

GREEN HUMAN RESOURCE MANAGEMENT IN GREEN HOSPITAL IMPLEMENTATION: A SYSTEMATIC LITERATURE REVIEW ON IMPACTS, SUPPORTING FACTORS, AND BARRIERS IN HOSPITALS

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Article history: received 01 March 2026; revised 15 March 2026; accepted 05 April 2026

DOI: <https://doi.org/10.33751/jhss.v10i01.450>

Abstract. Growing environmental pressures have compelled hospitals to transition toward the green hospital concept, yet human resources remain an underexplored determinant, positioning Green Human Resource Management (GHRM) as a strategic approach to embedding environmental values across all HRM functions. This study aims to analyze the impact of GHRM on green hospital implementation, identify facilitating factors, and map the barriers faced by hospitals in adopting GHRM practices. Employing a Systematic Literature Review (SLR) design guided by PRISMA, data were collected from four databases—ScienceDirect, ProQuest, Scopus, and Google Scholar—yielding 2,959 records, of which 16 studies met the inclusion criteria and were further analyzed using VOSviewer for bibliometric mapping. The results indicate that GHRM positively influences sustainable performance, corporate sustainability, and employee pro-environmental behavior, with green training showing the strongest effect on organizational reputation. Additionally, transformational leadership and organizational policy emerged as the main facilitating factors, while financial constraints and limited managerial knowledge were identified as the primary barriers. In conclusion, the integrated implementation of GHRM, supported by strong organizational and governmental policies, can significantly accelerate the realization of sustainable green hospitals.

Keywords: Green Human Resource Management; Green Hospital; environmental sustainability; transformational leadership; hospital management

I. INTRODUCTION

Global pressure on environmental sustainability has driven the healthcare sector to undergo a fundamental transformation. Hospitals, as resource-intensive institutions, contribute significantly to carbon emissions, medical waste, and high energy consumption. The concept of the green hospital emerged as a strategic response to this environmental crisis, integrating sustainability principles into all aspects of healthcare operations. Various countries have begun adopting green building standards, environmentally friendly waste management, and energy efficiency as part of their healthcare institutions' transformation toward more environmentally responsible practices.

Amidst efforts to implement a green hospital, human resources (HR) are a crucial factor that often receives insufficient attention. Green Human Resource Management (GHRM) presents itself as a management approach that integrates environmental awareness and responsibility into all HRM functions, from recruitment and training to performance evaluation and compensation. GHRM not only builds employee technical competency but also fosters pro-environmental behaviors that are embedded in the

organizational culture in a sustainable manner. This approach has been proven to increase employee commitment to hospital environmental programs in a structured and measurable manner (Saleem et al., 2025; Younis & Hussain, 2023).

Green hospital implementation across countries has shown mixed results, influenced by a complex mix of facilitators and barriers. Supporting factors include transformational leadership, conducive government policies, and a sustainability-oriented organizational culture. Conversely, budget constraints, employee resistance to change, and limited managerial capacity are key barriers facing hospitals, particularly in developing countries. A thorough understanding of the dynamics of these factors is a prerequisite for successful green transformation in the healthcare sector (Farrukh et al., 2022; Piwovar-Sulej, 2020).

A systematic review of the existing literature reveals a significant research gap regarding the specific role of GHRM in the hospital context. Most existing studies focus on the manufacturing and industrial sectors, while research specifically examining GHRM within the hospital ecosystem remains very limited. Yet, hospitals have unique characteristics such as high regulatory pressure, heterogeneity of professional staff, and sensitivity to changes in operational procedures that distinguish them from other sectors (Al-Swidi et al., 2021; Renwick et al., 2021).

The urgency of this research is further strengthened by the increasing demands for international accreditation, which require environmental standards for hospitals. Global accreditation bodies are now integrating environmental sustainability indicators as part of their healthcare quality assessments. In this context, GHRM plays a strategic role as an enabler, ensuring that all elements of hospital human resources are prepared, competent, and motivated to consistently implement environmentally friendly practices. Therefore, this systematic literature review was conducted to comprehensively map, synthesize, and analyze the latest empirical evidence regarding the impact, facilitators, and barriers of GHRM on green hospital implementation (Al-Swidi et al., 2021).

