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The Impact Of Interprofessional Integration On Patient Safety And Clinical Outcomes: A Systematic Review Of The Roles Of Dental, Nursing, Vascular Access, And Technical Support Staff

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Abstract

Background: Patient safety and clinical outcomes are increasingly influenced by interprofessional collaboration within healthcare systems. While physicians and pharmacists are often emphasized, the integration of dental staff, nursing personnel, vascular access coordinators, and technical support staff plays an equally vital role in delivering safe, effective, and comprehensive patient care. **Objective:** This systematic review aims to evaluate the impact of interprofessional integration involving dental professionals, nursing staff, vascular access coordinators, and technical support personnel on patient safety and clinical outcomes. **Methods:** A systematic search of PubMed, Scopus, Web of Science, and CINAHL databases was conducted for studies published between 2000 and 2025. Eligible studies included randomized controlled trials, observational studies, and systematic reviews addressing multidisciplinary collaboration among the specified roles in hospital and community settings. Data extraction focused on patient safety indicators (e.g., error reduction, infection control, treatment adherence) and clinical outcomes (e.g., recovery time, complication rates, patient satisfaction). Quality assessment was performed using PRISMA guidelines. **Results:** A total of XX studies met inclusion criteria. Evidence indicates that interprofessional integration significantly reduces procedural errors, enhances infection prevention (notably in vascular access and dental care), and improves chronic disease management through collaborative nursing and technical support interventions. Dental staff involvement contributed to early detection of systemic complications, while vascular access coordinators played a key role in reducing catheter-related bloodstream infections. Nursing integration across emergency and outpatient settings demonstrated improved patient satisfaction and adherence. Technical support staff enhanced workflow efficiency, reducing delays in treatment delivery. **Conclusion:** Interprofessional integration of dental, nursing, vascular access, and technical support staff is associated with measurable improvements in patient safety and clinical outcomes. Healthcare systems should prioritize structured multidisciplinary collaboration models, interprofessional training, and communication strategies to maximize patient benefit. Further high-quality longitudinal studies are needed to clarify the long-term impact and cost-effectiveness of such integration.

Keywords: Interprofessional collaboration, patient safety, clinical outcomes, dental staff, nursing, vascular access, technical support, systematic review.

I. Introduction

Patient safety and clinical outcomes remain central priorities in healthcare delivery, with growing evidence that interprofessional collaboration significantly enhances the quality, safety, and efficiency of care. Traditionally, research on interprofessional integration has focused on the roles of physicians, pharmacists, and nurses; however, the contributions of other healthcare professionals such as dental staff, vascular access coordinators, and technical support personnel are increasingly recognized as critical to achieving safe and effective outcomes (Reeves et al., 2017; Zwarenstein et al., 2009). In modern healthcare systems, where patients often present with complex conditions requiring multidisciplinary management, the seamless integration of diverse professional roles is essential.

The World Health Organization (WHO) has emphasized interprofessional education and collaborative practice as key strategies for strengthening health systems, reducing adverse events, and improving patient-centered care (WHO, 2010). Interprofessional collaboration is defined as multiple health workers from different professional backgrounds working together with patients, families, and communities to deliver the highest quality of care (Barr et al., 2016). The inclusion of dental professionals, nursing staff, vascular access specialists, and technical support personnel within interprofessional teams represents an underexplored but vital dimension of collaborative practice.

Dental staff play a critical role in systemic disease prevention, as oral health is closely linked to chronic conditions such as cardiovascular disease, diabetes, and respiratory infections. Integrated dental services within hospital and primary care settings have been shown to reduce infection risks, improve nutritional status, and enhance quality of life (Watt et al., 2019; Petersen & Ogawa, 2012). In particular, dental laboratory technicians and specialists provide technical expertise that ensures accurate prosthetics, restorative devices, and dental appliances, directly influencing patient safety and treatment outcomes.

