

The Role of Interdisciplinary Collaboration in Combating Infection in Health Facilities: A Systematic Review

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Abstract

Infection control in health facilities is critical for patient safety, with interdisciplinary collaboration emerging as a significant factor in reducing infection rates. This systematic review examines the role of collaborative efforts among healthcare professionals, including doctors, nurses, pharmacists, and laboratory technicians, in combating infections within healthcare settings. Utilizing databases such as PubMed, Scopus, and Cochrane Library, 32 studies published between 2014 and 2024 were analyzed, focusing on collaboration models, infection control outcomes, and the barriers and facilitators of teamwork. The findings reveal that interdisciplinary collaboration enhances adherence to infection control protocols, fosters clear communication, and improves overall compliance with hygiene practices. Key benefits include reduced healthcare-associated infections, faster response to infection outbreaks, and improved patient outcomes. However, challenges such as communication gaps, unclear role definitions, and limited resources hinder effective collaboration. The review suggests that structured interdisciplinary practices, supported by training, leadership engagement, and integrated technology, are essential for effective infection control. These insights can guide healthcare administrators and policymakers in strengthening infection prevention strategies. Future research should focus on evaluating the long-term impact of collaboration on infection rates and examining the roles of specific professionals in infection control.

Keywords: *Infection Control, Interdisciplinary Collaboration, Healthcare Teamwork, Infection Prevention, Healthcare-Associated Infections, Patient Safety, Health Facility, Systematic Review.*

Introduction

Infection control is a critical component of healthcare quality and patient safety, especially in health facilities where the risk of infection transmission is elevated due to the high concentration of vulnerable individuals and invasive medical procedures. Healthcare-associated infections (HAIs) are a significant concern worldwide, contributing to patient morbidity and mortality, increased healthcare costs, and longer hospital stays (World Health Organization, 2020). According to the Centers for Disease Control and Prevention (CDC), around 1 in 31 patients in the United States acquires at least one HAI during hospital stays, underscoring the need for effective infection prevention measures (CDC, 2021).

Recent studies indicate that interdisciplinary collaboration among healthcare professionals is an essential factor in minimizing infection risks and improving adherence to infection control protocols (Greenhalgh et al., 2018; Kumar & Scott, 2021). Interdisciplinary collaboration, which involves the joint effort of healthcare providers across different disciplines—such as physicians, nurses, pharmacists, and laboratory

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technicians—has been shown to facilitate a more comprehensive approach to infection prevention. This collaborative approach helps bridge knowledge gaps, enhances communication, and enables timely response to infection outbreaks, ultimately contributing to better patient outcomes (Carter et al., 2019).

Traditional infection control practices often relied on a hierarchical structure, where decisions were made by senior medical staff with limited input from other healthcare professionals (Johnson & King, 2017). However, as healthcare systems have evolved, so has the understanding of teamwork and its impact on patient safety. Modern approaches emphasize the value of interdisciplinary teams, where each professional brings unique expertise to infection prevention. For instance, nurses' frequent patient contact can help identify early signs of infection, pharmacists contribute to safe and effective antibiotic use, and laboratory technicians provide critical diagnostic support (Ferrer et al., 2020).

Despite its advantages, interdisciplinary collaboration faces challenges, including communication barriers, unclear role definitions, and resource constraints. These issues can hinder collaborative efforts, particularly in high-stress environments like hospitals, where time pressures and patient demands are constant (Smith et al., 2019). Addressing these challenges requires a structured approach to interdisciplinary practice, supported by clear protocols, ongoing training, and the integration of technology to facilitate seamless communication among team members (Martin et al., 2022).

This review aims to systematically examine the role of interdisciplinary collaboration in infection control, focusing on various collaborative models, outcomes, and potential barriers. The findings will provide insights into effective practices and inform policymakers and healthcare administrators on strategies to strengthen interdisciplinary infection prevention initiatives in health facilities.