Based on the background outlined, this study formulated three main research questions: (1) What is the impact of implementing Green Human Resource Management (GHRM) on Green Hospital implementation? (2) What factors support the implementation of GHRM in hospitals? (3) What obstacles or challenges are faced in implementing GHRM to support Green Hospitals?

Referring to the established problem formulation, this study has three main objectives. First, to analyze and synthesize empirical evidence regarding the impact of GHRM implementation on the successful implementation of Green Hospitals, encompassing aspects of employee behavior, organizational culture, and the overall environmental performance of hospitals. Second, to identify and classify factors that act as facilitators in the implementation of GHRM in hospitals, including leadership, policy, and organizational capacity. Third, to map the various obstacles and real challenges faced by hospitals in implementing GHRM as a strategy towards Green Hospitals, so that relevant, evidence-based recommendations can be formulated for the development of sustainable HR management practices in the healthcare sector.

This research is expected to provide significant contributions from two main dimensions. From a theoretical perspective, this research enriches the knowledge of Human Resource Management and health management by providing a systematic synthesis that connects GHRM and Green Hospital specifically in the context of healthcare institutions, while filling a research gap that has not been comprehensively bridged in the international scientific literature. From a practical perspective, the results of this

research can be used as a strategic reference for hospital management, HRM practitioners, and policymakers in the healthcare sector in designing, implementing, and evaluating effective and contextual GHRM programs. Furthermore, this research is also expected to contribute to accelerating the wider adoption of Green Hospital standards, especially in developing countries that still face limitations in human resource capacity and infrastructure in realizing sustainable and environmentally friendly healthcare services.

II. RESEARCH METHODS

Study Design

This study was designed using a Systematic Literature Review (SLR) approach guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) as the primary reporting framework. This approach was selected due to its ability to produce a comprehensive, transparent, and reproducible synthesis of scientific evidence. It is important to note that this study did not require ethical approval as it did not involve direct human participants, but instead relied entirely on previously published scientific documents and articles (Page et al., 2021; Snyder, 2023).

Problem Identification

Based on the research problem outlined in the introduction, the problem identification was methodologically reformulated using the PICO framework (Population, Interest, Context) to ensure alignment between the research questions, search strategy, and literature selection criteria. The PICO framework was chosen as it is particularly suitable for qualitative systematic reviews, where the focus extends beyond clinical interventions to include broader organizational and managerial phenomena. This approach enables researchers to explicitly define the population under study, the main topic of interest, and the specific context surrounding the research problem, thereby ensuring a consistent and systematic literature selection process (Sarkis-Onofre et al., 2021). The PICO framework applied in this study is presented in Table 1.

Table 1. PICO Framework

Component	Description
Population	Hospitals / healthcare organizations
Interest	Green Human Resource Management (GHRM)
Context	Impacts, facilitating factors, and barriers in Green Hospital implementation

Search Strategy

A systematic literature search was conducted across four major databases: ScienceDirect, ProQuest, Scopus, and Google Scholar, with the latter included as a

findings. The primary search process was carried out in December 2025. The search strategy was developed using a structured combination of keywords tailored to the research topic, namely: ("Green Human Resource Management" OR "GHRM") AND ("Green Hospital" OR "Sustainable Hospital" OR "Healthcare Sustainability") AND ("implementation" OR "barrier"

OR "facilitator" OR "impact"). The use of Boolean operators and synonyms ensured a comprehensive search coverage, allowing the identification of all potentially relevant articles (Bramer et al., 2022). In addition to electronic searches, hand searching of reference lists from eligible articles was performed, complemented by backward and forward citation tracking to identify additional relevant studies that may not have been captured in the initial search (Rethlefsen et al., 2021).

Eligibility Criteria

The article selection process was conducted rigorously based on predefined inclusion and exclusion criteria to ensure consistency and objectivity in selecting

studies for the final synthesis. Although review articles were generally excluded from the primary inclusion, several review and systematic literature review articles were selectively included in this study. This decision was based on their significant contribution to strengthening the conceptual foundation of GHRM and green hospitals, as well as enriching the novelty of the synthesis through mapping recent research trends not fully captured by single primary studies. This selective inclusion was conducted transparently and documented during the data extraction process in accordance with PRISMA 2020 guidelines (Page et al., 2021). The inclusion and exclusion criteria applied in this study are presented in Table 2.

