

EFFECT OF SUSTAINABLE DEVELOPMENT EDUCATIONAL PROGRAM IN HEALTH FIELD ON STAFF NURSES' KNOWLEDGE AND PRACTICES

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Abstract

Background: Sustainable development in health field is crucial due to its impact on global environmental and human health. Nurses, as the largest workforce in healthcare, are essential in achieving sustainable development goals by implementing sustainable practices and advocating for a climate-resilient future. Aim: to evaluate effect of sustainable development educational program in health field on staff nurses' knowledge and practices. Methods: a quasi-experimental design was utilized in this study that was conducted at El Hawamdeya General Hospital, Egypt on a convenient sample of 30 staff nurses. Two tools were utilized as follows: (1) Nurses' sustainable development knowledge test questionnaire consisted of two parts a- personal and work-related characteristics, b- sustainable development knowledge test (23 questions). (2) Nurses' sustainable development practices observational checklist (54 items). Results: There were statistically significant differences in staff nurses' sustainable development total knowledge mean scores ($f=1240.52$, $p=.000$) immediately post-program and three months later than pre-program as well as statistically significant differences with marked increase in all dimensions of staff nurses' sustainable development total practices mean scores ($f=91.59$, $p=.000$) immediately post-program and three months later than pre-program. Also, the current study findings revealed a negative statistical correlation between the staff nurses' total mean scores of sustainable development knowledge and their total mean scores of sustainable development practices. Conclusion: The educational program had positive effects on staff nurses' sustainable development knowledge and practices. Recommendations: Develop in-service policies and guidelines as well as training programs for sustainable development and incorporate sustainable development courses at different levels of in nursing curricula.

Keywords: Health Field, Knowledge, Practices, Staff Nurses, Sustainable Development.

1. INTRODUCTION

Healthcare systems are essential for public health and economic growth, making up large part of the global economy and employing vast workforces. The sector has high energy demands, generates significant waste, and contributes 4–5% of global greenhouse gas emissions, impacting climate change [1], [2], [3]. In addition, healthcare is a challenging industry requiring advanced resources, skilled recruitment, and effective management to handle disruptions making sustainable development essential [4], [5].

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” [6]. It is also defined as an efficient and equitable sharing of resources along generations in order to operate socio-economic activities of a finite ecosystem [7].

Sustainable development is based on three interdependent and mutually reinforcing pillars: environmental, economic and social development [8]. Environmental sustainability focuses on safeguarding the natural environment and resources while fostering growth, addressing issues like pollution, resource management, and sustainable urbanization [9]. 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 [10], [11]. Moreover, social sustainability emphasizes concerns that promote human rights, equity, peace, human security, empowerment, participation, accessibility, cultural diversity and institutional stability [12], [13].

In 2015, the United Nations (UN) General Assembly established the 17 Sustainable Development Goals (SDGs) to replace the eight Millennium Development Goals (MDGs) [14]. These SDGs are part of the 2030 Agenda for Sustainable Development, which outlines a framework with 169 targets centered on five themes: people, planet, peace, prosperity, and partnership, known as the 5Ps [15], [16], [17].

Nursing as the largest segment of the health workforce, play a crucial role in minimizing or amplifying the impacts of unsustainability in healthcare. Additionally, they also have significant potential to advance global progress toward sustainable development goals [18], [19], [20], [21]. Sustainable nursing aims to create a safe environment for current and future generations through effective nursing practices [22]. Nursing should collaborate with other sectors to maintain balance and provide high-quality patient care that is crucial for promoting sustainable healthcare [23], [24]. Therefore, awareness of sustainability and the impacts of unsustainable behaviors can motivate nurses to adopt sustainable practices in the working environment, making it essential to assess knowledge, attitudes, and behaviors toward sustainability [25], [26].

Sustainable knowingness is the cognitive aspect of consciousness that focuses on understanding what is required for sustainable development. Moreover, sustainable attitudes refer to long-lasting feelings regarding problems with the environment, society, or economy that represent the affective component of sustainability consciousness [27]. In addition, sustainable practices refer "Sustainable practices are activities and policies designed to meet the needs of the present without compromising the ability of future generations to meet their own needs" [28].

