

Walking towards Green Hospitals: innovation and commitment for a healthy future in Latin America

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Abstract:

Aim: Explore the path towards Green Hospitals in the context of Latin America, highlighting the importance of innovation and commitment as vehicles for a healthy future. **Methods.** A qualitative, exploratory and descriptive methodology was implemented that allowed a detailed analysis of bibliographic sources on sustainable practices and initiatives in hospitals in the region. **Results.** The findings highlight that despite the challenges that still persist in this matter and the prevailing need to evolve towards a healthier future, some Latin American countries have already undertaken actions in the search for Green Hospitals, thus contributing to the strengthening of care. **quality medical.** **Conclusions.** The urgency of transforming hospital infrastructure into a positive agent for environmental sustainability becomes evident. The dichotomy between the essential role of hospitals in healthcare and their significant contribution to environmental degradation underscores the need to reevaluate operational actions in healthcare in Latin America, contributing to a more sustainable future that benefits both health of the population and the environment.

Key words: innovations; sustainable development; healthy city

Introduction

Growing awareness of the interconnection between the environment and human health has driven the need to rethink sustainability in key sectors, including the healthcare system. [1]. Hospitals today face the challenge of reconciling their crucial role in healthcare with the significant environmental impact associated with their daily operations.

The current state of the problem reveals a dichotomy in which hospital centers, essential for medical care, also face the reality of contributing significantly to environmental degradation. The pressure on natural resources and the generation of harmful waste highlight

manifest the need to reevaluate operational practices in health care in Latin America [2].

The background evidences the urgency of transforming hospital infrastructure, traditionally designed to meet medical needs, into a positive agent for environmental sustainability. [3]. In this scenario, conventional hospital practices can give way to more efficient and environmentally friendly models, thus marking a transition towards ecological resilience.

This dilemma has led to a critical reflection on the urgency of adopting more sustainable and environmentally friendly practices, emerging the prevailing need to explore ways that transform medical care into an agent of positive change for the planet. [4].

From this point of view, the justification of this study lies in the need to address this common challenge in Latin America, seeking solutions that integrate innovation and transparency as fundamental elements. The goal is to not only optimize the quality of healthcare, but also reduce the environmental footprint of hospitals in the region, aligning healthcare practices with the imperatives of sustainability.

Therefore, this article aims to explore the path towards Green Hospitals in the context of Latin America, highlighting the importance of innovation and commitment as vehicles for a healthy future. With the presentation of the current state of the problem, the basis is established to address the specific objectives of the study, aimed at: analyzing and describing the operational and environmental management practices in the hospitals of the region, describing innovative initiatives and solutions that some hospitals in Latin America have successfully implemented to improve

their energy efficiency, reduce waste and minimize their environmental impact and finally substantiate the relevance and urgency of the transition towards Green Hospitals in the Latin American region. By establishing these objectives, the article aims to contribute to the understanding and promotion of sustainable practices in Latin American hospitals, providing a comprehensive perspective that combines innovation, commitment and environmental well-being with quality healthcare.

Methods

In the quest to fully understand the emerging practices and perspectives in the transition towards Green Hospitals in Latin America, an exhaustive methodology was implemented based on qualitative elements.

A descriptive exploratory study was carried out, with the purpose of analyzing current practices and innovative initiatives in Latin American hospitals related to environmental sustainability. This design allowed us to obtain a detailed vision of the existing dynamics and possible emerging solutions in the field of Green Hospitals.

The target population consisted of hospitals located in different Latin American countries. The sample selection was carried out using non-probabilistic sampling, considering the availability of public information on the sustainable practices adopted by hospitals.

Likewise, a comprehensive analysis of documents, such as sustainability reports and institutional policies, was carried out to obtain data on sustainable practices in hospitals. This approach allowed information to be corroborated and a documented perspective of the initiatives to be obtained.

A qualitative approach was used to analyze the data collected through bibliographic documents. Qualitative data were organized using thematic coding to identify emerging patterns and trends in sustainable hospital practices.

Results

Environmental Challenges, Sustainable Advances and the Path to Transformation

In recent years, Latin America has faced significant and, unfortunately, irreversible environmental changes, which have caused disturbances in both terrestrial and aquatic ecosystems. Climate change, global warming, soil and water degradation, together with poor management of natural resources, have led to a progressive deterioration of these essential elements. [5]. In the Latin American context, this reality takes on unique importance, since the health of the population depends largely on land and water for its subsistence.