Table 2. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Type of article	Original research articles	Editorials, commentaries, opinion papers, and review articles
Language	Indonesian and English	Languages other than Indonesian and English
Publication year	2016–2026	Outside the range of 2016–2026
Study focus	GHRM implementation in hospitals	Settings not relevant to hospitals
Accessibility	Full-text accessible articles	Articles without full-text access

Data Analysis

The collected raw data were first analyzed using VOSviewer to perform bibliometric analysis. This included co-authorship network mapping to identify collaboration patterns among authors, keyword co-occurrence analysis to explore relationships between concepts, and overlay visualization to map the temporal development of research topics. This approach enabled the identification of relational patterns, research clusters, and evolving trends in GHRM studies and Green Hospital implementation within healthcare settings (Donthu et al., 2021).

Furthermore, data extraction was conducted systematically based on study characteristics, including author(s), publication year, country, type and classification of hospitals, research design, data collection methods, data analysis techniques, and methodological quality or risk of bias assessment. Information regarding the context of hospital sustainability implementation was also extracted, including organizational environmental policies and implementation frameworks. Additionally, participant characteristics were recorded, such as sample size, professional roles (e.g., human resource managers, healthcare workers, administrative staff), educational background, years of work experience, and

involvement in GHRM-related programs or training. Finally, data synthesis was carried out by categorizing the GHRM components examined—such as green recruitment, green training, green performance appraisal, and green compensation—as well as the reported outcomes, including impacts, facilitating factors, and implementation barriers, all of which were documented in detail for the final synthesis (Bramer et al., 2022; Donthu et al., 2021).

III. RESULTS AND DISCUSSION

Study Selection

The systematic literature search identified a total of 2,959 records from four databases: Google Scholar (n = 1,572), Scopus (n = 687), ScienceDirect (n = 511), and ProQuest (n = 189). Prior to the screening stage, 2,714 records were removed, including duplicates (n = 899), records flagged as ineligible by automation tools (n = 1,387), and records excluded for other reasons (n = 428). Consequently, 245 records proceeded to title and abstract screening. At this stage, 172 records were excluded due to publication before 2015, leaving 73 reports for full-text review. Of these, 41 articles were excluded due to irrelevant topics, resulting in 32 reports assessed for eligibility. In the final stage, 16 reports were excluded due to being review articles (n = 8), having an inappropriate population (n = 3), or not being

conducted in hospital or healthcare settings ($n = 5$). Ultimately, 16 studies met all inclusion criteria and were included in the final analysis, as illustrated in Figure 1 (PRISMA Flow Diagram).

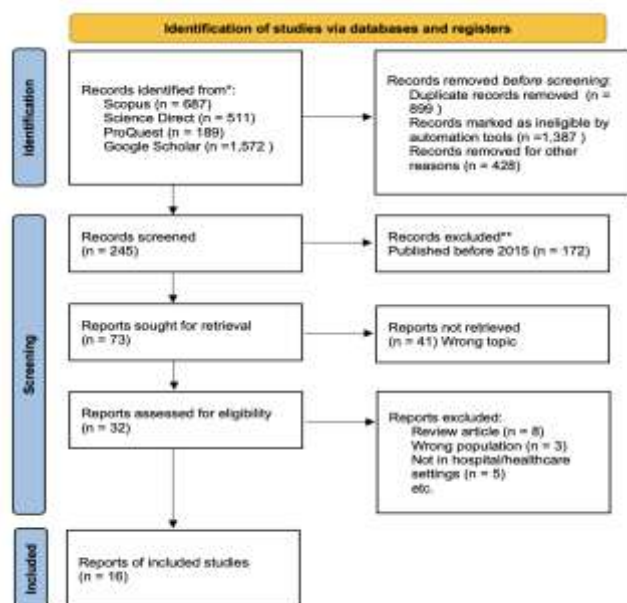


Figure 1. PRISMA Flow

Study Characteristics

The sixteen included studies originated from various countries, including Ethiopia, Saudi Arabia, Indonesia, Pakistan, Ghana, Malaysia, Egypt, and Taiwan, with

publication years ranging from 2018 to 2026. Most studies employed a quantitative cross-sectional design using SEM-PLS approaches. It is important to note that three studies—Fawehinmi et al. (2020), Akma et al. (2024), and Godbole and Lamb (2018)—were not conducted exclusively in hospital settings; however, they were included due to their relevance to GHRM dimensions and sustainability practices applicable to Green Hospital implementation.

