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Interprofessional Collaboration among Nurses, Radiation Therapists, and Radiology Professionals: A Comprehensive Review

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Abstract

Interprofessional collaboration (IPC) has become an essential pillar of modern healthcare delivery, particularly in highly specialized fields such as nursing, radiation therapy, and radiology. This comprehensive review synthesizes global evidence on the nature, determinants, and outcomes of collaborative practice among these professional groups. The study examines how interdisciplinary teamwork enhances clinical efficiency, care coordination, patient outcomes, and safety in diagnostic and therapeutic settings. Findings indicate that effective IPC is influenced by organizational culture, role clarity, communication practices, professional autonomy, and shared decision-making frameworks. Barriers, including hierarchical structures, limited understanding of professional roles, workload pressures, and resource constraints, continue to hinder optimal collaboration across many healthcare systems. Nevertheless, evidence shows that structured communication models, joint training programs, collaborative leadership approaches, and technological integration significantly improve teamwork and care delivery. The review concludes that strengthening interprofessional collaboration among nurses, radiation therapists, and radiology professionals is crucial for advancing patient-centered care, improving workflow efficiency, and supporting high-quality oncology and diagnostic services. Recommendations emphasize the need for institutional policies that foster collaborative environments, investment in interprofessional education, and ongoing evaluation of teamwork practices to ensure sustainable improvements in healthcare outcomes.

Keywords: Healthcare delivery, Radiation therapy, Radiology, Nursing, Professional autonomy.

1. Introduction

Interprofessional collaboration (IPC) has become a central priority in modern healthcare systems, driven by the increasing complexity of patient needs, the demand for high-quality care, and the recognition that no single profession can address all aspects of patient management effectively. As technological advancements and diagnostic capabilities expand, the interactions among nurses, radiation therapists, and radiology professionals have become more frequent and more essential, particularly within oncology, emergency care, and diagnostic imaging environments. These professional groups often operate at critical points in the patient care continuum, where effective communication, role clarity, and coordinated decision-making directly influence clinical outcomes, patient safety, and service efficiency (Arruzza, 2023).

Nurses provide frontline patient assessment, procedural preparation, patient education, and continuity of care across clinical settings. Radiology professionals, including radiographers and radiologists, are responsible for diagnostic imaging procedures and interpretation, which inform clinical decisions and treatment planning. Radiation therapists, on the other hand, deliver highly specialized therapeutic procedures that require precise coordination with imaging findings and nursing-supported patient care processes. The interdependent nature of these roles underscores the importance of IPC in ensuring accurate diagnoses, safe therapeutic interventions, and holistic patient support (Bolderston, 2010).

Despite the recognized value of IPC, challenges persist across practice environments. Issues such as hierarchical relationships, communication barriers, workflow constraints, limited understanding of each profession's scope of practice, and technological disparities can impede effective collaboration. As healthcare systems worldwide shift toward multidisciplinary and patient-centered models, enhancing collaboration between nurses, radiation therapists, and radiology professionals is not only beneficial but essential for optimizing care quality and resource utilization (Coetzee, 2024).

This comprehensive review examines existing evidence on interprofessional collaboration among these three professional groups, identifies facilitators and barriers influencing collaborative practice, and explores strategies that enhance teamwork within diagnostic and therapeutic imaging settings. By synthesizing current knowledge, the review aims to provide insights that can guide policy development, education, and clinical practice frameworks that foster effective collaboration and ultimately improve patient outcomes.

2. Methodology

2.1 Research Design

This study adopted a systematic narrative review design to examine interprofessional collaboration (IPC) among nurses, radiation therapists, and radiology professionals. A review approach was suitable given the study's aim of synthesizing diverse empirical, theoretical, and practice-based evidence related to collaborative practices in medical imaging and radiation therapy settings. The design enabled an integrative examination of the factors influencing collaboration, existing IPC models, challenges, and outcomes across multidisciplinary clinical environments.

2.2 Search Strategy

A comprehensive and structured literature search was conducted across major academic databases including PubMed, CINAHL, Scopus, Web of Science, Embase, and Google Scholar**.** Additional hand-searching of reference lists, institutional repositories, and relevant professional association publications (e.g., nursing, radiography, radiation therapy associations) supplemented the electronic search.

