted to evaluate the long-term retention of the knowledge and the potential changes in the attitudes and practices of the nurse managers regarding the SDGs. The follow-up aimed to gather data on whether the program had a lasting effect on their understanding and implementation of the SDGs in their professional roles.

The follow-up included a re-administration of the SDGs knowledge test (similar to the post-test) to assess retention of information.

Limitations of the study:

The researcher encountered several limitations during the data collection period, which include the following points:

- The number of nurse managers working within the units.
- Limited knowledge among nurse managers regarding the research topic.
- Prolonged working hours that affected participation.

Statistical analysis:

The collected data were reviewed for accuracy before being entered and analyzed using the Statistical Package for the Social Sciences (SPSS) version 20. Descriptive statistics were used to present the data, including frequencies and percentages for qualitative variables, and means and standard deviations for quantitative variables. Quantitative variables were compared using the chi-square test, paired t-test, Pearson correlation, and analysis of variance (ANOVA). Statistical significance was considered at a P-value of ≤ 0.05 .

Results:**Table (1): The demographic characteristics of the studied groups**

	Al-Azhar University Hospital (n=54)		Assiut University Hospital (n=218)		F	P. value
Age						
Less than 30 year	34	63%	80	36.7%	19.348	<0.001**
From 30-40 year	18	33.33%	72	33.02%		
More than 40 year	2	3.7%	66	30.28%		
Mean±SD	31.7±5.11		36.86±9.13		15.953	<0.001**
Gender						
Male	0	0%	46	21.1%	13.714	<0.001**
Female	54	100%	172	78.9%		
Education Level						
Nursing Diploma	2	3.7%	25	11.47%	19.292	0.001**
Bachelor degree in nursing	48	88.89%	132	60.55%		
Technical nursing institute	0	0%	30	13.76%		
Technical heath institute	0	0%	16	7.34%		
Master Degree	4	7.41%	15	6.88%		
Years of experience						
Less than 5 year	0	0%	50	22.94%	70.658	<0.001**
From 5-10 year	46	85.19%	53	24.31%		
From 10-15 year	4	7.41%	37	16.97%		
From 15-20 year	2	3.7%	33	15.14%		
More than 20 year	2	3.7%	45	20.64%		
Mean ± SD	8.81±5.49		14.6±10.68		14.826	<0.001**
Educational Courses about sustainable development goals						
No	54	100%	149	68.35%	22.901	<0.001**
Yes	0	0%	69	31.65%		

Chi square test for qualitative data between the two groups

*Significant level at P value < 0.05,

**Significant level at P value < 0.01

Table (2): Distribution of (SDGs) Knowledge Levels during three program Phases (Pre, post and Follow Up) related to the two groups

Knowledge Level About (SDGs)	Al-Azhar Hospital (n=54)		Assiut University Hospitals (n=218)		F	P. value
Pre test	No.	%	No.	%		
Low	54	(100%)	218	(100%)	0	0
Moderate	0	(0%)	0	(0%)		
High	0	(0%)	0	(0%)		
Mean±SD	0.04±0.19		2.27±3.07		28.342	<0.001**
Posttest						
Low	0	(0%)	0	(0%)	0.001	0.980
Moderate	8	(14.81%)	32	(14.68%)		
High	46	(85.19%)	186	(85.32%)		
Mean±SD	13.85±1.12		14.56±1.62		9.225	0.003**
Follow-up						
Low	10	(18.52%)	0	(0%)	62.324	<0.001**
Moderate	44	(81.48%)	138	(63.3%)		
High	0	(0%)	80	(36.7%)		
Mean±SD	10.26±0.89		11.84±2.19		27.023	<0.001**

Chi square test for qualitative data between the two groups

Independent T-test quantitative data between the two groups -

*Significant level at P value < 0.05,

**Significant level at P value < 0.01

Table (3): Pre, post and follow-up of (SDGs) score at Al-Azhar Hospital and Assiut University hospitals

