

# Promoting Sustainability Healthcare Practices: A Quasi-experimental Study on Nursing Education in Governmental Hospitals

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## ABSTRACT

**Background:** Climate change, driven mainly by human activities such as fossil fuel combustion, poses severe risks to global health and stability. As healthcare practices contribute to environmental degradation, there is a growing emphasis on sustainable healthcare. As crucial healthcare providers, nurses play a vital role in adopting sustainable practices, yet they often need more education on these topics. This study addresses this gap by evaluating an educational programme to enhance nurses' knowledge and attitudes toward sustainable practices in healthcare settings. **Objectives:** The study aimed to assess the effectiveness of an educational intervention in improving nurses' knowledge and attitudes toward sustainable healthcare practices, thereby promoting a more environmentally conscious approach to healthcare. **Methods:** A quasi-experimental one-group pre-test/post-test design was implemented with 30 nurses from Mosul's governmental hospitals. Data were collected through a structured questionnaire administered before and after the educational program, which consisted of eight sessions covering topics from energy conservation to sustainable procurement practices. Reliability was confirmed with a Cronbach's alpha of 0.82. Statistical analyses included paired t-tests to compare pre- and post-intervention scores for knowledge and attitudes. **Results:** The intervention significantly improved participants' knowledge and attitudes toward sustainability. Average knowledge scores increased from 50 (SD = 8.2) pre-intervention to 75 (SD = 5.6) post-intervention, while attitude scores rose from 60 (SD = 7.3) to 82 (SD = 6.1). These findings suggest that structured educational programmes effectively elevate understanding and positive perceptions regarding sustainable healthcare practices. **Conclusion:** The educational programme enhanced nurses' knowledge and attitudes toward sustainability, indicating that similar interventions could benefit healthcare sectors. Integrating sustainability education into nursing curricula is essential for equipping nurses with the skills to address healthcare's environmental impacts.

**Keywords:** *Attitudes; Climate Change; Environment; Knowledge; Nursing Education; Sustainability Training*

## INTRODUCTION

Climate change is recognised as one of the most significant threats to human survival, profoundly impacting humanity and the planet (Frazer & Davidson, 2022; Gnjidic *et al.*, 2022). Climate change, defined by the United Nations (UN) as long-term shifts in temperature and weather patterns, was initially attributed to natural factors like variations in the solar cycle, volcanic activity, and changes in the Earth's orbital and geochemical cycles, as noted by scientists in the 19<sup>th</sup> century (Cosenz *et al.*, 2024; Rosa, Dossey, *et al.*, 2019; Rosa, Kurth, *et al.*, 2019). However, modern research using mathematical modelling and satellite data now identifies human activities—notably the burning of fossil fuels for energy, deforestation, and unsustainable land use—as the primary drivers of climate change (Rosa *et al.*, 2020).

These activities are altering the conditions necessary for human survival and worsening health issues

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globally, from food insecurity to respiratory diseases, prompting the displacement of climate refugees due to famine, drought, flooding, and fires (Morton *et al.*, 2019; Peng, 2019). In response to the pressing challenges posed by climate change, various health organisations have committed to reducing their environmental impact. For instance, the NHS in the United Kingdom has pledged to achieve net-zero carbon emissions by 2040 for directly controlled emissions and by 2045 for those within its broader influence (Iwai *et al.*, 2025; Marra, 2025; Morton *et al.*, 2017). Actions such as transitioning to electric transportation fleets, building net-zero hospitals, replacing lights with LEDs, and enhancing supply chain sustainability are part of the NHS's approach to addressing its environmental footprint. Nurses play a critical role in healthcare sustainability and climate mitigation efforts, given their use of various materials and resources in daily care, from pharmaceuticals to nutritional and care products. (Bein, 2025; Lilienfeld *et al.*, 2018). Many single-use healthcare items come in extensive packaging, increasing healthcare services' carbon footprint. To mitigate this impact, some sustainable practices are emerging in nursing, including shutting down computers when idle, reducing waste, recycling, and opting for digital files over printed materials. (Kiyat & Palamar, 2025; Nicholas & Breakey, 2017; Santiago *et al.*, 2025). Examples from other regions, such as China, include limiting disposable supplies, recycling, and green commuting (Nicholas *et al.*, 2021).

