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Bridging Clinical And Administrative Healthcare: Systematic Review Of Collaborative Models Between Medical Laboratory Technicians, Nursing Staff And Health Information Technicians In Saudi Vision 2030 Healthcare Reforms

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Abstract

The Saudi Vision 2030 healthcare reforms emphasize digital transformation and integrated care delivery, necessitating enhanced collaboration between clinical nursing staff and health information technicians. This systematic review synthesizes existing literature on collaborative models, barriers, and facilitators affecting interprofessional partnerships in technology-enabled healthcare environments, with specific consideration of the Saudi Arabian context. A comprehensive search identified 38 peer-reviewed articles addressing nursing-health information technology collaborations, interprofessional teamwork models, and healthcare digitalization initiatives. Findings reveal that successful collaboration requires clearly defined roles, shared governance structures, integrated training programs, and technological infrastructure supporting bidirectional communication. Barriers include professional silos, inadequate informatics competencies among nursing staff, workflow disruptions, and resistance to organizational change. Facilitators encompass interprofessional education, collaborative decision-making frameworks, administrative support, and alignment with national healthcare transformation goals. The review highlights significant gaps in empirical research specifically examining nursing-health information technician partnerships within the Saudi Vision 2030 context. Recommendations emphasize developing competency frameworks, establishing formal collaborative structures, and conducting implementation research to evaluate partnership models in Saudi healthcare settings. These findings inform strategic planning for healthcare workforce development and technology integration aligned with national reform objectives.

Keywords: interprofessional collaboration, nursing informatics, health information management, Saudi Vision 2030, healthcare technology.

1. Introduction

Healthcare systems globally are experiencing unprecedented transformation driven by digital innovation, population health management imperatives, and demands for integrated care delivery (Jones et al., 2014). The Kingdom of Saudi Arabia has positioned healthcare reform as a central pillar of its Vision 2030 national transformation agenda, emphasizing quality improvement, technological advancement, and workforce development (Alharbi, 2023). These reforms necessitate fundamental restructuring of professional relationships, particularly between clinical providers and administrative-technical personnel who collectively enable safe, efficient, and data-informed healthcare delivery (Almalki et al., 2018).

Nursing staff represent the largest segment of the healthcare workforce and serve as primary users of clinical information systems, while health information technicians manage the data infrastructure, system maintenance, and information governance essential for organizational operations (Topaz et al., 2017). Despite their interdependence, these professional groups have historically functioned in parallel rather than collaborative structures, creating inefficiencies, communication gaps, and suboptimal technology utilization (Bowman, 2013). Contemporary healthcare delivery models require dissolution of these silos through intentional interprofessional collaboration frameworks (Reeves et al., 2017).

The Saudi context presents unique considerations for nursing-health information technician collaboration. The Saudi healthcare system has invested substantially in electronic health records, health information exchanges, and digital infrastructure as part of Vision 2030 objectives (Alaboudi et al., 2016). However, successful technology adoption depends not solely on infrastructure but on the collaborative capacity of multidisciplinary teams to implement, optimize, and sustain these systems (Aldosari, 2014). The nursing workforce in Saudi Arabia faces challenges including rapid expansion, diverse educational backgrounds, variable informatics competencies, and cultural adaptation to collaborative practice models (Almalki et al., 2012). Concurrently, health information management as a profession is evolving from custodial record-keeping toward strategic roles in clinical quality, data analytics, and system optimization (Aldosari et al., 2018).

Despite the critical importance of nursing-health information technician partnerships, the literature reveals significant gaps. Most interprofessional collaboration research focuses on physician-nurse or multidisciplinary clinical team dynamics, with limited attention to clinical-administrative interfaces (Nancarrow et al., 2013). Health information technology literature predominantly examines technical specifications, adoption barriers, and clinician perspectives, rarely incorporating health information management professional viewpoints (Boonstra & Broekhuis, 2010). Furthermore, research examining collaborative models within Middle Eastern healthcare contexts, particularly aligned with national reform initiatives like Saudi Vision 2030, remains sparse (Aljadhey et al., 2014).

This systematic review addresses these gaps by examining collaborative models between nursing staff and health information technicians within technology-enabled healthcare environments, with specific consideration of applicability to Saudi Vision 2030 healthcare reforms. The review synthesizes evidence regarding effective partnership structures, educational and training approaches, workflow integration strategies, barriers and facilitators to collaboration, and outcomes associated with enhanced interprofessional teamwork between these professional groups. The objective is to provide evidence-based guidance for healthcare organizations, policymakers, and educational institutions seeking to optimize clinical-administrative collaboration as part of comprehensive healthcare transformation efforts.

2. Literature Review

2.1 Saudi Vision 2030 and Healthcare Transformation

Saudi Vision 2030 represents a comprehensive national agenda to diversify the economy, enhance public services, and improve quality of life for Saudi citizens (Alharbi, 2023). Healthcare transformation constitutes a foundational element of this vision, with explicit goals including increased healthcare sector efficiency, enhanced quality and safety outcomes, expanded access to care, and development of a sustainable healthcare workforce (Almalki et al., 2018). The reforms emphasize digital health infrastructure, evidence-based practice, performance measurement, and patient-centered care delivery models (Alaboudi et al., 2016).

The Saudi healthcare system has evolved from a predominantly government-funded model toward greater private sector participation and insurance-based financing mechanisms (Walston et al., 2008). This transition requires sophisticated information management systems to support claims processing, quality monitoring, and population health analytics (Aldosari, 2014). Historical reviews of the Saudi health system identify workforce development, particularly in technical and allied health professions, as critical to achieving transformation objectives (Albejaidi, 2010). The nursing profession specifically has been identified as requiring strategic investment in education, professional development, regulatory frameworks, and practice environment improvements to support Vision 2030 goals (Almalki et al., 2018).

Healthcare quality and safety in Saudi Arabia has received increasing research attention, with systematic reviews identifying opportunities for improvement in clinical documentation, adverse event reporting, and information continuity (Aljadhey et al., 2014). These quality challenges often relate to fragmented information systems, inadequate integration between clinical and administrative processes, and insufficient collaboration among multidisciplinary team members (Aldosari et al., 2018). The Vision 2030 framework explicitly recognizes that technological infrastructure alone cannot achieve quality objectives without corresponding workforce capacity development and organizational culture change (Alharbi, 2023).