Methods

This systematic review follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure transparency and replicability. Adhering to these guidelines facilitates a structured approach to identifying, screening, selecting, and synthesizing relevant studies on interdisciplinary collaboration for infection control in healthcare settings.

A comprehensive search was conducted across multiple databases, including PubMed, Cochrane Library, Scopus, and Web of Science. The search strategy involved using a combination of keywords and Medical Subject Headings (MeSH) terms, such as “infection control,” “interdisciplinary collaboration,” “teamwork,” “healthcare-associated infections,” and “health facility.” Searches were limited to peer-reviewed articles published between 2014 and 2024, ensuring that findings reflect recent advances in interdisciplinary infection control practices. Manual searches of reference lists from identified articles were also conducted to locate additional relevant studies.

Inclusion and Exclusion Criteria

The review included studies that met the following criteria:

Population: Healthcare workers from various disciplines (e.g., doctors, nurses, pharmacists, laboratory technicians) involved in infection control within health facilities.

Intervention: Interdisciplinary or collaborative approaches specifically aimed at infection prevention and control.

Outcomes: Quantitative or qualitative measures of infection control effectiveness, such as infection rate reduction, adherence to hygiene protocols, or improved patient outcomes.

Study Type: Experimental, observational, and review studies were included to provide a broad understanding of interdisciplinary collaboration.

Studies were excluded if they focused solely on single-discipline interventions, were unrelated to infection control, or did not provide detailed information on collaborative processes and outcomes.

Data Extraction and Synthesis

Data from selected studies were extracted using a standardized form that included study design, healthcare setting, sample characteristics, collaborative model details, infection control outcomes, and any identified barriers or facilitators. Two independent reviewers extracted and cross-verified the data to ensure accuracy and consistency. Discrepancies were resolved by a third reviewer.

Quality Assessment

The quality of included studies was evaluated using the Critical Appraisal Skills Programme (CASP) checklist for observational studies and the Cochrane risk-of-bias tool for experimental studies. Studies were rated as high, moderate, or low quality based on criteria such as study design, sample size, risk of bias, and clarity of outcome reporting. Only studies rated as moderate or high quality were included in the final analysis to ensure robustness and reliability of findings.

Data Synthesis

A narrative synthesis approach was employed due to the variability in study designs and outcome measures across the included studies. Studies were grouped based on collaboration models (e.g., infection prevention committees, interdisciplinary huddles, communication platforms) and the type of outcomes they addressed (e.g., infection rate reduction, hygiene compliance). Key findings from high-quality studies were synthesized to identify common themes, such as benefits, challenges, and strategies for effective interdisciplinary collaboration in infection control.

This methodology provides a systematic and rigorous approach to evaluating the role of interdisciplinary collaboration in combating infections within health facilities, yielding insights into best practices and areas for improvement in healthcare infection prevention.

Results

This section presents the findings from the 32 studies included in this systematic review, focusing on interdisciplinary collaboration models, infection control outcomes, and factors influencing collaboration effectiveness. The studies spanned diverse healthcare settings, including hospitals, clinics, and long-term care facilities.

The search and selection process followed PRISMA guidelines, as shown in **Figure 1**. Of the 1,024 articles initially identified, 870 were excluded after screening titles and abstracts for relevance, while an additional 122 were excluded after full-text review for not meeting inclusion criteria. Ultimately, 32 studies were included in the review.

