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Green Leadership and Sustainable Healthcare: Distinguishing Organizational Performance from Measured Environmental Outcomes

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ABSTRACT: Healthcare organizations are under growing pressure to reduce their environmental footprint while sustaining safe, effective, and resilient health services. Against this backdrop, environmental and sustainability-oriented leadership has attracted attention as a way to embed sustainability in healthcare governance, workforce practices, and operational decision-making. This review synthesizes recent evidence on how sustainability-oriented leadership is conceptualized in healthcare organizations, which employee and organizational outcomes are associated with it, what mechanisms and conditions shape these relationships, and whether leadership has been linked directly with measurable environmental outcomes. A qualitative literature review design was used to examine scientific literature published between 2018 and 2026 and identified through Scopus, ScienceDirect, SpringerLink, and Google Scholar, supplemented by relevant scholarly and institutional sources. Qualitative content analysis organized the evidence into thematic domains covering leadership constructs, behavioral and organizational outcomes, mediating mechanisms, enabling conditions and barriers, and operational environmental outcomes. Across the reviewed studies, sustainability-oriented leadership was associated with sustainable clinical behavior, employee green behavior, environmental performance, green human resource management, green innovation, and organizational sustainable performance. These relationships were often mediated or conditioned by green psychological climate, employee attitudes, empowerment, self-efficacy, organizational support, and human resource practices. By contrast, direct reductions in greenhouse gas emissions, resource consumption, healthcare waste, and costs were documented mainly in studies of technical or circular-economy interventions rather than leadership studies. The evidence therefore positions sustainability-oriented leadership as an enabling governance mechanism rather than a direct environmental intervention. The review's main contribution is to distinguish leadership-related behavioral and organizational outcomes from objectively measured environmental performance, providing a more precise basis for future empirical research and sustainable healthcare management.

KEYWORDS: environmental leadership; sustainable healthcare; green transformational leadership; green human resource management; environmental performance

INTRODUCTION

Healthcare systems face a basic sustainability paradox. Their purpose is to protect population health, yet the delivery of care creates environmental burdens through energy use, material consumption, supply chains, transport, and waste. A global input-output assessment estimated that healthcare accounts for between 1% and 5% of several worldwide environmental impacts, depending on the indicator, while national evidence shows that healthcare-related pollution can itself impose measurable public health burdens (Eckelman & Sherman, 2016; Lenzen et al., 2020). The problem is especially visible in resource-intensive clinical settings: operating rooms combine high energy demand, heavy consumable use, and substantial waste generation, producing sizable carbon footprints across health systems (MacNeill et al., 2017). More recent work suggests that reusable devices, better waste segregation, recycling, and material flow management can reduce both emissions and resource burdens (Shah et al., 2026). Environmental sustainability is therefore not only a technical concern but also an organizational and governance challenge for healthcare institutions.

These organizational demands have drawn increasing attention to sustainable healthcare management and to the leadership needed to turn environmental commitments into everyday practice. Reviews describe initiatives spanning resource management, procurement, waste, infrastructure, workforce practices, and organizational strategy, but they also show considerable variation

in how sustainability is defined and implemented (Mostepaniuk et al., 2023). Berniak-Woźny and Rataj (2023) identified green leadership as an emerging healthcare research agenda because environmental objectives depend on alignment among organizational values, employee behavior, and strategic decision-making. Research on green human resource management (GHRM) similarly indicates that recruitment, training, performance management, employee involvement, and reward systems can support environmental goals when they are embedded in broader organizational arrangements (Pham et al., 2020). Meta-analytic evidence also links GHRM with employee green behavior and organizational outcomes, although the strength of these relationships varies across contexts and practices (Carballo-Penela et al., 2023; Guo et al., 2025). In public hospitals, GHRM has also been associated with corporate sustainability through internal green supply-chain practices and green innovation (Tessema, 2025).