2.2 Interprofessional Collaboration in Healthcare

Interprofessional collaboration is defined as multiple health workers from different professional backgrounds working together with patients, families, and communities to deliver comprehensive care (D'Amour et al., 2005). Systematic reviews consistently demonstrate that effective interprofessional teamwork improves patient outcomes, enhances healthcare efficiency, reduces medical errors, and increases professional satisfaction (Reeves et al., 2017; Zwarenstein et al., 2009). However, achieving meaningful collaboration requires intentional organizational structures, shared goals, mutual respect, clear communication channels, and role clarity (Nancarrow et al., 2013).

Theoretical frameworks for interprofessional collaboration emphasize several core dimensions including governance structures that facilitate shared decision-making, formalization of collaborative processes through policies and procedures, and internalization of collaborative values among team members (D'Amour et al., 2005). Successful collaboration depends on both relational factors such as trust and respect and structural factors including physical proximity, information sharing mechanisms, and administrative support (Tang et al., 2013). Research examining physician-nurse collaboration demonstrates that hierarchical professional cultures, status differentials, and gender dynamics can impede effective teamwork (Tang et al., 2013).

Interprofessional education represents a foundational strategy for developing collaborative competencies, with systematic reviews indicating that educational interventions can positively influence knowledge, skills, attitudes, and behaviors related to teamwork (Reeves et al., 2008; Hammick et al., 2007). However, educational interventions alone are insufficient without corresponding practice environment changes that enable and reward collaborative behaviors (Buring et al., 2009). International comparisons of healthcare reform initiatives highlight that successful interprofessional collaboration requires policy support, financial incentives, and alignment with broader system transformation goals (Hutchison et al., 2011).

2.3 Health Information Technology and Nursing Practice

Health information technology encompasses a broad range of digital tools including electronic health records, clinical decision support systems, computerized provider order entry, barcode medication administration, telehealth platforms, and health information exchanges (Topaz et al., 2017). Systematic reviews examining HIT impact on nursing practice reveal both opportunities and challenges (Strudwick et al., 2016). Positive impacts include improved access to patient information, enhanced clinical decision-making, reduced medication errors, and better care coordination (Kelley et al., 2011). However, negative consequences include increased documentation burden, workflow disruptions, diminished patient interaction time, and user dissatisfaction when systems are poorly designed or implemented (Lee, 2007).

The quality of health information systems data critically affects clinical utility, with research identifying issues including incomplete documentation, inconsistent data entry, interoperability failures, and inadequate data validation mechanisms (Chen et al., 2014). Nurses play pivotal roles in ensuring data quality through accurate, timely, and comprehensive documentation, yet they require appropriate training, system usability, and workflow integration to fulfill these responsibilities effectively (Alshahrani et al., 2019). Electronic health record implementation without adequate consideration of nursing workflows can paradoxically reduce documentation quality and increase clinical risk (Poissant et al., 2005).

Nursing informatics competencies have been systematically defined to include computer literacy, information literacy, professional practice knowledge, and skills in using information systems to support patient care (Staggers et al., 2001). However, research consistently identifies gaps between required competencies and actual nursing workforce capabilities, particularly among practicing nurses educated before widespread HIT adoption (Saba & McCormick, 2015). Nurses' attitudes toward health information technology significantly influence adoption and effective use, with factors including perceived usefulness, ease of use, system reliability, and organizational support affecting technology acceptance (Tubaishat, 2018).

Saudi Arabian research examining electronic health records and nursing practice identifies opportunities to enhance system utilization through targeted training, workflow redesign, and stakeholder engagement (Alshahrani et al., 2019). The Saudi context presents challenges including multilingual documentation requirements, diverse nursing workforce educational backgrounds, variable computer literacy, and organizational cultures requiring adaptation to technology-enabled practice models (Aldosari, 2014).

2.4 Health Information Management Professionals in Healthcare

Health information management professionals have evolved from medical record custodians to strategic partners in healthcare delivery, quality improvement, and organizational leadership (Bowman, 2013). Contemporary roles encompass data governance, health informatics, clinical documentation improvement, coding and classification systems, privacy and security compliance, and information system implementation and optimization (Abouelmehdi et al., 2018). The profession requires competencies spanning healthcare delivery processes, information technology, data analytics, regulatory compliance, and project management (Aldosari et al., 2018).

Research examining health information managers' roles in clinical governance demonstrates their contributions to quality measurement, performance improvement, clinical audit, and risk management (Protti, 2002). However, these contributions depend on effective integration with clinical teams and mutual understanding of how information management supports direct patient care (Bowman, 2013). Barriers to effective health information management include inadequate resources, limited clinical engagement, professional isolation, and organizational structures that separate information functions from clinical operations (Aldosari et al., 2018).

A descriptive study of health information management professionals in Saudi Arabia identified workforce challenges including limited professional recognition, inadequate career development pathways, and gaps between job responsibilities and educational preparation (Aldosari et al., 2018). The study emphasized the need for enhanced professional identity, expanded scope of practice aligned with international standards, and greater integration with clinical teams to support healthcare transformation objectives (Aldosari et al., 2018).

2.5 Barriers and Facilitators to Technology-Enabled Collaboration

Systematic reviews examining health information technology implementation identify multiple barriers spanning technical, organizational, human, and financial domains (Boonstra & Broekhuis, 2010; Ross et al., 2016). Technical barriers include system interoperability failures, poor usability, inadequate functionality, and infrastructure limitations (Rudin et al., 2014). Organizational barriers encompass insufficient leadership support, inadequate change management, poorly defined workflows, and resistance to process redesign (Adler-Milstein et al., 2015). Human barriers include limited computer literacy, negative attitudes toward technology, fear of change, and inadequate training (Tubaishat, 2018).

Research examining nurses' information management in relation to workflow reveals that technology integration must account for complex, non-linear work patterns, frequent interruptions, multitasking demands, and the need for flexible information access (Hardey et al., 2000). Meaningful use of electronic health records requires alignment of system design with clinical workflows rather than forcing workflow adaptation to rigid technological constraints (Sockolow et al., 2012). Successful implementation depends on engaging frontline users in system selection, configuration, testing, and continuous improvement processes (Ross et al., 2016).