Tessema (2025) examined the impact of GHRMPs on corporate sustainability in Ethiopian public hospitals, mediated by internal green supply chain management and moderated by green innovation. Correia et al. (2024) investigated the effect of GHRM on sustainable performance in Pakistani hospitals with risk management as a moderator. Hakim et al. (2026) analyzed the influence of GHRM on thriving at work and green commitment through the mediation of green self-efficacy in hospitals in Batam. Cinanthia and Jayanagara (2026) explored the impact of GHRM on corporate reputation and employee well-being in Indonesian hospitals. Sultan and Azhar (2021) examined the role of transformational leadership in sustainable performance in hospitals in Punjab, Pakistan. Taie et al. (2024) and Almotairy et al. (2024) assessed managerial perceptions of GHRM barriers in hospitals in Egypt and Saudi Arabia using descriptive designs.

Table 2. Study Characteristics

Author & Year	Country	Design	Objective	GHRM Indicators	Main Findings
(Tessema, 2025)	Ethiopia	Quantitative cross-sectional	Examine the impact of GHRMPs on corporate sustainability	Green recruitment, training, performance appraisal	GHRMPs significantly positively influence CS through IGSCM and green innovation
(Almotairy et al., 2024)	Saudi Arabia	Descriptive cross-sectional	Evaluate GHRM barriers among clinical managers	Green training, green policy	Most clinical managers have positive perceptions of GHRM barriers but low knowledge
(Hakim et al., 2026)	Indonesia	Quantitative SEM-PLS	Analyze the effect of GHRM on thriving at work and green commitment	Green recruitment, training, reward	Green self-efficacy is a significant mediator
(Correia et al., 2024)	Pakistan	Quantitative PLS-SEM	Examine GHRM impact on sustainable performance	Green training, green innovation	GHRM positively influences performance through green innovation
(Fu et al., 2019)	Taiwan	Quantitative FAHP	Analyze green e-procurement implementation factors	Green procurement	Technological and organizational factors are key determinants
(Taie et al., 2024)	Egypt	Descriptive	Examine GHRM barriers from nursing managers' perspective	Green training, green policy	Most managers have unsatisfactory knowledge of GHRM
(Tweneboa Kodua et al., 2022)	Ghana	Quantitative PSI	Identify GHRM implementation barriers	All GHRM dimensions	Economic barriers (23.3%) are the largest constraint
(Sultan & Azhar, 2021)	Pakistan	Quantitative SEM-PLS	Assess sustainable performance in healthcare	Job design, career planning	Transformational leadership significantly influences outcomes
(Cinanthia & Jayanagara, 2026)	Indonesia	Quantitative SEM-PLS	Analyze GHRM impact on reputation and well-being	Green recruitment, training, reward	Green training significantly affects corporate reputation
(Anshima et al., 2025)	India	SLR	Examine GHRM antecedents and outcomes for sustainable development	All GHRM dimensions	Policy mandates and employee empowerment are key drivers
(Miah et al., 2024)	Multicontext	Bibliometric SLR	Map GHRM and sustainability research trends	All GHRM dimensions	GHRM implementation remains moderate

Author & Year	Country	Design	Objective	GHRM Indicators	Main Findings
(Fawehinmi et al., 2020)	Malaysia	Quantitative SEM-PLS	Examine GHRM effect on employee green behavior	Green training, green policy	Personal moral norms mediate GHRM and behavior
(Parker, 2023)	UK	Ethical study	Examine barriers to green prescribing in NHS	Green clinical practice	Patient resistance and cost are key ethical barriers
(Leon, 2020)	Canada	Literature review	Explore sustainability barriers in dental healthcare	Green clinical practice	Four barriers: infrastructure, institutional, educational, individual
(Akma et al., 2024)	Multicontext	SLR	Examine GHRM and sustainable workplace	All GHRM dimensions	GHRM promotes economic, social, and environmental sustainability
(Godbole & Lamb, 2018)	Multicontext	Review	Examine green IT and cloud computing in healthcare	Green technology	Big data and cloud computing improve energy efficiency