This is how hospital institutions make intensive use of natural resources, generating adverse environmental impacts and contributing to an increase in the carbon footprint. The institutions in charge of providing health services can become highly polluting centers, from their construction phase to their operation and maintenance. Most of these infrastructures are built with materials that contain toxic components, such as flame retardants, asbestos, lead paint, PVC, phthalates, formaldehydes, mercury, among others. [6].

Furthermore, during the provision of health services, these institutions use contaminating supplies such as refrigerants, reagents, medications, disinfectants and even, depending on the level of service, radioactive substances and other contaminants. This panorama is aggravated by

inadequate management of solid and liquid waste, turning health institutions into places prone to environmental problems. Indoor air quality can be affected by the presence of chemical and biological components in the hospital environment [6]. In addition to this, poor designs of hospital buildings can lead to the appearance of true "sick buildings", increasing the incidence of infections associated with medical care and generating significant environmental impacts. These problems not only affect employees and health providers, but also impact visitors, users and the community in general, at a local, regional, national and global level.

Considering this reality, the sector dedicated to the provision of health services faces the urgent need to implement continuous improvements in its energy processes. This becomes evident when observing the considerable carbon footprints left by leading countries in the field of health. For example, the United States represents between 8% and 10% of the total carbon footprint generated, while the United Kingdom contributes 25% of the carbon footprint in the public sector, Brazil, for its part, represents the 10% [7].

Paradoxically, although the health sector intrinsically works to promote life, the figures reveal that, in many cases, it contributes negatively to climate change. This contradiction between the fundamental mission of these entities and their direct environmental impact suggests that it is essential to rethink and reform operational processes to align them with sustainability. Specifically, the extreme increase in temperature, linked to climate change, is contributing to the increase in morbidity and mortality in various communities. [8].

Consequently, the urgency of adopting more sustainable practices in the health sector is presented as an unavoidable imperative, not only in terms of environmental responsibility, but also as a means to protect the health of communities and promote a healthier and more sustainable environment. resilient.

The importance of green hospitals lies in their ability to integrate sustainable and environmentally responsible practices into the delivery of healthcare services. These hospitals take measures to reduce their environmental impact, promote the health of communities and contribute to general well-being.

Faced with such a reality, nations continue to explore new strategies in the search for sustainable actions that allow them to contribute to new changes. In the case of Latin American countries, although their participation in this type of process has been very slow, according to data from the Global Network of Green and Healthy Hospitals between 2022 and August 2023, more than 300 additional institutions completed the procedure of accession and They joined the Global Network. A total of 87 institutions joined through four calls aimed at incorporating new cohorts of members, while another 216 were integrated as part of health systems and the carbon footprint estimation project of the Colombian health system. [9].

In Latin America and the Caribbean, the Global Network has achieved a significant achievement by surpassing the 1,000 member mark. As of August 2023, the region had a total of 1,022 members, which represent the interests of 27,682 hospitals and health centers distributed in 16 countries: Argentina, Uruguay, Chile, Brazil, Peru, Colombia, Ecuador, Costa Rica, Honduras, Panama, Nicaragua, El Salvador, Mexico, Haiti and the Dominican Republic (See figure 1) [9].



Figure 1. Latin American countries members of the Global Network of Green and Healthy Hospitals [9]

Initiatives implemented in recent years

Latin America:

Hospitals that reduce environmental impact

In recent years, Latin America has witnessed a growing interest and commitment on the part of various health institutions in the implementation of initiatives aimed at reducing their environmental impact. These actions reflect a growing awareness of the importance of addressing the environmental implications of the healthcare sector. Below are some of the most relevant initiatives implemented until the end of 2023 in hospitals in the region to mitigate their environmental impact:

Colombia

In recent years, Colombia has been a pioneer in the adoption of sustainable measures in the health sector. Several hospitals such as the Farallones Clinic, ESE Hospital San Francisco de Gachetá, ESE Hospital San Rafael Cáqueza, Oncology Research Center San Diego Ciosad Clinic, Hospital San Rafael de Pasto, Méderi Red Hospitalaria – Hospital Universitario Mayor, ESE Hospital San Rafael De Pacho, among others, have made significant progress in comprehensive waste management. The implementation of segregation systems at the source, the adequate treatment of biological waste and the promotion of recycling are common practices [10]. In addition, some medical centers have established alliances with recycling companies to ensure responsible final disposal of recyclable materials.

In response to energy challenges, several Colombian hospitals have adopted measures to improve energy efficiency. The installation of LED lighting systems, the modernization of medical equipment with energy

efficient technologies and the incorporation of renewable energy sources, such as solar panels, are strategies implemented to reduce the carbon footprint.

