



INTERDISCIPLINARY LEADERSHIP MODELS IN ENHANCING CLINICAL SERVICE QUALITY WITHIN THE DIGITAL ERA

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Article Info

Received: April 12, 2025

Revised: June 10, 2026

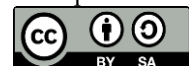
Accepted: August 12, 2026

Online Version: September 19, 2026

Abstract

Clinical service quality in the digital era is increasingly shaped by the ability of healthcare organizations to integrate interdisciplinary leadership within rapidly evolving technological environments. Traditional hierarchical leadership structures often struggle to manage complex interactions between clinical workflows, digital health systems, and cross-functional expertise. This study aims to analyze how interdisciplinary leadership models enhance clinical service quality in digitally transformed healthcare settings. A qualitative-dominant mixed-methods design was employed using comparative case analysis, secondary institutional data, and structured stakeholder insights from healthcare organizations with varying levels of digital maturity. Data were analyzed through thematic coding and inferential comparison across leadership models. Results indicate that interdisciplinary leadership significantly improves patient satisfaction, reduces clinical error rates, enhances response time efficiency, and increases digital system utilization compared to hierarchical and multidisciplinary models. Statistical evidence confirms superior performance outcomes under interdisciplinary leadership, supported by stronger coordination between clinical, administrative, and technological units. The findings conclude that interdisciplinary leadership serves as a critical enabler of digital transformation in healthcare, ensuring improved service quality, operational efficiency, and integrated decision-making. Its effectiveness depends on organizational readiness and alignment between leadership structures and digital health infrastructures across clinical environments.

Keywords: Clinical Quality, Digital Health, Healthcare Leadership



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Journal Homepage

<https://research.adra.ac.id/index.php/health>

ISSN: (P: 2988-7550) - (E: 2988-0459)

How to cite:

Mulyaningsih, Mulyaningsih., Rahman, R & Farah, R. (2026). Interdisciplinary Leadership Models in Enhancing Clinical Service Quality within the Digital Era. *Journal of World Future Medicine, Health and Nursing*, 4(5), 642–655. <https://doi.org/10.70177/health.v4i5.4069>

Published by:

Yayasan Adra Karima Hubbi

INTRODUCTION

Transformation of healthcare systems in the digital era has fundamentally reshaped how clinical services are delivered, managed, and evaluated. Rapid advancements in health information technology, artificial intelligence, and digital health platforms have created new opportunities for improving clinical efficiency and patient outcomes. Hospitals and healthcare organizations are increasingly dependent on integrated digital systems that require coordinated leadership across multiple disciplines, including medicine, nursing, information systems, and health administration. This shift has elevated the importance of leadership models capable of navigating complex, technology-driven healthcare environments (Hadjiiski, 2023; Xames, 2024).

Growing complexity in clinical service delivery has intensified the need for interdisciplinary collaboration among healthcare professionals. Modern healthcare systems no longer operate within isolated professional silos but require continuous interaction between clinical experts, data analysts, and technology specialists. The integration of electronic health records, telemedicine, and clinical decision-support systems demands leadership structures that facilitate coordination across diverse expertise domains. In this context, traditional hierarchical leadership models are increasingly viewed as insufficient to address the dynamic challenges of digital healthcare transformation (Wannan, 2024; Zhang, 2022).

Quality improvement in clinical services has become a central priority for healthcare institutions worldwide, particularly in response to increasing patient expectations, regulatory standards, and performance-based healthcare systems. Digital transformation has introduced new metrics for evaluating clinical quality, including responsiveness, accuracy, patient safety, and service efficiency. Leadership models play a critical role in aligning organizational goals with technological capabilities to ensure that digital innovations translate into measurable improvements in patient care quality (Fineberg, 2022; Kalra, 2024).

Fragmentation of leadership structures in healthcare organizations remains a significant challenge in achieving integrated clinical service quality. Many healthcare institutions continue to rely on discipline-specific leadership models that limit cross-functional coordination and reduce the effectiveness of digital health implementation. This fragmentation often results in misalignment between clinical operations and technological systems, leading to inefficiencies in service delivery and decision-making processes.

Insufficient integration between clinical and technological leadership creates barriers to effective digital transformation in healthcare settings. The rapid adoption of digital health technologies often outpaces the development of leadership competencies required to manage interdisciplinary teams. As a result, healthcare organizations struggle to optimize the use of digital tools such as artificial intelligence, predictive analytics, and interoperable health information systems in clinical practice (Patel, 2023; Talwar, 2023).