Participant Characteristics

Table 3. Participant Characteristics

Author & Year	Resources	Work Experience	Hospital Type
(Tessema, 2025)	Hospital employees (N=321)	Not reported	Public hospital
(Almotairy et al., 2024)	Clinical managers (N=100)	Not reported	Military hospital
(Hakim et al., 2026)	Hospital staff (N=200)	Not reported	General hospital
(Correia et al., 2024)	Hospital employees (N=400)	Not reported	Public & private hospitals
(Fu et al., 2019)	Top managers (N=20)	Not reported	Private hospital
(Taie et al., 2024)	Nursing managers (N=50)	Not reported	General hospital
(Tweneboa Kodua et al., 2022)	CEOs, HR managers, CFOs (N=119)	Not reported	Various organizations
(Sultan & Azhar, 2021)	Nurses	Not reported	Public hospital
(Cinanthia & Jayanagara, 2026)	Healthcare employees (N=256)	Not reported	Private hospital
(Fawehinmi et al., 2020)	Academics (N=425)	Not reported	Academic hospitals

Bibliometric Analysis

The bibliometric analysis using VOSviewer produced three main visualizations. The network visualization revealed six interconnected keyword clusters representing organizational performance, green innovation, theoretical development, implementation barriers, environmental sustainability, and specific healthcare practices. The overlay visualization illustrated the temporal evolution of GHRM research, showing earlier focus (2016–2018) on clinical practices, mid-period (2022–2024) emphasis on barriers and innovation, and recent trends (2025–2026) shifting toward corporate reputation and environmental sustainability. The density visualization confirmed that “barriers,” “challenges,” and “green human resource management” were the most intensively studied topics, while leadership and career planning remained underexplored.