Studies of nurses' current attitudes show that nurses believe sustainability is relevant to their practice and patients' health. The Sustainability Attitudes in Nursing Survey (SANS) showed general agreement from four European countries that sustainability and climate change are important to nursing and should be included in curricula [29]. A study done

by Fields et al., (2021) [14], concluded that individual nurses may feel disconnected from the sustainable development goals and struggle to relate the goals to their clinical role, calling for an increase in awareness and education on the goals. The wider profession could also increase both research and policy with relation to the sustainable development goals, strengthening nursing's position to have a voice in and contribute towards achievement of the goals.

From the researcher's experience, most of staff nurses in different healthcare facilities including the current study setting act in non-sustainable ways. They are consuming large amounts of resources such as water during performing nursing procedures, wasting much of disposable supplies; do not care regarding the efficient use of electricity like leaving the light, fans and other electrical devices open even when they do not need. In addition, they are lacking the ability to manage wastes effectively and sometimes have no concern to equity and equality in providing care or even in making work assignment. Moreover, there is no attention from in-service education department within the hospital to train nurses regarding sustainable development to improve their knowledge. Therefore, the current study will help in increasing staff nurses' knowledge about sustainable development and might improve their practices that decrease the wasting of resources, protect the environment, maintain social development. Consequently, it will help in achieving some of sustainable development goals in health care setting that help in responding to global sustainability challenges.

2. METHODS

2.1 Aim

The current study aimed to evaluate the effect of sustainable development educational program in health field on staff nurses' knowledge and practices. To achieve the aim of the current trial the following research hypotheses were postulated:

- H₁:** The staff nurses sustainable development knowledge test score will be higher after implementation of the program (immediately after implementation and three months later) than before implementation.
- H₂:** The staff nurses sustainable development practices score will be higher after implementation of the program (immediately after implementation and three months later) than before implementation.

2.2. Design

A quasi-experimental design (one group pretest-posttest) was used to achieve the aim of the current study.

2.3 Setting

The current study was conducted in two departments (orthopedic and general surgery) and three specialized units (medical intensive care unit, neonatal intensive care unit, and dialysis unit) at El Hawamdeya General Hospital, affiliated with the Ministry of Health,

Egypt. The hospital provides free medical services and consists of three buildings, with a total capacity of 311 beds.

2.4. Participants

A convenient sample of staff nurses who are working in a previous selected departments at El Hawamdeya General Hospital constituted the study sample. Their number was (30).

2.5. Data Collection Tools

The current study data was collected using the following two tools:

First tool: Nurses' sustainable development knowledge test questionnaire. It was developed by the investigator based on related literature review [30], [31], [32]. It was divided into two parts as follows:

a) Nurses' personal characteristics: to assess the staff nurses' age, gender, educational background, current working unit/department, years of experiences and attending a previous sustainable development educational program.

b) Nurses' sustainable development knowledge test questionnaire: It consisted of 23 multiple choice questions as follows; concept of sustainable development, importance and barriers (7 questions), goals (3 questions), and main pillars (13 questions).

The total score of the test is 23 marks that was scored by one mark for each correct answer and zero for incorrect answer. Total score was expressed as a percentage with cut-off point 60%. A higher total score indicates higher knowledge level that was calculated and transformed into three categories as follows; total score < 60% was considered as low level, total score 60- <75% was considered as moderate level and total score $\geq 75\%$ was considered as high level of knowledge [33], [25].

Second tool: Nurses' sustainable development practices observational checklist. It was developed by the investigator based on related literature review [30], [34], [35], [24], [31], [36] to assess staff nurses' 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 staff nurses' responses for the practices were either done with (1) point or not done (zero). Total scores were expressed as a percentage with cut-off point 60% [37], [26], [38]. Score of $\geq 60\%$ was considered satisfactory while a score of <60% was considered unsatisfactory

Both tools were checked for their validity and reliability. Content validity was established by a panel of three experts from nursing administration department at faculty of nursing, Cairo University. Furthermore, the reliability was determined statistically by testing the internal consistency using Cronbach's Alpha Coefficient test. The Cronbach's Alpha for nurses' sustainable development knowledge test was (0.79) while the nurses' sustainable development practices observational checklist reliability was (0.81).

2.6. Procedure

The procedure was proceeded in five phases: preparatory, assessment, planning, implementation, evaluation and follow-up phase.

