

SUSTAINABILITY IN NURSING HOSPITALS: NURSES' PERSPECTIVES

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Abstract

The article examines the issue of sustainability in healthcare organizations. Contemporary society is characterized by consumerism, waste generation, and other processes that impact both society and the environment. The healthcare sector is no exception, as its processes, despite being aimed at the noble goal of improving human health, leave a negative footprint. For these reasons, it is crucial to analyze and assess sustainability issues in the healthcare sector and seek the most appropriate solutions to prevent negative impacts on society and the surrounding environment. The results of this study revealed that, although employees are aware of the fundamental principles of sustainability, their application within healthcare organizations depends largely on the conditions provided by the organization itself.

Keywords: sustainability, healthcare, energy use, waste generation.

Anotacija

Straipsnyje analizuojama tvarumo sveikatos priežiūros organizacijose problema. Šių laikų visuomenė pasižymi vartotojiškumu, atliekų generavimu ir kitais procesais, kurie paveikia tiek pačią visuomenę, tiek aplinką. Sveikatos priežiūros sektorius yra ne išimtis, nes čia vykstantys procesai, nors ir skirti kilniam tikslui – žmogaus sveikatai gerinti – vis dėlto palieka neigiamą pėdsaką. Dėl šių priežasčių labai svarbu analizuoti ir vertinti tvarumo problemą sveikatos priežiūros sektoriuje ir ieškoti tinkamiausių sprendimų siekiant išvengti neigiamo poveikio visuomenei ir ją supančiai aplinkai. Šio tyrimo rezultatai atskleidė, kad nors darbuotojai ir žinos esminius tvarumo principus, tačiau asmens sveikatos priežiūros organizacijose juos taiko tiek kiek pačioje organizacijoje tam yra sudarytos sąlygos.

Raktažodžiai: tvarumas, sveikatos priežiūra, energijos naudojimas, atliekų gaminimas.

INTRODUCTION

Relevance of the Study. Long-term sustainability solutions in the healthcare sector are not only related to meeting environmental requirements but also to the well-being of employees in healthcare organizations, their relationship with the social environment, and the commitment to providing high-quality healthcare services. Healthcare organizations have many opportunities to implement sustainability principles: conserving energy, reducing the amount of difficult-to-recycle waste, promoting a sustainable society, and improving employees' quality of life by implementing sustainable solutions. Both the organization and its employees play important roles in implementing these principles.

The Aim of Research. To analyze how does the implementation of sustainability principles in healthcare organizations providing supportive and nursing services affect the employees working there.

Methodology. The quantitative survey of healthcare professionals was used. The survey instrument included questions about the principles of sustainability implementation and employees' attitudes toward sustainability, with respondents expressing their opinions on a 5-point *Likert* scale. The data collected were analyzed using SPSS statistical analysis software, with averages, percentage distribution, Chi-square values, and standard deviation reported.

Results. Healthcare organizations have sufficient opportunities to implement sustainability principles; however, only a small proportion of employees are inclined to follow these principles. Less than half of the employees surveyed try to conserve energy in their work, although they are inclined to sort waste. It is worth noting that organizations devote relatively little attention to promoting sustainability among employees.

Originality/Value of Research. This study is one of the few that examines the implementation of sustainability principles in hospitals and the attitudes of hospital staff toward sustainability. The value of this research is undoubtedly linked to the potential use of the results to achieve high-quality healthcare services while simultaneously avoiding harmful impacts on the social environment.

THEORETICAL FRAMEWORK

The term "Sustainability" was first used in 1987 (Kuhlman, Farrington, 2010) and has since evolved to encompass broader meanings. Today, it is applied across various disciplines and includes key elements such as social life, the environment, resources, technology, and economic factors (Ozili, 2022). Sustainability cannot be limited solely to environmental protection principles but must also consider aspects like the well-being of clients, employees, and communities. Incorporating sustainability into business practices is crucial for efficient resource management, continuous service improvement, cost-effectiveness, and the creation of service quality that ensures business sustainability. However, the existing literature on sustainability in healthcare is not sufficiently structured to effectively address hidden sustainability challenges in the sector (Marimuthua, Paulose, 2016). A clear definition of sustainability's meaning in healthcare can only be achieved through thorough scientific inquiry.