The search covered studies published between 2010 and 2025, reflecting contemporary trends in healthcare collaboration and technological advancements in diagnostic and therapeutic imaging. Key search terms included combinations of: "interprofessional collaboration," "multidisciplinary teamwork," "nurses," "radiation therapists," "radiographers," "radiologic technologists," "diagnostic imaging," "communication," "team-based care," and "oncology care." Boolean operators "AND" and "OR" were used to refine search results.

2.3 Inclusion and Exclusion Criteria

To ensure relevance and rigor, studies were selected based on predefined inclusion and exclusion criteria:

Inclusion criteria:

- Published in English between 2010–2025

- Peer-reviewed empirical studies, systematic reviews, theoretical papers, and professional guidelines
- Focus on collaboration among nurses, radiation therapists, radiographers, or mixed clinical teams in imaging or oncology settings
- Research addressing communication, teamwork, workflow coordination, patient safety, or role integration

Exclusion criteria:

- Studies unrelated to healthcare or outside imaging and oncology contexts
- Articles without clear relevance to IPC
- Commentaries or opinion-based pieces lacking empirical or conceptual grounding
- Duplicates or inaccessible full texts

These criteria ensured the review focused on high-quality, contextually relevant literature that reflects real-world collaborative practices.

2.4 Data Synthesis

Given the heterogeneity of the included studies, ranging from qualitative interviews to quantitative evaluations and mixed-methods designs, a thematic narrative synthesis approach was applied. Key themes were identified inductively and deductively, enabling integration of conceptual, empirical, and practice-oriented findings. Themes were then organized into categories reflecting: Nature and structure of collaboration, Professional roles and interdependencies, Communication and coordination mechanisms, Challenges and facilitators of IPC and Impacts on patient outcomes, workflow efficiency, and care quality

The synthesis process allowed for a holistic understanding of interprofessional collaboration across imaging and therapeutic environments.

2.5 Ethical Considerations

As this study is a review of existing literature, no primary data were collected, and ethical approval was not required. However, all included studies were reviewed to ensure they adhered to acceptable ethical standards, particularly those involving human participants. Proper citation and acknowledgment of all sources were strictly observed to maintain academic integrity.

3. Findings and discussion

3.1 Overview of Interprofessional Collaboration in Medical Imaging and Radiotherapy

The review reveals that interprofessional collaboration (IPC) among nurses, radiology professionals, and radiation therapists plays an increasingly central role in optimizing patient outcomes in diagnostic imaging and radiotherapy settings. Across the reviewed literature, IPC has evolved from discipline-specific interactions toward more integrated care models, particularly in oncology departments where complex patient needs require coordinated care. Several studies highlight that collaboration is most effective when supported by structured communication, shared clinical objectives, and mutual understanding of professional roles (Davis et al., 2015; Erler et al., 2020). However, the degree of collaboration varies widely across healthcare contexts, with diagnostic imaging departments reporting more task-focused interactions and oncology/radiotherapy units demonstrating more sustained teamwork due to continuity of patient care. Overall, the general state of IPC reflects gradual progress, though gaps in consistency, communication, and role integration remain.

3.1.1 Current Status of IPC across Disciplines

The reviewed literature indicates that the current level of collaboration among nurses, radiologists, radiographers, and radiation therapists is moderate but improving, particularly in institutions that have

adopted team-based care models. For example, a multi-site study by Goh et al. (2017) found that radiographers frequently collaborate with nurses during patient preparation and safety verification processes, especially in high-risk imaging procedures such as MRI sedation and contrast-enhanced CT scans. Similarly, radiation therapists regularly interact with oncology nurses during treatment planning and patient education sessions, reflecting shared responsibilities in patient management.

Common collaborative practices identified in the literature include joint patient assessments, participation in multidisciplinary team (MDT) meetings, cross-checking of imaging requests, and co-management of procedural risks. Communication patterns, however, differ: diagnostic imaging departments rely heavily on short, task-specific exchanges, while radiotherapy settings demonstrate deeper collaborative communication due to long-term patient follow-up. Variations also emerge across healthcare contexts. Oncology units often report stronger IPC because cancer care pathways naturally require team coordination, whereas stand-alone imaging departments tend to operate along more linear workflows that may not always facilitate cross-disciplinary engagement.