Facilitators to effective technology-enabled collaboration include strong leadership commitment, adequate resources for training and support, user-centered design approaches, interprofessional implementation teams, and organizational cultures that value innovation and continuous learning (Boonstra & Broekhuis, 2010). Research examining collaborative chronic care management demonstrates that health information technology can enhance interprofessional teamwork when deliberately designed to support communication, care coordination, and shared decision-making (Graetz et al., 2014).

2.6 Impact on Quality, Safety, and Patient Outcomes

Systematic reviews examining health information technology's impact on healthcare quality and safety reveal mixed findings, with positive effects dependent on implementation quality, system design, and organizational context (Jones et al., 2014; Campanella et al., 2016). Meta-analyses demonstrate that HIT can reduce medication errors, improve adherence to clinical guidelines, enhance preventive care delivery, and facilitate chronic disease management when appropriately implemented (Buntin et al., 2011). However, poorly designed or implemented systems can introduce new error types, increase cognitive burden, and paradoxically reduce safety (Alkureishi et al., 2016).

Clinical information systems' impact on patient outcomes depends substantially on data quality, with research demonstrating associations between complete, accurate, timely documentation and improved clinical outcomes (Lau et al., 2010). Electronic health record adoption in U.S. hospitals has progressed substantially, yet challenges persist in achieving meaningful use, interoperability, and sustained quality improvement (Adler-Milstein et al., 2015). International comparisons reveal that successful technology-enabled quality improvement requires not only infrastructure investment but also workforce development, process redesign, and performance measurement aligned with quality goals (Buntin et al., 2011).

Research examining electronic health records' impact on nurse-sensitive patient outcomes identifies potential benefits including reduced pressure ulcers, decreased falls, improved pain management, and better infection prevention when nursing documentation is comprehensive and accessible (Kutney-Lee & Kelly, 2011). However, realizing these benefits requires meaningful nursing engagement in system design, implementation, and optimization rather than passive technology adoption (Kelley et al., 2011). Nurses' information-seeking behaviors reveal preferences for rapid access to synthesized, patient-specific information integrated into workflow rather than requiring separate system queries or disruption of care activities (McKnight, 2006).

3. Methods

3.1 Review Design and Framework

This systematic review employed an integrative approach to synthesize diverse literature addressing interprofessional collaboration between nursing staff and health information technicians within technology-enabled healthcare environments. The review methodology was informed by systematic review principles while accommodating the heterogeneous nature of included studies spanning multiple disciplines, methodologies, and healthcare contexts (Reeves et al., 2017).

3.2 Search Strategy

A comprehensive search strategy was developed to identify peer-reviewed literature addressing the intersection of nursing practice, health information management, interprofessional collaboration, and healthcare technology implementation. Electronic databases searched included PubMed, Scopus, Web of Science, CINAHL, and Cochrane Library. Search terms combined concepts including nursing OR

nurses OR nursing staff, health information technician OR health information management OR medical records, interprofessional collaboration OR teamwork OR partnership, electronic health records OR health information technology OR clinical information systems, and healthcare quality OR patient safety OR workflow. Boolean operators and truncation were employed to maximize retrieval while maintaining specificity.

Given the specific focus on applicability to Saudi Arabian healthcare reforms, supplementary searches specifically targeted literature addressing Saudi Vision 2030, Middle Eastern healthcare systems, and healthcare transformation in developing nations. The search encompassed literature published from 2000 to 2023 to capture the evolution of health information technology and interprofessional collaboration research while maintaining contemporary relevance.

3.3 Inclusion and Exclusion Criteria

Inclusion criteria specified peer-reviewed journal articles published in English that addressed nursing practice in relation to health information technology, interprofessional collaboration involving nursing and administrative or technical healthcare personnel, health information management professional roles, barriers and facilitators to health information technology adoption, or healthcare transformation initiatives relevant to nursing and information management. Studies employing quantitative, qualitative, or mixed methods were included, as were systematic reviews, literature reviews, and conceptual frameworks addressing relevant topics.

Exclusion criteria eliminated non-peer-reviewed sources, conference abstracts, editorials without substantial literature synthesis, and studies focusing exclusively on physician or other non-nursing clinical perspectives without addressing nursing roles. Studies addressing health information technology in non-healthcare contexts or examining exclusively technical specifications without consideration of human factors or organizational impacts were excluded.

3.4 Study Selection and Data Extraction

Study selection proceeded through title screening, abstract review, and full-text assessment conducted by multiple reviewers to ensure consistency and minimize selection bias. Data extraction employed a standardized form capturing study characteristics including authors, publication year, country, study design, sample characteristics, interventions or phenomena examined, key findings, and relevance to nursing-health information technician collaboration.

Given the heterogeneous nature of included studies and the integrative review design, formal quality assessment tools were not applied. Instead, all peer-reviewed sources meeting inclusion criteria were incorporated, with attention to study design, methodological rigor, and relevance in the synthesis process (Reeves et al., 2017).

3.5 Data Synthesis

Data synthesis employed a thematic approach, organizing findings according to major conceptual domains including collaborative models and frameworks, professional roles and competencies, barriers and facilitators, implementation strategies, quality and safety outcomes, and contextual considerations for healthcare transformation initiatives. Findings from multiple studies were compared, contrasted, and synthesized to identify patterns, convergences, divergences, and gaps in the literature. The synthesis emphasized drawing implications for nursing-health information technician collaboration within the Saudi Vision 2030 healthcare reform context.

4. Results

4.1 Overview of Included Literature

The systematic search identified 38 peer-reviewed articles meeting inclusion criteria and addressing aspects of nursing-health information technician collaboration, interprofessional teamwork in technology-enabled environments, or healthcare transformation relevant to these professional groups. The literature spanned multiple countries including the United States, Canada, United Kingdom, Australia, and Saudi Arabia, with publication dates ranging from 2000 to 2023. Study designs included

systematic reviews, cross-sectional surveys, qualitative studies, implementation research, and conceptual frameworks.

The literature revealed limited empirical research directly examining partnerships between nursing staff and health information technicians as distinct professional groups. Most identified studies addressed either nursing perspectives on health information technology, interprofessional collaboration among clinical disciplines, or health information management roles independently rather than examining the clinical-administrative interface explicitly. No identified studies specifically evaluated collaborative models implemented as part of Saudi Vision 2030 healthcare reforms, reflecting the nascent stage of these transformation efforts and the research gap this review addresses.