Sustainability is a philosophy aimed at ensuring the availability of resources for both the present and the future. To achieve this, it is important to make the right decisions that incorporate economic, social, and environmental activities. The concept of sustainability is applied across various sectors in the 21st century (Dixit, Chaudhary, 2023), but there is a noticeable lack of decisive action in the healthcare sector. Providing healthcare services in modern society leaves a significant ecological footprint, from the large volume of medical waste to considerable energy consumption and greenhouse gas emissions (Shaban et al., 2024). Several scientific sources emphasize that healthcare services and patient health should not be ensured at the expense of environmental protection.

Research on sustainability's impact on organizations has shown that the more employees believe their organization values their contribution to sustainability, the higher their engagement level with the organization's activities. Organizations can focus on promoting sustainable practices, knowing that this will positively affect employee and workplace dynamics, ultimately influencing the organization's overall performance (Mendes et al., 2022).

In one study, sustainability was identified as a key factor in boosting employee motivation and satisfaction, with the greatest impact when sustainability principles are clearly communicated. Employees feel a greater sense of meaning in their work, stronger commitment to their jobs and employers, and show a keen desire to participate in strategies when they are involved in processes and have opportunities to contribute to initiatives. This suggests that sustainability in the workplace is important for both current employees, management, and future staff (Tschelisnig, Westerlaken, 2022).

Another study emphasized the importance of flexible working conditions and integrated well-being programs in creating a culture of employee satisfaction and active engagement with sustainable practices. These initiatives not only improve work-life balance but also act as catalysts for increasing environmental responsibility, promoting overall commitment to sustainable business processes. Given these findings, organizations must adopt a holistic approach, integrating employee well-being initiatives with sustainable work practices. This requires proactive policy implementation, continuous evaluation, and a commitment to creating an inclusive culture that promotes environmental awareness (Ramya et al., 2024).

Sustainability in healthcare is closely related to individual well-being and public health. Although the primary goal of healthcare systems is to provide high-quality health services to all members of society, it is crucial to ensure the proper use of resources and environmental protection to achieve this aim (Tschelisnig, Westerlaken, 2022). Therefore, it is essential to assess how healthcare organizations are prepared to incorporate sustainability into their operational policies and how they implement the key sustainability principles based on the services they provide.

The aging population and growing number of people undoubtedly contribute to the need to ensure sustainability in healthcare organizations, as organizations are forced to increase resource use, which leaves a significant ecological footprint, especially in areas such as environmental protection and technology use (Luque-Alcaraz et al., 2024).

One of the activities carried out by healthcare systems is the provision of long-term health services in Nursing hospitals. These organizations provide healthcare to patients with multiple illnesses, requiring multidisciplinary team services such as doctors, nurses, nursing assistants, physiotherapists, massage therapists, and dietitians. In providing these services, various resources are inevitably used, leading to the generation of not only hazardous medical waste but also the need for a systematic approach to ensuring sustainability.

Some studies suggest that sustainability in healthcare organizations can be ensured through quality management systems such as Lean, Six Sigma, etc. Sustainability can be achieved through aspects like operational efficiency (process optimization and reduction of waste), environmental impact reduction (green technology principles, minimizing ecological consequences), management decisions (organization's preparedness and senior leadership involvement), and stakeholder engagement (raising awareness, increasing involvement, defining and modifying attitudes, and identifying challenges). It is also believed that healthcare organizations can ensure sustainability by properly using and recycling technologies when they are no longer suitable for use. Expected outcomes of applying sustainability in healthcare organizations include increased service efficiency and enhanced sustainability (Levett-Jones et al., 2024).

Nursing education is a key factor in empowering nurses to positively impact on the environment. This goal is important in organizations, management, and policy by integrating high-quality education, enabling nurses to become active and positive agents in creating and maintaining sustainable healthcare systems. Nurses are a driving force in addressing climate change. They are concerned about the lack of environmental awareness and improper waste sorting in healthcare settings, especially regarding equipment misuse and excessive waste. Applying sustainability knowledge is essential to enable nurses to take on leadership roles in clinical practice change. Therefore, sustainable development education must be integrated through innovative educational practices to prepare healthcare professionals to deal with the mitigation and adaptation challenges posed by climate change (Lokmic-Tomkins et al., 2022; Kalogirou et al., 2021).