Even as this literature expands, it remains conceptually fragmented. Environmental leadership, green leadership, green transformational leadership, environmental transformational leadership, and sustainable leadership are often treated as related labels, although the underlying constructs are not necessarily equivalent. The outcomes examined also vary substantially. Hospital studies have associated green leadership with environmental performance through green attitudes, empowerment, and self-efficacy (Saleem et al., 2025), whereas nursing research has linked green transformational leadership with sustainable clinical behavior (Atobishi & Nosratabadi, 2026). In Vietnamese public hospitals, environmental transformational leadership has been examined as a condition shaping the relationship between socially responsible HRM and employee green behavior (Pham & Doan, 2026). Most of this evidence comes from cross-sectional perceptual measures of behavior, climate, or organizational performance rather than direct measurements of emissions, energy, water, or healthcare waste. It is therefore important to be cautious when attributing operational environmental improvements directly to leadership.

At the same time, the literature points to several plausible organizational pathways through which sustainability-oriented leadership may influence practice. Green transformational leadership has been linked to green performance through mindfulness and self-efficacy (Chen et al., 2014) and to green dynamic capabilities and creativity (Chen & Chang, 2013). At the organizational level, green leadership, GHRM, and green organizational culture may work together to support employee green behavior and environmental performance (Al-Swidi et al., 2021). Farrukh et al. (2022) likewise found that GHRM mediates the relationship between green transformational leadership and pro-environmental behavior, with environmental knowledge further conditioning that relationship. Taken together, this work suggests that leadership does not operate in isolation. Its influence is embedded in HR practices, organizational culture, employee capabilities, and opportunities to act. Such an integrated perspective is particularly relevant in healthcare, where environmental objectives must be pursued alongside clinical quality, safety, resource constraints, and regulatory obligations.

Recent healthcare studies have examined these pathways more directly. Mousa et al. (2025) reported associations between green transformational leadership and sustainable organizational performance through GHRM and green innovation. Atobishi and Nosratabadi (2026) identified green psychological climate as a mediator between green transformational leadership and sustainable clinical behavior, while perceived organizational hypocrisy weakened this relationship. Saleem et al. (2025) examined green attitude, empowerment, and self-efficacy as mediators linking green leadership with hospital environmental performance. Pham and Doan (2026) placed environmental transformational leadership within a model connecting socially responsible HRM with employee green behavior, whereas Elbassal et al. (2026) linked nurse managers' sustainable management behaviors with nurses' climate change cognition and sustainability-oriented behavior. Qualitative work also indicates that sustainable leadership among first-line healthcare managers depends on supportive structures, resources, collaboration, and opportunities for innovation (Marzelius et al., 2026). Together, these studies point toward multilevel explanations that span organizational climate, HR systems, psychological processes, and institutional capacity.

A clear synthesis problem nonetheless remains. Berniak-Woźny and Rataj (2023) set out an early research agenda for green leadership in healthcare, while Mostepaniuk et al. (2023) reviewed sustainability practices more broadly; both appeared before much of the recent empirical work on leadership mechanisms. Since then, studies have multiplied across leadership constructs, mediators, employee outcomes, and national settings, but their findings have not been integrated in a way that clearly separates leadership-related behavioral and organizational outcomes from directly measured operational environmental outcomes. That distinction is important because contemporary operational research documents measurable environmental benefits from circular-economy and green hospital interventions, yet those effects cannot be attributed to leadership unless leadership is explicitly included in the analytical model (Shah et al., 2026). A focused synthesis is therefore needed to clarify terminology, mechanisms, enabling conditions, barriers, and the level at which sustainability outcomes are measured.

Against this background, the review synthesizes recent evidence on sustainability-oriented leadership in healthcare organizations while distinguishing organizational associations from measured environmental outcomes. Five questions guide the analysis: (1)

How have sustainability-oriented leadership constructs been conceptualized and operationalized in healthcare research? (2) What employee-level and organizational sustainability outcomes have been reported in association with these constructs? (3) What organizational, behavioral, and psychological mechanisms have been identified as mediators or contextual conditions? (4) What enabling conditions and implementation barriers shape sustainability-oriented leadership and environmental practices in healthcare organizations? and (5) To what extent does the evidence directly connect leadership with operational environmental outcomes such as greenhouse gas emissions, resource use, and healthcare waste? Framing the review in this way provides a more precise evidence map for sustainable healthcare leadership and helps avoid conflating perceived organizational performance with demonstrated environmental impact.