4.2 Collaborative Models and Frameworks

The literature describes multiple frameworks for interprofessional collaboration applicable to nursing-health information technician partnerships. D'Amour et al. (2005) proposed a structuration model emphasizing four dimensions: shared goals and vision, internalization of collaborative values, governance mechanisms enabling shared decision-making, and formalization through policies and procedures. This framework has been applied across diverse healthcare contexts and provides conceptual grounding for designing collaborative structures (Reeves et al., 2017).

Research examining health information technology implementation emphasizes the importance of multidisciplinary implementation teams including clinical end-users, information technology specialists, health information management professionals, and organizational leadership (Ross et al., 2016). Successful implementations involve clinicians in system selection, workflow analysis, configuration decisions, testing, training development, and continuous improvement processes rather than positioning them as passive recipients of technology determined by technical personnel (Boonstra & Broekhuis, 2010). However, true partnership requires reciprocal engagement, with health information professionals also developing clinical knowledge to inform system design decisions (Bowman, 2013).

Collaborative practice models addressing chronic disease management demonstrate that health information technology can facilitate interprofessional teamwork when systems support care coordination, enable information sharing, and include collaborative documentation features (Graetz et al., 2014). These models emphasize role clarity, with each team member contributing unique expertise while working toward shared patient outcomes (Hutchison et al., 2011). Table 1 summarizes key collaborative models identified in the literature with applicability to nursing-health information technician partnerships.

Table 1.Collaborative Models for Nursing-Health Information Technician Partnerships

Model/Framework	Key Components	Outcomes/Applications	Source
Structuration Model of Collaboration	Shared goals, internalization, governance, formalization	Interprofessional teamwork across settings	D'Amour et al., 2005
Multidisciplinary Implementation Teams	Clinical users, IT specialists, HIM professionals, leadership	HIT system selection and implementation	Ross et al., 2016; Boonstra & Broekhuis, 2010
Collaborative Chronic Care Model	Care coordination, information sharing, role clarity	Enhanced chronic disease management	Graetz et al., 2014
Interprofessional Education Model	Joint training, shared learning, mutual understanding	Improved collaborative competencies	Reeves et al., 2008; Hammick et al., 2007
Clinical Governance Integration	HIM roles in quality improvement, clinical audit	Enhanced clinical quality and safety	Protti, 2002; Bowman, 2013
Workflow Integration Framework	Clinical workflow analysis, system-workflow alignment	Meaningful use of EHR systems	Sockolow et al., 2012

Note. HIT = Health Information Technology; HIM = Health Information Management; EHR = Electronic Health Record

4.3 Professional Roles and Competencies

The literature identifies distinct yet complementary competencies required for effective nursing-health information technician collaboration. Nursing informatics competencies encompass computer literacy, information literacy, documentation standards, clinical decision support utilization, and understanding of how information systems support patient care processes (Staggers et al., 2001). However, systematic reviews consistently identify gaps between required informatics competencies and actual nursing workforce capabilities, particularly among practicing nurses educated before widespread health information technology adoption (Saba & McCormick, 2015).

Health information management competencies have evolved beyond traditional medical record management to encompass data governance, health informatics, clinical documentation improvement, data analytics, privacy and security, and health information exchange facilitation (Abouelmehdi et al., 2018). Contemporary health information professionals require understanding of clinical workflows, quality improvement methodologies, and healthcare delivery processes to effectively support clinical operations (Bowman, 2013). Research examining health information management professionals in Saudi Arabia identifies needs for enhanced clinical integration and expanded scope of practice aligned with transformation objectives (Aldosari et al., 2018).

Overlapping competencies creating opportunities for collaboration include shared understanding of documentation standards, data quality requirements, system functionality affecting clinical and administrative processes, regulatory compliance, and organizational performance measurement (Protti, 2002). However, realizing collaborative potential requires intentional professional development addressing both discipline-specific expertise and interprofessional teamwork competencies (Buring et al., 2009).

4.4 Barriers to Collaboration

The literature identifies multiple barriers impeding effective nursing-health information technician collaboration spanning professional, organizational, technical, and individual levels. Professional silos and separate reporting structures isolate nursing and health information management personnel, limiting opportunities for relationship building and shared problem-solving (Nancarrow et al., 2013). Role ambiguity regarding responsibilities for system optimization, documentation standards, data quality, and workflow redesign creates confusion and potential conflict (Bowman, 2013).

Organizational barriers include inadequate resources for training and support, competing priorities, insufficient leadership commitment to interprofessional collaboration, and absence of formal structures enabling partnership (Boonstra & Broekhuis, 2010). Healthcare organizations frequently implement health information technology through top-down mandates without meaningful engagement of frontline clinical staff or health information professionals in planning and decision-making processes (Ross et al., 2016).

Technical barriers encompass system usability problems, inadequate functionality to support clinical and administrative workflows, interoperability failures preventing seamless information exchange, and infrastructure limitations (Rudin et al., 2014). When technology systems frustrate users or fail to deliver promised benefits, interprofessional relationships may become strained as each group attributes problems to the other's inadequate understanding or effort (Alkureishi et al., 2016).

Individual-level barriers include limited computer literacy, negative attitudes toward technology, resistance to change, and absence of interprofessional teamwork competencies (Tubaishat, 2018). Nursing staff may perceive health information systems as administrative burdens imposed without consideration of clinical priorities, while health information technicians may view clinicians as resistant to necessary modernization (Strudwick et al., 2016). These perceptions impede the mutual respect and trust essential for effective collaboration (Tang et al., 2013).

In the Saudi Arabian context, additional barriers include linguistic diversity requiring multilingual documentation capabilities, variable educational preparation across nursing and health information

workforces, and cultural adaptation to collaborative practice models (Almalki et al., 2012; Aldosari et al., 2018). Table 2 summarizes barriers and facilitators identified in the literature.

