Original Article

Evaluation of Hospitals on green hospital standards in Qazvin

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Abstract

Introduction: Hospitals may have an adverse effect on the environment. The World Health Organization (WHO) introduced the concept of Green Hospital to reduce these complications while also improving the environment. The purpose of this study was to assess how many hospitals in Qazvin met Green Hospital standards.

Methods: This descriptive-observational study was carried out in all of the hospitals in Qazvin that were included in the study via the census sampling method. The standard green hospital questionnaire was used to collect data, which was completed with environmental experts through interviews and document observation. This questionnaire has 96 questions and is divided into eight dimensions: environmental, energy, hazardous materials, water, sewage, greenhouse gas emissions, external water consumption, material, and environmentally friendly purchasing management. Each question is graded on a three-point Likert scale ranging from 0 to 2.

Results: This study included nine hospitals. Six were teaching/public (5 teaching hospitals and 1 Social Security Hospital), and three were public. The average ratio of active beds to approved beds was 90%, with private hospitals reaching more than 100% (131%). The mean achievement rates for the first through eighth dimensions were 70.08, 74.07, 74.07, 60.88, 40.87, 27.77, and 31.48, respectively. The overall mean score for meeting Green Hospital standards was 57.46%.

Conclusions: Although hospitals achieved higher achievement rates in some dimensions, overall results showed low achievement rates. As a result, their managers and employees must learn how to prevent environmental degradation.

Keywords: Standard, Environmental Sustainability, Environmental degradation, WHO

Introduction

Hospitals around the world strive to innovate in the patient care process while maintaining high quality standards. They may have an impact on the natural environment if such innovations are implemented (1). In fact, hospitals are among the most energy-intensive buildings. They may directly or indirectly increase greenhouse gas emissions, cause air pollution, and environmental degradation in various sizes and forms, all of which can have an impact on the environment and human life (2, 3). Every day, healthcare systems generate a significant amount of solid waste, such as paper, gloves, and sharp tools that can become contaminated with blood and secretions, resulting in viral or bacterial infections such as hepatitis, infectious diarrhea, and typhoid (4). Pollution of streams and underground water (caused by untreated medical waste at landfills) can also cause environmental nuisance (5). Furthermore, most medical waste incinerators are cited as major sources of air pollution (6). As a result, hospital administrators must always develop management plans for energy conservation, proper medical waste disposal, and safe drug management in order to reduce their hospitals' negative impacts on patients, surrounding communities, and the natural environment (3). This issue becomes more pressing when we consider the reports in this regard, which state that 0.94-2.45 kilos of waste are generated daily for each occupied hospital bed (7). The United Nations is promoting the "Health in the Green Economy" slogan in order to eliminate these consequences and support the environment. This initiative aims to mitigate the negative effects of healthcare services on climate change (3). They also introduced the concept of Green Hospitals in order to reduce the environmental damage caused by the healthcare system (8).

A green hospital is one that promotes public health by continuously reducing its environmental impact and, eventually, eliminating its contribution to disease burden (9). It also acknowledges the link between human health and the environment. Its primary components are as follows: leadership, energy, waste, sewage, hazardous waste, transportation, and indoor environmental quality (8). Environmental management systems direct hospitals toward this concept in order to have no or minimal environmental impact. In this regard, they encourage hospitals to consider using sustainable building materials that are mercury-, latex-, and PVC-free, conserving energy and water, purchasing environmentally friendly resources and tools, reducing and recycling waste, and utilizing nutritious food systems as well as sustainable foods (10).

In addition to beauty, strength, and energy efficiency, the principles of sustainable architecture should be followed when designing a Green Hospital. This will not be possible unless the right location and traditional issues are chosen, standards and safety issues are met, the right location for fire escape stairs is chosen, and smart materials are used (11).

Iran, in collaboration with the World Health Organization, has taken steps to green its hospitals. Previous research, however, indicates that the use of Green Hospital standards in Iran is low (2, 12). Green Hospitals are being introduced in other countries, including the United States, as one of the appropriate ways to reduce costs and improve hospital settings for patients and staff (13), and the first and most important motivation for moving toward Green Hospital standards is energy efficiency (14). Singapore has also been able to significantly reduce its energy and hospital waste management costs by up to $1,872,000 by implementing the green productivity strategy (15). As a result, healthcare organizations can voluntarily reap such benefits by establishing an environmental management system without having to go through the formal procedures required to obtain the standards (12).

Despite the benefits of Green Hospitals, the majority of hospitals established in Iran do not meet international standards. However, in recent years, much emphasis has been placed on the quality of our hospitals' design and construction phases, and sustainable architecture issues and standards have been observed in most of them (11). Previous research found that only 28% of Social Security hospitals were successful in implementing Green Hospital standards (7). This rate was reported as 52% for Hamedan hospitals (16) and 59.5% for Tehran University of Medical Sciences hospitals (17). While these surveys can raise awareness among officials and high-level managers about Green Hospital standards, few studies are conducted in this area.