Nurses' interaction with patients and their critical role in providing healthcare services gives them a unique opportunity to promote and implement eco-friendly practices, embedding sustainability within the healthcare system. However, integrating environmentally conscious principles into nursing practice faces several challenges. Barriers such as a lack of knowledge, insufficient training in sustainable practices, and systemic obstacles often hinder progress in sustainability (López-Medina et al., 2022).

Although nurses generally demonstrate acceptable knowledge, attitudes, and behavior regarding environmental sustainability, a significant difference is observed when it comes to the frequency of sustainable actions in their professional environments. Often, a gap exists between theory and practice due to time constraints, issues with waste management, and challenges related to healthcare workers. Consequently, interventions are necessary to address these barriers and encourage sustainable behavior among nurses, as highlighted by current research (Kalogirou et al., 2021).

There is little known about globally applied sustainability practices in clinical nursing. A broader understanding of contemporary practices could facilitate the exchange of ideas and initiatives, potentially improving the application of sustainability practices internationally. Nursing offers both opportunities and challenges related to clinical education, with success depending on active employee engagement, clear signals, and sustainability orientation.

Leadership and commitment from employees, which promote sustainability and address resistance, are crucial to achieving meaningful change. Additionally, the approach to sustainability interventions requires changes. When analyzing sustainability's importance in healthcare, it is essential to consider not only direct costs but also the long-term environmental benefits. Emphasizing sustainability initiatives such as well-structured recycling and reuse programs, resource conservation, and the use of renewable energy can yield long-term savings. It is also important to consider financial risks related to climate change, such as infrastructure damage, rising insurance costs, or supply chain disruptions. The goal of integrating sustainable practices into nursing is to reduce environmental impact while aligning with societal expectations. The path to a sustainable, resilient future requires a strategic and holistic approach, including collaboration, commitment, and continuous improvement (Muktar, Adeogun, 2024; Sawyer et al., 2021).

For example, the food sector and its environmental impact were analyzed in a study related to the provision of long-term nursing services. The study found that the food sector is responsible for more than 30% of all greenhouse gas emissions (GHGs), which are one of the main causes of global warming. Adopting healthier and more sustainable food models was identified as one of the effective solutions to this issue. The study also analyzed the environmental impact of the food menu provided to patients in nursing homes. The results showed that providing a healthier menu for patients emitted fewer GHGs into the environment (Tolera et al., 2024). Based on these findings, it can be inferred that preparing healthier food uses less electricity and/or natural gas, thereby reducing CO₂ emissions, which is a significant change toward sustainability in healthcare organizations.

The World Health Organization, in its study, mentions the large amounts of waste generated in healthcare facilities, which can be both hazardous and non-hazardous. One study indicates that about 10% of waste containing hazardous biological materials is released into the environment (WHO, 2014). Another study states that the volume of medical waste is constantly increasing worldwide (Kokkinos et al., 2024). As seen from the presented data, the issue of medical waste is significant and must be properly managed to ensure the implementation of sustainability principles in hospitals.

From the analysis of the literature sources, it is evident that sustainability in healthcare practices is fragmented, and essential principles have not been fully integrated. It remains unclear how sustainability principles are implemented in specific areas of healthcare. One area where sustainability is particularly significant is supportive care and nursing. The provision of these services generates not only substantial resources but also has a multifaceted impact on both the organization and society.

RESEARCH METHODOLOGY

The study on ensuring the implementation of sustainability principles in providing services in Nursing hospitals was conducted from April to July 2024. The quantitative research instrument used for the study consisted of the following components: sociodemographic questions, questions about the participants' attitudes toward energy use, waste generation, sustainability practices in the organization, their view of sustainability, and sustainability's impact on employees. The instrument also asked participants to share their opinions on the most common types of waste generated. The research instrument included 63 questions. To assess the suitability of the research instrument for the study, a pilot study was conducted with 51 participants. Based on the obtained results, adjustments were made to the questionnaire scales, and the revised questionnaire was used for further research.

The reliability of the questionnaire is understood as the correlation between the obtained test results and hypothetical "true" results, with one of the key characteristics being the internal consistency of the questionnaire scale, based on the correlation between individual questions

(Balarina, 2016). The *Cronbach's alpha* for the entire instrument was 0.971, and the highest internal reliability was found in the block related to the impact of accreditation on employees' psychosocial work environment, with a *Cronbach's alpha* of 0.985. Based on these results, the research instrument was deemed suitable for further studies.