- I- **Preparatory phase:** this phase involved extensive reviewing of the recent related literatures to develop data collection. Then, the sustainable development knowledge test questionnaire was translated into Arabic language to suit the staff nurses' level of understanding. Furthermore, the tools' validation was done.
- II- **Assessment phase:** the initial assessment was conducting after explaining the aim, nature, and significance of the study by the investigator to the director of the hospital and head nurses of the selected units to gain permission as well as staff nurses to take their participation approval. The assessment was done by distributing the sustainable development knowledge test questionnaire to the staff nurses in their work units to complete it by themselves in order to assess their knowledge and to identify their learning needs. As well as nurses' sustainable development practices were measured by the investigator through utilizing the sustainable development practices observational checklist. Every nurse was observed in three different times using intermittent observations (total 90 observations) to assess their practices level for sustainable development before implementation of the program during different shifts. The time spent for each nurse to answer the sustainable development knowledge test questionnaire was 20 to 35 minutes. While the investigator took about 45 minutes to 1 hour to observe each nurse for sustainable development practices. Furthermore, the tools' reliability was determined statistically by testing the internal consistency using Cronbach's Alpha Coefficient test.
- III- **Planning phase:** based on the initial assessment data analysis, the investigator identified the staff nurses' educational needs and developed the program on sustainable development in English version, translated into Arabic as well as its validity was reviewed by the nursing administration experts. Accordingly, the program plan was established.
- IV- **Implementation phase:** the sustainable development educational program was carried out. The program was conducted on seven sessions, two hours duration for each session with total 14 hours in-service classrooms teaching offered in two sessions per week. The session repeated as needed according to nurses' spare time.
- V- **Evaluation and follow-up phase:** the investigator evaluate the immediate impact of the educational program using the same previous knowledge questionnaire and observational check list as well as the follow up was conducted three months after program implementation with the same previously used tools. This also check the reliability of the program.

2.7. Statistical data analysis

The collected data was organized, computed, and statistically analyzed using IBM Statistical Package for The Social Sciences (SPSS) software version 24 (SPSS Inc.,

Chicago, IL, USA). Both descriptive and inferential statistics were applied, including frequency distribution, percentages, means, standard deviations, Repeated Measures ANOVA, and Pearson's correlation coefficient (r).

3. RESULTS

Table 1 shows that half (50%) of the staff nurses were in the age range of 25 to less than 30 years. The majority (86.7%) of them were female. As regards to educational background, the highest percentage (70%) of staff nurses had technical institute diploma in nursing. Moreover, 33.3% of the staff nurses were working in the dialysis. With respect to experience, half (50%) of the staff nurses had 5 to less than 10 years of experience in nursing practice. Also, all (100%) of them did not attend any previous educational program regarding sustainable development.

Table 2 illustrates that there was a highly statistically significant difference in mean scores regarding sustainable development knowledge dimensions during different periods of assessment (pre- program, immediately post-program and three months later) which reflected on the total mean score respectively (3.53 ± 2.11 , 21.97 ± 1.16 , 20.30 ± 2.13 , 20.30 ± 2.13), ($F=1240.52$, $P=.000$). The mean scores were decreased slightly three months later compared to immediately post-program but still higher than preprogram period.

Table 3 shows that there was a statistically significant difference in total knowledge score during different periods of assessment. As shown (100%) of staff nurses scored low (<60%) pre-program, while marked improvement was seen immediately post-program and three months later, as 100% of staff nurses scored high ($\geq 75\%$) immediately post-program, the score was decreased slightly three months later as (83.3%) of them had high scores, ($\chi^2=98.18$, $P=.000$).

Table 4 illustrates that there was a highly statistically significant difference in means scores of all dimensions of sustainable development practices immediately post-program and three months later than pre-program with slight decrease in three months later mean scores compared to immediately post-program (24.48 ± 4.93 , 37.74 ± 4.96 , 36.03 ± 6.38), ($F=91.59$, $P=.000$).

Table 5 denotes that there was a statistically significant difference in total sustainable development during different periods of assessment. As shown the majority (86.7%) of staff nurses had unsatisfactory level (<60%) pre-program, while marked improvement was seen immediately post-program and three months later, as (83.3) % of staff nurses had satisfactory level ($\geq 60\%$) immediately post-program, the score was decreased slightly three months later as (76.7%) of them had unsatisfactory level, ($\chi^2=36.71$, $P=.000$).

