

Effectiveness of Implementing Green Management Program on Nursing Staff' Knowledge, Attitudes, and Green Management Practices towards Occupational Safety

Eman Ismail Ibrahim Elksas (1), Dr. Amal S. Abu Almakarem (2), Manal Abd Elsalam Amin (3), Asmaa Mohamed Ahmed Maiz (4)

1Lecturer of Nursing Administration, Faculty of Nursing, Damanhour University

2 Department of Basic Medical Sciences, Faculty of Applied Medical Sciences, Al Baha University, Saudi Arabia E-mail: amala2050@yahoo.co

3) Fellow of Nursing, PhD in Community Health Nursing, Ain Shams University Hospital

4Assistant professor of nursing Administration department Faculty of Nursing, South Valley University, Egypt

Abstract

Background: Green management is a way for healthcare institutions to lessen their impact on the environment and occupational hazards. **Aim:** This study aimed to evaluate the effectiveness of implementing a green management program on nursing staff' knowledge, attitudes, and green management practices toward occupational safety. **Research design:** The goal of this study was accomplished using a quasi-experimental design. **Setting:** This study was carried out in Damanhour University Hospital in these selected departments for general medicine, general surgery, specialized surgery, pediatrics, obstetrics and gynecology, general intensive care, and cardiac care. **Sample:** By using a convenience sampling technique, a total of 100 nursing staff, from the previously mentioned setting, who accepted to participate in the study were recruited in the study. **Tools:** Three tools were used: Tool I: Structured interviewing questionnaire: It consists of two parts as the following: Part I is concerned with the demographic data of the studied nursing staff and Part II is concerned nursing staff' knowledge, Tool II: Green management practices questionnaire, and Tool III: The Occupational Safety Scale (OSS). **Results:** Green management was low among the majority of nursing staff before the intervention; after the intervention, most of them improved to a high level, which they maintained for 78.0% of the time. Comparably, of the nursing staff, less than 75% had low levels of occupational safety before the intervention, and most of them improved to high levels after it. **Conclusion:** Green management practices, knowledge, and attitudes of nursing staff about occupational safety are positively correlated with the implementation of green management programs. **Recommendations:** Hospitals should offer a safe environment for staff by supporting the green management system and continuing to provide green management programs for nursing staff to improve their knowledge and attitudes. Encouraging all healthcare facilities to embrace occupational safety regulations and green management practices to decrease waste, protect the environment, and make the workplace safer for healthcare workers. **Keywords:** Green management program, Nursing staff' knowledge, attitudes, and green management practices, Occupational Safety

al., 2020).

Introduction:

Hospital "green management" is the process of integrating ecologically friendly practices and guidelines into the running and administration of medical facilities (O'Hara et al., 2022). Hospitals that want to practice green management work together with environmental specialists, administrators, and healthcare professionals to create and execute sustainable policies and practices. The ultimate objective of hospital green management is to advance environmental stewardship and sustainability within the healthcare sector (Adu et

A registered nurse who oversees the daily operations of a nursing unit in a medical facility is referred to as a nurse. They are frequently in charge of maintaining compliance with legal requirements, developing and implementing policies and procedures, overseeing the nursing staff, and improving the health and wellness of both patients and staff members (Barraclough et al., 2019). To ensure that patients receive top-notch treatment, nurses closely communicate with other medical specialists, including physicians, administrators, and support staff. They might also be in charge

of creating timetables, developing the workforce, and budget planning. To promote a culture of safety and well-being at work, they are essential (Ofei et al., 2020).

The concept of hospital occupational safety involves identifying and assessing any hazards within the hospital environment, followed by the implementation of controls aimed at mitigating or eliminating those risks. This includes providing workers with the appropriate PPE, setting up protocols for infection prevention and control, and instructing staff members on safe work practices (Dopolani et al., 2022). To safeguard healthcare professionals, such as nurses, from potential job risks such as infectious infections, bodily harm, and psychological pressures, hospitals must prioritize occupational safety (Minikumary et al., 2023).

A nurse's supervision of safety protocols and procedures, creation of safety training programs, availability, and appropriate utilization, promotion of a culture of safety, and management of work-related stress and burnout are all vital components of their role in promoting safety and well-being. All things considered, nurse managers play a critical role in creating a safe and healthy work environment for nurses and other medical professionals (Saputra & Mahaputra, 2022).