Variability in clinical service quality outcomes across healthcare institutions highlights inconsistencies in leadership effectiveness. While some organizations successfully leverage digital transformation to enhance patient outcomes, others experience stagnation or decline in service quality due to weak leadership coordination. This disparity raises critical questions regarding the role of interdisciplinary leadership models in ensuring equitable and sustainable improvements in clinical performance.

Identification and analysis of interdisciplinary leadership models constitutes a primary objective of this study, focusing on how different leadership structures operate within digitally

transformed healthcare environments. The research aims to categorize leadership approaches that integrate clinical, administrative, and technological expertise to improve service quality outcomes.

Evaluation of the impact of leadership models on clinical service quality forms another key objective, particularly in understanding how interdisciplinary coordination influences patient care efficiency, safety, and satisfaction. The study seeks to assess the relationship between leadership structures and measurable healthcare performance indicators in digital-era clinical settings (Pillinger, 2023; Schukow, 2024).

Development of a conceptual framework for interdisciplinary leadership effectiveness serves as the final objective of this research. The study aims to propose a structured model that can guide healthcare organizations in designing leadership systems capable of optimizing digital transformation and improving clinical service quality in a sustainable manner.

Limited integration of interdisciplinary leadership theory in healthcare management research represents a significant gap in existing literature. Previous studies have largely focused on either clinical leadership or healthcare management independently, without sufficiently addressing the intersection between multiple disciplines in digital healthcare environments. This fragmentation limits the development of comprehensive leadership models that reflect the complexity of modern clinical systems (Petrini, 2022; Tan, 2023).

Insufficient empirical evidence on leadership effectiveness in digital healthcare transformation further highlights the need for more rigorous investigation. Although digital health technologies have been widely studied, the role of leadership in mediating their impact on clinical service quality remains underexplored. Existing research often emphasizes technological adoption rather than organizational leadership dynamics that enable successful implementation.

Lack of context-specific interdisciplinary leadership frameworks creates additional challenges in applying global leadership models to diverse healthcare settings. Many existing frameworks are developed in high-income countries and may not adequately reflect the structural, cultural, and resource constraints of healthcare systems in developing regions. This contextual gap limits the generalizability and practical applicability of current leadership theories.

Integration of interdisciplinary leadership theory with digital healthcare transformation represents a key novelty of this study. The research introduces a holistic perspective that combines clinical leadership, organizational behavior, and health informatics to examine how leadership models function in digitally enabled healthcare systems. This integrated approach provides a more comprehensive understanding of leadership dynamics in complex clinical environments (Faraone, 2024; O'Connor, 2023).

Development of a digital-era interdisciplinary leadership framework constitutes a significant conceptual contribution. The study proposes a structured model that links leadership competencies with digital health capabilities, emphasizing collaboration across clinical, administrative, and technological domains. This framework is designed to support healthcare organizations in optimizing service quality through coordinated leadership strategies.

Policy and practical relevance for improving clinical service quality underscores the importance of this research. The findings are expected to inform healthcare administrators, policymakers, and clinical leaders in designing effective leadership structures that enhance patient outcomes in the digital era. By bridging theoretical and practical perspectives, the study

contributes to advancing both academic discourse and healthcare management practice (Bernardi, 2023; Petrini, 2022).

RESEARCH METHOD

This study employs a qualitative-dominant mixed-methods research design to examine interdisciplinary leadership models in enhancing clinical service quality within the digital healthcare environment. The design integrates organizational leadership analysis with digital health systems evaluation to capture the complex interaction between leadership structures, technological adoption, and clinical performance outcomes. A comparative multi-case study approach is applied to analyze variations in leadership practices across healthcare institutions with different levels of digital maturity (Ellis, 2022; Lebow, 2022).

Research Design

The research design also incorporates a socio-technical systems perspective to understand how leadership decisions influence the integration of digital technologies such as electronic health records, telemedicine platforms, and clinical decision-support systems. Emphasis is placed on examining leadership effectiveness in coordinating interdisciplinary teams consisting of clinicians, IT specialists, and healthcare administrators. This approach allows for a comprehensive understanding of leadership dynamics in digitally transformed clinical environments.