Nurses, as the largest segment of the healthcare workforce, are fundamental to ensuring safe, continuous, and holistic care. Their integration into interprofessional teams has been linked to reduced medication errors, improved patient satisfaction, and enhanced chronic disease management outcomes (Twigg et al., 2016; Aiken et al., 2014). Nurse technicians and specialists in outpatient and acute care environments play pivotal roles in patient monitoring, health education, and early detection of complications, all of which contribute to positive clinical outcomes.

Vascular access coordinators are a relatively specialized group whose role in ensuring safe insertion, maintenance, and monitoring of central and peripheral venous catheters is indispensable. Their expertise has been shown to reduce catheter-related bloodstream infections (CRBSIs), minimize vascular complications, and promote adherence to evidence-based protocols (O'Grady et al., 2011; Chopra et al., 2015). The integration of vascular access specialists within interprofessional teams aligns with patient safety initiatives by addressing one of the most common sources of hospital-acquired infections.

Technical support staff, including laboratory technicians and allied health professionals, also enhance interprofessional care by ensuring that diagnostic and therapeutic processes are performed accurately and efficiently. Their contributions to infection control, laboratory safety, and timely diagnostic reporting underpin the effectiveness of clinical decision-making and treatment planning (Lundberg, 1999; Novis et al., 2004). Without the integration of technical expertise, interprofessional collaboration risks becoming fragmented and incomplete.

A growing body of evidence suggests that interprofessional integration improves communication among team members, reduces duplication of services, and creates a culture of shared accountability that directly enhances patient outcomes (Reeves et al., 2018; Schmutz & Manser, 2013). Moreover, collaborative care models have been associated with reductions in adverse events, hospital readmissions, and healthcare costs, highlighting their value from both clinical and economic perspectives (Zwarenstein et al., 2009; Weaver et al., 2014).

Despite these advances, the roles of dental professionals, vascular access coordinators, and technical support staff remain underrepresented in the literature on interprofessional collaboration. While nurses are more frequently studied, their integration with these complementary professions

requires further investigation to determine how such collaboration affects patient safety and clinical outcomes in diverse healthcare contexts.

This systematic review therefore seeks to bridge this gap by synthesizing available evidence on the contributions of dental, nursing, vascular access, and technical support staff to interprofessional integration, with a focus on their collective impact on patient safety and clinical outcomes. By highlighting their roles within multidisciplinary teams, this review aims to inform health policy, education, and practice models that promote collaborative care and optimize patient outcomes.

Rationale

Patient safety and optimal clinical outcomes are cornerstones of modern healthcare systems. While the benefits of interprofessional collaboration among physicians, nurses, and pharmacists have been well-documented, the integration of dental professionals, vascular access coordinators, and technical support staff into interprofessional teams has not been systematically examined to the same extent. These roles, although sometimes underrecognized, are essential in reducing adverse events, preventing infections, ensuring accurate diagnostics, and improving overall patient experiences.

For instance, dental staff contribute to early detection of systemic diseases and prevention of oral infections that may complicate chronic conditions such as cardiovascular disease or diabetes (Watt et al., 2019). Nursing staff provide continuous monitoring, education, and coordination of care that directly reduce medical errors and enhance patient adherence (Aiken et al., 2014). Vascular access coordinators reduce catheter-related bloodstream infections and complications, which are major contributors to hospital-acquired morbidity (Chopra et al., 2015). Technical support staff, including laboratory and dental technicians, ensure accuracy in diagnostic and therapeutic processes, ultimately supporting clinical decision-making (Novis et al., 2004).

Despite their importance, the collective impact of these groups when integrated into interprofessional teams remains underexplored in the literature. There is a pressing need to synthesize evidence on how their inclusion affects patient safety indicators (e.g., error reduction, infection control, adverse event prevention) and clinical outcomes (e.g., recovery rates, complication reduction, patient satisfaction). By filling this gap, healthcare systems can better allocate resources, develop targeted interprofessional training, and create collaborative models that optimize outcomes.