These actions reflect an active commitment to sustainability and a recognition of the health sector's responsibility in protecting the environment.

Ecuador

Ecuador has gradually emerged in the implementation of sustainable initiatives in the hospital field, showing an outstanding commitment to reducing environmental impact, as is the case of the Vozandes Quito HVQ SA Hospital, where actions have been developed aimed at the efficient use of energy (100% of the water is heated by a solar panel system), waste management, 100% reduction in the generation of expired drugs [9]. Additionally, they have established a "zero tolerance" policy toward the distribution of medical samples. The introduction of medical samples by suppliers is not authorized, which prevents the generation of dangerous waste, such as medications in inadequate conditions or expired. [11].

Peru

In the case of Peru, there are also health institutions that have adopted advanced practices for comprehensive environmental impact management. With the aim of addressing energy challenges, several Peruvian hospitals, such as the National Institute of Children's Health, have implemented measures to improve energy efficiency [9]. This includes incorporating more efficient technologies, updating lighting systems and exploring renewable energy sources, such as solar. These actions not only reduce the carbon footprint, but also contribute to long-

term energy sustainability. As these practices become consolidated, it is hoped that they will inspire other Latin American countries to follow the path towards Green and more sustainable Hospitals [12].

Argentina

Argentina has been a pioneer in the implementation of sustainable initiatives in the hospital field. One of the examples that has made a difference is the Hospital Austral, which has become a benchmark for sustainable purchases in Latin America [9].

For this entity, procurement management involves a constant process of review, adjustment, reconsideration of previously made decisions and rethinking. The fundamental premise is that it is possible and necessary to influence the market. They also maintain that, although not all adjustments in terms of sustainability are significant, they represent changes, and it is this constant search for improvements that has marked the hospital's path. [13]. This path has been supported by results that demonstrate providers' willingness to adapt to new practices.

Other countries that are contributing to this process are Brazil, Costa Rica, Panama and Mexico, who by the end of 2023 demonstrated their commitment to adapting greener practices in the health system.

These initiatives represent only a group of the variety of actions that hospitals in Latin America are undertaking to reduce their environmental impact. [14]. As awareness of sustainability in the healthcare sector continues to grow, more institutions are expected to adopt innovative and sustainable practices, thereby contributing to the well-being of the planet and the communities they serve. [15].

Challenges and Barriers in the Implementation of Green Hospitals in Latin America: A Detailed Exploration

Despite the progress that has been made in some countries in the search for the development of more sustainable hospitals, it cannot be denied that this is a complex process that faces various challenges and barriers, reflecting the complexity inherent in the implementation of sustainable practices. in the health sector in the region [16]:

Amplified Budget Constraints: In the context of the implementation of Green Hospitals, budget constraints are presented as a central challenge. Going deeper into this aspect, it is revealed that the limited allocation of financial resources directly impacts the capacity of hospitals to adopt sustainable practices. The acquisition of more energy-efficient technologies, the incorporation of environmental management systems and the training of staff in eco-friendly practices are significantly affected by the lack of funds [6].

This budget challenge manifests itself in the difficulty of financing initial investments in sustainable technologies, although in the long term these investments can result in significant savings. The need to raise awareness among authorities and decision-makers about the long-term benefits of investments in sustainability becomes a key aspect to overcome these restrictions.

Resistance to Change in Organizational Culture: Resistance to change is not simply an individual obstacle, but a challenge rooted in the organizational culture of hospitals. Existing culture, based on hierarchical structures and entrenched traditions, can act as a substantial barrier to the adoption of sustainable initiatives [6]. It is essential to delve into how these organizational structures can hinder the implementation of eco-friendly practices and, at the same time, explore effective strategies to foster cultural change that supports sustainability.

Lack of Specific Regulations and Regulatory Framework: The lack of specific regulations and a clear regulatory framework for Green Hospitals in many Latin American countries constitutes another central challenge. This lack of specific guidelines creates uncertainty and may discourage the adoption of sustainable practices. Expanding on this aspect involves analyzing how the absence of clear regulations can affect strategic decision making and long-term planning. [9].

The development and implementation of regulatory policies that support the transition towards Green Hospitals becomes a critical aspect. This process involves collaboration between governments, health institutions and sustainability experts to design regulations that establish standards clear, encourage the adoption of eco-friendly practices and sanction unsustainable actions.