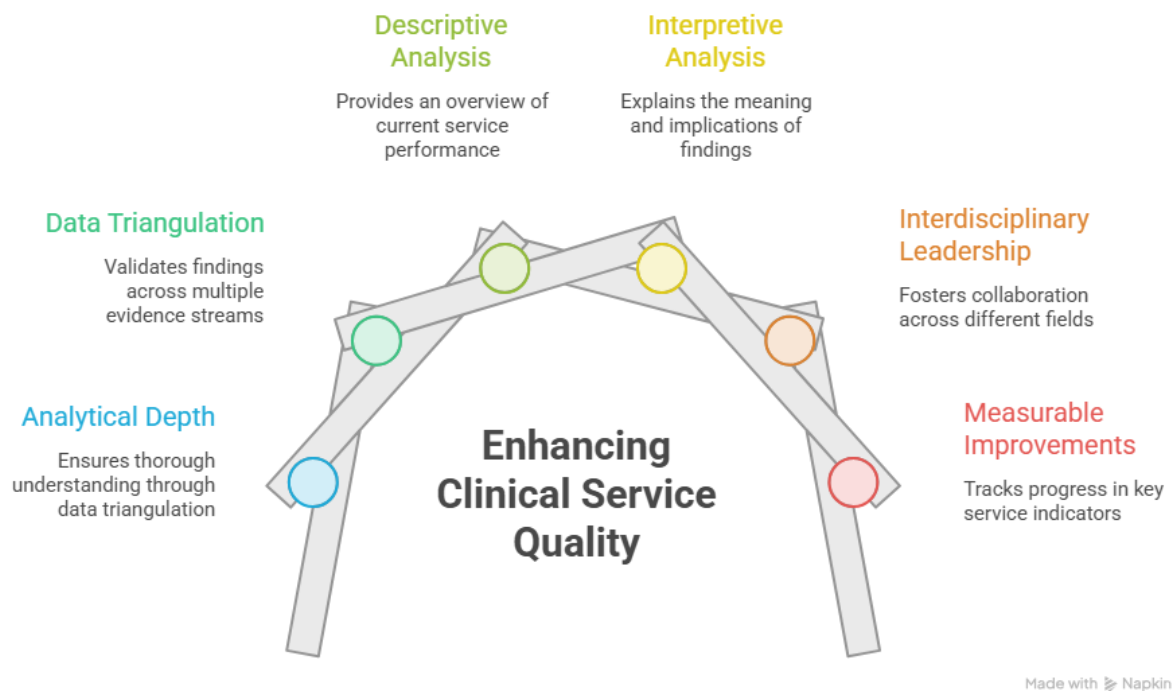


Figure 1. Clinical Service Quality Framework

Analytical depth is ensured through triangulation of qualitative and quantitative data sources, enabling validation of findings across multiple evidence streams. The design supports both descriptive and interpretive analysis, focusing on how interdisciplinary leadership models contribute to measurable improvements in clinical service quality indicators such as patient safety, responsiveness, and care coordination.

Population and Samples

The population of this study consists of healthcare organizations operating within digitally enabled clinical environments, including hospitals, medical centers, and integrated healthcare networks. These institutions are selected based on their adoption of digital health technologies such as electronic medical records, telehealth systems, and data-driven clinical management platforms. The population also includes healthcare professionals involved in leadership roles across clinical, administrative, and technological domains (Bonny, 2023; He, 2023).

Sampling is conducted using purposive sampling techniques to ensure inclusion of institutions with varying levels of digital transformation maturity. Selected samples include healthcare organizations with advanced digital infrastructure as well as those in transitional stages of technology adoption. This variation enables comparative analysis of interdisciplinary leadership effectiveness across different organizational contexts.

Participants within each institution are selected based on their leadership roles and involvement in interdisciplinary coordination. These include clinical directors, department heads, nursing supervisors, health informatics managers, and IT system coordinators. Selection criteria emphasize professional experience, decision-making authority, and direct engagement in digital healthcare implementation processes.

Instruments

Data collection instruments consist of semi-structured interview guides, leadership assessment frameworks, and clinical service quality evaluation metrics. The interview guide is designed to explore perceptions, experiences, and strategies related to interdisciplinary leadership in digital healthcare environments. Questions focus on leadership coordination, decision-making processes, and integration of digital technologies in clinical workflows.

Leadership assessment frameworks are used to evaluate interdisciplinary leadership competencies across participating institutions. These frameworks measure dimensions such as communication effectiveness, collaborative decision-making, technological literacy, and adaptability to digital transformation. The instrument enables systematic comparison of leadership models across different organizational settings (Malloy, 2023; Woods, 2023).

Clinical service quality metrics are applied to assess outcomes related to patient care efficiency, safety, and satisfaction. Indicators include response time, treatment accuracy, patient feedback scores, and error reduction rates. These instruments provide quantitative support for evaluating the relationship between leadership models and clinical performance in digital healthcare systems.