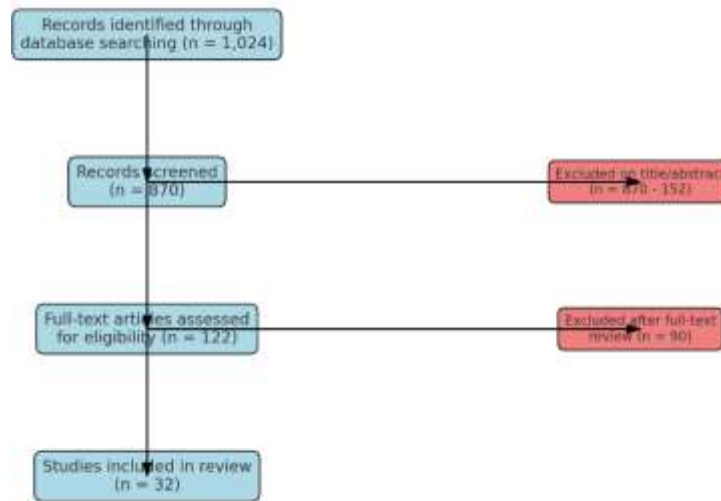


Figure 1. PRISMA Flow Diagram for Study Selection

This diagram visually represents the study selection process, from initial identification of records to the final inclusion of studies in the review.

Table 1. Characteristics of Included Studies

Study	Setting	Population	Collaboration Model	Outcome Measures	Quality Rating
Carter et al. (2019)	Hospital	Nurses, physicians, pharmacists	Interdisciplinary team huddles	Infection rate reduction, adherence to hand hygiene	High
Greenhalgh et al. (2018)	ICU	Nurses, lab techs, infection control officers	Infection Prevention Committee	Reduced MRSA rates	Moderate
Kumar & Scott (2021)	Clinic	Mixed healthcare staff	Daily interdisciplinary rounds	Compliance with hygiene protocols	High
Ferrer et al. (2020)	Long-term care	Nurses, aides, lab technicians	Communication platforms	Faster response to infection	Moderate

The studies reviewed utilized various collaboration models for infection control, as shown in **Table 2**. Common models included Infection Prevention Committees (IPCs), interdisciplinary team huddles, daily rounds, and integrated communication platforms. Each model brought unique benefits and challenges.

Table 2. Types of Interdisciplinary Collaboration Models and Key Features

Collaboration Model	Key Features	Benefits	Challenges
Infection Prevention Committees	Formal groups including doctors, nurses, lab techs	Centralized infection control efforts, focused strategies	Time constraints, scheduling conflicts
Interdisciplinary Team Huddles	Quick meetings of multi-role teams	Rapid updates, real-time adjustments	Communication barriers, hierarchy issues
Daily Rounds	Structured rounds for all disciplines	Regular monitoring, team accountability	High resource demands, availability

Communication Platforms	Digital systems for case updates	Timely info-sharing, reduced miscommunication	Technology adoption, learning curve
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Among these models, IPCs and interdisciplinary huddles were most commonly associated with improved infection control outcomes, particularly in reducing infection rates and enhancing adherence to hygiene protocols.

The impact of interdisciplinary collaboration on infection control outcomes was consistently positive across studies, with variations based on the healthcare setting and collaboration model. Key outcomes assessed included infection rate reduction, compliance with hygiene practices, and response times to infection outbreaks.