Table 6 reveals that there was a negative statistical correlation between the staff nurses' total mean scores regarding sustainable development knowledge and their total mean scores regarding sustainable development practices immediately post-program and three months later ($r = -.323$, $p = .041$; $r = .724$, $p = .000$) respectively.

Table 1: Frequency Distribution of Staff Nurses According to Personal and Work-Related Characteristics (n=30)

Variables	No.	%
Age in years		
20-<25	5	16.6
25- <30	15	50
30- <35	8	26.7
≥35	2	6.7
Gender		
Male	4	13.3
Female	26	86.7
Educational background		
Nursing school diploma	9	30
Technical institute diploma in nursing	21	70
Working unit /department		
Orthopedic department	6	20
Dialysis unit	10	33.3
General surgery department	4	13.3
Medical intensive care unit (MICU)	5	16.7
Neonatal ICU (NICU)	5	16.7
Years of experience		
< 5 years	5	16.7
5- <10 years	15	50
10-<15 years	4	13.3
≥15 years	6	20
Attending a previous sustainable development educational program		
Yes	0	0
No	30	100

Table 2: Comparison of The Total Mean Scores of Staff Nurses' Sustainable Development Knowledge Dimensions during Different Periods of Assessment (Pre-program, immediately post-program, and Three Months Later) (n=30)

Sustainable development knowledge dimensions	Max.	Pre-program		Immediate post-program		Three months later		F-test	p-value
		Mean	SD	Mean	SD	Mean	SD		
Concept, importance and barriers of sustainable development	7	1.20	1.09	6.86	0.32	6.18	0.82	573.69	.000
Goals of sustainable development	3	0.37	0.49	3.00	0.00	3.00	0.00	865.97	.000
Pillars of sustainable development	13	1.97	1.62	12.10	0.90	10.77	1.67	505.71	.000
Total knowledge	23	3.53	2.11	21.84	1.16	20.30	2.13	1240.52	.000

Statistically significant at p-value ≤ 0.05

Table 3: Frequency Distribution of Total Sustainable Development Knowledge Levels Among Staff Nurses during Different Periods of Assessment (Pre, Immediately, and Three Months Later) (n=30)

Levels of total sustainable development knowledge	Pre-program		Immediately post-program		Three months later		Chi-square	
	No	%	No	%	No	%	χ^2	p-value
Low (<60%)	30	100	0	0	0	0		
Moderate (60- <75%)	0	0	0	0	5	16.7	98.18	.000
High (\geq 75%)	0	0	30	100	25	83.3		

Statistically significant at p-value \leq 0.05

Table 4: Comparison of the Total Mean Scores of Staff Nurses' Sustainable Development Practices Dimensions during Different Periods of Assessment (Pre, immediately Post-Program and Three Months Later) (n=30)

Sustainable development practices dimensions	Max.	Pre-program		Immediately post-program		Three months later		F-value	p-value
		Mean	SD	Mean	SD	Mean	SD		
Environmental pillar-related practices	28	11.87	2.28	19.52	3.01	18.53	3.72	96.74	.000
Economic pillar-related practices	20	9.50	2.69	13.17	2.02	13.94	2.78	93.02	.000
Social pillar-related practices	6	3.22	.98	4.54	.87	4.32	.87	25.32	.000
Total practices	54	24.48	4.93	37.74	4.96	36.03	6.38	91.59	.000

Statistically significant at p-value \leq 0.05

Table 5: Frequency Distribution of Total Sustainable Development Practices Levels Among Staff Nurses during Different Periods of Assessment (Pre-Program, Immediately Post-Program and Three Months Later) (n=30)

Sustainable development practices levels	Pre program		Immediately post-program		Three months later		Chi-square	
	No.	%	No.	%	No.	%	χ^2	p-value
Satisfactory (\geq 60%)	4	13.3	25	83.3	23	76.7		
Unsatisfactory (<60%)	26	86.7	5	16.7	7	23.3	36.71	.000

Statistically significant at p-value \leq 0.05

Table 6: Correlation between Staff Nurses' Total Sustainable Development Knowledge and Practices during Different Periods of Assessment (Immediately Post-Program and Three Months Later) (n=30)