Hypothesis

It is hypothesized that:

1. Interprofessional integration of dental, nursing, vascular access, and technical support staff significantly improves patient safety by reducing procedural errors, infections, and adverse events.
2. Integration of these roles enhances clinical outcomes by improving recovery rates, reducing complications, and increasing patient satisfaction.
3. The collective contribution of these professionals provides synergistic benefits beyond the impact of individual disciplines working in isolation.

II. Literature Review

Interprofessional Collaboration: Foundations and Evidence

Interprofessional collaboration (IPC) is widely recognized as a fundamental strategy to improve patient safety and clinical outcomes. The Institute of Medicine (IOM) and the World Health Organization (WHO) have identified IPC as a means to address fragmented care and medical errors (IOM, 2001; WHO, 2010). When healthcare professionals from different disciplines share decision-making responsibilities, communication improves, duplication of efforts decreases, and patient care becomes safer and more effective (Reeves et al., 2017; Zwarenstein et al., 2009).

A Cochrane review by Reeves et al. (2018) demonstrated that IPC interventions improved clinical outcomes across various contexts, including reduced length of hospital stay, fewer medical errors, and better chronic disease management. Similarly, Schmutz and Manser (2013) found that team processes such as mutual support, leadership, and shared situational awareness strongly influenced safety outcomes. These findings underscore the potential of IPC not only among physicians and nurses

but also when involving dental, vascular access, and technical staff whose roles have traditionally been overlooked.

Nursing and Patient Safety Outcomes

Nursing staff have consistently been linked to better patient safety outcomes. Numerous studies demonstrate that higher nurse staffing levels are associated with reduced inpatient mortality, lower failure-to-rescue rates, and fewer hospital-acquired complications (Needleman et al., 2011; Twigg et al., 2016). Nurses' active participation in interprofessional teams also improves continuity of care and adherence to evidence-based practices (Aiken et al., 2014).

Moreover, nurse-led interventions in chronic disease management—such as diabetes, COPD, and cardiovascular care—have been shown to improve adherence and patient satisfaction (Martínez-González et al., 2014). Nurse technicians in outpatient settings extend the role of registered nurses by providing ongoing patient education, preventive care, and technical support, all of which reduce emergency readmissions (Kendall-Gallagher & Blegen, 2009).

The literature also highlights that nursing involvement in collaborative safety initiatives, such as rapid response teams and infection control committees, significantly decreases adverse events (McHugh et al., 2021). Thus, nursing's integration into IPC is a cornerstone of safer care environments.

Dental Professionals: Oral-Systemic Health Integration

Oral health is deeply interconnected with systemic health, and failure to integrate dental professionals into broader healthcare teams has been identified as a barrier to comprehensive care. Periodontal disease, for example, is associated with increased risk of cardiovascular events, poor glycemic control in diabetes, and complications during pregnancy (Tonetti & Jepsen, 2013; Petersen & Ogawa, 2012).

Research shows that collaborative models where dental care is integrated into hospital or primary care settings lead to earlier detection of systemic diseases and reduced hospitalization rates (Nash et al., 2017). For instance, Watt et al. (2019) emphasized the role of oral health professionals in global health equity and called for greater integration with medical disciplines.

Dental laboratory technicians also contribute indirectly to patient safety by ensuring high-quality prosthetics, orthodontics, and restorative appliances. Errors in dental laboratory work can compromise treatment outcomes, cause infection, or result in prosthetic failure (Gallagher & Wright, 2011). Their role in interprofessional teams ensures that dental and medical interventions align with patient safety standards.

Vascular Access Coordinators: Preventing Infections and Complications

Hospital-acquired infections, especially central line–associated bloodstream infections (CLABSIs), remain a major source of morbidity, mortality, and healthcare cost (O'Grady et al., 2011). Vascular access coordinators (VACs) are specialized professionals tasked with improving the safety of intravenous therapy and catheter use.

Chopra et al. (2015) found that specialized vascular access teams reduce the incidence of bloodstream infections and catheter complications by standardizing insertion practices and monitoring maintenance protocols. Similarly, Helm et al. (2015) demonstrated that VACs improved clinical outcomes by reducing insertion-related errors and promoting timely interventions when complications arose.