However, research indicates that nurses may need more awareness of their potential to drive positive environmental change. Studies in Sweden and China show that while nurses may recognise climate change's impact on public health, they often lack an understanding of healthcare's role in contributing to climate change (Ennen, 001). Addressing this gap is crucial, as increasing nurses' awareness and knowledge about sustainable practices could significantly reduce the healthcare sector's environmental impact. According to Watts *et al.* (2015), the health impacts of global warming could be devastating, with an estimated 250,000 additional deaths linked to climate change between 2030 and 2050. As global temperatures rise, addressing climate change has become an urgent priority for the nearly 9 billion people expected to inhabit the planet by mid-century. Although global initiatives such as the United Nations' 17 Sustainable Development Goals and the Paris Agreement, recognised as the first legally binding international climate accord signed by 195 countries, demonstrate a strong international commitment to climate change, progress has been slow. The Intergovernmental Panel on Climate Change has cautioned that climate change will lead to irreversible damage to human health and natural ecosystems unless significant efforts are made to reduce its impact, emphasising the urgent need for collective action by governments, organisations, and individuals worldwide (Klein *et al.*, 2017).

In the United Kingdom, the healthcare sector plays a significant role in national carbon emissions, with the National Health Service responsible for producing approximately 22.8 million tonnes of carbon dioxide each year. These emissions stem from various activities, including procurement, energy consumption in buildings, and transportation, making the NHS a substantial contributor to the country's overall environmental footprint. This paradox, where healthcare efforts to improve health simultaneously contribute to ecological harm, underscores the need for sustainable practices within the sector (Agbedahin, 2019). Studies like those by Álvarez-Nieto *et al.* (2018) and Cruz *et al.* (2018) suggested that sustainability education can significantly impact nursing practices by improving knowledge and attitudes toward sustainability, fostering a mindset of environmental responsibility among healthcare providers. Nurses represent a significant subset of the workforce within the global healthcare landscape. In the United Kingdom, 285,893 nurses and health visitors play a vital role in daily healthcare delivery, placing them in a strong position to adopt and promote sustainable practices. However, despite the size and influence of this workforce, there is a notable lack of research exploring their perspectives on climate change and global warming NHS Confederation.

This study addresses the pressing need for sustainable practices within healthcare settings by focusing on nursing education as a pathway to promoting environmental responsibility. Climate change, fuelled predominantly by human activities, such as fossil fuel combustion, poses severe risks to global health and stability. As a critical subset of the healthcare workforce, nurses play a pivotal role in daily healthcare operations and are well-positioned to integrate sustainable practices into their routines. However, there remains a gap in education and training that equips nurses with the knowledge and attitudes necessary to foster

sustainable practices. To guide this investigation, the study will address the following research questions:

How effective is the educational program in enhancing nurses' knowledge of sustainable healthcare practices?

How does the educational intervention impact nurses' attitudes toward sustainability in healthcare settings?

Do specific demographic factors (e.g., age, experience) influence knowledge and attitudes post-intervention changes?

**Based on these questions, the study objectives are as follows:**

To evaluate the effectiveness of a structured educational program on improving knowledge and attitudes toward sustainable healthcare among nurses.

To identify demographic characteristics that may correlate with knowledge and attitude changes in sustainable healthcare practices.

To explore nurses' perceptions of sustainable healthcare practices, aiming to promote a sustainable healthcare model.