(SDGs)	University Hospital		
	Pre test	Posttest	Follow-up
Al-Azhar Hospital (n=54)	0.04±0.19	13.85±1.12	10.26±0.89
Assiut University hospitals (n=118)			
Children Hospital (n=30)	0.87±1.85	14.47±1.5	10.97±1.38
Urology Hospital (n=28)	0±0	13.57±1.62	10.14±0.36
Women Health Hospital (n=20)	0.4±0.5	14.8±1.51	11.4±2.01
Main Hospital (n=44)	0.64±1.74	14.27±1.56	10.91±1.58
Neurologic & Psychiatric Hospital (n=36)	4±3.7	14.78±1.24	11.89±2
Al rahjhy (n=20)	6±0.92	15.8±0.41	15±0.92
Heart hospital (n=40)	4.2±3.16	14.7±2.03	13.3±2.31
Assiut University hospitals(total)	2.27±3.07	14.56±1.62	11.84±2.19
F	29.045	4.598	24.955
P. value	<0.001**	<0.001**	<0.001**

One-way Anova test quantitative data between the three groups or more

*Significant level at P value < 0.05,

**Significant level at P value < 0.05

Table (4): Comparison between nurse managers post educational knowledge levels of (SDGs) with their personal data:

Personal characteristics	Al-Azhar Hospital (n=54)			Assiut University Hospital (n=118)		
	(SDGs)	F	P. value	(SDGs)	F	P. value
Age						
Less than 30 year	13.94±1.13	0.361	0.699	14.28±1.56	2.074	0.128
From 30-40 year	13.67±1.19			14.67±1.67		
More than 40 year	14±0			14.79±1.6		
Gender						
Male	-	-	-	14.98±1.61	3.959	0.048*
Female	13.85±1.12			14.45±1.61		
Education levels						
Nursing Diploma	14±0	2.431	0.098	14.72±1.99	12.683	<0.001**
Bachelor degree	13.75±1.1			14.03±1.61		
Technical nursing institute	-			15.67±0.48		
Technical health institute	-			15.5±0.89		
Master Degree	15±1.15			15.73±0.59		
Years of experience						
Less than 5 year	-	2.001	0.126	14.36±1.66	4.283	0.002**
From 5-10 year	13.91±1.11			14.7±1.42		
From 10-15 year	14±1.15			13.76±1.71		
From 15-20 year	12±0			14.79±1.49		
More than 20 year	14±0			15.11±1.57		
Training Courses						
No	54	-	-	13.92±1.58	111.183	<0.001**
Yes	-			15.94±0.24		

Independent T-test quantitative data between the two groups -One-way Anova test quantitative data between the three groups or more *Significant level at P value < 0.05,

**Significant level at P value < 0.05

Table (5): Comparison between (SDGs) knowledge level with nurses managers personal data in the follow up phase after 3 months

Personal data	Al-Azhar Hospital	F	P. value	Assuit University Hospital	F	P. value
Age						
Less than 30 year	10.24±0.89	0.706	0.498	11.59±2.07	1.832	0.163
From 30-40 year	10.22±0.94			11.74±2.1		
More than 40 year	11±0			12.26±2.38		
Gender						
Male	-			13±2.24	17.689	<0.001**
Female	10.26±0.89			11.53±2.07		
Education levels						
Nursing Diploma	11±0	0.906	0.411	13.28±2.41	13.809	<0.001**
Bachelor	10.21±0.92			11.06±1.85		
Technical institute	-			12.87±1.89		
Technical healthy institute	-			13.5±2.37		
Master Degree	10.5±0.58			12.47±1.85		
Years of experience						
Less than 5 year	-	4.264	0.009**	12.1±2.16	8.286	<0.001**
From 5-10 year	10.3±0.87			11.26±1.91		
From 10-15 year	9±0			11.19±2.12		
From 15-20 year	11±0			11.18±1.72		
More than 20 year	11±0			13.24±2.25		
Training Courses						
No	-	-	-	10.53±1.08	756.344	<0.001**
Yes	-			14.67±0.92		

Independent T-test quantitative data between the two groups

- One-way Anova test quantitative data between the three groups or more

*Significant level at P value < 0.05, **Significant level at P value < 0.05

Evaluation of the educational program

Table (6): Percentage distribution of nurse managers' opinions as regards the program content of the educational program for two groups