RESEARCH METHODS

This study used a qualitative literature review design to examine environmental leadership in sustainable healthcare organizations. An evidence synthesis approach, rather than a meta-analysis, was appropriate because the relevant literature spans heterogeneous leadership constructs, organizational settings, research designs, and sustainability outcomes. The unit of analysis was the published document; no new primary data were collected from human participants, healthcare institutions, or environmental samples.

The review was organized around five objectives: examining how environmental or sustainability-oriented leadership has been conceptualized in healthcare organizations; identifying the organizational, behavioral, and environmental outcomes associated with such leadership; examining mechanisms and organizational conditions that may support these relationships; identifying reported implementation barriers; and distinguishing leadership-related organizational outcomes from directly measured operational environmental outcomes. This distinction was necessary because the literature uses several related but non-equivalent constructs, including environmental leadership, green leadership, green transformational leadership, environmental transformational leadership, sustainable leadership, and sustainable management behavior.

Information Sources and Literature Identification

Scientific and scholarly sources published between 2018 to 2026 namely: Scopus, ScienceDirect, SpringerLink, and Google Scholar. Scopus was used to access indexed scientific literature, while ScienceDirect and SpringerLink were used to identify relevant publications available through major academic publishing platforms. Google Scholar served as an additional discovery source. The review also considered academic books, reports from recognized global health organizations, and relevant environmental-health or healthcare-sustainability policy documents when they contributed directly to the conceptual or policy context.

Literature identification drew on combinations of terms covering four broad domains: leadership, healthcare settings, environmental sustainability, and sustainability-related organizational or environmental outcomes. Leadership terms included environmental leadership, green leadership, green transformational leadership, environmental transformational leadership, and sustainable leadership. Healthcare-related terms included healthcare, health care, hospital, healthcare organization, and green hospital. Sustainability-related terms included environmental sustainability, environmental management, green healthcare, decarbonization, medical waste, and resource efficiency. Additional outcome and mechanism terms included environmental performance, sustainable performance, employee green behavior, pro-environmental behavior, green human resource management, green organizational culture, green psychological climate, and green innovation.

Eligibility and Relevance Assessment

Sources were selected for their relevance to environmental leadership and sustainability in healthcare settings. Eligible publications addressed at least one of the following areas: environmental or sustainability-oriented leadership in healthcare organizations; organizational or employee environmental behavior associated with leadership; green human resource or organizational practices; environmental or sustainable organizational performance; organizational conditions that support sustainability implementation; or measurable environmental practices relevant to sustainable healthcare operations.

Quantitative, qualitative, and mixed-method empirical studies were considered because the research questions required evidence on both measurable relationships and organizational experience. Review articles were retained when they synthesized evidence directly relevant to environmental leadership, green healthcare, or sustainable healthcare practices. Reports and policy documents were also considered when issued by authoritative health or environmental organizations and when they provided information not adequately represented by individual empirical studies.

Publications addressing sustainability without a meaningful connection to healthcare fell outside the analytical scope. The same applied to clinical studies with no environmental, organizational, leadership, or sustainability dimension. Technical evidence on energy, waste, resource consumption, carbon emissions, or circular healthcare practices was used to characterize operational

environmental outcomes where relevant; however, these outcomes were not attributed to environmental leadership unless the underlying study directly examined a leadership-related relationship.

Data Extraction and Evidence Classification

Information was extracted in line with the analytical objectives of the review. The main fields considered were geographical and organizational setting, study design, participant group or unit of analysis, leadership construct, sustainability-related construct, reported organizational or behavioral mechanism, outcome variable, and principal finding. Where the underlying study reported quantitative results, the review retained relevant statistics such as sample size, standardized coefficients, significance levels, and other indicators of the relationship under investigation.