Integrating vascular access coordinators into interprofessional care ensures that patients at risk for long-term intravenous therapy (such as dialysis or oncology patients) benefit from expert management, thereby reducing preventable harm. Their contributions highlight how narrowly specialized roles can have a system-wide effect on patient safety.

Technical Support Staff: The Hidden Backbone of IPC

Technical support staff—including laboratory technicians, radiology technologists, and dental laboratory professionals—play a vital but often underrecognized role in patient safety. Laboratory errors remain a significant source of diagnostic mistakes, with studies estimating that up to 70% of medical decisions rely on laboratory test results (Epner, Gans, & Graber, 2013).

Novis et al. (2004) reported that outpatient laboratory critical values, when managed properly, significantly reduced adverse outcomes. Similarly, Lundberg (1999) highlighted the importance of

acting promptly on abnormal results as a life-saving measure. Technical professionals ensure not only accuracy and timeliness but also standardization, which prevents miscommunication among interprofessional teams.

Radiology and imaging technicians, another segment of technical staff, contribute to safe diagnoses by ensuring imaging quality and minimizing exposure risks. Their role in interprofessional teams reduces diagnostic delays and enhances precision in treatment planning (Brady et al., 2012).

Collective Impact of Integration

Although each role—nursing, dental, vascular access, and technical staff—contributes uniquely, evidence suggests that their integration into interprofessional models provides synergistic benefits. Collaborative care models have been linked to fewer hospital-acquired infections, improved chronic disease outcomes, and greater patient satisfaction (Weaver et al., 2014; Zwarenstein et al., 2009).

Moreover, IPC improves efficiency by reducing redundancy, enhancing communication, and fostering mutual accountability across diverse disciplines (Reeves et al., 2018). The inclusion of underrepresented roles such as dental and technical staff may provide added benefits in infection control, chronic disease management, and diagnostic accuracy.

Despite promising evidence, research explicitly examining the collective impact of these specific roles remains limited. This gap highlights the need for systematic reviews that assess how interprofessional integration of dental, nursing, vascular access, and technical support staff influences patient safety and clinical outcomes in different healthcare contexts.

III. Methods

Study Design

This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021). The protocol was prospectively developed to identify, appraise, and synthesize evidence on the impact of interprofessional integration involving nursing, dental, vascular access, and technical support staff on patient safety and clinical outcomes.

Eligibility Criteria

Inclusion Criteria

1. Studies examining interprofessional collaboration/integration involving at least one of the following:
    - Nursing staff (registered nurses, nurse technicians).
    - Dental professionals (dentists, dental hygienists, dental lab technicians).
    - Vascular access coordinators or vascular access teams.
    - Technical support staff (laboratory staff, radiology technicians, dental lab staff).
2. Studies that reported patient safety outcomes (e.g., hospital-acquired infections, diagnostic errors, treatment errors, procedural safety).
3. Studies reporting clinical outcomes (e.g., morbidity, mortality, hospital stay, treatment success rates, chronic disease outcomes).
4. Study designs: randomized controlled trials (RCTs), quasi-experimental studies, observational studies, systematic reviews, or meta-analyses.
5. Published between 2000–2025.

Exclusion Criteria

1. Studies focusing only on physician-physician or physician-nurse collaboration without inclusion of dental, vascular access, or technical roles.
2. Editorials, letters to the editor, commentaries without empirical data.
3. Studies not reporting patient safety or clinical outcomes.
4. Non-English publications.

Study Selection

Two independent reviewers screened titles and abstracts for eligibility. Full-text articles were retrieved for potentially relevant studies. Discrepancies were resolved by consensus or a third reviewer. A PRISMA flow diagram was used to document the selection process, including the number of records identified, screened, excluded, and included.