### **Environmental Impact of Healthcare**

The healthcare sector is gaining recognition as a major contributor to environmental harm. Research shows that healthcare systems across the globe generate significant carbon emissions, produce large amounts of waste, and consume vast energy resources—all of which play a role in accelerating climate change (Morton, Pencheon & Squires, 2017). For example, the National Health Service (NHS) in the United Kingdom emits around 22.8 million tonnes of CO<sub>2</sub> annually, stemming from activities such as procurement, energy use in facilities, and transportation. This paradox, where healthcare, a sector devoted to improving health, also poses risks to global health through its environmental impact, highlights an urgent need for sustainable practices within the field (Álvarez-Nieto *et al.*, 2018).

### **Sustainable Healthcare Practices and Initiatives**

Efforts are underway to mitigate the environmental footprint of healthcare systems, including initiatives that prioritise sustainability in healthcare operations. For instance, the NHS has committed to achieving net-zero emissions by 2040, with strategies such as transitioning to electric vehicle fleets, constructing net-zero hospitals, and enhancing supply chain sustainability (Nicholas & Breakey, 2017; Cruz *et al.*, 2018). These initiatives align with global frameworks like the United Nations Sustainable Development Goals (SDGs) and the COP21 Paris Agreement, which underscore the necessity of sustainable actions across industries. Implementing sustainable practices in healthcare requires adopting eco-friendly procurement policies, waste reduction techniques, and energy conservation measures (Cosenza *et al.*, 2024).

### **Role of Nurses in Sustainability Efforts**

Nurses, comprising a substantial portion of the healthcare workforce, have a unique potential to drive sustainability efforts due to their integral role in day-to-day healthcare operations. Research indicates that nurses' practices—from resource use to waste disposal—directly impact the environmental footprint of healthcare (Lilienfeld *et al.*, 2018; Ennen, 2001). Studies from China and Sweden demonstrate that while nurses generally understand the health risks associated with climate change, they may lack specific knowledge about sustainable practices in their clinical environments. This knowledge gap highlights the importance of equipping nurses with sustainability-focused education to encourage environmentally responsible practices within healthcare settings (Nicholas *et al.*, 2021).

### **Impact of Sustainability Education on Nursing Practices**

Several studies underscore the positive influence of sustainability education on nursing practices. For example, Álvarez-Nieto *et al.* (2018) found that targeted educational interventions significantly improved nursing students' knowledge and attitudes toward sustainability, fostering a mindset oriented toward

environmental responsibility. Cruz *et al.* (2018) similarly observed that educational programmes can enhance nursing students' and professionals' understanding of sustainability concepts, making them more likely to integrate sustainable practices into their clinical roles. These studies suggest that embedding sustainability within nursing curricula can be a powerful tool for shaping future healthcare practices and promoting an environmentally conscious healthcare sector (Biasutti & Frate, 2017).

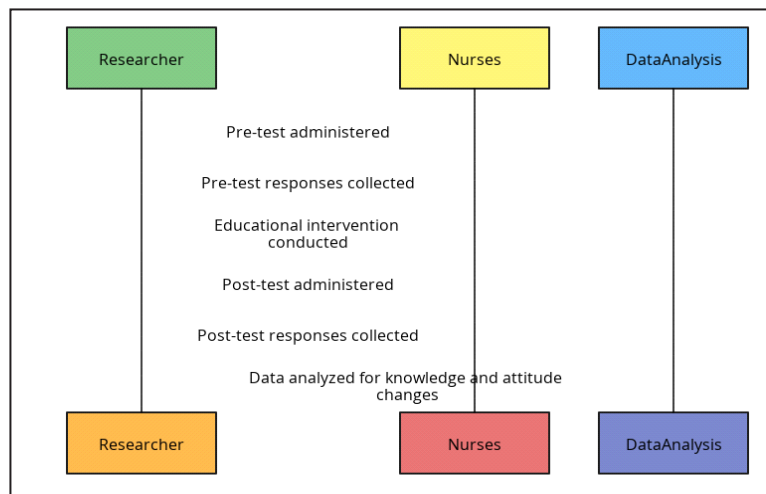
### Existing Gaps in Nursing Education and Sustainability