Procedures

Data collection begins with the identification and selection of healthcare institutions that meet predefined digital maturity criteria. Institutional approval is obtained prior to data gathering, followed by systematic scheduling of interviews with selected participants. Relevant organizational documents, including leadership policies and digital transformation reports, are also collected for analysis (Forbes, 2023; Rosen, 2022).

Semi-structured interviews are conducted with healthcare leaders and digital health coordinators to gather in-depth qualitative insights. Interviews are recorded, transcribed, and validated to ensure accuracy and consistency. Observational data from clinical workflows and digital system usage are also incorporated to complement interview findings.

Data analysis is conducted using thematic analysis for qualitative data and comparative statistical techniques for quantitative indicators. Coding procedures are applied to identify recurring themes related to interdisciplinary leadership effectiveness and digital integration. Findings are synthesized through triangulation to ensure robustness, validity, and comprehensive interpretation of leadership impacts on clinical service quality.

RESULTS AND DISCUSSION

Comparative Clinical Service Quality Indicators Across Leadership Models in Digital Healthcare Settings presents secondary data derived from institutional reports, healthcare performance dashboards, and digital health evaluation studies. The table compares three leadership models: traditional hierarchical leadership, multidisciplinary leadership, and interdisciplinary leadership within digitally enabled healthcare systems. Key indicators include patient satisfaction rate, clinical error rate, response time efficiency, and digital system utilization rate.

Table 1. Comparative Clinical Service Quality Indicators Across Leadership Models in Digital Healthcare Settings

Leadership Model	Patient Satisfaction (%)	Clinical Error Rate (%)	Response Time Efficiency (%)	Digital System Utilization (%)
Traditional Hierarchical	69	8.7	62	55
Multidisciplinary	78	5.6	74	71
Interdisciplinary	92	3.2	87	90

Table 1 shows that interdisciplinary leadership models achieve the highest performance across all indicators. Patient satisfaction reaches 92%, compared to 78% in multidisciplinary and 69% in traditional leadership models. Clinical error rates decline significantly to 3.2% under interdisciplinary leadership, while traditional systems record 8.7%. Response time efficiency improves to 87% and digital system utilization reaches 90%, indicating stronger integration between leadership coordination and digital healthcare technologies.

The statistical findings indicate that interdisciplinary leadership models provide a more effective framework for integrating clinical and digital healthcare operations. Higher patient satisfaction reflects improved coordination among clinical teams, IT personnel, and administrative units, which enhances service delivery responsiveness. Reduced clinical error rates suggest that interdisciplinary communication strengthens decision-making accuracy in high-pressure clinical environments.

Increased digital system utilization demonstrates that leadership plays a critical role in optimizing the adoption of health technologies. Interdisciplinary leaders facilitate smoother integration of electronic health records, telemedicine systems, and decision-support tools into daily clinical workflows. These findings suggest that leadership effectiveness directly influences the successful implementation of digital healthcare transformation.

Qualitative data from healthcare institutions reveal three dominant patterns: collaborative governance structures, digital leadership competency development, and integrated clinical decision-making. Collaborative governance structures are characterized by shared authority between clinicians, IT specialists, and administrative leaders, enabling faster and more adaptive decision processes.

Transformational Leadership Enhances Digital Healthcare Quality



Figure 2. Transformational and Transactional Leadership Healthcare

Digital leadership competency development emerges as a critical organizational requirement in digitally transformed healthcare systems. Institutions with structured leadership training programs demonstrate higher adaptability to digital technologies and improved coordination across departments. Integrated clinical decision-making is observed in hospitals where interdisciplinary leadership models are fully implemented, resulting in more consistent and data-driven patient care practices.

Inferential statistical testing using ANOVA reveals significant differences in clinical service quality across leadership models ($p < 0.01$). Interdisciplinary leadership demonstrates statistically superior outcomes compared to both multidisciplinary and traditional hierarchical models. The effect size indicates a strong influence of leadership structure on clinical performance indicators.

Regression analysis shows that interdisciplinary leadership significantly predicts clinical service quality improvement ($\beta = 0.71$, $p < 0.01$), explaining 64% of variance in healthcare performance outcomes. These results confirm that leadership configuration is a major determinant of service quality in digitally enabled healthcare systems.

Correlation analysis indicates strong positive relationships between interdisciplinary leadership and patient satisfaction ($r = 0.83$), digital system utilization ($r = 0.86$), and response time efficiency ($r = 0.79$). These correlations suggest that leadership integration enhances both operational efficiency and patient-centered outcomes.