Significance of the study

Nurse Managers' work safety can be enhanced by green management training programs. These projects include promoting environmentally friendly behaviors, improving workplace safety, and supporting sustainable practices. Nursing managers can benefit from the training programs by recognizing possible hazards at work and implementing the appropriate safety measures to prevent mishaps or injuries (Roscoe et al., 2019). The programs can also reduce the risk of exposure by providing advice on how to appropriately handle hazardous materials and trash. These initiatives may also contribute to the development of a safe work environment, where employees are encouraged to prioritize their own health and safety. Employee collaboration and communication can result in a safer and more productive work environment (Anwar et al., 2020). **So the researchers conducted this study to** evaluate the effectiveness of implementing a green management program on nursing staff's knowledge, attitudes, and green management practices towards occupational safety.

Aims of the study:

Evaluate the effectiveness of implementing a green management program on nursing staff's knowledge, attitudes, and green management practices toward occupational safety

Research Hypothesis

H1: Implementing the green management program had a positive effect on nursing Staff Knowledge, Attitudes, and green management practices.

H2: Implementing the green management program had a positive effect on nursing Staff's occupational safety.

Subjects and Methods

Research design:

The goal of this study was accomplished using a quasi-experimental design

Setting:

This study was carried out in Damanhour University Hospital in these selected departments for general medicine, general surgery, specialized surgery, pediatrics, obstetrics and gynecology, general intensive care, and cardiac care.

Sample:

By using a convenience sampling technique, a total of 100 nursing staff, from the previously mentioned setting, who accepted to participate in the study were recruited in the study.

Tools:

Tool I: The structured interviewing questionnaire was developed by the researchers after reviewing literature reviews (Singh et al, 2020 Pinzone et al., 2019). It consists of three parts as the following:

Part I was concerned with the demographic data of the studied nursing staff, including characteristics them such as age, gender, educational level, years of experience, training courses about green management, and occupation safety.

Part II concerned nursing staff's knowledge and had twenty multiple-choice questions that covered a variety of topics, including green management techniques, principles, benefits, and concepts. A score of one was assigned to

each right response, while a score of zero was assigned to each wrong response. A total score of 70.0% was considered unacceptable, whereas a score of 70.0% or above was considered satisfactory.

Part III: Attitudes measured using 22 items: Attitude towards clinical training area safety, safety while working in a team with colleagues, safety rules, the effectiveness of safety training, and the effectiveness of personal protective equipment in preventing infection.

Tool II: Green management practices questionnaire: Following a survey of literature reviews, the researchers created it (Raut et al., 2019 Mousa & Othman, 2020). This comprises the following five domains—19 elements separated into each; The head nurse actively encourages staff and stakeholders to participate in sustainability efforts, demonstrating leadership commitment to the sustainability domain "3 items." The chief nurse encourages staff to adopt sustainable practices and offers training and education on these practices, which falls within the "three items" area of staff engagement and training. The domain "3 items" pertains to sustainability planning and implementation, wherein sustainability efforts are executed with effectiveness and efficiency, and their advancement is consistently tracked and communicated.

The nursing staff emphasizes using ecologically friendly products in the workplace, which falls under the green procurement area "3 items." As the head nurse consistently tracks energy usage and provides updates on efforts to curtail it, the energy conservation domain "3 items" is evident. The head nurse consistently keeps an eye on waste reduction initiatives and provides updates on the state of waste reduction goals under the waste reduction and management domain "4 items."

Likert scale scores were assigned to each item as follows: never (0 points), sometimes (1 point), and always (2 points). The overall scores of every member of the nursing staff are classified as low if the score is 70% or lower and high if the score is greater than 70%.

Tool III: The Occupational Safety Scale (OSS), This evaluated how nursing staff members felt about occupational safety. From, it was adapted (Ozturk & Babacan, 2012). The OSS is a 25-item test that evaluates five areas of domain "5 items" for the physical environment because this workplace's

physical environment is secure, The workplace's equipment is safe, hence the equipment safety domain is "5 items." Hazardous exposures domain "5 items" because the chemicals used here are kept in a safe manner Domain "5 items" for workplace violence: I feel secure from violence here. The workload at this workplace is manageable, hence the job stress domain is "5 items." Every item was graded from 1 (strongly disagree) to 5 (strongly agree) on a 5-point Likert scale. On a Likert scale, each item was assigned a score of zero. The total scores of each nursing staff were categorized as high occupational safety if the score was >70% and low if the score was 70% or less.