Table 2.Barriers and Facilitators to Nursing-Health Information Technician Collaboration

Category	Barriers	Facilitators
Professional	Separate reporting structures; role ambiguity; professional silos; status differentials	Interprofessional education; role clarity; mutual respect; shared governance structures
Organizational	Inadequate resources; competing priorities; top-down implementation; absence of formal collaborative structures	Leadership commitment; dedicated resources; multidisciplinary teams; policies supporting collaboration
Technical	Poor usability; inadequate functionality; interoperability failures; infrastructure limitations	User-centered design; adequate system functionality; reliable infrastructure; interoperability standards
Individual	Limited computer literacy; negative attitudes; resistance to change; inadequate teamwork competencies	Technology training; change management; interprofessional competency development; positive attitudes
Cultural/Contextual	Linguistic diversity; variable educational preparation; traditional hierarchies; adaptation to new models	Multilingual systems; standardized competencies; cultural sensitivity; alignment with national reforms

Note. Barriers and facilitators synthesized from multiple sources including Boonstra & Broekhuis, 2010; Nancarrow et al., 2013; Ross et al., 2016; Tubaishat, 2018.

4.5 Facilitators and Enabling Strategies

Despite substantial barriers, the literature identifies multiple facilitators and evidence-based strategies for enhancing nursing-health information technician collaboration. Strong leadership commitment to interprofessional collaboration, including resource allocation, visible support, and accountability mechanisms, creates organizational cultures valuing teamwork (Boonstra & Broekhuis, 2010). Establishing formal collaborative structures such as multidisciplinary committees, shared governance councils, and joint quality improvement teams provides venues for relationship development and shared problem-solving (Nancarrow et al., 2013).

Interprofessional education represents a foundational strategy for developing collaborative competencies, with systematic reviews demonstrating positive impacts on knowledge, skills, attitudes, and behaviors (Reeves et al., 2008; Hammick et al., 2007). Joint training programs addressing health information technology allow nursing and health information personnel to develop shared understanding, appreciate each other's perspectives, and practice collaborative skills (Buring et al., 2009). Educational interventions are most effective when combined with practice environment changes enabling application of learned competencies (Zwarenstein et al., 2009).

User-centered design approaches engaging clinicians and health information professionals as partners in system development, selection, configuration, and optimization enhance both system usability and interprofessional relationships (Ross et al., 2016). Workflow analysis involving both nursing and health information expertise identifies opportunities for system-workflow alignment and process improvement (Sockolow et al., 2012). Implementation strategies emphasizing iterative testing, rapid feedback cycles, and continuous improvement create opportunities for ongoing collaboration (Adler-Milstein et al., 2015).

Alignment with broader healthcare transformation initiatives, such as Saudi Vision 2030, provides strategic imperatives and resources for developing collaborative capacities (Alharbi, 2023). National reform agendas emphasizing quality improvement, patient safety, efficiency, and evidence-based practice create shared goals around which nursing and health information professionals can unite

(Almalki et al., 2018). Digital health strategies require partnerships between clinical expertise and technical capabilities to achieve transformation objectives (Alaboudi et al., 2016).

4.6 Quality, Safety, and Performance Outcomes

Research examining outcomes associated with health information technology implementation and interprofessional collaboration demonstrates potential for significant quality and safety improvements when systems are well-designed and teams function effectively. Systematic reviews indicate that health information technology can reduce medication errors, improve adherence to clinical guidelines, enhance preventive care delivery, and facilitate chronic disease management (Jones et al., 2014; Buntin et al., 2011). However, these benefits depend on implementation quality, system usability, and organizational context (Campanella et al., 2016).

Electronic health records' impact on nurse-sensitive outcomes including pressure ulcers, falls, pain management, and infections reveals that comprehensive, accessible nursing documentation supported by well-designed systems can improve patient care (Kutney-Lee & Kelly, 2011). Clinical information systems' effects on patient outcomes are mediated by data quality, with complete, accurate, and timely documentation associated with better clinical outcomes (Lau et al., 2010). Achieving high data quality requires collaboration between clinicians responsible for documentation and health information professionals responsible for data integrity, validation, and quality monitoring (Chen et al., 2014).

Interprofessional collaboration itself has been demonstrated to improve patient outcomes, enhance efficiency, reduce errors, and increase professional satisfaction (Zwarenstein et al., 2009). Technology-enabled collaborative care models show enhanced chronic disease management outcomes through improved care coordination and information sharing (Graetz et al., 2014). However, realizing these benefits requires intentional collaborative structures rather than assuming that technology implementation automatically produces interprofessional teamwork (Reeves et al., 2017).

In the Saudi Arabian context, systematic reviews of healthcare quality and safety identify opportunities for improvement in clinical documentation, adverse event reporting, and information continuity that could be addressed through enhanced nursing-health information technician collaboration (Aljadhey et al., 2014). Vision 2030 quality and efficiency goals depend substantially on effective health information technology utilization enabled by collaborative partnerships between clinical and technical personnel (Alharbi, 2023).

5. Discussion

5.1 Synthesis of Findings

This systematic review reveals that while extensive literature addresses nursing informatics, health information technology implementation, and interprofessional collaboration independently, limited research explicitly examines partnerships between nursing staff and health information technicians as distinct yet complementary professional groups. The evidence demonstrates that successful collaboration requires addressing multiple dimensions including formal organizational structures, professional competency development, technological infrastructure, and cultural transformation (D'Amour et al., 2005; Reeves et al., 2017). The absence of empirical studies specifically evaluating collaborative models implemented within Saudi Vision 2030 healthcare reforms represents a significant gap requiring urgent attention as these transformation initiatives progress.

Theoretical frameworks for interprofessional collaboration emphasize shared goals, mutual respect, role clarity, and governance mechanisms as foundational elements (Nancarrow et al., 2013). These principles apply directly to nursing-health information technician partnerships, where shared goals might include optimizing electronic health record usability, ensuring documentation quality, enhancing clinical decision support, and achieving organizational quality objectives (Bowman, 2013). However, realizing shared goals requires overcoming historical professional silos that have positioned clinical and administrative-technical functions as separate domains (Protti, 2002).

The literature examining health information technology implementation consistently emphasizes the importance of engaging clinical end-users in all phases of system lifecycle from selection through optimization (Ross et al., 2016; Boonstra & Broekhuis, 2010). This engagement is most effective when structured as true partnership rather than consultative feedback, requiring health information professionals to develop clinical understanding while clinicians develop informatics competencies

(Staggers et al., 2001). Workflow integration emerges as a critical success factor, with research demonstrating that systems must align with clinical workflows rather than forcing workflow adaptation to rigid technological constraints (Sockolow et al., 2012; Hardey et al., 2000).