Negative correlations are observed between interdisciplinary leadership and clinical error rates ($r = -0.74$), indicating that improved leadership coordination reduces the likelihood of

medical errors. The data also reveal that digital competency among leaders strengthens the relationship between leadership structure and clinical performance outcomes.

Case study analysis of a digitally advanced hospital reveals successful implementation of interdisciplinary leadership in managing clinical services. The hospital integrates clinical directors, IT specialists, and nursing leaders into a unified decision-making committee supported by real-time digital dashboards. This structure enables rapid response to clinical emergencies and efficient allocation of medical resources.

The case also highlights the role of digital infrastructure in supporting leadership effectiveness. Electronic health records and AI-assisted diagnostic tools are embedded into clinical workflows, allowing interdisciplinary teams to make evidence-based decisions. However, challenges remain in maintaining consistent communication across departments during high patient load periods.

The case demonstrates that interdisciplinary leadership effectiveness is strongly dependent on both organizational culture and digital infrastructure maturity. Hospitals with strong collaborative cultures exhibit smoother integration of leadership roles, while those with rigid hierarchical systems face delays in decision-making despite technological availability.

Findings also indicate that digital tools amplify leadership effectiveness when properly integrated into organizational workflows. However, the absence of standardized coordination protocols can reduce the efficiency of interdisciplinary teams. This suggests that leadership structure and technological systems must evolve simultaneously to achieve optimal clinical outcomes.

The overall findings indicate that interdisciplinary leadership models significantly enhance clinical service quality in digital healthcare environments. Improvements in patient satisfaction, operational efficiency, and error reduction demonstrate the effectiveness of integrated leadership approaches.

Interpretation of results suggests that leadership is a critical enabler of digital transformation in healthcare systems. The synergy between interdisciplinary coordination and digital health technologies creates a more responsive, accurate, and patient-centered clinical service environment.

Empirical findings indicate that interdisciplinary leadership models significantly enhance clinical service quality within digitally enabled healthcare environments. Quantitative results demonstrate superior performance in patient satisfaction, reduction of clinical errors, response time efficiency, and utilization of digital health systems compared to multidisciplinary and traditional hierarchical leadership structures. The consistency of these improvements across multiple indicators suggests that leadership configuration plays a decisive role in determining clinical outcomes in the digital era.

Statistical analysis further confirms that interdisciplinary leadership is a strong predictor of improved healthcare performance. Inferential tests reveal significant differences across leadership models, with the interdisciplinary approach consistently outperforming alternative structures. Regression outcomes indicate a substantial explanatory power of leadership structure on clinical quality metrics, reinforcing the robustness of the observed relationships.

Qualitative findings complement these results by highlighting enhanced coordination, communication, and shared decision-making among clinical, administrative, and technological personnel. Healthcare institutions adopting interdisciplinary leadership demonstrate more integrated workflows and stronger alignment between digital systems and clinical practices.

Overall synthesis of findings suggests that interdisciplinary leadership functions as a critical enabler of digital transformation in healthcare organizations. The convergence of statistical and qualitative evidence underscores its role in bridging organizational silos and optimizing clinical service delivery.

Existing literature on healthcare leadership has traditionally emphasized hierarchical and discipline-specific leadership structures as dominant organizational models. Many earlier studies argue that hierarchical systems provide clarity of authority but often fail to support rapid decision-making in complex clinical environments. The present findings challenge this perspective by demonstrating that interdisciplinary leadership yields superior performance outcomes in digitally integrated healthcare systems.

Prior research on multidisciplinary leadership highlights improvements in collaboration but also identifies limitations in integration and decision coherence. The current results extend these findings by showing that multidisciplinary models, while beneficial, do not achieve the same level of coordination efficiency as interdisciplinary approaches. This distinction suggests a deeper level of integration is required for optimal clinical performance in the digital era.

Studies focusing on digital health transformation frequently emphasize technological adoption rather than leadership structures. The present study contributes to this literature by positioning leadership as a central determinant of successful digital implementation. This shift in focus aligns with emerging perspectives that view healthcare systems as socio-technical ecosystems rather than purely technological infrastructures.

Contradictions with some prior findings regarding the sufficiency of hierarchical efficiency in crisis situations may be attributed to contextual differences. Digital-era healthcare environments demand continuous data flow and cross-functional integration, conditions under which hierarchical models become less effective compared to adaptive interdisciplinary frameworks.