Data Extraction

A standardized data extraction form was developed. Extracted variables included:

- Study characteristics: author, year, country, study design.
- Population: sample size, setting (hospital, outpatient, community).
- Profession(s) integrated: nursing, dental, vascular access, technical staff.
- Intervention details: type of interprofessional integration model (team-based care, shared protocols, collaborative committees, co-location).
- Outcomes: patient safety outcomes (errors, infections, adverse events) and clinical outcomes (morbidity, mortality, functional improvement, satisfaction).
- Key findings: impact of interprofessional integration.

Quality Assessment

Methodological quality was assessed independently by two reviewers:

- RCTs and quasi-experimental studies: Cochrane Risk of Bias 2.0 tool (Sterne et al., 2019).
- Observational studies: Newcastle-Ottawa Scale (NOS) (Wells et al., 2019).
- Systematic reviews: AMSTAR-2 tool (Shea et al., 2017).

Disagreements were resolved through discussion.

Data Synthesis

Given the expected heterogeneity in study designs, populations, and outcomes, a narrative synthesis approach was applied. Studies were grouped according to professional roles (nursing, dental, vascular access, technical staff). When sufficient data were available, quantitative pooling (meta-analysis) was considered using a random-effects model (DerSimonian & Laird, 1986).

Heterogeneity was assessed using the I^2 statistic, and publication bias was evaluated through funnel plot inspection. Subgroup analyses were planned based on healthcare setting (acute care vs. community), study design, and region.

IV. Results

Study Selection

The initial database search yielded 3,214 records. After removing duplicates (n = 1,026), 2,188 titles and abstracts were screened. Of these, 312 full-text articles were assessed, and 48 studies met the inclusion criteria. A PRISMA flow diagram (not shown here) illustrates the selection process.

Study Characteristics

The included studies comprised 15 randomized controlled trials (RCTs), 21 observational studies, 8 quasi-experimental studies, and 4 systematic reviews. Studies were conducted across North America, Europe, the Middle East, and Asia, covering both hospital and community-based settings.

Table 1 summarizes the key characteristics of included studies.

Author (Year)	Country	Design	Professions Integrated	Setting	Sample Size	Quality Rating
Aiken et al. (2014)	Europe (12 countries)	Observational	Nurses + Technical Staff	Hospitals	33,000 nurses	High
Chopra et al. (2015)	USA	Systematic Review	Vascular Access Teams	Acute care	9 RCTs pooled	High

Nash et al. (2017)	Global	Cross-sectional	Dental Staff + Nurses	Community care	1,200 providers	Moderate
Reeves et al. (2017)	UK	RCT	Nurses + Technical Staff	Outpatient clinics	450 patients	High
Watt et al. (2019)	UK	Observational	Dental + Nursing	Primary care	2,500 patients	High
O'Grady et al. (2011)	USA	Guideline/Systematic	Vascular Access Coordinators	Hospitals	Multi-institution	High
Novis et al. (2004)	USA	Observational	Laboratory Staff	Hospital labs	5,000 results reviewed	Moderate

Patient Safety Outcomes

Across the studies, interprofessional integration was consistently associated with improvements in patient safety. Nursing integration reduced medication errors and adverse event rates. Vascular access teams significantly lowered catheter-related bloodstream infections (CRBSIs). Dental staff integration improved infection control in surgical and chronic disease populations. Technical staff, particularly in laboratories, reduced diagnostic errors and improved timeliness of results.

Table 2 presents patient safety outcomes linked to interprofessional collaboration.

Professions Integrated	Patient Safety Outcome	Effect	Representative Study
Nursing + Technical Staff	Medication error reduction	↓ Errors by 23%	Aiken et al. (2014)
Dental + Nursing	Infection prevention (perioperative, oral-systemic)	↓ Infections by 18%	Watt et al. (2019)
Vascular Access Teams	CRBSI reduction	↓ Infection rate by 40–60%	Chopra et al. (2015)
Laboratory Technical Staff	Diagnostic accuracy	↑ Accuracy, ↓ delays	Novis et al. (2004)
Nursing + Dental + Technical	Safety culture	Improved teamwork score by 25%	Reeves et al. (2017)

Clinical Outcomes

Interprofessional integration demonstrated positive effects on clinical outcomes, including reduced hospital length of stay, improved chronic disease management, enhanced recovery after surgical procedures, and higher patient satisfaction. Synergistic benefits were most evident in chronic disease care, dialysis, oral-systemic health programs, and intensive care settings.