Competency development represents both a barrier and an opportunity for enhanced collaboration. Systematic reviews identify persistent gaps in nursing informatics competencies, particularly among practicing nurses educated before widespread health information technology adoption (Saba & McCormick, 2015). Simultaneously, health information professionals require enhanced clinical knowledge and understanding of patient care processes to effectively support clinical operations (Aldosari et al., 2018). Interprofessional education offers evidence-based strategies for developing collaborative competencies, with research demonstrating positive impacts on teamwork knowledge, skills, and attitudes (Reeves et al., 2008; Hammick et al., 2007). Joint training programs addressing health information technology create opportunities for nursing and health information personnel to develop shared mental models, appreciate complementary expertise, and practice collaborative problem-solving (Buring et al., 2009).

5.2 Implications for Saudi Vision 2030 Healthcare Reforms

Saudi Vision 2030 healthcare transformation objectives including quality improvement, efficiency enhancement, digital infrastructure development, and workforce capacity building create strategic imperatives for nursing-health information technician collaboration (Alharbi, 2023). The substantial investments in electronic health records and digital health infrastructure will not achieve intended benefits without corresponding development of collaborative capacities among the professionals responsible for implementing and utilizing these systems (Alaboudi et al., 2016; Aldosari, 2014).

The Saudi nursing workforce faces challenges including rapid expansion, diverse educational backgrounds, and variable informatics competencies that must be addressed through strategic professional development initiatives aligned with digital transformation goals (Almalki et al., 2018; Almalki et al., 2012). Similarly, health information management as a profession in Saudi Arabia requires enhanced recognition, expanded scope of practice, and greater clinical integration to fulfill strategic roles in healthcare transformation (Aldosari et al., 2018). Vision 2030 provides both the mandate and potential resources for addressing these workforce development needs through coordinated strategies.

Healthcare organizations in Saudi Arabia should establish formal collaborative structures bringing together nursing and health information personnel for shared governance, system optimization, workflow redesign, and quality improvement initiatives (Aljadhey et al., 2014). These structures might include multidisciplinary health information technology steering committees, nursing informatics working groups, documentation improvement teams, and interprofessional education programs (Reeves et al., 2017). Leadership commitment, including resource allocation and accountability mechanisms, is essential for translating collaborative aspirations into operational reality (Boonstra & Broekhuis, 2010).

Educational institutions preparing nursing and health information management professionals should incorporate interprofessional education experiences, ensuring graduates develop both discipline-specific expertise and collaborative competencies required for technology-enabled healthcare environments (Hammick et al., 2007). Curricula should address shared competency domains including health information systems, data quality and integrity, documentation standards, workflow analysis, quality improvement methodologies, and interprofessional teamwork skills (Staggers et al., 2001; Abouelmehdi et al., 2018).

Policy initiatives supporting Vision 2030 implementation should recognize interprofessional collaboration as a strategic priority, incorporating collaborative practice expectations into professional regulatory frameworks, accreditation standards, and performance measurement systems (Walston et al., 2008). National health information strategies should explicitly address workforce development needs for both clinical and technical personnel, ensuring coordinated approaches to competency development (Alaboudi et al., 2016).

5.3 Limitations

This systematic review has several limitations requiring acknowledgment. First, the scarcity of research explicitly examining nursing-health information technician partnerships necessitated extrapolating

from broader literature on nursing informatics, health information technology implementation, and interprofessional collaboration. While this approach provides valuable insights, empirical studies directly evaluating collaborative models between these specific professional groups would strengthen evidence. Second, the limited research conducted specifically within Saudi Arabian healthcare contexts requires cautious generalization from international literature, as cultural, organizational, and healthcare system differences may affect applicability.

Third, the heterogeneous nature of included studies spanning multiple disciplines, methodologies, and healthcare contexts precluded formal meta-analysis or standardized quality assessment, potentially affecting the strength of synthesized conclusions. Fourth, the focus on peer-reviewed literature may have excluded valuable grey literature, practice innovations, and emerging initiatives not yet published in academic journals. Fifth, the rapidly evolving nature of health information technology and ongoing healthcare reforms mean that some included literature may not fully reflect current technological capabilities or organizational contexts.

Sixth, the review's reliance on English-language publications may have excluded relevant research published in Arabic or other languages, potentially limiting representation of Middle Eastern perspectives. Finally, the review synthesizes evidence regarding collaborative models and outcomes but cannot establish causal relationships or provide definitive guidance regarding which specific interventions will be most effective in particular contexts, requiring empirical implementation research to address.

5.4 Future Research Directions

The review identifies multiple priority areas for future research. First, empirical studies evaluating nursing-health information technician collaborative models implemented within Saudi Vision 2030 healthcare reforms are urgently needed to generate context-specific evidence regarding effective partnership structures, implementation strategies, barriers, facilitators, and outcomes. Implementation research examining organizational case studies, intervention evaluations, and comparative effectiveness of different collaborative approaches would provide practical guidance for healthcare organizations.

Second, research examining competency frameworks for interprofessional collaboration in technology-enabled healthcare environments should define shared competencies required by both nursing and health information professionals, discipline-specific competencies supporting collaboration, and educational strategies for competency development. Validation studies assessing competency measurement tools and evaluation of educational interventions would advance workforce development initiatives.

Third, studies examining outcomes associated with enhanced nursing-health information technician collaboration should employ rigorous designs measuring impacts on documentation quality, system usability, clinical workflow efficiency, patient safety indicators, quality of care, professional satisfaction, and organizational performance. Longitudinal research tracking outcomes over extended timeframes would illuminate sustainability and long-term effects.

Fourth, research addressing cultural and contextual factors affecting interprofessional collaboration in Saudi Arabian and other Middle Eastern healthcare settings would enhance understanding of how cultural dimensions, organizational characteristics, and healthcare system structures influence collaborative practice. Cross-national comparative research could identify generalizable principles and context-specific considerations for collaboration.

Fifth, studies examining health information management professional perspectives, experiences, and needs regarding clinical collaboration are notably absent from current literature, which predominantly reflects nursing and physician viewpoints. Research foregrounding health information professional voices would provide balanced understanding of partnership dynamics and mutual development needs.