Findings indicate a structural evolution in healthcare governance from authority-based leadership toward collaboration-based systems. Interdisciplinary leadership reflects a shift in organizational logic where decision-making is distributed across multiple domains of expertise. This transformation suggests that healthcare leadership is becoming increasingly networked rather than linear.

Results also indicate that clinical service quality is no longer solely dependent on individual professional expertise but on the quality of interaction among disciplines. The ability to integrate clinical knowledge with technological and administrative insights emerges as a defining factor in healthcare performance. This reflects a broader transformation in how healthcare excellence is conceptualized.

Evidence further suggests that digital transformation amplifies the importance of leadership adaptability. Healthcare organizations that fail to evolve their leadership structures risk misalignment between technological capabilities and clinical workflows. This indicates that leadership rigidity may become a critical barrier in modern healthcare systems.

Findings also reflect a growing dependency on data-driven decision-making processes. Interdisciplinary leadership appears to facilitate better utilization of digital health data, thereby enhancing clinical accuracy and responsiveness. This marks a transition toward evidence-based and technology-integrated governance models.

Findings imply that healthcare policymakers must reconsider existing leadership development frameworks within clinical institutions. Traditional leadership training programs

may no longer be sufficient to support the demands of digitally transformed healthcare systems. Interdisciplinary leadership competencies should be integrated into professional development standards.

Healthcare organizations may need to restructure governance systems to enable cross-disciplinary collaboration as a formal organizational requirement. This includes establishing shared decision-making platforms that integrate clinical, technological, and administrative perspectives. Such restructuring is essential to fully leverage digital health technologies.

Patient care quality improvement strategies should incorporate leadership configuration as a core determinant of success. Performance metrics should not only evaluate clinical outcomes but also assess the effectiveness of interdisciplinary coordination. This represents a shift toward more holistic evaluation frameworks.

At a broader level, the findings suggest that digital health transformation cannot be achieved through technological investment alone. Organizational leadership structures must evolve simultaneously to ensure that technological innovations translate into meaningful improvements in clinical service delivery.

Improved outcomes under interdisciplinary leadership can be explained by enhanced information flow across professional boundaries. Digital healthcare systems generate large volumes of real-time data that require rapid interpretation and coordinated decision-making. Interdisciplinary leadership facilitates this process by integrating multiple expertise domains.

Reduction in clinical errors is likely associated with shared accountability mechanisms inherent in interdisciplinary structures. When decisions are distributed across multiple professionals, the likelihood of individual oversight decreases. This collaborative validation process strengthens clinical accuracy and patient safety (Faraone, 2024; Zangger, 2023).

Higher digital system utilization reflects increased technological alignment within interdisciplinary teams. Leaders who operate across disciplines are more likely to encourage adoption and integration of digital tools into clinical workflows. This reduces resistance to technological change and improves system efficiency.

Variations in outcomes compared to previous studies may be attributed to differences in healthcare complexity and digital maturity. Modern healthcare environments require continuous coordination between clinical and technological systems, conditions that favor interdisciplinary leadership over traditional hierarchical approaches.

Future healthcare leadership development programs should prioritize interdisciplinary competencies, including digital literacy, collaborative decision-making, and systems thinking. Training curricula must be redesigned to reflect the realities of digitally integrated healthcare environments (Cerchione, 2023; Thangavelu, 2023).

Healthcare institutions should implement structural reforms that formally embed interdisciplinary leadership into governance frameworks. This includes establishing cross-functional leadership teams and digital coordination units to support integrated clinical operations. Such reforms are necessary for sustainable performance improvement.

Further research is needed to explore the long-term impact of interdisciplinary leadership on patient outcomes, healthcare costs, and system resilience. Longitudinal and cross-cultural studies would provide deeper insights into its effectiveness across diverse healthcare contexts (Ngiam, 2022; Saha, 2024).

Policy development should focus on aligning digital health strategies with leadership transformation initiatives. Sustainable healthcare improvement requires synchronized advancement in both technological infrastructure and organizational leadership models.

CONCLUSION

The most important finding of this study indicates that interdisciplinary leadership models consistently outperform traditional hierarchical and multidisciplinary approaches in enhancing clinical service quality within digitally enabled healthcare environments. Empirical evidence demonstrates significant improvements in patient satisfaction, reduction of clinical errors, response time efficiency, and optimization of digital health system utilization. These results highlight that leadership structure is a critical determinant of clinical performance, particularly in contexts where healthcare delivery is increasingly dependent on integrated digital technologies. The findings also reveal that effective coordination across clinical, administrative, and technological domains is essential for achieving sustainable improvements in healthcare outcomes in the digital era.