These trends align with findings from previous studies showing that the nature of workflow integration strongly determines the extent of collaboration (Hilder, 2018). The evidence thus suggests that although collaborative interactions are frequent, they remain uneven and sometimes fragmented depending on departmental culture and workflow structures.

3.1.2 Key Facilitators of Effective Collaboration

A prominent facilitator of effective IPC across nursing, radiology, and radiotherapy is the presence of structured communication protocols. Standardized tools—such as the SBAR (Situation, Background, Assessment, Recommendation) format—enable clear, concise information exchange and have been widely reported to reduce ambiguity in high-stakes environments like radiology (Koo et al., 2014). For instance, the use of SBAR in MRI units has been shown to decrease miscommunication-related delays by ensuring nurses and radiographers share unified patient preparation information.

Role clarity also emerges as a critical factor supporting collaboration. Studies highlight that when team members understand the scope of practice of each discipline—such as nurses' role in patient triage, radiographers' responsibilities in image acquisition, and radiation therapists' role in treatment planning—collaborative tasks proceed more efficiently. A Canadian study (LeGuerrier et al., 2019) found that role delineation workshops in radiotherapy departments significantly increased interdisciplinary confidence and reduced role disputes.

Additionally, multidisciplinary rounds provide a platform for shared decision-making and problem-solving. In oncology settings, MDT meetings involving nurses, radiation oncologists, radiologists, and radiation therapists have been linked to improved treatment planning accuracy and enhanced continuity of care. Best-practice models from integrated cancer centers demonstrate that routine interdisciplinary case discussions foster accountability, encourage knowledge exchange, and build team cohesion (Lee, 2020).

Previous studies consistently support these findings, emphasizing that supportive leadership, collaborative culture, and regular interprofessional training further reinforce effective IPC (Morgan et al., 2024). Therefore, the literature suggests that collaboration thrives when structural, organizational, and interpersonal facilitators are aligned.

3.1.3 Barriers and Challenges in IPC

Despite the growing emphasis on interprofessional practice, several recurring obstacles hinder full collaboration across disciplines. One major challenge is role conflict, which often arises when responsibilities overlap or when team members misunderstand each other's professional boundaries.

Nurses, for example, report conflict when radiology staff expect them to undertake tasks beyond their scope, such as technical imaging preparation, while radiographers may feel constrained when nurses dominate patient-management decisions (Oliveira et al., 2023).

Hierarchical structures remain a persistent barrier, particularly in diagnostic imaging departments where radiologists' authority may overshadow contributions from nurses and radiographers. Literature shows that such hierarchies reduce open communication and discourage shared decision-making (Shah, 2025). In radiotherapy settings, hierarchy tends to be less pronounced but still affects interactions between radiation oncologists and radiation therapists.

Workload pressures also significantly limit collaborative engagement. High patient volumes, staffing shortages, and time-sensitive imaging schedules restrict opportunities for meaningful interaction and teamwork. Nurses in emergency and outpatient imaging units often describe the collaboration as "rushed" or "procedural," occurring only when necessary for patient safety. Radiation therapists likewise report time constraints during treatment setup and verification, reducing the scope for deeper interdisciplinary communication (Winter, 2019).

Another barrier is inadequate interprofessional training. Many professionals in radiology and radiotherapy programs receive limited formal training in IPC, leading to varying levels of confidence in teamwork. Empirical studies note that professionals who lack exposure to collaborative learning environments are more likely to experience communication breakdowns and role misunderstandings (Wright, 2024).

The challenges differ across disciplines:

- Nurses often face workload burden and unclear expectations during imaging procedures.
- Radiology staff struggle with hierarchical structures and communication gaps with referring clinicians and nurses.
- Radiation therapists encounter challenges related to limited staffing, high patient turnover, and insufficient interdisciplinary training.

Overall, these findings mirror trends observed in previous IPC research, underscoring the need for more integrated communication models, supportive leadership, and structured collaborative training across medical imaging and radiotherapy environments.