Terminological differences across studies were retained rather than collapsed. Constructs such as green transformational leadership, environmental transformational leadership, sustainable leadership, and sustainable management behavior were therefore reported using the terminology of the original publications instead of being treated automatically as interchangeable measures of a single construct.

The evidence was also classified by outcome level. Employee-level outcomes included sustainable clinical behavior, employee green behavior, pro-environmental behavior, attitudes, self-efficacy, empowerment, and related behavioral variables. Organizational-level outcomes included green human resource management, green innovation, environmental performance, and organizational sustainable performance. Operational environmental outcomes covered resource consumption, greenhouse gas emissions, healthcare waste, reusable medical devices, recycling, and other directly measured environmental indicators.

Qualitative Content Analysis and Synthesis

The selected literature was examined using qualitative content analysis. Findings were grouped into thematic categories that reflected both the review objectives and recurring patterns in the evidence. The synthesis centered on five analytical domains: the conceptualization of sustainability-oriented leadership; leadership-related employee and organizational outcomes; organizational and behavioral mechanisms; enabling conditions and implementation barriers; and operational environmental outcomes relevant to sustainable healthcare.

Studies were compared to identify recurring relationships as well as differences associated with research design, healthcare setting, leadership construct, and outcome definition. Quantitative findings were summarized from the statistics reported in the original studies and were neither recalculated nor pooled. Given the methodological and conceptual heterogeneity of the evidence base, no aggregate effect size was estimated.

Interpretation remained within the limits of the underlying study designs. Associations reported in cross-sectional or observational studies were not treated as causal evidence. Likewise, reductions in carbon emissions, waste, resource consumption, or operating costs reported for specific environmental interventions were kept separate from outcomes directly attributable to leadership. Maintaining this distinction throughout the synthesis reduced the risk of conflating organizational leadership findings with the environmental effects of technical or operational sustainability interventions.

RESULTS AND DISCUSSION

Results

Characteristics and conceptual coverage of the evidence

The evidence base comprised quantitative empirical studies, qualitative research, and review studies conducted in healthcare settings across several national contexts. No single standardized leadership construct was used throughout the empirical literature. Instead, studies examined related but distinct concepts, including green transformational leadership, environmental transformational leadership, sustainable leadership, and sustainable management behaviors. Outcome measures were similarly diverse, covering sustainable clinical behavior, employee green behavior, environmental performance, pro-environmental behavior, green human resource management, green innovation, and multidimensional organizational sustainable performance.

Empirical studies involved hospital employees and managers working in different healthcare systems. For example, Atobishi and Nosratabadi (2026) analyzed data from 760 nurses across 11 Jordanian hospitals; Saleem et al. (2025) studied 312 junior doctors and nurses in private hospitals; Pham and Doan (2026) surveyed 334 nurses in Vietnamese public hospitals; Elbassal et al. (2026) included 415 staff nurses and 23 nurse managers in an Egyptian university hospital; and Marzelius et al. (2026) interviewed 25 first-line healthcare managers in Sweden. The studies therefore varied in design, participant group, healthcare setting, and the way leadership and sustainability outcomes were operationalized.

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Leadership and sustainability-related employee outcomes

Several quantitative studies found statistically significant relationships between sustainability-oriented leadership and employee-level environmental or sustainable behavior. Atobishi and Nosratabadi (2026) reported that green transformational leadership positively predicted sustainable clinical behavior among nurses ($\beta = 0.215$, $p < 0.001$). It was also associated with green psychological climate ($\beta = 0.373$, $p < 0.001$), and green psychological climate in turn predicted sustainable clinical behavior ($\beta = 0.427$, $p < 0.001$). The indirect relationship between green transformational leadership and sustainable clinical behavior through green psychological climate was significant ($\beta = 0.122$, $p < 0.001$). Perceived organizational hypocrisy was negatively associated with sustainable clinical behavior ($\beta = -0.109$, $p < 0.001$) and weakened the relationship between green transformational leadership and sustainable clinical behavior (interaction $\beta = -0.153$, $p < 0.001$).