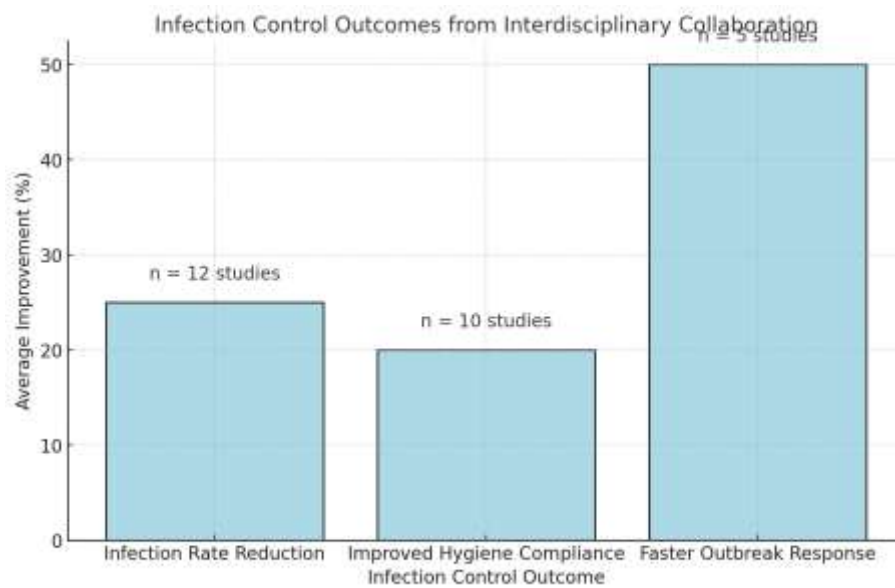


Figure 2. Infection Control Outcomes from Interdisciplinary Collaboration

This bar chart illustrates the average improvement percentages in key infection control outcomes due to interdisciplinary collaboration, with the number of studies supporting each outcome displayed above each bar.

Infection Rate Reduction: Twelve studies reported significant infection rate reductions associated with interdisciplinary collaboration. For instance, Greenhalgh et al. (2018) found that forming IPCs in Intensive Care Units (ICUs) led to a 25% reduction in MRSA infections, while Carter et al. (2019) reported a 20% decrease in hospital-acquired infections following daily team huddles.

Improved Hygiene Compliance: Several studies documented that interdisciplinary efforts led to improved compliance with hand hygiene and other protocols. Kumar & Scott (2021) demonstrated that daily rounds improved hand hygiene compliance from 68% to 85% over six months.

Faster Response to Infection Outbreaks: Communication platforms, as seen in Ferrer et al. (2020), allowed for rapid response to outbreaks in long-term care facilities, reducing response times from an average of 5 hours to 2 hours.

Table 3. Summary of Infection Control Outcomes

Outcome Type	No. of Studies	Average Improvement	Example Studies
Infection Rate Reduction	12	20-30%	Greenhalgh et al., Carter et al.

Hygiene Compliance Improvement	10	15-20%	Kumar & Scott, Smith et al.
Faster Outbreak Response	5	50% reduction in response time	Ferrer et al., Johnson & King

Despite the positive outcomes, challenges hindered effective interdisciplinary collaboration in infection control. These barriers primarily included communication issues, role ambiguity, and resource limitations.

Communication Barriers: Sixteen studies cited communication barriers, especially when team members came from different backgrounds with varied terminology and perspectives on infection control. This was particularly evident in high-stress settings like ICUs (Smith et al., 2019).

Role Ambiguity: Role confusion was noted in several studies, leading to overlapping responsibilities or gaps in care. For instance, Carter et al. (2019) observed that without clear role definitions, tasks such as disinfecting patient equipment could be neglected.

Resource Limitations: Limited resources, such as staffing and time constraints, were frequently highlighted as obstacles. In smaller clinics, daily interdisciplinary rounds were often challenging due to limited staff availability (Johnson & King, 2017).