3.2 Collaborative Roles and Responsibilities in Patient Management

Findings from the reviewed literature consistently highlight that effective interprofessional collaboration (IPC) in medical imaging and radiotherapy depends on the seamless integration of distinct yet interconnected roles among nurses, radiology professionals, and radiation therapists. Each group brings specialized expertise that shapes patient outcomes at different stages of diagnostic and therapeutic pathways. Across studies, IPC was shown to reduce procedural delays, enhance diagnostic accuracy, improve patient satisfaction, and support safer oncology treatment delivery. These findings align with the interprofessional practice framework proposed by (Schultz, 2021), which emphasizes complementary competencies for coordinated care.

The evidence shows that collaborative patient management is strengthened when each profession understands not only its own responsibilities but also how they interlink with those of others. Examples from oncology, emergency radiology, and radiation therapy settings demonstrate that shared decision-making, synchronized workflow planning, and continuous communication reduce errors and unnecessary duplication of tasks. Similar conclusions were drawn by Probst et al. (2014), who found that professional clarity and reciprocal role understanding are central to IPC effectiveness in complex clinical environments.

3.2.1 Nursing Contributions to Imaging and Radiotherapy Collaboration

Nurses emerged as central coordinators of patient care, responsible for ensuring continuity across the imaging and radiotherapy workflow. Findings show that nurses frequently act as the first point of patient contact, facilitating pre-procedure preparation such as obtaining medical histories, performing safety screening (e.g., MRI compatibility checks), and offering psychosocial support to reduce anxiety before imaging or radiotherapy sessions. Studies such as those by Mudadi et al. (2024) emphasize the importance of nursing-led patient education in improving compliance with imaging and treatment instructions, thereby enhancing procedural efficiency.

In radiotherapy settings, nurses collaborate closely with radiation therapists to monitor side effects such as skin toxicity, fatigue, and nausea. Their role in symptom assessment ensures early intervention and prevents treatment interruptions—a finding consistent with McLaren (2024), who associated proactive nursing support with improved radiotherapy adherence. Effective communication with radiology teams is also highlighted, particularly regarding urgent imaging requests, clarification of patient conditions, and updating radiologists about relevant clinical findings. For example, in trauma imaging, nurses play a crucial role in stabilizing patients for CT or X-ray procedures while coordinating with technologists to maintain safety (Lavender et al., 2014).

The findings support the view that nurses' holistic expertise enables them to bridge clinical information across disciplines, reinforcing collaborative decision-making and enhancing patient safety throughout diagnostic and therapeutic processes.

3.2.2 Role of Radiology Professionals in Multidisciplinary Care

Radiology professionals—including radiographers, radiologic technologists, and radiologists—contribute significantly to collaborative care by providing high-quality imaging and interpretive support essential for accurate diagnosis and treatment planning. The reviewed studies highlight that radiographers' technical expertise in modality selection, patient positioning, and radiation protection ensures that images meet diagnostic requirements while minimizing risk. For instance, research by Lam (2015) notes that radiographer-led initiatives in imaging optimization have improved diagnostic workflow and reduced repeat examinations, reinforcing the value of their collaboration with nurses and clinicians.

Radiologists further support the multidisciplinary process by generating timely interpretations that guide clinical decisions across oncology, emergency care, and chronic disease management. Their interaction with nurses and radiation therapists is especially critical in cancer care, where precise tumor delineation influences radiotherapy planning. Studies in multidisciplinary tumor boards show that radiologists enhance team decision-making by clarifying imaging findings and identifying disease progression (Kindle et al., 2024).

Workflow coordination also emerged as a core radiology contribution. Imaging teams collaborate with nursing staff to schedule procedures efficiently and communicate variations in patient status that might influence imaging techniques. Effective IPC in radiology departments has been shown to reduce patient waiting times and enhance throughput, findings consistent with the work of Hkamy et al. (2024), who emphasized the importance of cross-disciplinary communication in imaging workflow efficiency.

Overall, radiology professionals' contributions underpin diagnostic accuracy and care continuity, reinforcing their indispensable role in collaborative healthcare delivery.

3.2.3 Role of Radiation Therapists in Collaborative Oncology Care

Radiation therapists play a central role in executing radiation treatment plans and supporting collaborative oncology care. Findings indicate that they are responsible for treatment simulation, accurate patient positioning, and operating linear accelerators, ensuring that radiation doses are delivered precisely as

prescribed. Their technical expertise directly influences treatment effectiveness and patient safety, as noted by Gillan (2015), who found that therapist-led precision in set-up reproducibility significantly reduces geometric errors in radiotherapy.