In planning the number of study participants, the aim was to create a representative sample by selecting participants through stratified sampling, i.e., forming a sample by categorizing population respondents into a homogeneous group based on an important characteristic for the study, namely general practice nurses providing inpatient palliative care and nursing services. The sample size was calculated using *V. Panniotis'* formula (Viechtbauer et al., 2015), considering the number of employees in institutions providing services in Nursing hospitals in Lithuania. The minimum sample size calculated for the study was 289 participants. The study was initiated by reaching out to 32 healthcare organizations, explaining the study's purpose, objectives, intended use of results, ethical principles, and prospects for publicizing the results. A research instrument was also provided. Out of these organizations, 19 agreed to participate.

Employees of these organizations who agreed to participate were informed in writing about the study's purpose, objectives, use of results, ethical principles, and the prospects for publicizing the results. They were instructed to place completed questionnaires in designated boxes (which were placed in a secluded area of the organization, ensuring their safety and the ability to submit them anonymously). The questionnaires were distributed to respondents who attended a meeting. In total, 645 questionnaires were distributed across the participating organizations. Participants were given adequate time to fill out the questionnaires, and the researcher revisited the organizations after a month to collect them. A total of 511 questionnaires were returned, of which 494 were considered valid for the study (the rest were discarded due to incomplete responses or non-completion). The return rate was 76.5%. Notably, the sample size and response rate met the minimum requirements for a quantitative study based on the calculation formula.

The collected data were analyzed using SPSS statistical analysis software. The statistical indicators calculated included the mean, standard deviation, percentage distribution, chi-square level, and correlation coefficient. The results were presented in tables. Statistical significance was determined at the 0.05 level, with differences considered statistically significant if the significance level was 0.05 or lower.

The study adhered to ethical principles, ensuring conditions that did not contradict respect for human dignity, individual rights, and freedoms. Informed verbal consent was obtained from participants, with the option to withdraw from the study at any time without providing a reason. Efforts were made to prevent any physical, psychological, or social harm to participants or threats to their health. The study was conducted in a safe environment that ensured the privacy of participants. Before the study began, participants were informed in writing about the study's key aspects, potential benefits, and the researcher's contact information. The information was presented in clear, understandable language, and any questions from participants were answered. The confidentiality of participants' identities and the study data was guaranteed, and it was ensured that the publication of study results would not reveal participants' identities, or the organizations involved.

RESEARCH RESULTS AND DATA ANALYSIS

The analysis of the data collected during the study revealed that in the surveyed healthcare organizations, although the concept of sustainability is frequently declared, the actual practices, from the nurses' perspective, appear to be somewhat different.

As shown by the data, nurses were more likely to agree than disagree that their organizations regulate room heating, avoid excessive use of paper napkins, and ensure

ventilation is done only as needed without wasting heat. However, the study results also revealed that nursing hospitals are not inclined to use energy-efficient lighting sources, and nurses are less motivated to conserve electricity or water (see Table 1).

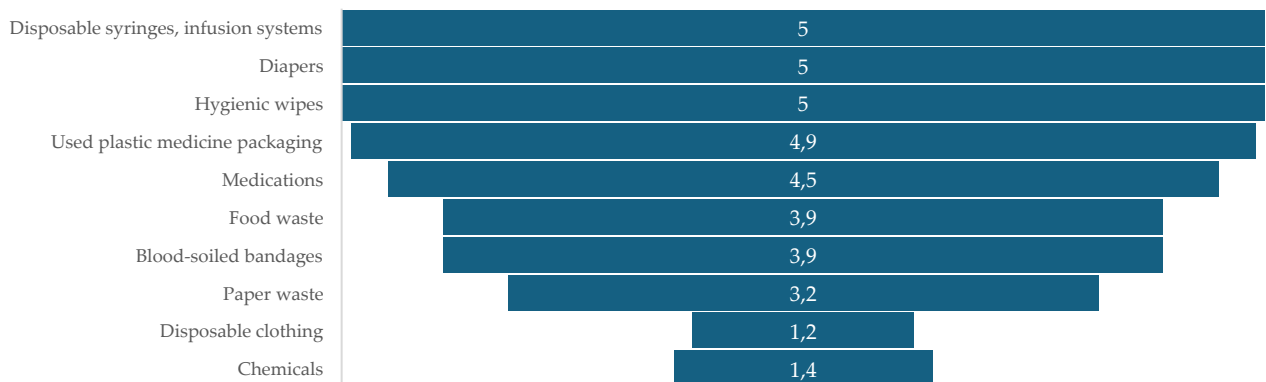
Table 1. Nurses' Opinion on Energy Usage in the Hospital.