Ethical considerations

The scientific study ethical committee of Damanhour University's faculty of nursing granted ethical permission before the research's commencement. After outlining the purpose of the study to the nursing staff, oral assent was sought to participate in it. The study was voluntary, and the nursing staff was notified by the researchers that they might leave the study at any time with no explanation. They were also guaranteed the privacy of their data. On a Likert scale, each item was given the following scores: never (0 points), sometimes (1 point), and always (2 points). Overall scores of each nursing staff member are classified as low for green management (score <70%) and good for green management (score >70%).

Pilot study:

Ten nursing staff members, or 10% of the projected sample size, participated in a pilot study to evaluate the viability of the research instruments and the comprehensibility of the study's questions. The length of time needed for participants to finish the questionnaire was also estimated with the aid of the pilot research. No changes or deletions were made to the items based on the pilot study's findings, and the nursing staff who took part was included in the final sample.

Validity and Reliability:

Three experts in nursing administration assessed the data-collecting instruments to make sure they captured all pertinent information and appropriately measured the topic under study. The consistency of results across time, observers, and test sections was examined using

Cronbach's alpha test to evaluate the reliability of the instruments. For tools I, II, and III, the dependability scores were, in order, 0.826 (good), 0.870 (very good), and 0.912 (excellent). This suggests that the instruments measured the intended constructs consistently and with reliability.

Fieldwork:

From 9:00 a.m. to 1:00 p.m., the researchers worked in the research setting during the morning shift. From November 2023 to April 2024, the data collection process was underway. The investigators presented themselves to the nursing supervisors and outlined the purpose of the investigation. Each interview with the nursing staff which lasted for about 30 minutes, was used to collect data.

Procedure:

Assessment phase:

The researchers gave the nursing staff under study an explanation of the purpose of the study and the elements of the instruments. To gauge their understanding of green management, attitudes, green management techniques, and occupational safety, the researchers gave them a questionnaire. Pretest results were used to determine the needs of the nursing staff for creating the program.

Intervention phase:

The researchers divided the studied nursing staff into three groups; each trained for two days (four hours per day –two sessions) in the form of lectures and seminars. The nursing staff were informed about the group to which they would be allocated via an invitation letter. They were also notified about the time and place of training. In the hospital conference hall, theoretical sessions were led by a researcher; the program implementation took about four weeks, (each group t w o days per week).

Contents of the training program: First day:

First Session: Overview and Introduction to Green Management (2 hours). Explain the meaning of "green management" and its significance for healthcare establishments. Describe briefly the many green management strategies that healthcare institutions might use. Describe how the nursing department might use these methods.

Key Green Management Strategies in **the second session** (2 hours). Talk about the main tactics used by healthcare institutions to adopt green management techniques. Describe how the department's head

nurses can implement these tactics. Give instances of effective tactics for execution.

On the Second day:

Third Session: Green Management Best Practices (2 hours). Provide case studies and best practices from healthcare institutions that have effectively incorporated green management principles. Talk about the advantages they have experienced and the difficulties they have surmounted. Urge the head nurses to take these examples as inspiration and modify them for their department.

Action Planning and Evaluation (2 hours) is the fourth session. Request that the head nurses create a plan of action for bringing green management techniques into their division. Assist with setting quantifiable objectives, identifying important stakeholders, and designing an implementation schedule. After the intervention, evaluate the training session, and then follow up with the nursing staff to gauge their success in putting green management techniques into practice after four weeks.

Evaluation Phase: At the end of the follow-up month green management program their knowledge, attitude, and practices about green management and occupation safety were evaluated using the same tools that were used in the pretest.