Despite these promising findings, there remains a limited focus on sustainability education within nursing programmes, particularly in low-resource settings where environmental practices may not be prioritised due to competing healthcare demands. Richardson *et al.* (2014) argue that nurses may need to be made aware of the ecological consequences of their daily practices with structured education in sustainability. As a result, there is a need for comprehensive, accessible educational programmes that can bridge this gap and empower nurses to participate actively in sustainability efforts (Gnjidic *et al.*, 2022).

## METHODOLOGY

### Study Design

This study employed a quasi-experimental design with a one-group pre-test/post-test format to assess changes in participants' knowledge and attitudes toward sustainable healthcare practices following an educational intervention. This design allowed for measuring the impact of the intervention on the same group of participants by comparing their knowledge and attitudes before and after the program. While this approach provides valuable insights into the effectiveness of the intervention, incorporating a control group could enhance the rigour of the findings by enabling comparisons between those who received the intervention and those who did not, thus isolating the intervention's specific effects. The sample consisted of 30 nurses working in governmental hospitals, selected to represent various roles and levels of experience. Data were collected through structured questionnaires administered before and after the intervention, allowing for a systematic evaluation of changes in sustainability-related knowledge and attitudes. This design was chosen to provide a practical yet effective approach to evaluating educational impacts in real-world healthcare settings (Figure 1).



**Figure 1: Process Flow for Assessing the Impact of Educational Intervention on Nurses' Knowledge and Attitudes**

### Study Participants and Recruitment

The study sample consisted of 30 nurses working in governmental hospitals in Mosul, Iraq. Participants were recruited through purposive sampling, focusing on nurses with varied experience levels and roles within the hospital setting to ensure a diverse representation. Recruitment occurred in collaboration with hospital administrators, who assisted in identifying nurses interested in advancing their understanding of sustainable practices. Thirty participants are commonly accepted for exploratory or educational intervention studies. All participants volunteered for the study after receiving a detailed explanation of its objectives, potential benefits,

and their rights as participants. Participants were informed of the study's purpose, procedures, potential risks, and benefits. They provided written informed consent and were informed of their right to withdraw from the study without penalty. All responses were anonymised to ensure confidentiality, and data were securely stored with restricted access to authorised research personnel only. Data will be retained in a secure, password-protected system for the duration specified by institutional guidelines and will be responsibly disposed of afterwards.

**Selection Criteria:** The inclusion criteria for participation were as follows:

Registered nurses working in Mosul's governmental hospitals.

Nurses with at least one year of professional experience to ensure a basic familiarity with standard healthcare practices.

Willingness to participate in the entire educational programme and pre- and post-intervention assessments.

Exclusion criteria included nurses who had recently participated in similar educational programmes on sustainability to ensure the intervention's effectiveness could be accurately measured without previous influence.

### **Study Tools**

The primary data collection tool was a structured questionnaire administered before and after the educational programme to measure changes in knowledge and attitudes related to sustainable healthcare practices.

### **Validity and Reliability**

Fifteen experts reviewed the questionnaire to ensure its validity and reliability. The internal consistency of the questionnaire was verified using Cronbach's alpha, which yielded a reliability coefficient of 0.82, indicating a high level of reliability.

### **Pilot Study**

A pilot study was conducted with ten nurses who were not part of the main study. This pilot test helped refine the questionnaire and ensure the clarity and relevance of the questions for the target participants.

### **Educational Programme**

The educational programme consisted of eight sessions conducted over five days and was constructed based on a literature review and previous studies. (Cosenz *et al.*, 2024; Gaspary *et al.*, 2024; Hamarash *et al.*, 2023; Mohammed & Ibrahim, 2023; van Elten *et al.*, 2023). Each session included a 60-minute lecture on various aspects of sustainable healthcare practices relevant to nursing. Following each lecture, there was a 15-minute discussion period, allowing participants to ask questions, share experiences, and engage in practical dialogue to enhance their understanding and application of the concepts presented.