Statement	Mean	Standard Deviation
Energy-saving lighting sources are used	2.6	1.1
Electricity is not used when the room is unoccupied	1.9	0.7
Room heating is regulated	3.6	0.9
Water is used only as needed	1.3	0.5
Paper napkins are not wasted	3.8	1.4
Natural ventilation is done only as needed	3.6	1.1
I prefer taking the elevator instead of using the stairs	2.7	0.8

Source: prepared by the author

When nurses were surveyed about waste generation in nursing hospitals, it was found that almost all participants sort medical waste (mean 4.9 ± 1.6), and the generated medical waste is managed according to legal regulations and then sent to a company for incineration (mean 5 ± 1.3). Nurses also reported that they handle medication waste (mean 4.2 ± 1.1) and food waste (mean 3.7 ± 0.8) according to the requirements set by the organization.

It is important to note that healthcare organizations, while providing their services, generate large amounts of various medical waste, which, if improperly managed, can significantly impact our environment and have negative effects on ecosystems. For these reasons, waste management is an important aspect of sustainability in nursing hospitals. Evaluating the nurses' opinions about the waste generated in their nursing hospitals, it was found that the most common waste is related to patient treatment, care, and personal hygiene (see Figure 1). It should be noted that insufficient attention is given to the management of hygiene care waste, as it is disposed of together with general waste.



1 fig. Nurses' Opinion on the Waste Generated in the Hospital.

Source: prepared by the author

Evaluating the nurses' views on sustainability, it was found that they are not familiar with the term "Sustainability" itself (mean 1.1 ± 0.5). However, they show concern for environmental protection and make efforts to implement key principles. For example, they care about the environment (mean 4.6 ± 1.6), save electricity (mean 4.5 ± 0.7), and conserve water (mean 4.8 ± 0.6) (see Table 2).

Table 2. Nurses' Attitude Towards Sustainability.

Statement	Mean	Standard Deviation
I know what the term "Sustainability" means	1.1	0.5
I care about my environment	4.6	1.6

I try to live in a way that doesn't harm the environment	3.8	1.2
I try to live in a way that doesn't harm others	3.0	0.6
I sort waste at home	2.8	1.1
I save electricity at home	4.5	0.7
I don't waste water unnecessarily at home	4.8	0.6
I return expired medications to the pharmacy	2.5	1.3
I take unused electronics to recycling centers	3.8	1.1
I encourage my colleagues not to harm the environment	3.9	1.4
I often notice that my colleagues act irresponsibly towards the environment	4.7	0.7
I use public transport more often than my own car	2.6	1.0
I think my colleagues care less about the environment than I do	4.2	1.4

Source: prepared by the author

The data collected from the study revealed that while organizations implement sustainability measures, they do not pay enough attention to nurses, who can take concrete actions to ensure the implementation of sustainability principles. Analysis of the collected data showed that nurses are not inclined to discuss the hospital's environmental impact (mean 1.1 ± 0.4) and are also not inclined to discuss their personal contribution to environmental protection (mean 1.8 ± 1.1). However, nurses tend to agree with the organization's decisions in the field of sustainability: hospitals have implemented measures that encourage saving electricity, water, and heating (mean 4.1 ± 0.6), and hospital activities are conducted in a way that minimizes environmental harm (mean 3.9 ± 1.4).

Despite the fact that the majority of nurses in the study indicate that they care about the environment, they are still inclined to travel to work by private car (mean 4.1 ± 1.2) or public transport (mean 3.8 ± 1.4), and only a smaller portion of them walk to the hospital (mean 2.8 ± 1.1), travel by carpooling with colleagues (mean 1.3 ± 0.5), or use a bicycle (mean 1.2 ± 0.7).

An analysis of the nurses' opinion on the impact of sustainability on them showed that nurses tend to rate their emotional and physical well-being positively (see Table 3).

Table 3. Nurses' Opinion on the Links Between Sustainability and Their Physical and Emotional Health.