Statistical Analysis

Data were organized, and categorized, result were presented in tables. Data were analyzed using a compatible personal computer using the Statistical Package for the Social Sciences (SPSS Inc; version 21; IBM Corp., Armonk, NY, USA). The ANOVA test was used to compare mean scores pre-, post, and follow-up intervention. The correlation coefficient is a numerical measure of some type of correlation, meaning a statistical relationship between two variables. Linear regression analysis is used to predict the value of a variable based on the value of another variable. The results were considered significant when the probability of error was less than 5% ($p < 0.05$) and highly significant when the probability of error was less than 0.1% ($p < 0.001$). The developed tool was tested for its reliability by using Cronbach's alpha test.

Results:

Table (1) shows that the mean age of nursing staff was 41.34 (3.89) years, and 84% of them were female. Additionally, 78% of nursing staff held a bachelor's degree, and the mean years of experience was 16.44 (4.7) years.

Figure (1) illustrates that only 11% of nursing staff attended training courses on green management and occupational safety.

Table (2) indicates that there was a significant improvement and difference detected between all green management domains regarding nursing staff knowledge related to Leadership commitment to sustainability, Staff engagement and training, pre and post-implementing green management programs, Sustainability planning and implementation, Green procurement, Energy conservation, Waste reduction and management at p-value of <0.01**

Figure (2) illustrates that before the implementation green management program, 85% of nursing staff had an unsatisfactory knowledge level about green management. After the intervention, 92% of them had a satisfactory level of knowledge.

Figure (3) illustrates that before the implementation green management program, 87% of nursing staff had a low knowledge level about green management practices. After the intervention, 90%

of them had a high level of knowledge.

Figure (4) illustrates that before the implementation green management program, 87% of nursing staff had a negative **attitude** level about green management practices. After the intervention, 90% of them had a positive level of **attitude**.

Table (4) indicates that there was a significant improvement and difference detected between all **occupation safety** domains among the nursing staff knowledge related to Physical environment, Equipment safety, Hazardous exposures, Workplace violence, and Job stress pre- and post-implementing green management program at a p-value of <0.01**

Figure (5) illustrates that before the implementation green management program, 70% of the studied nursing staff had a low perception level regarding occupational safety. However, after the implementing green management program, 86% of them had a high perception level regarding occupational safety.

Table (5): Illustrates that there were highly statistically significant positive correlations between total knowledge and total attitude of nursing management staff at pre and post-implementing green management programs. Highly statistically significant positive correlations are found between total knowledge and total practices pre and post-implementing green management programs.

Table (1) Demographic data distribution of the studied nursing staff (n=100)

Items	No	%
Age:		
25 - <35	43	43.0
35 - <45	37	37.0
>45	20	20.0
Mean (SD)	41.34 (3.89)	
Gender :		
Male	16	16.0
Female	84	84.0
Education level:		
Bachelor's	78	78.0
Master's degree	18	18.0
PhD degree	4	4.0
Years of experience:		
1 – <10 years	26	26.0
10 – 20	52	52.0
>20 years	22	22.0
Mean (SD)	16.44 (4.7)	

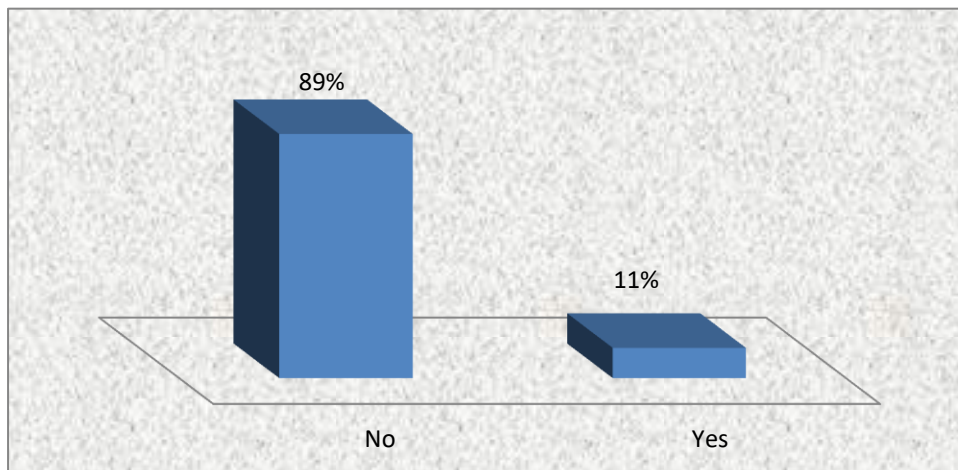


Figure (1) Nursing staff distribution regarding their attendance of training courses on green management and occupational safety (n=100)