**The sessions covered topics such as:**

**Introduction to Sustainable Healthcare:** Importance and impact of sustainability in healthcare.

**Energy Conservation in Healthcare Settings:** Strategies for Reducing Energy Consumption.

**Waste Management and Reduction:** Techniques for minimising and managing healthcare waste.

**Eco-friendly Procurement Practices:** Choosing sustainable materials and reducing single-use products.

**Water Conservation Practices:** Importance of water conservation and practical steps in healthcare.

**Sustainable Transportation and Green Travel:** Reducing the carbon footprint through transportation choices.

**Digitalisation and Paper Reduction:** Shifting towards digital solutions to minimise paper waste.



**Leadership in Sustainability:** Role of nurses as advocates and leaders in promoting sustainable practices within healthcare.

This structured programme aimed to equip nurses with the knowledge and skills to incorporate sustainability into their daily practices, thereby reducing the environmental impact of healthcare services.

### Statistical Analysis

Data were analysed using statistical methods, including mean, standard deviation (SD), *t*-tests, and ANOVA. These analyses were used to assess changes in knowledge and attitudes between pre- and post-test scores and to determine the effectiveness of the educational intervention on sustainable healthcare practices.

### Ethical Consideration

The study received ethical approval from the Institutional Review Board (IRB) at the University of Mosul, Iraq, with reference number 41-CCMRE-NUR-24-12 on 28<sup>th</sup> October, 2024.

## RESULTS

**Table 1: Socio-Demographic Characteristics of the Study Subjects**

Demographic Characteristic	Category	N	Percentage (%)
Age (years)	21 - <22	5	16.7
	22 - <23	16	53.3
	23 - 24	9	30
Marital Status	Single	24	80
	Married	6	20
Sex	Male	16	53.3
	Female	14	46.7
Residence	Rural	17	56.7
	Urban	13	43.3
Previous training courses regarding SD	Yes	0	0
Hearing about SD	Yes	5	16.7
	No	25	83.3
Source of Information (if Yes)	Internet	5	100

The table 1 presents the demographic characteristics of the study participants (N = 30). The majority of participants were aged between 22 and less than 23 years (53.3%), followed by those aged 23–24 years (30%) and 21–less than 22 years (16.7%). Most participants were single (80%), with a smaller proportion being married (20%). In terms of sex, 53.3% were male and 46.7% were female. A larger portion resided in rural areas (56.7%) compared to urban areas (43.3%).

Regarding previous exposure to the topic of sustainable development (SD), none of the participants had attended any training courses. Only 16.7% had heard about SD, all of whom cited the Internet as their sole source of information, while the remaining 83.3% had no prior knowledge of SD.

**Table 2: Pre and Post-Test Scores of the Study Participants According to their Knowledge and Attitudes**

Measure	Pre-test Score	Standard Deviation (SD)	Post-test Score	Standard Deviation (SD)	Paired <i>t</i> -test ( <i>p</i> -value)	Effect Size (Cohen's <i>d</i> )
Knowledge	50	8.2	75	5.6	< 0.001	3.57
Attitude	60	7.3	82	6.1	< 0.001	3.27

The table 2 summarizes the comparison of participants' knowledge and attitude scores before and after the intervention. The mean pre-test knowledge score was 50 (SD = 8.2), which significantly increased to a post-test score of 75 (SD = 5.6). Similarly, the mean attitude score improved from 60 (SD = 7.3) in the pre-test to 82 (SD = 6.1) in the post-test. Paired *t*-test results indicated statistically significant improvements in both knowledge and attitude ( $p < 0.001$ ). The effect sizes, as measured were 3.57 for knowledge and 3.27 for attitude, indicating a very large effect of the intervention.