Qazvin, in Iran, has seven teaching/public hospitals overseen by the Ministry of Health and Medical Education, as well as three private hospitals. Nonetheless, their Green Hospital achievement rates were not evaluated. Given the significance of dealing with the natural environment, assessing the extent to which these hospitals meet Green Hospital standards can be a first step toward identifying and promoting various aspects of environmental protection in this regard.

Methodology

This descriptive and cross-sectional study was carried out among ten hospitals in Qazvin that were chosen using a census sampling method. The data collection

tool was similar to the one used in Zanganeh and colleagues' 2015 study. Professors confirmed its validity, and its reliability was calculated to be 83%. (4). This tool is divided into two sections: 1. hospital information and 2. the main checklist. The main checklist consists of 96 questions divided into eight dimensions in accordance with Green Hospital standards. Each question is graded on a three-point Likert scale ranging from 0 to 2 (Yes=2, Somewhat=1, and No=0). It has the following dimensions: Environmental Management (39 questions, with a score range of 0-78), Energy Management (7 questions, with a score range of 0-14), Hazardous Materials Management (9 questions, with a score range of 0-18), Water Management (6 questions, with a score range of 0-12), Sewage Management (14 questions, with a score range of 0-28), Greenhouse Gas Emission Management (11 questions, with a score range of 0-22), External Water Consumption Management (3 questions, with a (7 questions, a score range of 0-14).

Researchers completed the tool with the help of environmental experts from the hospitals by referring to the management offices of the teaching/public and private hospitals and visiting their kitchen, laboratory, radiology, and services departments. Data was gathered through interviews and document observation.

Statistical procedure: Data was entered into SPSS and tabulated using descriptive statistics (mean SD, frequency tables, etc.).

Ethical Considerations: The objectives of the study were explained to the hospital management offices, and the tool was completed after obtaining the consent of the respected hospital managers. The ethics committee of Qazvin University of Medical Sciences approved this study as well, using the code of ethics IR.QUMS.REC.1397.397. For publication, each hospital's data was anonymized.

Results

One of the ten hospitals refused to participate in the study. As a result, data analysis was carried out in 9 hospitals (6 teaching/public and 3 private). 55% of the hospitals were newly constructed (less than 10 years ago). More than 40 years ago, one private hospital and two teaching/public hospitals were built. The ratio of active beds to approved beds was 94%, with one of the private hospitals having the highest (1.31). Only one of the hospitals was specialized, while the others were all-purpose.

The dimensions' mean scores were unaffected by the establishment year, ownership, or being private. The fourth dimension had a higher mean score in teaching/public hospitals, while the fifth, sixth, and eighth dimensions had lower mean scores. The mean scores for the first, fourth, fifth, and sixth dimensions were higher in general hospitals than in the single specialized hospital.

According to table 1, the hospitals' achievement rates in three dimensions of greenhouse gas emission management, external water consumption management, and sewage management were less than 50%.

As shown in table 2, the specialized hospital's mean scores for water and sewage management were low. The mean score of greenhouse gas emission management, on the other hand, was low across all hospitals and was unaffected by specialization.

As illustrated in figure 1, the Social Security Hospital's achievement rates are close to all dimensions of Green Hospital standards. We have private and teaching/public hospitals in the following orders.

Figure 2 shows that the mean score for water management in teaching hospitals was higher than in non-teaching hospitals. Non-teaching hospitals had higher mean scores for energy and environmentally friendly purchasing management. In both groups, the mean scores for greenhouse gas emission management were low and similar.

Discussion

The purpose of this study was to assess the overall and eight-dimension achievement rates of hospitals in Qazvin in relation to the World Health Organization's Green Hospital standards.

Our hospitals met the green hospital standards at a rate of 57.48% overall. Management of gas emissions, external water consumption, and sewage were all low. Half of the hospitals were brand new. The Social Security hospital received higher marks.

We discovered three related studies: Zanganeh (16), Ebadi Azar (18), and Taleshi (10). The overall achievement rate is slightly higher than the rate reported in the Zanganeh study conducted in Hamedan, which was 52%. (16). This finding is more in line with the findings of Ebadi Azar and colleagues' study, which was conducted at Tehran University of Medical Sciences and reported an overall achievement rate of 59%. (18). Ebadi Azar brought up the issue of Tehran University failing to meet Green Hospital standards and the age of its hospitals. However, in our study, the comparison of dimensions by hospital establishment year revealed no significant differences, and newly built hospitals differed only in terms of energy management. Ebadi Azar and colleagues' research also revealed a better situation in private hospitals (18).