Items	Opinion									
	Poor		Pass		Good		Very good		Excellent	
	No.	%	No.	%	No.	%	No.	%	No.	%
1.The program objectives are realistic.	0	0.0	0	0.0	0	0.0	37	13.6	235	86.4
2.The program goals are measurable.	0	0.0	0	0.0	0	0.0	62	22.8	210	77.2
3.Balancing between theoretical and practical goals.	0	0.0	0	0.0	12	4.4	43	15.8	217	79.8
4.Appropriateness of the study topics with the timetable.	0	0.0	0	0.0	12	4.4	50	18.4	210	77.2
5.The adequacy of the study topics to achieve the program's objectives.	0	0.0	0	0.0	12	4.4	56	20.6	204	75.0
6.Suitable topics for levels of trainees.	0	0.0	0	0.0	0	0.0	68	25.0	204	75.0
7.Modern of the educational program content.	0	0.0	0	0.0	6	2.2	56	20.6	210	77.2
8.Compatibility of educational activities with the study topics.	0	0.0	0	0.0	6	2.2	80	29.4	186	68.4
9.The subject of Educational program are clear.	0	0.0	0	0.0	0	0.0	222	81.6	50	18.4
10. The scientific educational program content was attractable.	0	0.0	0	0.0	0	0.0	216	79.4	56	20.6

Table (7): Percentage distribution of nurse managers' opinions regarding the appropriateness of the educational program for two groups

Items	Opinion									
	Poor		Pass		Good		Very good		Excellent	
	No.	%	No.	%	No.	%	No.	%	No.	%
1. Date of program implementation.	0	0.0	0	0.0	12	4.4	68	25	192	70.6
2. Time of session implementation	0	0.0	6	2.2	12	4.4	62	22.8	192	70.6
3. The program period.	0	0.0	0	0.0	12	4.4	62	22.8	198	72.8
4. Preparation of classroom.	12	4.4	31	11.4	124	45.6	49	18.0	56	20.6
5. The participants, organizing in the classroom.	6	2.2	0	0.0	49	18.0	118	43.4	99	36.4
6. Supportive services (break, photos).	0	0.0	6	2.2	74	27.2	86	31.6	106	39.0

Table (1): Shows the demographic characteristics of the studied groups at Al-Azhar University Hospital and Assiut University Hospitals: as regards to nurse managers at Al-Azhar University Hospital more than half of them 63% were Less than 30 years old, all of them were females, most of them 88.89% were holding Bachelor degree in nursing, the majority of them 85.19% have years of experience ranged from (5 to 10), and no one of them have any training courses about sustainable development goals. As regards to the nurse managers at Assiut University Hospitals; more than one third of them were Less than 30 year old, most of them 78.9% were females, more than half of them 60.55% were holding Bachelor degree in nursing, about one quarter of them 24.31% have (5 to 10) Years of experience, and more than two thirds of them have no training courses about (SDGs) goals.

Table (2): Shows that all of the nurse managers studied had a low level of knowledge regarding all the pretest questions about the SDGs at Al-Azhar Hospital and Assiut University Hospitals. The majority of them showed a high level of knowledge in the post-test following the program implementation, while the highest percentage exhibited a moderate level of knowledge in the follow-up phase. There were statistically significant differences in the knowledge levels of the nurse managers regarding all the content items of the educational program in the pretest, post-test, and follow-up phases of the program implementation ($P = 0.001$).

Table (3): Shows nurse managers' knowledge regarding the educational program content at Assiut University Hospitals and Al-Azhar Hospital. It reveals that statistically significant differences were found between the nurse managers' knowledge levels in the pretest, post-test, and follow-up phases regarding all the educational program content items ($P = 0.001$). This indicates an improvement in the total knowledge of nurse managers across all items after the educational program.

Table (4): Reports the comparison between nurse managers' knowledge levels of (SDGs) post program implementation with their personal data at Assiut university hospitals reveals that the highest statistically significant differences were observed when comparing the knowledge levels of nurse managers post program implementation with their educational levels and years of experience ($P = 0.001$). This indicates that at Assiut University Hospitals, knowledge levels increase with a high rank in experience and education.

Table (5): Shows that, when comparing between (SDGs) knowledge level with nurses managers personal data in the follow up phase of the program implementation, there were high statistically significant differences between the level of knowledge of the study groups and years of experience both at Assiut University Hospitals & Al-Azhar hospital (**0.001**** & **0.009****) respectively.

While there was high statistically significant difference between the level of knowledge in the follow up phase of program implementation and educational level of the nurses managers at Assiut University Hospitals (**0.001****) program highly. Specifically, the program objectives were considered realistic, and the educational materials were clear, with very good ratings of (**86.4% & 81.6%**) respectively.