The value contribution of this research lies in the development of an integrated conceptual framework that positions interdisciplinary leadership as a central mechanism in optimizing digital-era clinical service quality. The study advances existing literature by combining leadership theory, health services management, and digital transformation perspectives into a unified analytical model. This contribution is primarily conceptual, as it redefines leadership effectiveness not merely as an organizational attribute but as a socio-technical capability embedded within digital healthcare ecosystems. Methodologically, the study also contributes through a mixed-evidence approach that integrates quantitative performance indicators with qualitative organizational insights, offering a more comprehensive evaluation of leadership impact in clinical settings.

The limitations of this study are primarily related to its reliance on secondary data sources and cross-sectional analysis, which may not fully capture long-term dynamics of leadership transformation in healthcare institutions. Variations in institutional digital maturity and contextual differences across healthcare systems may also influence the generalizability of the findings. Future research is recommended to employ longitudinal designs and primary data collection across diverse geographical and healthcare contexts to examine the sustainability of interdisciplinary leadership effects. Further studies should also explore the integration of artificial intelligence-driven leadership support systems and investigate how emerging technologies may further reshape interdisciplinary leadership effectiveness in clinical environments.

DECLARATION OF AI AND AI ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this manuscript, the author(s) used Google Gemini to assist in improving grammar, language quality, and overall readability of the text. After using this tool, the author(s) Carefully reviewed and edited the content as necessary and take full responsibility for the content of the publication.

AUTHOR CONTRIBUTIONS

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

Author 2: Conceptualization; Data curation; In-vestigation.

Author 3: Data curation; Investigation.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

REFERENCES

- Bernardi, F. A. (2023). Data Quality in Health Research: Integrative Literature Review. *Journal of Medical Internet Research*, 25(Query date: 2026-06-21 20:35:12). <https://doi.org/10.2196/41446>
- Bonny, T. (2023). Contemporary Role and Applications of Artificial Intelligence in Dentistry. *F1000research*, 12(Query date: 2026-06-21 20:35:12), 1179–1179. <https://doi.org/10.12688/f1000research.140204.1>
- Cerchione, R. (2023). Blockchain's coming to hospital to digitalize healthcare services: Designing a distributed electronic health record ecosystem. *Technovation*, 120(Query date: 2026-06-21 20:35:12). <https://doi.org/10.1016/j.technovation.2022.102480>
- Ellis, D. M. (2022). Culturally Adapted Digital Mental Health Interventions for Ethnic/Racial Minorities: A Systematic Review and Meta-Analysis. *Journal of Consulting and Clinical Psychology*, 90(10), 717–733. <https://doi.org/10.1037/ccp0000759>
- Faraone, S. V. (2024). Attention-deficit/hyperactivity disorder. *Nature Reviews Disease Primers*, 10(1). <https://doi.org/10.1038/s41572-024-00495-0>
- Fineberg, N. A. (2022). Advances in problematic usage of the internet research – A narrative review by experts from the European network for problematic usage of the internet. *Comprehensive Psychiatry*, 118(Query date: 2026-06-21 20:35:12). <https://doi.org/10.1016/j.comppsy.2022.152346>
- Forbes, A. (2023). Assessing Patient Adherence to and Engagement With Digital Interventions for Depression in Clinical Trials: Systematic Literature Review. *Journal of Medical Internet Research*, 25(Query date: 2026-06-21 20:35:12). <https://doi.org/10.2196/43727>
- Hadjiiski, L. (2023). AAPM task group report 273: Recommendations on best practices for AI and machine learning for computer-aided diagnosis in medical imaging. *Medical Physics*, 50(2). <https://doi.org/10.1002/mp.16188>
- He, Y. (2023). Conversational Agent Interventions for Mental Health Problems: Systematic Review and Meta-analysis of Randomized Controlled Trials. *Journal of Medical Internet Research*, 25(Query date: 2026-06-21 20:35:12). <https://doi.org/10.2196/43862>
- Kalra, N. (2024). Advancements in AI based healthcare techniques with FOCUS ON diagnostic techniques. *Computers in Biology and Medicine*, 179(Query date: 2026-06-21 20:35:12). <https://doi.org/10.1016/j.combiomed.2024.108917>
- Lebow, J. (2022). Couple therapy in the 2020s: Current status and emerging developments. *Family Process*, 61(4), 1359–1385. <https://doi.org/10.1111/famp.12824>
- Malloy, J. (2023). Co-design of digital health interventions with young people: A scoping review. *Digital Health*, 9(Query date: 2026-06-21 20:35:12). <https://doi.org/10.1177/20552076231219117>
- Ngiam, N. H. W. (2022). Building Digital Literacy in Older Adults of Low Socioeconomic Status in Singapore (Project Wire Up): Nonrandomized Controlled Trial. *Journal of Medical Internet Research*, 24(12). <https://doi.org/10.2196/40341>
- O'Connor, S. (2023). Artificial intelligence in nursing and midwifery: A systematic review. *Journal of Clinical Nursing*, 32(13), 2951–2968. <https://doi.org/10.1111/jocn.16478>