Radiation therapists also collaborate closely with radiation oncologists, medical physicists, and nurses during treatment planning and verification. They provide essential feedback regarding patient positioning challenges, anatomical changes, and tolerability of treatment—a practice shown to enhance adaptive radiotherapy processes (D'Alimonte, 2017). For instance, daily assessments conducted by therapists allow rapid identification of issues such as weight loss or tumor shrinkage, prompting multidisciplinary review and treatment adjustment.

Patient education emerged as another critical responsibility. Therapists routinely explain treatment schedules, expected side effects, and safety procedures, thereby improving patients' understanding and reducing anxiety. Studies such as those by Clarke et al. (2024) show that therapist-led communication significantly enhances patients' confidence during radiotherapy, which in turn supports adherence.

Their participation in team-based decision-making is increasingly recognized in modern radiotherapy models. Findings show that therapists' insights into machine performance, workflow constraints, and patient comfort provide valuable input during multidisciplinary meetings. This aligns with trends identified in advanced practice literature, where expanded therapist roles lead to improved team efficiency and patient-centered care (Chen et al., 2024).

3.3 Impact of Interprofessional Collaboration on Quality of Care

The findings of this review indicate that interprofessional collaboration (IPC) among nurses, radiation therapists, and radiology professionals substantially enhances the overall quality of patient care. Collaborative practice was shown to improve clinical accuracy, patient safety, workflow coordination, and patient satisfaction, reflecting a growing consensus in the literature that integrated teamwork is essential in technologically intensive environments such as radiology and radiotherapy. Studies have consistently demonstrated that where professional roles overlap or depend heavily on timely exchange of information—such as imaging interpretation, treatment planning, and patient monitoring—teamwork becomes a central determinant of care quality. Similar observations have been made in prior reviews of healthcare teams, which emphasize that shared decision-making and mutual role understanding reduce fragmentation of care (Ball et al., 2021). The evidence from this review aligns with these findings and points to measurable benefits across multiple dimensions of service delivery.

3.3.1 Effects on Patient Safety and Clinical Accuracy

The findings show that IPC directly contributes to improved patient safety by minimizing diagnostic and procedural errors, particularly in imaging and radiation therapy. For example, close collaboration between radiology professionals and nurses during patient preparation was found to significantly reduce incorrect imaging protocols, contrast administration errors, and repeat scans. This finding mirrors previous work by Al Abdullah et al. (2023), which highlighted that communication breakdowns are among the leading causes of imaging-related safety incidents. When nurses clarify patient histories and contraindications—such as allergies, pregnancy status, or renal complications—radiographers are better equipped to select appropriate imaging parameters, reducing risks of adverse events.

In radiation therapy settings, collaboration between nurses and radiation therapists improved treatment precision through coordinated verification of patient positioning, treatment plans, and side-effect monitoring. Evidence from the reviewed studies shows that regular safety huddles and joint treatment-planning sessions decreased near-miss events in radiotherapy departments. These results are consistent with the findings of Abdul (2022), which emphasizes that multidisciplinary safety checks significantly reduce radiotherapy errors. Furthermore, shared responsibility for patient assessment allowed early detection of

complications such as skin reactions, fatigue, and radiation-induced toxicity, demonstrating how IPC strengthens patient monitoring and mitigates risks across the treatment continuum.

3.3.2 Influence on Patient Experience and Satisfaction

The review also finds that IPC positively shapes patient experience, largely through improved communication, emotional support, and continuity of care. Collaborative teamwork ensures that patients receive consistent information regarding procedures, risks, timelines, and expected outcomes. For example, when nurses, radiographers, and radiation therapists jointly guide patients through imaging or treatment processes, patients report greater confidence and reduced anxiety. Several studies, including those by Ball et al. (2021), show that clear, coordinated communication reduces fear associated with medical imaging and radiation therapy, particularly among first-time patients undergoing complex procedures such as MRI scans or radiotherapy fractions.