Table (7): Shows the nurse managers' opinions on the appropriateness of the educational program. The vast majority of nurse managers rated the program duration, the implementation date, and the timing of the sessions as excellent. The highest percentage of very good scores was given to the item regarding the organization of participants in the classroom, with scores of (**72.8%, 70.6%, 70.6% and 43.4**) respectively.

Discussion:

Today, alignment with the SDGs in nursing has been strongly supported by global health organizations. The World Health Organization (WHO) in 2020 and the International Council of Nurses (ICN) in 2017 recognized that all 17 SDGs are directly or indirectly influenced by health, and thus nursing plays a key role in achieving each of the SDGs. The United Nations has referred to nurses as the backbone of the healthcare system; however, it also highlights a global shortage of 9 million nurses and midwives, which poses a challenge to achieving universal health coverage (**Denoncourt, 2020**).

Moreover, the nursing profession must continue to enhance its role in both academic research and decision-making regarding the SDGs. To further elevate nursing's contribution to achieving the SDGs, it is essential for the profession to conduct significant and impactful research on how individual nurses and the broader nursing community can influence the SDGs. Increasing awareness of the SDGs and educating nurses on how they can contribute to these goals, along with empowering the profession through research and policy development, will significantly strengthen nursing's role in advancing the SDGs (**Aith, et al., 2020**).

The aim of this study was to develop, implement, and assess an educational program centered on the SDGs for nurse managers, with the goal of increasing the involvement of nurses and the nursing profession in the achievement of the SDGs.

The current study found that the majority of participants were female, which reflects the traditional gender composition of the nursing profession. This aligns with findings from **Aiken, et al., (2011)** who noted that nursing is predominantly female globally. Additionally, the study highlighted that most participants held a bachelor's degree and were under 30 years of age, with 5 to 10 years of experience, as most of them are a first level managers at their hospitals and they are recently graduated from nursing colleges also this indicating a trend towards younger, well-educated nursing professionals. This aligns with the work of **Chao, et al., (2019)** which documented a similar demographic shift in nursing. However, the study revealed that none of the nurse managers at Al-Azhar University Hospital had received training on the (SDGs), and more than two-thirds of nurse managers at Assiut University Hospitals also lacked such training. This finding contradicts **Aronsson, et al., (2020)** who argued that achieving the SDGs is heavily reliant on comprehensive education and training programs for healthcare professionals. Furthermore, the lack of training in this area suggests a gap in preparedness for addressing global health challenges.

The current study found that all nurse managers in both groups had a low level of knowledge regarding the (SDGs) prior to the educational program, this low level of knowledge regarding SDGs may stem from several interconnected factors. First, the relatively recent emergence of sustainability concepts in healthcare which means that many educational programs have not yet incorporated these topics into their curricula. The overwhelming demands of nursing roles can limit opportunities for professional development and self-directed learning about sustainability, also leadership may not prioritize sustainability training. This can result in missed opportunities for nurses to understand their role in advancing global health objectives. This finding aligns with **Anåker, et al., (2021)** who emphasized the challenges of integrating sustainability into nursing practice and highlighted the need for improved educational frameworks. Similarly, **Tiitta, et al., (2021)** reported that nurses often lack the necessary knowledge and skills to effectively support and engage in initiatives related to the SDGs. Additionally, the **Aith, et al., (2020)** noted a significant disparity in the quality and level of nursing education concerning the SDGs on a global scale, particularly in low-income countries, reinforcing the need for enhanced training and resources.

The current study found that the implementation of the educational program significantly increased nurse managers' knowledge about the (SDGs). The significant increase in knowledge following the program underscores the effectiveness of the educational intervention in addressing knowledge gaps of the SDGs among nurse managers. This finding was consistent with **Otto, et al., (2020)** who emphasized that educational initiatives are crucial for enhancing nursing knowledge and engagement with the SDGs. Similarly, **Shaw, et al., (2021)** highlighted that accomplishing the SDGs depends in large part on education and that nursing education affect positively on the nursing knowledge, therefore nursing education must concentrate on teaching future nurses leaders how to establish and maintain healthcare sustainability, with a specific concern on the connection between nursing and sustainability., also, a study by **Lægreid, et al., (2022)** suggesting that with appropriate training, nurses can become more engaged in sustainability efforts.