Table (2) Mean score differences among nursing staff 'knowledge about green management practices pre and post-implementing green management program (n=100)

Domains	Pre Mean (SD)	Post Mean (SD)	ANOVA P. value
Leadership commitment to sustainability	1.77 (0.34)	4.54 (1.7)	8.77 = <0.01**
Staff engagement and training	1.88 (0.25)	5.23 (1.6)	7.88 = <0.01**
Sustainability planning and implementation	2.22 (0.23)	4.77 (1.4)	7.33 = <0.01**
Green procurement	1.66 (0.37)	3.86 (0.68)	8.22 = <0.01**
Energy conservation	1.72 (0.26)	4.23 (1.06)	7.44 = <0.01**
Waste reduction and management	2.64 (0.87)	5.89 (1.55)	9.56 = <0.01**

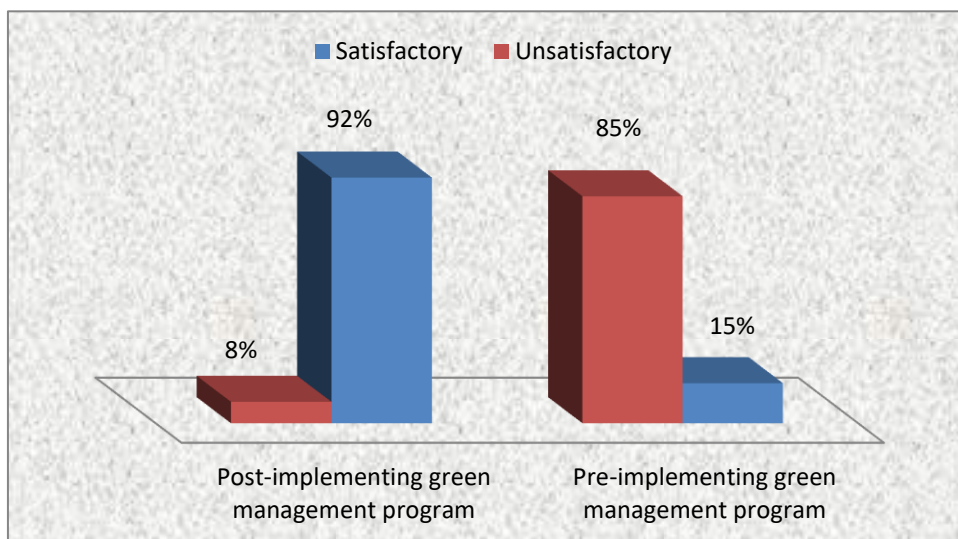


Figure (2) Nursing staff's total knowledge level pre and post-implementing green management program (n=100)

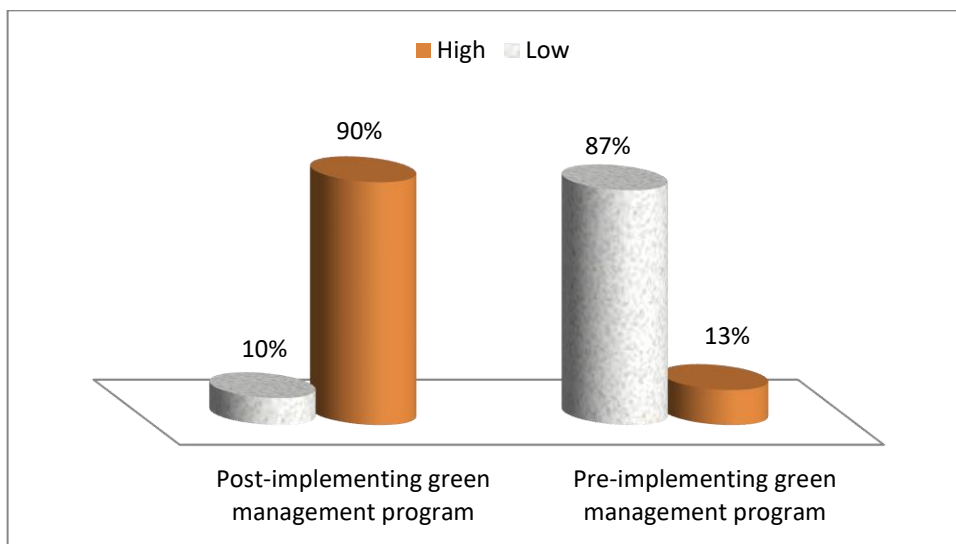


Figure (3) Nursing staff's total knowledge level regarding green management practices pre and post-implementing green management program (n=100)