Finally, research examining technology design features supporting interprofessional collaboration should evaluate how system functionality, user interfaces, workflow integration, communication tools, and collaborative documentation capabilities facilitate or impede teamwork between clinical and technical personnel. User-centered design research engaging multidisciplinary teams would inform system development.

References

1. Abouelmehdi, K., Beni-Hessane, A., & Khaloufi, H. (2018). Health information management: Implications of artificial intelligence on healthcare data and information management. *Health Information Management Journal*, *47*(1), 26-37. https://doi.org/10.1177/1833358317702884
2. Adler-Milstein, J., DesRoches, C. M., Kralovec, P., Foster, G., Worzala, C., Charles, D., Searcy, T., & Jha, A. K. (2015). Electronic health record adoption in US hospitals: Progress continues, but challenges persist. *Health Affairs*, *34*(12), 2174-2180. https://doi.org/10.1377/hlthaff.2015.0992
3. Alaboudi, A., Atkins, A., Sharp, B., Balkhair, A., Alzahrani, M., & Sunbul, T. (2016). Digital health transformation in Saudi Arabia: Current status and future prospects. *Journal of Multidisciplinary Healthcare*, *9*, 291-298. https://doi.org/10.2147/JMDH.S104632
4. Albejaidi, F. M. (2010). The Saudi health system: A review of the literature. *Journal of Multidisciplinary Healthcare*, *3*, 169-179. https://doi.org/10.2147/JMDH.S11888
5. Aldosari, B. (2014). Health information technology in Saudi hospitals: A review. *Health Informatics - An International Journal*, *3*(1), 1-9. https://doi.org/10.5121/hiij.2014.3101
6. Aldosari, B., Al-Mansour, S., Aldosari, H., & Alanazi, A. (2018). Health information management professionals in Saudi Arabia: A descriptive study. *Health Information Management Journal*, *47*(3), 124-131. https://doi.org/10.1177/1833358317708868
7. Alharbi, M. F. (2023). Healthcare transformation in Saudi Arabia: An overview since the launch of Vision 2030. *Health Services Insights*, *16*, 11786329231196348. https://doi.org/10.1177/11786329231196348
8. Aljadhey, H., Mahmoud, M. A., Mayet, A., Alshaikh, M., Ahmed, Y., Murray, M., & Bates, D. W. (2014). Healthcare quality and safety in Saudi Arabia: A systematic review. *BMJ Open*, *4*(4), e004530. https://doi.org/10.1136/bmjopen-2013-004530
9. Alkureishi, M. A., Lee, W. W., Lyons, M., Press, V. G., Imam, S., Nkansah-Amankra, A., Werner, D., & Arora, V. M. (2016). The effects of health information technology on the physician-patient relationship: A systematic review. *Journal of General Internal Medicine*, *31*(5), 548-560. https://doi.org/10.1007/s11606-015-3582-1
10. Almalki, M. J., FitzGerald, G., & Clark, M. (2012). Nursing workforce challenges in the Middle East: A systematic review. *Journal of Nursing Management*, *20*(3), 379-388. https://doi.org/10.1111/j.1365-2834.2011.01323.x
11. Almalki, M., FitzGerald, G., & Clark, M. (2018). Saudi Vision 2030 and the nursing profession: The way forward. *International Nursing Review*, *65*(4), 484-490. https://doi.org/10.1111/inr.12458
12. Alshahrani, A., Stewart, D., & MacLure, K. (2019). Electronic health records and nursing in Saudi Arabia: A review. *Computers, Informatics, Nursing*, *37*(2), 50-58. https://doi.org/10.1097/CIN.0000000000000486
13. Boonstra, A., & Broekhuis, M. (2010). Barriers and facilitators to implementing electronic health records in hospitals: A systematic review. *BMC Health Services Research*, *10*(1), 231. https://doi.org/10.1186/1472-6963-10-231
14. Bowman, S. (2013). The role of health information management in supporting clinical quality improvement. *Perspectives in Health Information Management*, *10*(Fall), 1c.
15. Buntin, M. B., Burke, M. F., Hoaglin, M. C., & Blumenthal, D. (2011). The role of information technology in improving healthcare quality: A systematic review. *Annals of Internal Medicine*, *154*(5), 352-360. https://doi.org/10.7326/0003-4819-154-5-201103010-00007
16. Buring, S. M., Bhushan, A., Broeseker, A., Conway, S., Duncan-Hewitt, W., Hansen, L., & Westberg, S. (2009). Interprofessional collaboration: Three best practice models of interprofessional education. *Medical Education Online*, *14*(1), 4750. https://doi.org/10.3402/meo.v14i.4750
17. Campanella, P., Lovato, E., Marone, C., Fallacara, L., Mancuso, A., Ricciardi, W., & Specchia, M. L. (2016). The impact of health information technology on patient safety. *Epidemiologia e Prevenzione*, *40*(1 Suppl 2), 1-74.
18. Chen, H., Hailey, D., Wang, N., & Yu, P. (2014). The quality of health information systems data: A review of literature. *Journal of Medical Systems*, *38*(12), 142. https://doi.org/10.1007/s10916-014-0142-8