Moreover, IPC enhances continuity of care, as professionals share updates regarding patient progress, symptoms, and procedural outcomes. This limits conflicting information and ensures that patients perceive the care process as organized and supportive (Coetzee, 2024). Evidence from patient-satisfaction surveys in imaging departments demonstrates that when nurses and radiology staff collaborate in patient education and preparation, satisfaction scores significantly improve due to increased trust and perceived professionalism.

Patients also benefit from reduced wait times and more predictable care journeys—factors closely tied to satisfaction. Collaborative task-sharing, such as nurses assisting with patient positioning for imaging or radiographers updating nurses on changes in patient status, helps streamline care pathways. As noted in previous research, patient perception of teamwork among caregivers is strongly associated with higher satisfaction and overall confidence in the healthcare system (D'Alimonte, 2017).

3.3.3 Contribution to Workflow Efficiency and Service Delivery

The evidence strongly suggests that IPC enhances workflow efficiency and optimizes service delivery in radiology and radiotherapy departments. Collaborative practices such as shared scheduling, cross-disciplinary briefings, and coordinated patient preparation reduce bottlenecks and minimize procedural delays. For instance, the review identified that when nurses and radiology professionals collaborate on pre-imaging assessments—including verification of laboratory results, fasting status, and contrast suitability—imaging sessions proceed more smoothly with fewer interruptions. This aligns with prior studies showing that poor interdepartmental communication is a major contributor to workflow inefficiencies in imaging services (Goh, 2017).

In radiotherapy, the integration of nurses into routine treatment reviews and toxicity assessments supports radiation therapists in maintaining timely treatment schedules, especially when rapid clinical decisions are needed. By sharing information promptly, teams can adjust treatment plans, manage complications early, and avoid unnecessary cancellation or postponement of sessions. Collaborative electronic documentation systems, noted in several studies reviewed, further improve coordination by ensuring that all professionals have real-time access to patient information (Kindle, 2024).

Additionally, IPC reduces duplication of tasks. For example, collaborative use of standardized communication tools such as SBAR (Situation–Background–Assessment–Recommendation) minimizes repeated questioning and redundant documentation. As a result, departments experience improved throughput and reduced patient backlogs (LeGuerrier et al., 2019).

3.4 Organizational and System-Level Factors Affecting Interprofessional Collaboration

The review revealed that collaboration among nurses, radiology professionals, and radiation therapists is shaped not only by interpersonal dynamics but also by the broader organizational and systemic environment

in which these professions operate. Institutional leadership, training structures, communication systems, and health facility infrastructure were found to significantly influence how effectively these professional groups coordinate care. These findings align with earlier research showing that IPC thrives in systems where policies, workflows, and technologies intentionally support teamwork rather than constrain it (McLaren et al., 2024; Oliveira et al., 2023).

3.4.1 Leadership and Management Support

The analysis showed that leadership practices play a pivotal role in fostering or hindering a collaborative culture across departments. Facilities where leaders adopted transformational and participatory leadership styles demonstrated stronger collaborative behaviours among staff. For instance, nurse managers who involved radiographers and radiation therapists in unit-level decision-making—such as scheduling protocols, safety rounds, and workflow redesign—created a climate of mutual respect and shared accountability. This finding parallels results from Schultz et al. (2021), who observed that inclusive leadership enhances cross-disciplinary trust and reduces role-based tensions.

Conversely, hierarchical leadership structures—common in radiology and oncology departments—were found to limit collaboration by reinforcing disciplinary silos. Participants in several reviewed studies described scenarios where radiology department heads made unilateral decisions regarding imaging workflows without consulting nursing teams, resulting in delays, miscommunication, and reduced service coordination. This is consistent with the literature, which notes that rigid administrative control often impedes IPC by discouraging open communication and limiting the flexibility required for patient-centred care (Wright, 2024).

Policy-level support was also identified as a key determinant. Institutions with explicit IPC policies—such as joint departmental meetings, structured interdisciplinary rounds, and shared performance indicators—reported improved teamwork and conflict resolution. These findings reinforce earlier evidence demonstrating that governance structures that institutionalize collaboration lead to more consistent interprofessional engagement (Shah, 2025).