Statement	Mean	Standard Deviation
I feel energetic	3.9	1.3
When I walk outside, I enjoy the views and nature	3.1	0.6
I rate my quality of life as good	3.9	1.2
My mood is usually great	4.2	1.3
I don't feel down	4.2	1.3
I frequently visit doctors	3.2	0.9
I don't need medication	2.4	0.6
I have been temporarily off work due to illness in the past six months	4.3	1.1
I often feel pain in different parts of my body	4.1	1.3
I often worry about something	2.9	0.9
I often notice that my colleagues act irresponsibly towards the environment	4.7	0.7
I use public transport more often than my own car	2.6	1.0
I think my colleagues care less about the environment than I do	4.2	1.4

Source: prepared by the author

The study data also revealed that nurses who are more inclined to implement sustainability principles also tend to rate their emotional and physical well-being more positively. For example, among the 64.8% of nurses who indicate that they care about the environment, as many as 93.5% feel energetic ($p < 0.001$), and 82.9% rate their mood as excellent ($p < 0.001$). Furthermore, the analysis showed that nurses who are inclined to save energy resources are also less likely to visit doctors ($p < 0.05$) and report feeling less pain in various parts of their bodies ($p < 0.001$).

DISCUSSION

The results of our study partially complement previous research findings. Based on the data collected, we found that while nurses in Nursing hospitals are personally inclined to implement sustainability principles, due to the nature of their work, it is assumed they do not have the opportunity to do so effectively. A similar study conducted in Canada revealed that nurses prioritize patient care, and due to high workloads, they cannot simultaneously consider the environmental impact of their work. Participants indicated that they struggled to practice environmentally responsible actions because they felt they were not receiving adequate support from their hospital organizations. However, there was a desire for the organization to support environmentally responsible practices (Richardson et al., 2017).

In a study conducted in hospitals in the United Kingdom, the effectiveness of energy-saving measures such as motion-activated light switches were evaluated. The results showed a clear benefit of these switches (Alrasheeday et al., 2023). Our research revealed that although nurses are inclined to save energy resources, such measures are not yet implemented in the organizations themselves, particularly regarding electricity consumption. This suggests that recommendations for reducing energy consumption in Nursing hospitals are needed.

Our study also highlighted that although various types of waste are generated in Nursing hospitals (such as medical, personal hygiene, food, etc.), they are sorted and managed in accordance with legal requirements, e.g., being transferred to carriers for recycling or incineration. On the other hand, a study conducted in Eastern Ethiopia found that hospitals generate large amounts of healthcare waste, which is not properly sorted or separated at the source and lacks standard treatment, leading to a recommendation to encourage regional and global cooperation in hospital waste and sewage management (Al-Moteri et al., 2024). These differences can be attributed to cultural distinctions and attitudes toward sustainability, which are more deeply ingrained in Western European countries.

In scientific literature, there is considerable evidence supporting the need for sustainability education in nursing studies and organizational solutions to enhance nurses' competencies in sustainability (Tischendorf et al., 2024; Padget et al., 2024). Our study results revealed that nurses are unfamiliar with the concept of sustainability. This finding is not surprising, as sustainability is not a part of the nursing curriculum in Lithuania, and it is only briefly discussed in isolated subjects. Given our study results and practices in other countries, it would be advisable to include sustainability topics in nursing programs to ensure the implementation of sustainability principles in professional practice.

As seen from the data collected in our study and similar research in other countries (Calabrese et al., 2023; Sijm-Eeken et al., 2023), sustainability is not an unknown concept in Nursing hospitals. However, for various reasons (insufficient organizational decisions, high nursing staff workloads, low motivation levels, etc.), its implementation remains inadequate. Despite this, significant progress has been made in Western European countries regarding proper waste management, though further progress has slowed, particularly when it comes to reducing energy consumption or involving medical personnel in organizational decisions and their implementation.

CONCLUSIONS

1. In Nursing hospitals, sustainability is ensured in a fragmented manner due to organizational reasons and staff attitudes toward the possibilities of implementing sustainability. Although Nursing hospitals have developed waste management policies, little attention is given to energy resource conservation and the development of nurses' competencies in sustainability.
2. Based on the study results, it is essential to encourage Nursing hospitals to implement energy-saving systems, improve staff competencies in sustainability, and include

commitments to sustainability in their quality policies. This would promote a more holistic approach to sustainability in these institutions and ensure that the environmental impact of their operations is minimized, while also enhancing the well-being and engagement of the nursing staff.

LITERATURE

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