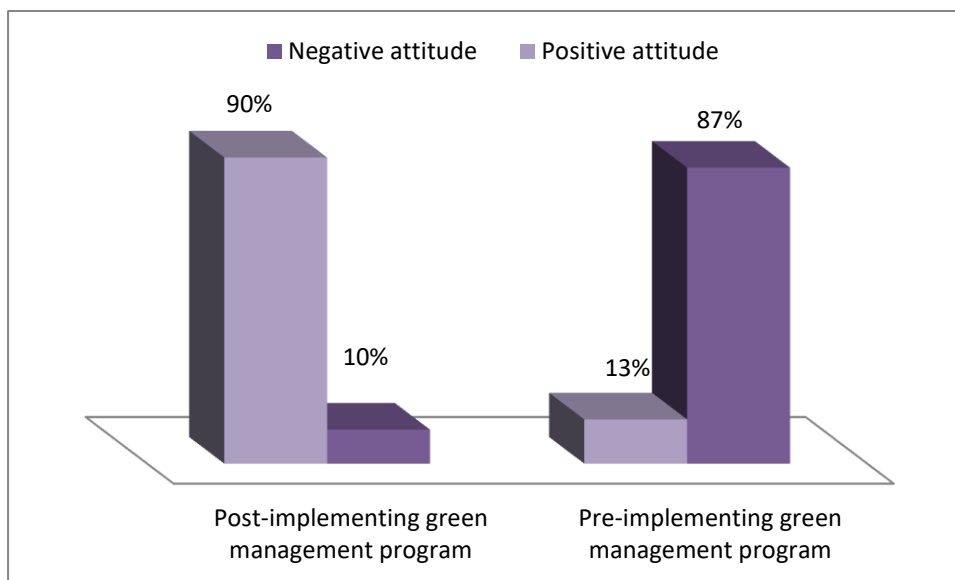


Figure (4) Nursing staff's total attitude level regarding green management practices pre and post-implementing green management program (n=100)

Table (4) Nursing staff mean score perception regarding occupational safety pre and post-implementing green management program (n=100)

Domains	Pre-implementing green management program Mean (SD)	Post-implementing green management program Mean (SD)	ANOVA P. value
Physical environment	13.45 (2.8)	19.7 (3.1)	8.43 <0.01**
Equipment safety	14.7 (5.2)	20.8 (7.3)	9.77 <0.01**
Hazardous exposures	13.9 (2.6)	21.4 (3.4)	7.88 <0.01**
Workplace violence	14.8 (5.3)	19.7 (2.7)	9.56 <0.01**
Job stress	12.6 (4.0)	20.5 (3.4)	7.28 <0.01**