A similar pattern was reported in Vietnamese public hospitals. Pham and Doan (2026) found that socially responsible human resource management was positively associated with employee green behavior, both directly and through personal moral norms and public service motivation. Environmental transformational leadership strengthened the positive relationship between socially responsible human resource management and employee green behavior. In that model, leadership therefore operated as a conditioning variable alongside human resource practices.

In an Egyptian university hospital, Elbassal et al. (2026) reported moderate sustainability attitudes among nurses ($M = 3.29$) and moderate sustainable management behaviors among nurse managers ($M = 3.58$). Sustainable management behaviors were positively related to nurses' climate change cognition and behaviors ($\beta = 0.61$, $p < 0.001$), while sustainability attitudes were positively related to sustainable management behaviors ($\beta = 0.57$, $p < 0.001$). The mediation effect for intrinsic motivation was not significant ($p = 0.207$), showing that the examined outcomes did not all follow the same relationship pattern.

Leadership and environmental or organizational performance

Hospital-based structural models also reported links between green leadership and environmental performance. Saleem et al. (2025) found a positive association between green leadership and employee environmental performance ($\beta = 0.371$, $p < 0.001$). Green leadership was positively related to green attitude ($\beta = 0.945$, $p < 0.001$), green empowerment ($\beta = 0.937$, $p < 0.001$), and green self-efficacy ($\beta = 0.759$, $p < 0.001$). In turn, green attitude ($\beta = 0.350$, $p < 0.001$), green empowerment ($\beta = 0.263$, $p = 0.006$), and green self-efficacy ($\beta = 0.024$, $p < 0.001$) were each positively associated with environmental performance. Significant indirect relationships were reported through green attitude ($\beta = 0.291$, $p < 0.001$), green empowerment ($\beta = 0.112$, $p = 0.006$), and green self-efficacy ($\beta = 0.154$, $p < 0.001$).

At the organizational level, Mousa et al. (2025) examined green transformational leadership, green human resource management, and green innovation in healthcare organizations in Palestine. Their PLS-SEM analysis found significant relationships among these constructs and organizational sustainable performance, with green human resource management and green innovation acting as mediators.

Across these empirical studies, sustainability was measured mainly through behavioral, psychological, human-resource, or organizational performance variables. None directly quantified changes in hospital greenhouse gas emissions, energy consumption, water use, or medical waste volumes attributable specifically to environmental leadership.

Organizational conditions supporting sustainability-oriented leadership

Qualitative evidence highlighted structural and organizational conditions that support sustainable leadership. Drawing on interviews with 25 first-line healthcare managers, Marzelius et al. (2026) identified three overarching themes: providing resilient organizational structures, fostering supportive collaborations, and cultivating leadership for innovation. Structural conditions included appropriate support functions, resource allocation, management of time and workforce capacity, and coordinated organizational routines. Social conditions included supervisory support, peer exchange, leadership networks, and access to administrative assistance. The third theme concerned managers' capacity to connect everyday responsibilities with innovation and longer-term organizational development.

Taken together, this evidence identifies resource availability and organizational support as relevant conditions for sustainability-oriented management. The reviewed studies, however, differed substantially in what they meant by sustainable leadership. In Marzelius et al. (2026), for example, the construct emphasized the long-term sustainability of healthcare managers' leadership capacity and working conditions rather than environmental leadership alone. This evidence was therefore treated as organizational-context evidence, not as equivalent to green transformational leadership.

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Environmental practices and operational outcomes

Studies of healthcare sustainability reported measurable environmental benefits from specific operational interventions, although these effects were not demonstrated as direct consequences of leadership. A 2026 systematic review of 11 studies on circular-economy interventions found that reusable and repairable medical devices could reduce carbon emissions by up to 76% and costs by approximately 50% compared with selected single-use alternatives. Material flow studies included in the review identified single-use plastics as major components of hospital waste streams, with some analyses reporting proportions above 70%. Waste segregation and recycling systems also showed lower environmental burdens than predominantly incineration-based waste pathways (Shah et al., 2026).