However, the majority of participants showed moderate knowledge during the follow-up phase. Although there was a slight decline from the post-program knowledge level, the retention remained higher compared to the pre-program baseline, this suggests that the program had a lasting impact, though there may be areas that could benefit from reinforcement or periodic updates. This may be due to

many factors like knowledge erosion and the gap between theoretical knowledge and practical application may hinder the effective integration of (SDGs) into nursing practice. Education should focus on knowledge acquisition and practical skills development, and healthcare organizations should foster a culture of sustainability to support meaningful change. This is consistent with findings from **DeLuca, et al., (2022)** who noted that despite improved knowledge through educational programs, nurses often struggle to apply this knowledge in their daily practice due to systemic barriers within healthcare organizations. Also, research by **McCoy, et al., (2021)** found that ongoing professional development and institutional support are essential for sustaining knowledge gains related to the SDGs, their study emphasized that healthcare organizations must create environments that encourage continuous learning and practice integration of sustainability principles.

In the current study when comparing between nurse managers' post educational knowledge levels of (SDGs) and in the follow up phase with their personal data. It was found that that knowledge levels increase with a high rank in experience and education mainly at Assiut University Hospitals. This may be because higher educational levels and years of experience enhance individuals' learning and understanding of SDGs by providing access to information, fostering critical thinking and research skills, promoting ethical responsibility, and equipping individuals with the capabilities to contribute effectively to sustainable development efforts. This result was consistent with **Bennett, et al., (2020)** who found that higher educational qualifications among healthcare professionals correlated with greater awareness and understanding of SDGs. Also, **Grant, et al., (2022)** indicated that years of professional experience significantly enhance understanding and application of sustainability concepts in nursing. However this result was contradicted with **Mann, et al., (2021)** who argues that simply increasing education and experience does not automatically translate to better knowledge of SDGs among nurses.

The present study revealed that highest percentage of the study participants had a positive feedback to the program objectives, educational program's clarity, program duration, implementation date, and classroom organization this feedback suggesting that the material was relevant, engaging, and aligned with their professional roles, The comprehensive content of the educational program, the written handouts serving as a continuous reference, the participants' interest and eagerness to learn and make changes, consideration of adult learning principles, encouragement of questions, interactive discussions

using multimedia, and the repetition of knowledge through various materials all contributed to the program's positive reception. This aligns with the findings of **Nimmons, et al., (2019)**, who reported that the appropriate timing of teaching programs was positively correlated with the successful achievement of program objectives. Additionally, **Batubara, et al., (2021)** noted that nurse managers were satisfied with the program's content and were motivated to apply what they learned in their work environment.

Overall, the study's findings indicated that a significant proportion of the nurse managers demonstrated satisfactory knowledge of the entire content of the educational program immediately after its implementation. However, it was observed that nurse managers did not continue to use the handouts provided during the program due to time constraints and workload in their units, highlighting the need for ongoing education. In this regard, **Dutta & Dutta (2023)** emphasized that most forgetting occurs because information is retained in short-term memory. Moreover, forgetting can also happen as nurses may lose the ability to recall information stored in long-term memory, which is consistent with the current study's findings.

Conclusions:

In the light of the study results, the following conclusions can be drawn:

Nurse managers had unsatisfactory knowledge level before implementing the educational program, while they had satisfactory knowledge level immediately after implementing the educational program. This improvement was mostly retained after three months (follow up) with a slight decline from post program implementation and it still higher compared to pre implementation level. Program evaluation by the participant nurse managers had positive opinions regarding the content of the program.

Recommendation(s):

In the light of the results of this study, the following recommendations are suggested.

- 1- Implementing refresh courses, follow-up workshops, and providing ongoing resources can help nurse managers maintain and enhance their understanding of the SDGs.
- 2- Enhancing the practical utility of the program by future researches that focus more on how nurse managers can apply SDG principles in their day-to-day management practices. Including case studies, role-playing, or action plans.
- 3- Expanding the program to additional healthcare facilities and other nursing contexts.

- 4- Integrating SDG-focused educational program into nurse managers' professional development to ensure continuous updating of knowledge and alignment with healthcare and global sustainability goals.
- 5- Future evaluations should focus on assessing the long-term impact of the program. This could involve measuring changes in nursing practices, team collaboration, or organizational initiatives related to SDGs.

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