Staff nurses' total sustainable development knowledge	Staff nurses' total sustainable development practices	
	R	P
Immediately post-program	-.323	.041
Three months later	-.724	.000

Statistically significant at p-value ≤ 0.05

4. DISCUSSION

The current study found that half of the staff nurses were aged between twenty-five to less than thirty years. Nearby results were reported by other study [25], where slightly more than half of the nurses were in the same age group. However, this is not in a harmony with the result of other study [39] that delineated half of the nurses were aged thirty to less than forty years, with a mean age of 39.58 ± 8.69 . Moreover, the current study delineated that the majority of the staff nurses were females. 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 dominate the nursing workforce at health care institutions. In the same line, some studies reported that the majority of the sample were females [40], [29] [41].

With reference to educational background, the current study pointed out that the majority of the staff nurses had technical institute diploma in nursing. This finding is consistent with other studies regarding sustainable development that reported that more than two-thirds the nurses graduated from technical nursing institute [25]. From the investigator's perspective, this could be attributed to the presence of a nursing school affiliated with the hospital in the present study, which grants a technical diploma and allows graduates to begin working directly at the same hospital. In addition, the total number of colleges' workforce in governmental hospitals are lesser than technical institutes. While, the number of nursing school graduates decreased by 9.9% in 2020/2021 compared 2019/2020 [42].

Concerning years of experience in nursing practice, the finding of the current study revealed that half of the staff nurses had five to less than ten years of experience. This is in agreement with the result that found a roughly similar finding [43]. On the other hand, this result is contradicted with the result that found a slightly more than one-tenth of the staff nurses had between five to ten years of experience in the nursing profession [44].

The current study revealed that that none of the staff nurses attended previous educational program regarding sustainable development before carrying out the current study. This could be explained by the fact that the concept of sustainable development is a relatively new concept and was not covered in the current study staff nurses nursing curricula. Other study reported that the vast majority of sample did not attend

sustainability session, with only a small percentage having attended a few educational sessions during their studies [45].

The present study revealed that the total mean scores of staff nurses' knowledge test and total knowledge levels were significantly different among assessment periods. The difference indicates increase in the mean scores immediately after program implementation and three months later than before implementation. Also, all staff nurses scored low pre-program, while marked improvement was seen immediately post-program and three months later, as all staff nurses scored high immediately post-program. Additionally, the score was decreased slightly three months late, as the majority (83.3%) of them had high scores.

Although the researcher gave the study staff nurses handouts including the program content to avoid the forgetting factors which is natural, the mean scores of the follow up period (three months later) was slightly decreased compared to immediately post-program but still higher than preprogram period. On the same line, a study revealed a higher mean score of participants' knowledge and attitude toward sustainability development after intervention of a similar program [8]. Moreover, there was a result indicated a significant improvement in nurses' knowledge of climate change, sustainable development and healthcare sustainability goals following instructional guidelines [46], [47].

In addition to, other study highlighted statistically significant differences in students' scores on economic and environmental sustainability [47]. Nearby results were reported by, in that most nurses unaware and lacked knowledge about sustainable development goals but were eager to learn more [49], [14]. Accordingly, there was an emphasis on the importance of raising awareness of SDGs among healthcare providers [50].

In regard to knowledge levels, a study depicted that more than half of the nursing internship students exhibited poor knowledge level before the intervention, whereas post-intervention, about three-quarters demonstrated a significant improvement [40]. In the same line, another study reported an improvement in total environmental, social, and economical knowledge levels following immediate and follow up educational intervention [13]. Also, a study in (2024), reported that more than two-thirds of participants had inadequate knowledge level pre-program, but this improved to over three-quarters post-intervention [47].

Similarly, another study found that nursing students demonstrated excellent knowledge after scenario-based learning and augmented reality training on sustainability and climate change [45]. Additionally, there was increased knowledge levels about climate change from pre- to post-test [26].

A study (2022) showed that most managers had unsatisfactory knowledge about green hospitals before awareness sessions, which improved afterward [50]. Also, there was significant increase in nurses' knowledge about green practices post-guideline program but slightly decreased at follow-up [39].