3.4.2 Interprofessional Training and Education Programs

The review highlighted that training and education are foundational in developing functional and sustainable IPC. Joint training initiatives—such as interprofessional workshops, case-based learning, and shared simulation exercises—were consistently associated with improved communication and clearer role recognition among nurses, radiographers, and radiation therapists. For example, studies in radiotherapy centres reported that simulation-based emergency response training enabled nurses and radiation therapists to coordinate more efficiently during treatment interruptions, patient falls, or acute reactions, indicating strengthened collaborative competencies.

The findings align closely with Mudadi et al. (2024), who argue that interprofessional education (IPE) reduces role misconceptions and enhances shared problem-solving. Participants in several included studies reported that prior to IPE exposure, they held incomplete or inaccurate assumptions regarding each profession's scope of practice. After participating in joint training programs, however, professionals were more confident in delegating tasks appropriately and engaging in shared care planning.

Continuous professional development (CPD) also emerged as essential. Institutions that offered ongoing rather than one-off IPE experiences showed greater long-term improvements in IPC. This resonates with the work of Lee et al. (2020), which emphasizes that sustained education is necessary to shift professional cultures and produce durable collaborative behaviours. Without such reinforcement, initial gains from IPE programs tended to diminish over time.

3.4.3 Communication Systems, Technology, and Infrastructure

Technological systems and communication infrastructure were found to significantly impact the ease and quality of collaboration among the three professions. Reviews revealed that centres equipped with integrated digital health systems, such as shared electronic medical records (EMRs), computerized radiology information systems (RIS), and treatment planning systems (TPS), demonstrated smoother coordination during patient assessment, imaging, and therapy processes. Shared access to imaging results, treatment notes, and nursing reports minimized duplication of tasks and reduced delays commonly associated with fragmented information flow (Lam, 2015).

For example, one study cited the implementation of a shared PACS-RIS-EMR interface, which enabled radiation therapists and radiology professionals to view updated nursing assessments before preparing patients for procedures. This facilitated real-time adjustments in positioning, contrast administration, and patient safety protocols. Such findings correspond with prior research identifying digital integration as a catalyst for IPC, particularly in high-technology environments like radiology and radiotherapy (Hilder et al., 2018).

However, not all institutions benefitted equally from technology. The review found that outdated systems, limited access to workstations, and insufficient IT support frequently constrained collaborative practice. Facilities where nurses lacked direct access to imaging or radiotherapy documentation systems experienced communication gaps, leading to incomplete patient preparation or inconsistent handovers. These challenges echo earlier studies stressing that digital tools must be supported by adequate training, maintenance, and equitable access to be effective enablers of IPC (Gillan et al., 2015).

Physical infrastructure also played a role. Departments designed with segmented workspaces—such as isolated imaging suites or distant radiotherapy units—were more prone to communication delays. Conversely, facilities with shared workstations, centralized reporting hubs, or co-located multidisciplinary rooms reported enhanced informal communication and more spontaneous collaborative problem-solving (Davis, 2015).

3.5 Implications for Practice, Policy, and Future Research

The findings of this review underscore the critical role of interprofessional collaboration (IPC) in optimizing patient outcomes, improving workflow efficiency, and enhancing the quality of care in imaging and radiotherapy settings. The synthesis of evidence highlights both facilitators and barriers to effective collaboration, offering insights into how practice, policy, and future research can be shaped to strengthen IPC across healthcare systems.

3.5.1 Implications for Clinical Practice

The review demonstrates that successful IPC relies heavily on clear role delineation, mutual respect, and structured communication among nurses, radiation therapists, and radiology professionals. In clinical practice, implementing strategies that reinforce these principles can significantly enhance patient care. For example, structured interdisciplinary rounds and joint case discussions allow team members to share insights and coordinate treatment plans, thereby reducing errors and improving patient safety—a finding consistent with studies by Chen (2024) and Arruzza et al. (2023) which emphasize the value of collaborative practice in complex healthcare settings.

Additionally, role clarification through competency frameworks or standardized protocols can prevent task duplication and conflicts. For instance, clearly defining which professional is responsible for patient positioning, imaging quality checks, or patient education ensures efficiency and accountability in radiotherapy workflows. Moreover, enhancing communication channels through digital platforms, checklists, or handover tools can minimize information gaps, echoing the findings of Al Abdullah et al. (2023) on structured communication improving teamwork effectiveness in oncology services. Training programs that focus on interprofessional skills, such as conflict resolution, shared decision-making, and

collaborative problem-solving, can further reinforce a culture of teamwork across imaging and radiotherapy departments.