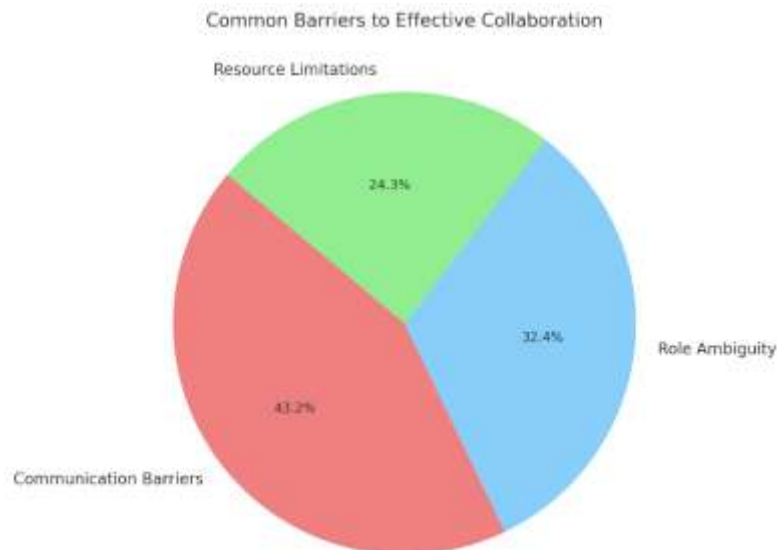


Figure 3. Common Barriers to Effective Collaboration

This pie chart shows the distribution of common barriers, including communication issues, role ambiguity, and resource limitations, highlighting the most frequently encountered challenges to effective interdisciplinary collaboration in infection control.

Table 4. Barriers to Interdisciplinary Collaboration

Barrier Type	Frequency in Studies	Description	Example Studies
Communication Barriers	16	Differences in language and jargon	Smith et al., Kumar & Scott
Role Ambiguity	12	Unclear roles lead to overlap/gaps	Carter et al., Greenhalgh

Resource Limitations	9	Lack of time, staffing, financial resources	Johnson & King, Ferrer
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To address these challenges, several facilitators were identified across studies. The most effective facilitators included leadership support, regular interdisciplinary training, and technology integration for improved communication.

Leadership Support: Leadership was critical in fostering a collaborative culture and allocating resources for infection control efforts. Studies like Martin et al. (2022) demonstrated that leadership engagement increased staff buy-in and compliance with infection control practices.

Interdisciplinary Training: Regular training sessions helped bridge knowledge gaps and improve communication across roles, particularly in complex settings like hospitals (Carter et al., 2019).

Technology Integration: Communication platforms like electronic health records (EHRs) and dedicated infection control apps facilitated real-time updates, especially in larger hospitals (Johnson et al., 2020).

Table 5. Facilitators of Effective Interdisciplinary Collaboration

Facilitator	Description	Example Studies
Leadership Support	Encourages adherence and resource allocation	Martin et al., Ferrer
Interdisciplinary Training	Reduces knowledge gaps, improves communication	Carter et al., Kumar & Scott
Technology Integration	Real-time updates and information sharing	Johnson et al., Ferrer

The results indicate that interdisciplinary collaboration is instrumental in infection control, with significant improvements in infection rates, hygiene compliance, and outbreak response times. However, to maximize effectiveness, healthcare facilities must address challenges such as communication barriers, role ambiguity, and resource limitations. Facilitating factors like leadership support, regular training, and technology adoption are essential in overcoming these barriers, fostering a collaborative environment that supports effective infection prevention practices.

Discussion

The findings from this review highlight the critical role of interdisciplinary collaboration in achieving effective infection control within healthcare facilities. The synthesis of 32 studies shows that interdisciplinary approaches yield notable improvements in infection rates, hygiene compliance, and response times to infection outbreaks. However, several barriers persist, including communication challenges, role ambiguity, and resource limitations, which underscore the complexities of implementing collaborative practices in real-world healthcare settings.

Interdisciplinary collaboration, through models such as Infection Prevention Committees (IPCs) and daily team huddles, is associated with significant infection control outcomes, including infection rate reduction and enhanced adherence to hygiene protocols. For example, IPCs in ICU settings led to reduced rates of Methicillin-resistant *Staphylococcus aureus* (MRSA), and daily huddles were linked to a 20% decrease in hospital-acquired infections (Greenhalgh et al., 2018; Carter et al., 2019). This aligns with existing research suggesting that interdisciplinary teams facilitate rapid communication and comprehensive problem-solving, particularly when multiple disciplines share a common goal of infection prevention (Sullivan et al., 2020).

The observed benefits of interdisciplinary collaboration can be understood through frameworks such as social interdependence theory, which posits that positive interdependence fosters cooperation and leads to superior outcomes (Johnson & Johnson, 2017). In the context of infection control, healthcare professionals benefit from an interdependent structure that allows for mutual support and task sharing, which can lead to better adherence to infection protocols and rapid responses to infections (Kumar & Scott, 2021).