The educational intervention conducted for 30 nurses in Mosul's governmental hospitals significantly improved knowledge and attitudes toward sustainability. The detailed findings are as follows:

### Knowledge Scores (Pre- and Post-Test)

The paired *t*-test analysis indicated a statistically significant increase in nurses' knowledge following the intervention ( $t=6.24$ ,  $p<0.001$ ,  $df=29$ ). This improvement highlights the effectiveness of the educational sessions in enhancing participants' awareness and understanding of sustainability concepts.

### Attitude Toward Sustainability

A significant positive change was also observed in participants' attitudes toward sustainability, as revealed by the paired *t*-test ( $t=7.85$ ,  $p<0.001$ ,  $df=29$ ). This suggests that the intervention increased knowledge and positively influenced the nurses' perspectives and commitment to sustainable healthcare practices.

## DISCUSSION

The findings from this study demonstrate a significant improvement in nurses' knowledge and attitudes toward sustainable healthcare practices following the educational intervention. Notably, the data suggest that younger nurses and those with fewer years of experience showed more significant improvements in knowledge and attitudes than their older or more experienced counterparts. This demographic insight is substantial and may be explained by several factors. Research has shown that younger professionals are often more open to adopting new ideas and practices, including sustainability initiatives, likely due to their recent educational experiences and greater familiarity with current issues in healthcare and environmental responsibility (Biasutti & Frate, 2017; Álvarez-Nieto *et al.*, 2018). Younger nurses may also be more adaptable to change and receptive to innovative practices, as they are typically more accustomed to integrating new information into their practice than those with longstanding routines (Álvarez-Nieto *et al.*, 2018).

### Knowledge Improvement

The increase in mean knowledge scores from 50 to 75 post-intervention suggests that the educational programme successfully bridged existing knowledge gaps. This finding aligns with previous studies that show knowledge as a critical barrier to sustainable practice adoption among healthcare providers; relevant information on sustainability makes them more likely to integrate environmentally responsible practices in their clinical settings. Nurses play a pivotal role in direct patient care and operational activities within healthcare facilities, so their enhanced knowledge can substantially reduce the overall environmental footprint of healthcare institutions.

Álvarez-Nieto *et al.* (2018) emphasised the need for digital educational materials tailored to nursing and sustainability, reinforcing the study's focus on using educational interventions to instil sustainability consciousness in healthcare professionals. Richardson *et al.* (2014) also highlighted the gap in nursing education regarding the nexus between climate change and healthcare, suggesting that sustainability policies may only be utilised with such education. Cruz *et al.* (2018) explored how targeted education could positively influence attitudes toward environmental sustainability in healthcare, showing that students who engaged in seminars and training better understood sustainability issues. Biasutti and Frate (2017) further supported the necessity of fostering a mindset oriented toward sustainable development, focusing on the three core dimensions of knowledge, attitude, and behaviour—these dimensions were crucial in shaping nursing students' sustainability competencies in the Menoufia University study.

### Attitude Changes

The positive attitude shift observed among participants is also noteworthy, with mean attitude scores increasing from 60 to 82. Attitudinal changes are essential because knowledge alone may not lead to action; positive attitudes toward sustainable practices are necessary to motivate actual behaviour change. Previous studies have similar outcomes, suggesting that when healthcare professionals understand the environmental impact of their activities, they are more inclined to support and adopt sustainable practices. This shift may foster a workplace culture where sustainability is valued and practised consistently, contributing to long-term environmental benefits within healthcare settings.

Research conducted at Menoufia University, Egypt, evaluated a quasi-experimental educational intervention among nursing students. The study revealed significant post-intervention gains in sustainability

knowledge, attitudes, and behaviours. Notably, students demonstrated substantial improvements across environmental, social, and economic sustainability dimensions, supporting the idea that focused educational programmes can foster critical competencies for sustainable healthcare practices.