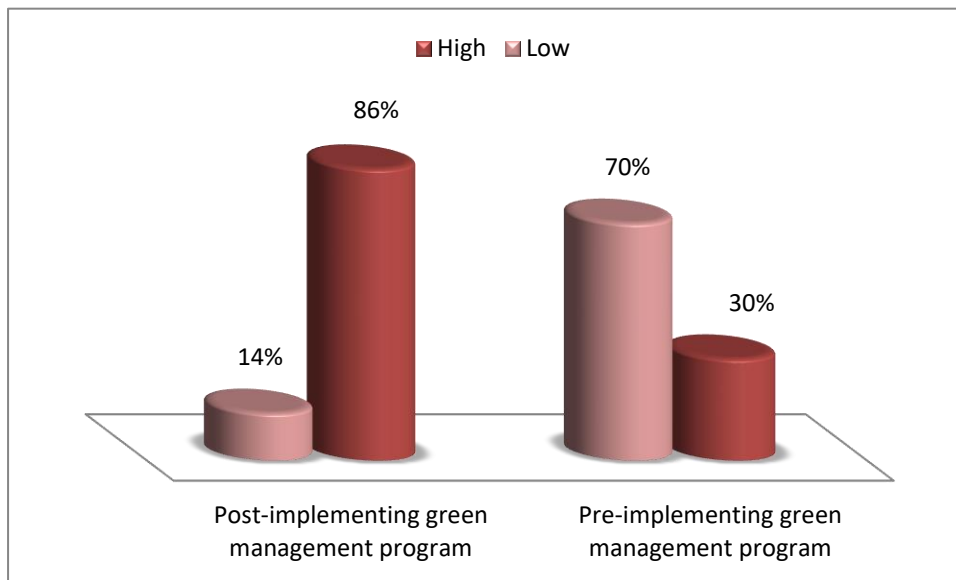


Figure (5) Nursing staff's total perception level regarding occupational safety pre and post-implementing green management program (n=100)

Table (5): Correlation between total knowledge, attitude, and green management practices towards occupational safety pre and post the implementing green management program

Program phase	Study variables		Total knowledge	Total attitude	Total practices
Pre Program	Total knowledge	R	1	.865	0.663
		p-value		.000**	.000**
	Total attitude	R	.875	1	.757
		p-value	.000**		.000**
	Total practices	R	0.649	.756	1
		p-value	.000**	.000**	
Post Program	Total knowledge	R	1	0.505	.786
		p-value		.001**	.000**
	Total attitude	R	0.506	1	0.538
		p-value	.001**		.001**
	Total practices	R	.789	0.534	1
		p-value	.000**	.001**	

Discussion:

To improve performance, managers and/or management must set green goals, targets, and responsibilities for their strategic management. Businesses must also evaluate the number of green incidents, the use of environmental responsibility, and the effective communication of environmental policy within their operational scope (Renwick,

2019).

Integrating concepts of environmental sustainability into organizational management practices is known as "green management." Nurse managers must prioritize the occupational safety of their personnel to reduce the environmental effects of their healthcare facility (Pinzone

et al., 2019).

The application of innovation across an organization to achieve sustainability, waste reduction, social responsibility, and competitive advantage through ongoing learning and development and by adopting environmental goals and strategies that are fully integrated with the organization's goals and strategies is known as "green management." Green management is the application of production, research, development, and marketing strategies that minimize environmental effects and yield ecologically friendly products. Better environmental quality is one of the fundamental objectives of green management, we think a more detailed and focused conception is necessary (Darnall et al., 2018).

The current study detected that only slightly more than ten percent of nursing staff attended training courses on green management and occupational safety. From the researchers' point of view, this may be the cause of knowledge deficit. Also, it reflected the need of the studied nursing staff to attend and implement green management programs and occupational safety

The current study results indicated that there was a significant improvement and difference detected between all green management domains regarding nursing staff knowledge related to Leadership commitment to sustainability, Staff engagement and training, pre and post-implementing green management programs, Sustainability planning and implementation, Green procurement, Energy conservation, Waste reduction and management. From the researchers' point of view, this may be related to the nursing staff's desire to improve their knowledge regarding green management, which also reflected the positive effects of green management implementation.

The results of this study were in line with those of Tarkar (2022), who examined the role of green hospitals in sustainable construction and found that there was a highly statistically significant difference in the level of knowledge improvement among nursing management staff. The study focused on the benefits, rating systems, and constraints of green hospitals. Furthermore, the present investigation aligned with the work of Ozdemir & Tuna (2022), who carried out Green and Smart Hospitals: A Review in the Context of

Indoor Air Quality. The majority of the nursing management staff had a satisfactory level of knowledge, according to the Indoor Air Quality Assessment for Smart Environments.

According to green management nursing staff's knowledge level, the current study results revealed that before the **implementation green management program**, the majority of the nursing staff had an unsatisfactory knowledge level about green management, after the **implementation**, almost all of them had a satisfactory level of knowledge. El-Shaer (2019) observed a significant improvement in the knowledge level of head nurses following a training intervention.