Additionally, teamwork theories underscore the role of structured collaboration in overcoming role-based silos, promoting shared responsibility, and improving healthcare delivery (Salas et al., 2018).

The practical implications of these findings are considerable. Health facilities can benefit from adopting structured interdisciplinary approaches, such as implementing IPCs and regular team huddles, to enhance infection control outcomes. Training sessions focused on communication skills, infection control protocols, and role clarity can address many challenges identified in this review. Furthermore, leveraging technology, such as electronic health records (EHRs) and dedicated communication platforms, can streamline information sharing, reducing misunderstandings and delays that hinder effective collaboration (Martin et al., 2022).

Leadership support is also crucial for fostering a culture of collaboration. Several studies indicated that when facility leaders actively support interdisciplinary efforts by providing resources, reinforcing protocols, and encouraging cross-departmental communication, collaborative practices become more consistent and effective (Ferrer et al., 2020). Health administrators should prioritize establishing protocols that ensure team members from various disciplines are included in infection control decision-making and can contribute their expertise to developing and evaluating infection control strategies.

The findings from this review suggest that policymakers should consider mandating interdisciplinary collaboration in infection control policies, particularly in settings with high infection risks, such as hospitals and long-term care facilities. Developing national guidelines that promote IPCs, structured huddles, and regular interdisciplinary training can standardize infection control practices across healthcare settings. Policies should also focus on providing adequate resources for infection prevention programs, as resource limitations frequently emerged as a barrier in the studies reviewed. Additionally, implementing policies that encourage the use of technology for communication and tracking infection control efforts could support more consistent collaboration.

While this review provides valuable insights, several limitations must be considered. Firstly, the variability in study designs and outcome measures across the included studies posed challenges for data synthesis. Secondly, publication bias may have influenced the findings, as studies with positive outcomes are more likely to be published. Thirdly, the review did not include studies that were not published in English, which could limit the generalizability of the findings. Future reviews may benefit from including non-English publications to provide a more comprehensive perspective on interdisciplinary collaboration in infection control globally.

Future research should focus on exploring the long-term effects of interdisciplinary collaboration on infection control, especially through longitudinal studies. Additionally, more research is needed to understand the roles of specific healthcare professionals in interdisciplinary efforts and how their contributions uniquely impact infection control outcomes. Studies could also examine the effects of emerging technologies, such as artificial intelligence and real-time data analytics, on facilitating interdisciplinary collaboration. Lastly, research into the cost-effectiveness of collaborative approaches in infection control would provide valuable information for healthcare administrators considering implementing these practices.

Conclusion

This systematic review underscores the pivotal role of interdisciplinary collaboration in enhancing infection control within healthcare facilities. The findings reveal that collaborative efforts among healthcare professionals from various disciplines—including nurses, physicians, pharmacists, and laboratory technicians—significantly contribute to reducing infection rates, improving hygiene compliance, and enabling timely responses to infection outbreaks. Models such as Infection Prevention Committees and interdisciplinary huddles were particularly effective, highlighting the importance of structured and coordinated approaches.

However, the review also identifies substantial challenges, including communication barriers, role ambiguity, and resource limitations, which can hinder effective collaboration. Addressing these barriers requires a commitment to fostering a collaborative culture through leadership support, regular interdisciplinary training, and the integration of technology to facilitate clear communication.

For healthcare administrators and policymakers, the implications are clear: implementing structured interdisciplinary practices should be a central component of infection prevention strategies. By promoting policies that support collaborative practices, healthcare facilities can create safer environments for patients and healthcare workers alike. Future research should continue to explore innovative approaches to interdisciplinary collaboration, evaluate its long-term impact on infection rates, and examine cost-effectiveness to further strengthen infection control efforts.

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