These findings align with existing literature (Mahmood *et al.*, 2022) suggesting that exposure to sustainability concepts in nursing curricula, primarily through structured interventions, can be instrumental in shaping nursing students' professional roles regarding environmental responsibility. Moreover, this study reaffirms similar outcomes observed in other regions, suggesting that these educational strategies could be generalised across diverse nursing programmes to cultivate a culture of sustainability in healthcare. Thus, the study provides valuable insights into the effectiveness of sustainability education, advocating for integrating such curricula to meet the growing demands for climate-responsive and sustainable healthcare practices.

### **The Role of Demographic Characteristics**

Analysis of socio-demographic characteristics of Tao *et al.*, 2024 reveals that younger nurses and those with fewer years of experience were more likely to show substantial knowledge and attitude improvements. This may reflect a greater openness to new ideas and practices among younger professionals or a more current educational background that includes sustainability concepts. Although further research is needed to understand the influence of demographic factors fully, these findings indicate that targeted training programmes for all demographic groups within the nursing workforce could ensure the widespread adoption of sustainable practices.

### **Barriers to Sustainable Practices**

Despite the positive outcomes, it is essential to consider the barriers to implementing sustainable practices in healthcare. For example, participants had yet to receive training in sustainable development (SD), and the majority (83.3%) had limited awareness of SD concepts. This highlights the need for systemic integration of sustainability in healthcare education and ongoing professional development. Additionally, rural nurses may need help with resources and support, which could hinder the consistent implementation of sustainable practices.

### **Recommendation**

The study highlights the importance of embedding sustainability education within nursing curricula, which could significantly enhance nurses' role in reducing healthcare's environmental impact. Specific implementation strategies for existing nursing programmes are recommended to provide practical guidance. For instance.

**Integration into Core Curriculum:** Adding modules on sustainable healthcare practices within existing courses (e.g., public health, ethics, and environmental health) would expose nursing students early on to the principles and importance of sustainability.

**Simulation and Case-Based Learning:** Incorporating case studies and simulations focusing on sustainable practices (such as energy conservation in clinical settings, waste reduction, and sustainable procurement) can help students apply sustainability concepts in realistic scenarios.

**Continuing Education Programs:** Developing ongoing professional development and certification programmes for nurses in practice would provide refresher training on sustainability, ensuring that current staff can update their skills and knowledge.

**Collaborative Projects:** Partnering with local hospitals for student-led sustainability projects could encourage experiential learning and promote engagement with real-world applications, reinforcing the practical benefits of sustainable actions in healthcare.

### **Limitation**

This study has several limitations, including a small sample size, lack of a control group, and a short timeframe, which may limit the generalisability and long-term impact of the findings. Additionally, the study did not fully explore challenges related to implementing sustainable practices in low-resource healthcare



settings. Future research should consider cost-effective, adaptable interventions, explore partnerships for resource sharing, and examine the role of policy and funding in supporting sustainability in such environments.

## CONCLUSION

The educational intervention in this study effectively improved nurses' knowledge and attitudes toward sustainable practices in Mosul's governmental hospitals. These results highlight the potential of academic programmes to influence healthcare practices positively and contribute to environmental sustainability. Given the significant role of nurses, integrating sustainability into healthcare training and creating supportive environments are crucial steps toward a greener healthcare sector.

Long-term impact of sustainability education on healthcare practices must be explored across diverse regions and hospital settings. Expanding this educational intervention to include a broader range of healthcare professionals could yield insights into interdisciplinary collaboration for sustainable healthcare. Research into developing specific guidelines and policies that support sustainable practices in healthcare institutions could also provide a robust framework for nationwide implementation. Finally, integrating digital tools and technology-driven solutions to enhance sustainability in daily healthcare practices presents a promising area for future exploration.

## Conflict of Interest

The authors declare that they have no competing interests.

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