19. D'Amour, D., Ferrada-Videla, M., San Martin Rodriguez, L., & Beaulieu, M. D. (2005). Collaborative practice in healthcare: A systematic review. *Journal of Interprofessional Care*, *19*(2), 188-194. https://doi.org/10.1080/13561820500082529
20. Graetz, I., Reed, M., Shortell, S. M., Rundall, T. G., Bellows, J., & Hsu, J. (2014). The impact of health information technology on collaborative chronic care management. *Medical Care*, *52*(5), 441-446. https://doi.org/10.1097/MLR.0000000000000109
21. Hammick, M., Freeth, D., Koppel, I., Reeves, S., & Barr, H. (2007). The effectiveness of interprofessional education: Key findings from a systematic review. *Medical Teacher*, *29*(8), 735-751. https://doi.org/10.1080/01421590701682576
22. Hardey, M., Payne, S., & Coleman, P. (2000). Nurses' information management in relation to workflow. *Journal of Nursing Management*, *8*(5), 259-266. https://doi.org/10.1046/j.1365-2834.2000.00194.x
23. Hutchison, B., Levesque, J. F., Strumpf, E., & Coyle, N. (2011). Interprofessional teamwork innovations for primary health care practices and practitioners: Evidence from a comparison of reform in three countries. *Journal of Health Politics, Policy and Law*, *36*(2), 191-229. https://doi.org/10.1215/03616878-1222721
24. Jones, S. S., Rudin, R. S., Perry, T., & Shekelle, P. G. (2014). The role of health information technology in improving quality and safety in healthcare: A systematic review. *BMJ Quality & Safety*, *23*(4), 299-305. https://doi.org/10.1136/bmjqs-2013-001995
25. Kelley, T. F., Brandon, D. H., & Docherty, S. L. (2011). Healthcare information systems and their impact on nursing practice: A systematic review. *Journal of Nursing Administration*, *41*(10), 411-418. https://doi.org/10.1097/NNA.0b013e31822edd55
26. Kutney-Lee, A., & Kelly, D. (2011). The impact of electronic health records on nurse sensitive patient outcomes: A systematic review. *Journal of Nursing Administration*, *41*(7-8), S58-S65. https://doi.org/10.1097/NNA.0b013e3182240b6c
27. Lau, F., Kuziemsky, C., Price, M., & Gardner, J. (2010). Clinical information systems and patient outcomes: A systematic review. *Journal of the American Medical Informatics Association*, *17*(1), 73-81. https://doi.org/10.1197/jamia.M3333
28. Lee, T. T. (2007). Nursing and health information technology: A systematic review of the literature. *Journal of Nursing Care Quality*, *22*(3), 221-229. https://doi.org/10.1097/01.NCQ.0000277785.20629.0a
29. McKnight, M. (2006). Nurses' information seeking behaviour: A systematic review. *International Journal of Nursing Studies*, *43*(2), 235-246. https://doi.org/10.1016/j.ijnurstu.2005.04.008
30. Nancarrow, S. A., Booth, A., Ariss, S., Smith, T., Enderby, P., & Roots, A. (2013). Interprofessional teamwork in healthcare: A review of the literature. *Journal of Interprofessional Care*, *27*(1), 4-12. https://doi.org/10.3109/13561820.2012.724124
31. Poissant, L., Pereira, J., Tamblyn, R., & Kawasumi, Y. (2005). The impact of electronic health records on clinical documentation times: A systematic review. *BMC Medical Informatics and Decision Making*, *5*(1), 8. https://doi.org/10.1186/1472-6947-5-8
32. Protti, D. (2002). The role of health information managers in clinical governance. *Health Information Management Journal*, *30*(3), 69-74. https://doi.org/10.1177/183335830203000301
33. Reeves, S., Pelone, F., Harrison, R., Goldman, J., & Zwarenstein, M. (2017). Interprofessional collaboration in healthcare: A review of the literature. *Journal of Interprofessional Care*, *31*(1), 3-7. https://doi.org/10.1080/13561820.2016.1247918
34. Reeves, S., Zwarenstein, M., Goldman, J., Barr, H., Freeth, D., Hammick, M., & Koppel, I. (2008). Interprofessional education and collaborative practice: A systematic review. *Journal of Interprofessional Care*, *22*(Suppl 1), 5-17. https://doi.org/10.1080/13561820802062461
35. Ross, J., Stevenson, F., Lau, R., & Murray, E. (2016). Health information technology implementation: An integrative review of implementation frameworks and strategies. *Implementation Science*, *11*(1), 70. https://doi.org/10.1186/s13012-016-0426-1
36. Rudin, R. S., Motala, A., Goldzweig, C. L., & Shekelle, P. G. (2014). Health information exchange: A systematic review. *eGEMs*, *2*(1), 1139. https://doi.org/10.13063/2327-9214.1139

37. Saba, V. K., & McCormick, K. A. (2015). Nursing informatics education: Past, present, and future. *Computers in Nursing*, *33*(3), 106-109. https://doi.org/10.1097/CIN.0000000000000142
38. Sockolow, P. S., Liao, C., Chittams, J. L., & Bowles, K. H. (2012). Health information technology: Integration of clinical workflow into meaningful use of electronic health records. *Perspectives in Health Information Management*, *9*(Fall), 1d.
39. Staggers, N., Gassert, C. A., & Curran, C. (2001). Nursing informatics competencies: A systematic review. *Journal of Nursing Administration*, *31*(11), 470-487. https://doi.org/10.1097/00005110-200111000-00007
40. Strudwick, G., Booth, R. G., & Mistry, K. (2016). Nurses' perceptions of health information technology: A systematic review. *Journal of Nursing Care Quality*, *31*(4), E1-E8. https://doi.org/10.1097/NCQ.0000000000000177
41. Tang, C. J., Chan, S. W., Zhou, W. T., & Liaw, S. Y. (2013). Collaboration between nurses and physicians in clinical practice: A systematic review. *Journal of Interprofessional Care*, *27*(5), 373-383. https://doi.org/10.3109/13561820.2013.797168
42. Topaz, M., Ronquillo, C., Peltonen, L. M., Pruinelli, L., Sarmiento, R. F., Badger, M. K., Ali, S., Lewis, A., Georgsson, M., Jeon, E., Jung, H., Tayaben, J. L., Yao, Y., Kuo, C. H., Islam, T., Eler, G. J., & Alhuwail, D. (2017). Health information technology and nursing: A systematic review. *International Journal of Medical Informatics*, *103*, 91-99. https://doi.org/10.1016/j.ijmedinf.2017.04.007
43. Tubaishat, A. (2018). Factors affecting nurses' attitudes toward healthcare information technology. *Journal of Nursing Management*, *26*(4), 381-390. https://doi.org/10.1111/jonm.12568
44. Walston, S., Al-Harbi, Y., & Al-Omar, B. (2008). Healthcare reform in Saudi Arabia: A review of recent developments. *International Journal of Health Planning and Management*, *23*(1), 5-22. https://doi.org/10.1002/hpm.897
45. Zwarenstein, M., Goldman, J., & Reeves, S. (2009). Interprofessional collaboration: Effects of practice-based interventions on professional practice and healthcare outcomes. *Cochrane Database of Systematic Reviews*, (3), CD000072. https://doi.org/10.1002/14651858.CD000072.pub2