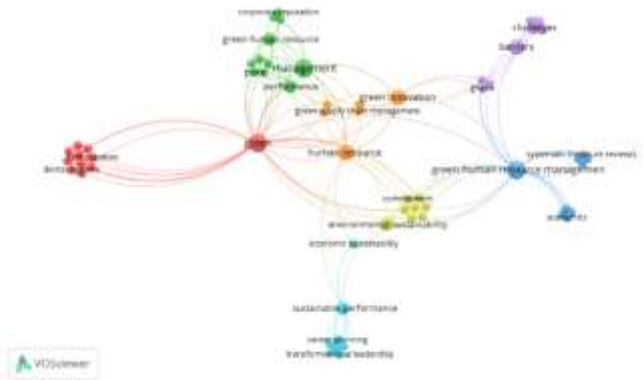


Figure 2. Network Visualization VOSviewer

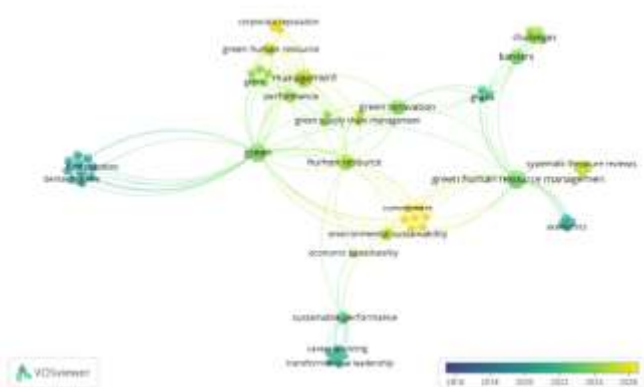


Figure 3. Overlay Visualization VOSviewer

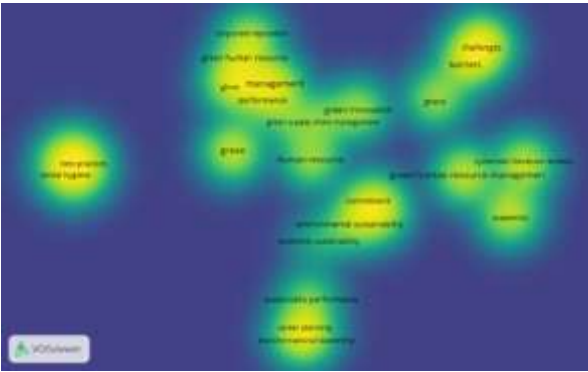


Figure 4. Density Visualization VOSviewer
Findings: Synthesis of GHRM Dimensions

Table 4. Synthesis of Findings

GHRM Dimension	Findings	Articles
Green Recruitment	Impact: Positive effect on employee well-being and commitment. Barriers: Lack of environmentally competent candidates; limited recruitment budget. Facilitators: Integration of sustainability values; top management support.	Cinanthia & Jayanagara (2026); Hakim et al. (2026); Tweneboa Kodua et al. (2022)
Green Training	Impact: Strong positive effect on corporate reputation, commitment, and thriving at work. Barriers: Budget limitations; low managerial knowledge. Facilitators: Transformational leadership; curriculum integration.	Cinanthia & Jayanagara (2026); Hakim et al. (2026); Taie et al. (2024); Almotairy et al. (2024); Anshima et al. (2025)
Green Performance Appraisal	Impact: Improves sustainable performance. Barriers: Lack of standardized green indicators. Facilitators: Organizational policies integrating environmental metrics.	Tessema (2025); Correia et al. (2024); Miah et al. (2024)
Green Reward	Impact: Positive on well-being, not significant on reputation. Barriers: Financial limitations; incentive gaps. Facilitators: Transparent compensation systems.	Cinanthia & Jayanagara (2026); Tweneboa Kodua et al. (2022); Fawehinmi et al. (2020)
Employee Involvement	Impact: Strengthens commitment and pro-environmental behavior. Barriers: Resistance to change; low awareness. Facilitators: Moral norms; environmental culture; leadership.	Fawehinmi et al. (2020); Sultan & Azhar (2021); Hakim et al. (2026); Leon (2020)

The synthesis of 16 studies demonstrates that GHRM consistently has a positive impact on Green Hospital implementation by enhancing corporate sustainability, sustainable performance, and employee green behavior (Tessema, 2025; Correia et al., 2024; Hakim et al., 2026). These effects are mediated by green self-efficacy, green innovation, and personal moral norms, indicating that GHRM effectiveness depends on both individual psychological capacity and organizational innovation. Green training emerges as the most influential factor for corporate reputation, while recruitment and reward contribute to employee well-being.

Key facilitating factors include transformational leadership, environmentally oriented organizational policies, and the integration of sustainability values across HR systems. Conversely, major barriers include financial constraints, low managerial knowledge, and employee resistance to change. Cross-country comparisons reveal that Indonesia is still at an early stage of GHRM adoption, while countries like Pakistan and Ethiopia demonstrate more advanced and integrated implementation supported by formal policies.

This study highlights important managerial, policy, and academic implications, emphasizing the need for integrated HR strategies, stronger regulatory

frameworks, and the incorporation of sustainability into healthcare education. Despite its strengths, including PRISMA-based methodology and bibliometric analysis, the study is limited by the small number of included studies, heterogeneity in research designs, and language restrictions, which may affect the generalizability of findings.

IV. CONCLUSIONS

The implementation of Green Human Resource Management (GHRM) in hospitals has demonstrated a significant positive impact on the successful realization of Green Hospital initiatives, particularly in enhancing sustainable performance, corporate sustainability, and employees' pro-environmental behavior. The effectiveness of GHRM operates indirectly, mediated by factors such as green self-efficacy, green innovation, and individual moral norms. Among its dimensions, green training emerges as the most influential component in strengthening organizational reputation, while green recruitment and green reward contribute substantially to employee well-being. Transformational leadership and environmentally oriented organizational policies serve as key driving forces, whereas financial constraints and limited managerial knowledge remain the most critical barriers that need to be systematically addressed. Therefore, hospitals are recommended to adopt GHRM as an integrated human resource management strategy rather than a symbolic policy, with a strong emphasis on

enhancing managerial capacity through environmental literacy-based training. Additionally, governments and accreditation bodies are expected to promote the formal standardization of environmental indicators within hospital performance evaluation systems. Future research should expand to other developing countries using longitudinal designs to better capture the long-term dynamics of GHRM implementation, while the integration of sustainability values into healthcare education curricula represents a strategic step toward accelerating the global adoption of Green Hospital practices.

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