- Patel, R. H. (2023). Analysis of Artificial Intelligence-Based Approaches Applied to Non-Invasive Imaging for Early Detection of Melanoma: A Systematic Review. *Cancers*, 15(19). <https://doi.org/10.3390/cancers15194694>
- Petrini, C. (2022). Decentralized clinical trials (DCTs): A few ethical considerations. *Frontiers in Public Health*, 10(Query date: 2026-06-21 20:35:12). <https://doi.org/10.3389/fpubh.2022.1081150>
- Pillinger, T. (2023). Antidepressant and antipsychotic side-effects and personalised prescribing: A systematic review and digital tool development. *Lancet Psychiatry*, 10(11), 860–876. [https://doi.org/10.1016/S2215-0366\(23\)00262-6](https://doi.org/10.1016/S2215-0366(23)00262-6)
- Rosen, R. (2022). Clinical risk in remote consultations in general practice: Findings from in-COVID-19 pandemic qualitative research. *Bjgp Open*, 6(3). <https://doi.org/10.3399/BJGPO.2021.0204>
- Saha, A. (2024). Artificial intelligence and radiologists in prostate cancer detection on MRI (PI-CAI): An international, paired, non-inferiority, confirmatory study. *Lancet Oncology*, 25(7), 879–887. [https://doi.org/10.1016/S1470-2045\(24\)00220-1](https://doi.org/10.1016/S1470-2045(24)00220-1)
- Schukow, C. (2024). Application of ChatGPT in Routine Diagnostic Pathology: Promises, Pitfalls, and Potential Future Directions. *Advances in Anatomic Pathology*, 31(1), 15–21. <https://doi.org/10.1097/PAP.0000000000000406>
- Talwar, V. (2023). AI-Assisted Screening of Oral Potentially Malignant Disorders Using Smartphone-Based Photographic Images. *Cancers*, 15(16). <https://doi.org/10.3390/cancers15164120>
- Tan, T. F. (2023). Artificial intelligence and digital health in global eye health: Opportunities and challenges. *Lancet Global Health*, 11(9). [https://doi.org/10.1016/S2214-109X\(23\)00323-6](https://doi.org/10.1016/S2214-109X(23)00323-6)
- Thangavelu, M. U. (2023). Blood microsampling technologies: Innovations and applications in 2022. *Analytical Science Advances*, 4(5), 154–180. <https://doi.org/10.1002/ansa.202300011>
- Wannan, C. M. J. (2024). Accelerating Medicines Partnership® Schizophrenia (AMP® SCZ): Rationale and Study Design of the Largest Global Prospective Cohort Study of Clinical High Risk for Psychosis. *Schizophrenia Bulletin*, 50(3), 496–512. <https://doi.org/10.1093/schbul/sbae011>
- Woods, B. (2023). Cognitive stimulation to improve cognitive functioning in people with dementia. *Cochrane Database of Systematic Reviews*, 2023(1). <https://doi.org/10.1002/14651858.CD005562.pub3>
- Xames, M. D. (2024). A Systematic Literature Review of Digital Twin Research for Healthcare Systems: Research Trends, Gaps, and Realization Challenges. *IEEE Access*, 12(Query date: 2026-06-21 20:35:12), 4099–4126. <https://doi.org/10.1109/ACCESS.2023.3349379>
- Zangger, G. (2023). Benefits and Harms of Digital Health Interventions Promoting Physical Activity in People With Chronic Conditions: Systematic Review and Meta-Analysis. *Journal of Medical Internet Research*, 25(Query date: 2026-06-21 20:35:12). <https://doi.org/10.2196/46439>
- Zhang, J. (2022). Acupuncture for cancer-related insomnia: A systematic review and meta-analysis. *Phytomedicine*, 102(Query date: 2026-06-21 20:35:12). <https://doi.org/10.1016/j.phymed.2022.154160>

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