3.5.2 Implications for Healthcare Policy and Organizational Development

At the policy and organizational level, the review highlights the need for structural reforms and resource allocation to facilitate IPC. Healthcare organizations should embed interprofessional collaboration within strategic objectives, linking it to quality assurance and patient safety metrics. Policies that incentivize collaborative practice, such as performance evaluations tied to teamwork outcomes, can foster a sustained commitment to IPC (Bolderston, 2010).

Resource allocation is another critical factor. Adequate staffing, access to shared technological tools, and protected time for interdisciplinary meetings can directly impact the ability of teams to collaborate effectively. The review's findings align with prior research by Clarke et al. (2024), which suggests that organizational support and leadership engagement are pivotal in nurturing interprofessional culture. Leaders must champion collaboration through mentorship, conflict mediation, and by modeling collaborative behavior, creating an environment where IPC is not optional but integral to service delivery.

Additionally, policy reforms should address systemic barriers such as hierarchical structures and rigid professional boundaries, which can impede cooperation. Establishing standardized protocols for interdisciplinary care pathways and integrating IPC principles into accreditation and licensure requirements can formalize collaborative expectations and promote accountability at institutional and national levels (Erler, 2023).

3.5.3 Directions for Future Research

Despite growing recognition of the importance of IPC, significant gaps remain in understanding its contextual effectiveness and outcomes in imaging and radiotherapy settings. Future research should explore longitudinal impacts of IPC on patient outcomes, such as treatment accuracy, safety, and satisfaction, using both qualitative and quantitative methodologies (Hkamy, 2024).

Moreover, studies are needed to evaluate the effectiveness of specific collaborative interventions, such as team-based training, digital communication platforms, and role clarification frameworks. Comparative research examining different organizational models of IPC across regions or healthcare systems can identify context-specific best practices and scalable strategies. Additionally, more research focusing on the perspectives of patients regarding interprofessional care, as well as on the economic implications of IPC for resource utilization, would provide a more holistic understanding of its value (Lee, 2020).

By addressing these gaps, future studies can inform evidence-based policies, enhance clinical protocols, and ultimately strengthen collaborative practice among nurses, radiation therapists, and radiology professionals, leading to improved healthcare delivery and patient outcomes.

4. Conclusion

This comprehensive review highlights the critical role of interprofessional collaboration (IPC) among nurses, radiation therapists, and radiology professionals in enhancing healthcare delivery within imaging and radiotherapy services. The findings indicate that effective collaboration fosters improved patient outcomes, enhances safety, and streamlines service efficiency. Nurses contribute holistic patient care and coordination, radiation therapists ensure precision in treatment delivery, and radiology professionals provide accurate diagnostic support. When these roles intersect seamlessly, the resulting synergy enhances both clinical effectiveness and patient satisfaction.

Despite its clear benefits, the review also underscores persistent barriers to IPC, including role ambiguity, communication gaps, and organizational constraints. Leadership support, institutional policies that

encourage shared decision-making, and structured communication frameworks emerged as key facilitators of successful collaboration. Evidence from prior studies corroborates that structured IPC initiatives, such as interdisciplinary rounds, joint training, and standardized protocols, significantly enhance teamwork and mitigate errors.

From a broader perspective, this review demonstrates that IPC is not merely a clinical necessity but a strategic approach to healthcare system optimization. Strengthening collaborative practices requires deliberate efforts at both the individual and organizational levels, including professional development, resource allocation, and policy reforms tailored to the needs of imaging and radiotherapy departments.

In conclusion, fostering robust interprofessional collaboration among nurses, radiation therapists, and radiology professionals is essential for delivering high-quality, patient-centered care. Future research should focus on longitudinal evaluations of IPC interventions, exploring the impact of cultural, technological, and systemic factors on teamwork, and developing evidence-based frameworks to sustain collaboration across healthcare settings. By prioritizing IPC, healthcare institutions can achieve safer, more efficient, and more integrated patient care.

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