Integration of Innovative Technologies: Another notable challenge lies in the integration of innovative technologies in hospitals. The adoption of environmental management systems, the implementation of sustainable medical technologies and the incorporation of digital solutions for monitoring and reducing energy consumption present specific challenges [16]. Lack of staff knowledge and training to operate these technologies, along with resistance to change, can hinder their effective implementation.

Overcoming this challenge involves investing in ongoing training programs for staff, promoting awareness of sustainable technologies and their positive impact. Furthermore, establishing alliances with sustainable technology providers and promoting local research and development can help overcome this barrier.

It is essential to highlight that, despite these challenges, the search for Green Hospitals in Latin America not only translates into environmental benefits, but also contributes to the health and well-being of communities. Overcoming these obstacles will not only require the collaboration of actors involved in the health sector, but also the active commitment of governments, academic institutions, non-governmental organizations and society in general.

Discussion

When analyzing the evidence that has been described and that shows the progress that some nations in Latin America have experienced, an innovative paradigm is glimpsed that represents great benefits for the health sector. The convergence of sustainable practices and environmental responsibility in these medical settings reflects a determined commitment to innovation for a healthy future.

Firstly, the adoption of energy efficiency technologies and the integration of renewable energy sources mark significant progress. Such and as stated by Beraún (2021), these hospitals seek to reduce their dependence on fossil fuels, mitigate greenhouse gas emissions and, at the same time, guarantee a more sustainable energy supply for their operations. [12].

Comprehensive waste management emerges as another innovative facet. According to Ticona and Sutta (2021), the implementation of advanced systems not only aims to reduce waste generation, but also establishes clear protocols for segregation, recycling and safe treatment of hazardous waste, demonstrating transparency in waste management. [2].

The adoption of more eco-efficient medical equipment and technologies represents an innovative change in healthcare. Green Hospitals seek to invest in technologies that minimize resource consumption, reduce waste

generation and optimize medical care, all aligned with sustainable practices.

Collaboration with suppliers committed to sustainability is another example of transparency. Choosing suppliers that offer eco-friendly products and services not only strengthens the supply chain, but also highlights a transparent commitment to responsible business practices.

From this perspective, and in accordance with Prada (2021), it can be stated that the active participation of hospitals in this type of initiatives strengthens the link with society. Involving the community in events, disseminating environmental achievements and receiving feedback demonstrate transparency and commitment to the community. In other words, the implementation of Green Hospitals in Latin America not only represents a shift towards more sustainable practices in the health sector, but also highlights transparency in the adoption of concrete measures for a healthy and sustainable future in the region. [3].

However, despite the progress, much remains to be done. The region faces challenges in the widespread adoption of sustainable practices, awareness community and collaboration with government entities. According to Hernández et al. (2022) when comparing the global figures of the countries that are part of the promotion and application of sustainable practices, with Latin American countries, it can be seen that Latin America only represents 6% of this total participation, which reflects the need to improve your performance in this matter [7], with the aim of contributing to a sustainable future that guarantees a medical care model that benefits both the health of its population and the environment in which it operates.

Therefore, the transition towards Green Hospitals in the Latin American region emerges as a critical need, driven by environmental and health challenges, as the intrinsic connection between human health and environmental health highlights the urgency of adopting more sustainable practices. in the health sector, promoting the well-being of communities and contributing to a more sustainable future.

Limitations of the study

A significant limitation during the conduct of this study was the lack of availability of articles and publications to carry out a comprehensive literature review. The scarce documents such as sustainability reports and institutional policies resulted in little information and data on the actual implementation of sustainable practices on the ground, which could affect the validity of the results.

Conclusions

Growing awareness of the interconnection between the environment and human health has driven the need to rethink sustainability in the healthcare sector. Hospitals, central to healthcare, are challenged to reconcile their crucial role with the significant environmental impact associated with their daily operations.

The urgency of transforming hospital infrastructure into a positive agent for environmental sustainability becomes evident. The dichotomy between the essential role of hospitals in healthcare and their significant contribution to Environmental degradation underscores the need to reevaluate operational practices in healthcare in Latin America.

However, despite the steps that some countries such as Ecuador, Peru, Argentina and Colombia have already taken, the region faces the need to

improve its performance in sustainable practices, contributing to a more sustainable future that benefits both the health of the population as well as the environment.

Exploring the path towards Green Hospitals highlights the importance of innovation and commitment as vehicles for a healthy future denoting the urgency of adopting more sustainable practices in the healthcare sector, not only in terms of environmental responsibility, but also as a means to protect the health of communities and promote a healthier environment.

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