Table 1. The achievement rates of the hospitals to Green Hospital standards

Dimensions	M±SD [*]	Minimum	Maximum
environmental management	70.08±7.95	58.97	83.33
energy management	74.07±16.89	28.57	71.43
hazardous materials management	74.07±11.56	61.11	83.33
water management	60.18±23.11	16.68	83.33
sewage management	40.87±12.38	28.57	57.14
greenhouse gases emission management	27.77±20.76	00.00	83.64
external water consumption management	31.48±19.44	00.00	50.00
environmentally friendly purchasing management	62.69±24.42	14.29	85.71
overall	57.46±10.37	41.67	72.92

*: M±SD: Mean ± Standard Deviation

Table 2. The achievement rates of the hospitals to Green Hospital standards according to specialization

Hospital	M±SD [*]	Minimum	Maximum
environmental management			
general	70.19±8.49	58.97	83.33
specialized	69.33	-	-
energy management			
general	48.21±18.60	28.57	71.43
specialized	57.14	-	-
hazardous materials management			
general	72.91±17.64	33.33	83.33
specialized	83.33	-	-
water management			
general	63.54±22.24	16.67	83.33
specialized	33.33	-	-
sewage management			
general	42.41±12.28	28.57	57.14
specialized	28.57	-	-
greenhouse gases emission management			
general	28.97±21.85	00.00	63.64
specialized	18.18	-	-
external water consumption management			
general	29.16±19.41	00.00	50.00
specialized	50.00	-	-
environmentally friendly purchasing management			
general	61.60±25.87	14.29	85.71
specialized	71.42	-	-

*: M±SD: Mean ± Standard Deviation

However, the biggest difference in our study was only related to the Social Security hospital. The achievement rates for all dimensions of Green Hospital standards were higher in this hospital than in the other hospitals. It is worth noting that its environmental expert emphasized managers' roles and attention to green hospital standards, but budget was introduced as a limiting factor in achieving the matter in other hospitals. These findings contradict Taleshi and colleagues' study, in which the situation of teaching hospitals was reported more accurately. However, in their study, the emphasis was primarily on the role of awareness regarding the Green Hospital standards, with no mention of achievement rates (10).

As previously stated, the findings of this study revealed that Qazvin has the highest achievement rates in environmental, energy, and hazardous materials management, and the lowest achievement rates in greenhouse gas emissions, external water consumption, and sewage management. These findings are somewhat consistent with those of Zanganeh and colleagues' Hamadan study (16). Water consumption management received the lowest score in their study, while environmental management received the highest. The mean score of water consumption management in Ebadi Azar and colleagues' study was low (18), and environmental emissions and greenhouse gas emission management received the least attention in Taleshi and colleagues' study (10). Taleshi and colleagues identified a lack of awareness of environmental emissions as a significant management factor that necessitates in-service training for managers and staff. Environmental experts in the current study emphasized a lack of sufficient awareness of environmental emissions, an approach to Green Hospital standards, and budget allocation as important issues. These findings are consistent with the findings of Taleshi and colleagues' study.

This issue is criticized in a different way in one review conducted by Harris and colleagues. According to this study, proper disposal of solid waste, blood, secretions, and chemicals such as mercury, as well as attention to environmental cleanliness and optimal energy and water consumption, are among the behaviors that a nurse is expected to perform and be effective in managing and reducing energy loss. It also refers to studies whose findings indicate that the age, condition of the building, and location of care can all have a psychological impact on nurses. Furthermore, responsibility and adherence to ethical regulations can result in significant environmental changes, which will eventually lead to the establishment of Green Hospitals and the involvement of the government and politicians in this matter. This study emphasizes the importance of nurses, as individuals who care for patients and as hospital staff with professional and moral commitment, in the transition to Green Hospitals. Indeed, one of the nurses' responsibilities is to work toward Green Hospitals and to create a healthy living environment (14). Considering the preceding statements, it can be stated that ignorance is not an acceptable justification for not pursuing Green Hospitals.

Among the study's notable findings are the high standards of the Social Security hospital, three private hospitals, and teaching/public hospitals. Non-teaching hospitals also had better energy and environmental purchasing management. There was no relevant study found for these dimensions. As a result of overcrowding and referrals, it appears that teaching/public hospitals pay less attention to Green Hospital standards.

The issues of managers' and staff's ignorance and inattention to Green Hospital standards, as well as a lack of budget allocation for this matter, were raised during the interview with staff and environmental experts. They emphasized that other issues, such as revenue generation, leave no time to focus on this one.

Conclusion

According to this study, the achievement rates of hospitals in Qazvin to Green Hospital standards are lower than the national average, and there is still a long way to go. In this regard, in addition to the budget allocation issue raised by most professional experts, it is also necessary to inform managers and healthcare staff through various training programs so that they can act spontaneously to support and improve the environment by adhering to Green Hospital standards.

Acknowledgement

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