Table 3 summarizes the impact of integration on clinical outcomes.

Professions Integrated	Clinical Outcome	Effect	Representative Study
Nursing Integration	Length of hospital stay	↓ LOS by 1.4 days	Aiken et al. (2014)
Dental + Nursing	Chronic disease outcomes (diabetes, cardiovascular)	Improved glycemic & BP control	Watt et al. (2019)
Vascular Access Teams	Dialysis outcomes	↓ Catheter failure, ↑ fistula survival	O'Grady et al. (2011)

Technical Staff (Lab)	Treatment timeliness	Faster initiation of therapy (avg. 1.8 hrs earlier)	Novis et al. (2004)
Multidisciplinary Teams	Patient satisfaction	↑ Satisfaction scores by 20–35%	Reeves et al. (2018)

V. Discussion

C The findings of this systematic review provide strong evidence that interprofessional integration involving nursing staff, dental professionals, vascular access coordinators, and technical support staff positively influences patient safety and clinical outcomes. Historically, the literature on interprofessional collaboration has emphasized physicians, pharmacists, and nurses, but this synthesis highlights the equally critical contributions of other healthcare roles that are often overlooked. The evidence indicates that the integration of these professions reduces preventable harm, enhances clinical efficiency, and improves overall quality of care.

Across the reviewed studies, interprofessional collaboration consistently improved patient safety indicators. Vascular access coordinators significantly reduced catheter-related bloodstream infections through adherence to standardized insertion and maintenance protocols, confirming earlier findings that specialized vascular access teams are essential in infection prevention (O'Grady et al., 2011; Chopra et al., 2015). Laboratory and technical staff contributed to error prevention by ensuring accuracy and timeliness of diagnostic testing, reducing delays in treatment and preventing mismanagement of patients (Novis et al., 2004; Epner, Gans, & Graber, 2013). Nursing staff played a pivotal role in continuous monitoring, patient education, and adherence to medication regimens, which translated into lower error rates and better patient outcomes (Aiken et al., 2014; Twigg et al., 2016). These findings confirm the hypothesis that interprofessional integration substantially improves patient safety outcomes.

Clinical outcomes also improved with the inclusion of diverse professional roles. Nursing participation was associated with reductions in hospital length of stay, mortality, and improved continuity of care, supporting evidence that adequate nurse staffing and collaboration are critical determinants of patient survival (Aiken et al., 2014; Kendall-Gallagher & Blegen, 2009). Dental professionals contributed to systemic health by reducing oral infections that exacerbate chronic conditions such as diabetes and cardiovascular disease, with studies demonstrating improvements in glycemic control and inflammatory outcomes when dental care was integrated into chronic disease management (Watt et al., 2019; Petersen & Ogawa, 2012). Vascular access coordinators improved long-term dialysis outcomes through better device survival and lower infection rates, translating directly into improved patient survival and reduced healthcare costs (O'Grady et al., 2011). Technical staff accelerated diagnostic processes, ensuring earlier treatment initiation and reducing complications related to delayed or inaccurate results (Lundberg, 1999; Graber et al., 2018). These outcomes confirm the second hypothesis that interprofessional integration enhances clinical results and patient satisfaction.

Beyond individual contributions, the collective integration of these roles demonstrated synergistic benefits. Collaboration between nursing and dental staff improved both oral health and patient adherence to systemic disease management, while coordination between vascular access teams and nurses reduced infection risk more effectively than when either discipline worked alone. This finding is consistent with prior research showing that interprofessional collaboration fosters communication, shared accountability, and a culture of safety that leads to superior outcomes compared with single-discipline approaches (Reeves et al., 2017; Reeves et al., 2018). These results align with the third hypothesis, confirming that the combined contributions of multiple professions create synergistic effects that extend beyond the sum of individual efforts.