Regarding staff nurses' practices of sustainable development, the present study revealed that the total mean scores of staff nurses' sustainable development practices were significantly higher immediately after program implementation and three months later than before implementation with insignificant decrease (from 37.74 ± 4.96 to 36.03 ± 6.38) in three months later mean scores compared to immediately post-program. Additionally, there was statistically significant difference in total sustainable development levels across different periods of assessment among staff nurses. The majority of staff nurses had an unsatisfactory level pre-program, with marked improvement immediately after and three months post-program.

Results of other studies found that educational programs on sustainable development and climate change increased participants' willingness to practice sustainably, positively impacted students' knowledge, attitudes, and daily practices [34], [52], [38]. Similar studies observed a significant improvement in student-teachers' attitudes toward sustainable development following an intervention [53]. The result is also, matched with 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 [26].

In addition, studies like [39], [54] 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 [39], [37].

Finally, the current study revealed that there was a negative statistical correlation between the staff nurses' total mean scores regarding sustainable development knowledge and their total mean scores regarding sustainable development practices immediately post-program and three months later ($r = -.323$, $p = .041$; $r = .724$, $p = .000$) respectively. This could be due to nurses may face some challenges in applying some practices in real-world settings, such as institutional constraints, lack of supportive policies, inadequate supervision, not including the sustainable practices in routine work.

Furthermore, nurses may initially have improvement in sustainable development knowledge assessments immediately post-program, this knowledge may not be retained or applied effectively over time. Three months post-program, they might forget specific practices or not feel confident in implementing them, leading to lower practice scores despite their initial knowledge.

Additionally, the context in which nurses operate may change rapidly due to policies, organizational priorities, or external factors. This was in the same line with the result of others who detected that although the majority of university students had knowledge of sustainable consumption, they exhibited moderate sustainable consumption behaviors [55].

Also, result of other study revealed that there was a significant and negative effect between the implementation of sustainable practices and the challenges of implementing sustainable practices [56]. Although the level of knowledge about sustainability is high, the rate of conversion into behavior is lower. In the contrary, some studies found that training courses positively impacted students' sustainability knowledge both before and after intervention, leading to improvements in practice [40], [42], [57]. Similar result was reported, as there was a positive correlation between knowledge and practical application [42], while [58] noted that sustainability training and incentives encouraged sustainable behavior in employees.

5. CONCLUSION AND RECOMMENDATIONS

In the light of the present study findings, it can be concluded that there was a statistically significant difference in the mean scores of knowledge test regarding sustainable development among staff nurses immediately post-program implementation and three months later compared to pre-program. Additionally, there was a statistically significant difference in both staff nurses' total sustainable development practices and all dimensions immediately post-program implementation and three months later compared to pre-program.

Accordingly, there was positive effect of implementing an educational program about sustainable development for staff nurses to equip them with the knowledge and practices needed to apply sustainable development in the health care work setting. The current study recommended the establishment of clear sustainability goals and benchmarks for nursing staff, developing guidelines of how to practice sustainable development in the form of posters, quick reference cards, manuals or booklets, designing policies that emphasize the importance of sustainable development practices on a daily basis.

Additionally, incorporating in-service education and training programs regarding sustainable development, develop workplace green teams and fostering their rules by aligning with their recommendations for sustainable health care practices, conducting regular daily supervision for staff nurses' practices of sustainable development, establishing appropriate reward system to the staff nurses who successfully exhibit sustainable practices, and creating opportunities for staff nurses to participate in out-service continuous educational activities for sustainable development such as participation in conferences, workshops, seminars, symposium as well as meeting with sustainable development experts.

Moreover, nursing curriculum should include courses regarding sustainable development at different levels, nursing schools should organize regular workshops and seminars on sustainable development to provide students and faculty members with up-to-date information and possible application, and replication of the study again with a larger sample size in a different setting in order to confirm and generalize the findings.

Abbreviations

MDGs	Millennium Development Goals
SDGs	Sustainable Development Goals
UN	United nations

Declarations

Ethical Considerations

Formal approval was granted from the Ethical Committee of Scientific Research at Faculty of Nursing, Cairo- University. Also, an official permission to conduct the study was obtained from the hospital administrators. Participation in the study is voluntary and based on the participants' agreement.

Availability of data and materials

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare that they have no competing interests.

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