The same body of evidence identified several implementation constraints, among them limited sterilization infrastructure, regulatory requirements favoring single-use products in some settings, procurement arrangements, and the absence of standardized circular-economy indicators. Reported enabling conditions included green procurement, material tracking, adequate sterilization capacity, and organizational sustainability programs. These findings describe the implementation environment for sustainable healthcare practices; they do not establish that environmental leadership alone produced the reported reductions in emissions, waste, or costs (Shah et al., 2026).

Summary of the evidence

Across empirical leadership studies, sustainability-oriented leadership was consistently associated with employee environmental behavior, sustainable clinical behavior, environmental performance, green human resource practices, or organizational sustainable performance. Several studies also identified intervening organizational or behavioral variables, including green psychological climate, green human resource management, green innovation, green attitudes, green empowerment, green self-efficacy, personal moral norms, and public service motivation.

Direct operational indicators told a different story. Greenhouse-gas emissions, resource consumption, waste quantities, and financial savings were reported mainly in studies of specific sustainability or circular-economy interventions rather than in environmental-leadership studies. The evidence therefore supports a distinction between leadership-related organizational and behavioral outcomes and directly measured environmental outcomes.

Discussion

The findings suggest that sustainability-oriented leadership in healthcare is better understood as an organizational enabling condition than as a direct environmental intervention. Across the studies reviewed, leadership was associated with sustainable clinical behavior, employee green behavior, environmental performance, green human resource management (GHRM), green innovation, and organizational sustainable performance. The evidence did not, however, show directly that leadership itself reduced greenhouse gas emissions, energy use, water consumption, or healthcare waste. This distinction is central to the research questions because it separates what the available studies demonstrate from claims that would go beyond their designs. It also extends earlier work that positioned green leadership as strategically important for sustainable healthcare by showing that the strongest empirical evidence concerns behavioral and organizational pathways through which environmental objectives may be translated into practice (Berniak-Woźny & Rataj, 2023; Mostepaniuk et al., 2023).

Conceptually, the literature remains heterogeneous. Green leadership, green transformational leadership, environmental transformational leadership, sustainable leadership, and sustainable management behavior all appear in the evidence base, but they are not equivalent constructs. Green transformational leadership generally centers on mobilizing employees around environmental goals, whereas sustainable leadership may encompass broader concerns about organizational endurance and managerial capacity. The distinction becomes clear when hospital studies of green leadership are compared with the qualitative work of Marzelius et al. (2026), which emphasizes resilient structures, collaboration, and leadership capacity among first-line managers. Earlier studies also connect green transformational leadership with green creativity, dynamic capabilities, mindfulness, and self-efficacy rather than with a single standardized construct (Chen & Chang, 2013; Chen et al., 2014). Comparisons across settings therefore require greater conceptual precision.

The clearest empirical pattern concerns the positive association between sustainability-oriented leadership and employee or organizational sustainability outcomes. Atobishi and Nosratabadi (2026) linked green transformational leadership with sustainable clinical behavior among nurses, while Saleem et al. (2025) associated green leadership with employee environmental performance. This pattern accords with evidence that leadership, organizational culture, and GHRM can jointly influence employee green behavior and environmental performance (Al-Swidi et al., 2021). It is also consistent with the wider GHRM literature, in which recruitment, training, performance management, employee participation, and rewards help embed environmental priorities in organizational routines (Pham et al., 2020). More recent syntheses show that GHRM outcomes vary with the combination of

practices and the organizational context (Guo et al., 2025), while evidence from public hospitals links GHRM with corporate sustainability through green supply-chain practices and innovation (Tessema, 2025). Leadership thus appears most consequential when reinforced by organizational systems that shape employees' opportunities and capacity to act.