The current study results revealed that before the implementation green management program, the majority of nursing staff had a low knowledge level of green management practices. After the intervention, almost all of them had a high level of knowledge, from the researchers' point of view, it confirmed the effectiveness of the intervention. The present study was in agreement with Garg & Dewan, (2022), who conduct greenhospitals. In the manual of hospital planning and designing and found that there is a highly statistically significant difference related to green management practice.

The results of this investigation were consistent with those of Benzidia et al. (2021) who carried out a study on the effects of artificial intelligence and big data analytics on green supply chain process integration and hospital environmental performance. They found that most participants had competent full practice both during the program phase and after and that the current study was supported by Jemai et al. (2020) who manage the environmental impact of a sophisticated green supply chain in a sustainable manner to control waste.

In a similar vein, Cruz et al. (2018) found that learning about environmental issues while enrolled in nursing schools, as well as attending pertinent seminars and training on

the subject, had a positive influence on the environment. By encouraging an atmosphere of environmental stewardship and involving employees in green projects, small- and medium-sized hospitality businesses could operate more sustainably, claim **Elshaer et al. (2023)**.

Li et al. (2022) found that nurses' intention to practice environmentally friendly behavior positively influenced their actual conduct. **Lee & Lee (2022)** also highlighted the importance of top management in motivating staff to participate in ecologically friendly healthcare practices. Conversely, perioperative nurses and nurse managers recognize the value of ecological and financial sustainability, according to **Leppänen et al., 2022**. Additionally, it was reported by **Abdelmonem et al. 2022** that a little more than two-thirds (66.7%) of head nurses thought favorably of green HRM practices.

The current study results revealed that before the implementation green management program, the majority of nursing staff had a negative attitude level about green management practices, after the intervention, almost all of them had a positive level of attitude. From the researchers' point of view, it reflected the success of the intervention. These findings are consistent with past research on the subject, including that conducted by **Ebrahim et al. (2022)**, which discovered that educational interventions were effective in increasing nurses' knowledge about, attitudes toward, and actions associated with sustainable development.

According to our findings, following participation in green management training, nursing staff reported that there was a significant improvement and difference detected between all occupation safety domains among the nursing staff knowledge related to Physical environment, Equipment safety, Hazardous exposures, Workplace violence, and Job stress pre and post implementing green management program. The aforementioned outcomes align with the research conducted by **Taghavi and Ghazanchari (2019)**, which highlights the advantages of incorporating green management practices in healthcare facilities. These benefits include enhanced patient and staff health and social outcomes, financial savings, and environmental preservation. Green management has been shown to help lower occupational dangers, according to **Bolandian-**

Bafghi et al. (2022).

The current study results revealed that before the implementation green management program, less than three-quarters of the studied nursing staff had a low perception level regarding occupational safety. But, after the implementing green management program, the majority of them had a high perception level regarding occupational safety. The present study was consistent with **Wahl et al., (2022)**, who conducted an Experience of learning from everyday work in daily safety huddles—a multi-method study and found that two-thirds of patients have a high total level of safety immediately post-program.

The results of the current study illustrated that there were highly statistically significant positive correlations between total knowledge and total attitude of nursing management staff in pre and post-implementing green management programs. Highly statistically significant positive correlations are found between total knowledge and total practices pre and post-implementing green management programs. From the researcher's point of view, this might be due to effective knowledge having a good impact on practices that increase and reflect on occupational safety, all this due to effective education programs. These results are in line with research by **Nasser Rayan et al. (2021)**, which found a statistically significant and favorable association between the total practice scores for occupational safety.

Conclusion:

Based on the findings of the current study, it can be concluded that implementing a green management program has a positive effect on nursing staff's knowledge, attitudes, and green management practices towards occupational safety. There was a highly statistically significant positive correlation between total knowledge and total attitude of nursing management staff in pre and post-implementing green management programs. Highly statistically

significant positive correlations are found between total knowledge and total practices pre and post-implementing green management program

Recommendations:

Based on the findings of the current study the following recommendations are suggested:

- Maintaining a green management program to enhance the attitudes and knowledge of nursing personnel.
- By supporting green management systems, hospitals can give their employees and patients a safe environment.
- Encouraging all healthcare facilities to embrace occupational safety regulations and green management practices to decrease waste, protect the environment, and make the workplace safer for healthcare workers.

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