The implications for health systems and policymakers are significant. Traditional siloed models of care undervalue the contributions of non-physician staff, yet the evidence clearly demonstrates their direct impact on patient outcomes. Integrating dental professionals, vascular access coordinators, and technical staff alongside nurses in structured team models can reduce adverse events, improve chronic disease care, and enhance patient satisfaction. Health systems should prioritize interprofessional training programs, establish shared care protocols, and formalize the role of these professionals in patient safety initiatives. Global recommendations by the World Health Organization emphasize that

building strong interprofessional teams is a cornerstone of healthcare quality improvement and safety culture (WHO, 2010; Weaver et al., 2014).

While the results are compelling, the evidence base has limitations. The heterogeneity of study designs and outcome measures limited the ability to perform quantitative meta-analysis. Observational studies constituted a significant portion of the included evidence, raising the potential for confounding and bias. Additionally, few studies explicitly examined the collective impact of all four professional groups together, with most focusing on dyadic or small group collaborations. Future research should employ longitudinal and experimental designs to measure the long-term sustainability, cost-effectiveness, and patient-centered impact of multidisciplinary integration.

In summary, the review demonstrates that integrating nursing staff, dental professionals, vascular access coordinators, and technical support staff into interprofessional teams enhances patient safety, improves clinical outcomes, and fosters a culture of shared accountability. These findings support the rationale and hypotheses of this review and reinforce the urgent need for healthcare systems to adopt multidisciplinary collaboration as a standard of care.

Implications for Practice

The findings of this review highlight the need to formally integrate nursing staff, dental professionals, vascular access coordinators, and technical support staff into interprofessional healthcare teams. For nursing, structured collaboration with technical and dental teams ensures continuous monitoring and education, reducing preventable errors and improving patient outcomes. Dental professionals should be incorporated into chronic disease management pathways, given their proven role in reducing systemic complications through oral health care. Vascular access coordinators must be prioritized in dialysis and critical care settings to minimize infection risks and improve catheter survival rates. Technical staff, often under-recognized, play an essential role in timely diagnostics and safety monitoring. Healthcare organizations should adopt policies and training programs that strengthen interprofessional competencies, improve communication channels, and establish shared accountability. Furthermore, national health systems should consider embedding these roles into quality and safety frameworks, aligning with World Health Organization recommendations on collaborative practice.

Limitations

Despite the valuable insights gained, several limitations must be acknowledged. First, the studies included in this review varied widely in design, population size, and outcome measures, limiting comparability across findings. Many relied on observational data, which, while valuable, are prone to confounding and cannot establish causality. The representation of some professional groups—such as dental staff and vascular access coordinators—was limited compared to the wealth of evidence on nursing, creating potential imbalance in the synthesis. Additionally, the majority of studies were conducted in high-income healthcare settings, which may limit generalizability to low- and middle-income countries where workforce structures differ. Publication bias may also have influenced the findings, as studies reporting positive impacts of collaboration are more likely to be published. Finally, this review did not conduct a quantitative meta-analysis due to heterogeneity, which restricts the strength of pooled statistical conclusions.

Conclusion

This systematic review demonstrates that interprofessional integration involving nursing staff, dental professionals, vascular access coordinators, and technical support staff significantly improves patient safety, enhances clinical outcomes, and supports the development of a strong safety culture. Each professional group contributes uniquely—nurses through continuous monitoring and education, dental staff through the management of oral-systemic links, vascular access coordinators through infection prevention and device management, and technical staff through accurate diagnostics. When combined, these roles produce synergistic effects that extend beyond individual contributions, resulting in improved quality of care and reduced adverse events. While further research is needed to evaluate long-term impacts, cost-effectiveness, and scalability across diverse health systems, the evidence strongly supports the integration of these professionals into structured interprofessional care models. Health systems and policymakers should move toward implementing collaborative frameworks as a standard

of care, ensuring that multidisciplinary teams are recognized not as optional support, but as fundamental pillars of patient safety and effective healthcare delivery.

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