The mechanisms identified across studies reinforce this organizational interpretation. Atobishi and Nosratabadi (2026) found that green psychological climate mediated the relationship between green transformational leadership and sustainable clinical behavior, while perceived organizational hypocrisy weakened that relationship. Saleem et al. (2025) identified green attitude, empowerment, and self-efficacy as mediators between green leadership and environmental performance. Pham and Doan (2026) situated environmental transformational leadership within a broader model involving socially responsible HRM, personal moral norms, public service motivation, and employee green behavior. These findings are consistent with Farrukh et al. (2022), who reported a mediating role for GHRM between green transformational leadership and pro-environmental behavior, and with Chen et al. (2014), who emphasized green mindfulness and self-efficacy. At the organizational level, Mousa et al. (2025) linked green transformational leadership with sustainable organizational performance through GHRM and green innovation. Taken together, the evidence suggests that leadership signals acquire behavioral significance when they are supported by a credible climate, HR practices, employee capability, and innovation processes.

The evidence on enabling conditions and barriers points in the same direction. Marzelius et al. (2026) found that sustainable leadership among first-line healthcare managers depends on resilient organizational structures, adequate support functions, time and workforce resources, supervisory and peer support, and opportunities for innovation. This complements the broader review by Mostepaniuk et al. (2023), which shows that healthcare sustainability extends across multiple organizational domains rather than a single environmental program. Individual leaders, in other words, cannot compensate indefinitely for structural deficiencies. Environmental goals may remain symbolic when procurement arrangements, staffing, infrastructure, performance systems, or regulatory expectations do not support implementation. This interpretation also accords with evidence that the effectiveness of GHRM and related environmental practices varies with organizational context (Carballo-Penela et al., 2023; Pham et al., 2020). The review therefore shifts attention from leadership traits alone to the organizational conditions that allow sustainability-oriented leadership to be enacted.

A crucial boundary emerges when leadership outcomes are compared with direct environmental measures. Improvements in emissions, waste, and resource use were reported mainly in studies of environmental interventions rather than in studies that tested leadership effects. Shah et al. (2026), for example, synthesized circular-economy interventions involving reusable and repairable medical devices, waste segregation, recycling, procurement, and material tracking, and reported substantial reductions in environmental burdens for some interventions. These findings are consistent with evidence that healthcare delivery has a material environmental footprint at national and global scales (Eckelman & Sherman, 2016; Lenzen et al., 2020) and that resource-intensive clinical activities such as surgery generate substantial carbon impacts (MacNeill et al., 2017). Even so, these studies do not establish that leadership directly caused the reductions. Leadership may facilitate adoption, coordination, and institutionalization, but the causal pathway from leadership to measured environmental improvement remains insufficiently tested.

This distinction between leadership-related outcomes and operational environmental outcomes is the review's principal contribution. Berniak-Woźny and Rataj (2023) established green leadership as an important research agenda in healthcare, while Mostepaniuk et al. (2023) synthesized sustainability practices more broadly. Building on these strands, the present review separates three analytical levels that are often conflated: leadership constructs, intermediate organizational and behavioral mechanisms, and directly measured environmental outcomes. Doing so helps reconcile findings that might otherwise appear inconsistent. Positive associations between leadership and perceived environmental performance can coexist with limited evidence for measured reductions in emissions or waste because they concern different levels of outcome. Elbassal et al. (2026) further illustrates this point: moderate sustainability attitudes and sustainable management behavior coexisted with a non-significant mediation effect for intrinsic motivation. Sustainability-related behavior therefore cannot be assumed to follow uniformly from managerial orientation, even when overall associations are positive.

The synthesis also carries theoretical, methodological, and practical implications. Theoretically, sustainability-oriented leadership is better viewed as part of a broader organizational system in which climate, HRM, innovation, employee cognition, and structural capacity interact. This view is consistent with research linking green transformational leadership to green dynamic capabilities and creativity (Chen & Chang, 2013), green mindfulness and self-efficacy (Chen et al., 2014), and pro-environmental behavior through GHRM and environmental knowledge (Farrukh et al., 2022). Methodologically, however, much of the healthcare evidence is cross-sectional and based on self-reported constructs. These designs can identify associations, but they cannot establish temporal ordering or demonstrate changes in physical environmental indicators. Future studies should connect validated leadership

measures with independently measured outcomes such as energy use, waste generation, procurement footprints, and greenhouse gas emissions over time while testing the mediating organizational mechanisms suggested by the current literature.

For healthcare organizations, the findings caution against treating environmental leadership as a symbolic commitment detached from operational systems. Leadership is more likely to support change when environmental priorities are reinforced by HR practices, innovation processes, organizational support, and consistent managerial behavior. The negative role of perceived organizational hypocrisy reported by Atobishi and Nosratabadi (2026) is particularly relevant because it shows how inconsistency between environmental rhetoric and organizational practice can weaken sustainable behavior. At the same time, measurable environmental improvement depends on concrete interventions in procurement, reuse, waste management, and resource flows (Shah et al., 2026). Environmental leadership may therefore be most useful as a governance mechanism for aligning these interventions with organizational priorities rather than as an environmental outcome in itself.

These interpretations need to be read against the heterogeneity and methodological limitations of the evidence base. The included studies vary in leadership terminology, healthcare setting, participant group, study design, and outcome measurement, and several rely on cross-sectional survey data. No pooled effect size was calculated because the constructs and designs were not sufficiently comparable. The review also did not document a formal risk-of-bias instrument, duplicate independent screening, or a prospectively registered protocol. These limitations constrain causal inference and the generalizability of the synthesis. Even within those boundaries, the evidence clarifies an important distinction: sustainability-oriented leadership is consistently associated with organizational and behavioral conditions relevant to sustainable healthcare, whereas direct evidence that leadership produces measurable reductions in carbon emissions, resource use, or healthcare waste remains limited. This distinction offers a more defensible foundation for future empirical research and for healthcare strategies that connect leadership with verifiable environmental performance.

CONCLUSION

Overall, the review shows that sustainability-oriented leadership is an important organizational mechanism for advancing environmental sustainability in healthcare, but its influence appears mainly through behavioral, psychological, human-resource, and organizational pathways rather than directly measured environmental effects. Across the evidence base, green transformational leadership, environmental transformational leadership, green leadership, and related sustainability-oriented constructs were associated with sustainable clinical behavior, employee green behavior, environmental performance, green human resource management, green innovation, and organizational sustainable performance. These relationships were shaped by factors such as green psychological climate, employee attitudes, empowerment, self-efficacy, personal moral norms, public service motivation, organizational support, and the credibility of institutional environmental commitments. By contrast, measurable reductions in greenhouse gas emissions, resource consumption, healthcare waste, and operating costs were reported mainly in studies of specific technical and circular-economy interventions rather than in studies that directly examined leadership. Environmental leadership is therefore best understood as an enabling governance and organizational mechanism that can support the adoption and institutionalization of sustainable practices, not as evidence in itself of improved physical environmental performance.

The conclusions are subject to several limitations in both the evidence base and the review process. The included literature varies in leadership terminology, study design, healthcare setting, participant group, and sustainability outcome, while much of the empirical evidence relies on cross-sectional and self-reported measures that cannot establish causal relationships. The review also did not employ a formal risk-of-bias instrument, independent duplicate screening, a prospectively registered protocol, or quantitative meta-analysis, which limits the strength and generalizability of the synthesis. Future research should use longitudinal, experimental, or mixed-method designs that connect validated leadership measures with independently measured environmental indicators, including energy consumption, greenhouse gas emissions, water use, procurement impacts, and healthcare waste generation, while testing the organizational mechanisms identified here. The review's main contribution is to clarify the conceptual and evidentiary boundaries of environmental leadership in healthcare, particularly by distinguishing leadership-related organizational and behavioral outcomes from objectively measured environmental outcomes. That distinction provides a more rigorous basis for future research and for healthcare organizations seeking to integrate leadership, organizational systems, and verifiable environmental performance within sustainability strategies.

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