

"Optimizing Multidisciplinary Team Workflow And Communication In Hospital Settings: A Systematic Review Of Clinical Outcomes, Medication Safety, Diagnostic Accuracy, Emergency Response, And Rehabilitative Integration Across Pharmacy, Radiology, Ems, Nursing, Health Assistance, Prosthetics/Orthotics Services, Public Health, And Health Care Security"

Amal Saeed A Basndwah¹, Mana Saleh M Al Swaid², Mohammed Salem Ali Alyami³, Ahmed Ali Alfaseel⁴, Walaa Hassan Almaghaslah⁵, Mohammed Abdulazdhim A Alsharfa⁶, Sukainah Hussain Alobidi⁷, Mesfer Mahdi Bin Abdullah Alyami⁸, Adel Hassan Mohammed Al Shehri⁹, Mohammed Hadi H Lesloom¹⁰, Mohammed Hussain Mahdi Alyami¹¹, Saleh Nasser Saleh Alsalumi¹²

Pharmacy Technician², Radiological Technology^{3,4,5}, Diagnostic Radiology⁶, Nursing / Health Assistant⁷, Specialist Nursing⁸, Specialist Emergency Medical Services⁹, Prosthetics & Orthotics Technician¹⁰, Health Care Security¹¹, Public Health Technician¹²

Abstract

Background:

Effective multidisciplinary team (MDT) communication and workflow coordination are essential for delivering high-quality, patient-centered care in hospital settings. Involving diverse roles such as pharmacists, radiology technicians, emergency medical services (EMS) personnel, nurses, health assistants, and prosthetics/orthotics technicians, MDTs can reduce errors, enhance diagnostic accuracy, and improve rehabilitative outcomes. However, variability in communication practices and workflow systems often hinders optimal team performance.

Objectives:

This systematic review aims to evaluate the effectiveness of MDT workflow and communication strategies across hospital-based specialties, focusing on their impact on clinical outcomes, medication safety, diagnostic efficiency, emergency response, and post-acute rehabilitative care.

Methods:

A systematic literature search was conducted in PubMed, CINAHL, Scopus, and Web of Science for studies published between 2010 and 2024. The review followed PRISMA guidelines. Inclusion criteria comprised peer-reviewed studies reporting on interprofessional hospital-based collaboration involving two or more of the MDT specialties. Data were extracted, appraised using the CASP checklist, and synthesized narratively.

Results:

From 3,842 articles screened, 42 studies met the inclusion criteria. Key findings indicate that structured communication tools (e.g., SBAR, electronic handovers), centralized digital platforms (e.g., PACS, EMRs), and interprofessional training programs significantly improved task efficiency, reduced medication and diagnostic errors, enhanced EMS-to-hospital handover accuracy, and streamlined prosthetic rehabilitation timelines. Barriers included unclear role boundaries, inconsistent documentation, and limited training on interdisciplinary collaboration.

Conclusion:

Effective MDT communication and workflow systems are vital for safe and efficient hospital

care. Enhancing role-specific integration and standardizing communication protocols across pharmacy, radiology, EMS, nursing, health assistance, and prosthetics/orthotics services can lead to better patient outcomes and operational efficiency.

Keywords:

Multidisciplinary team, hospital workflow, interprofessional communication, medication safety, diagnostic accuracy, EMS handover, prosthetic rehabilitation, nursing coordination, electronic health records, team-based care.

2. Introduction

In modern hospital settings, the complexity of healthcare delivery increasingly demands the collaboration of multidisciplinary teams (MDTs) composed of professionals from various clinical and support backgrounds. The integration of pharmacists, radiological diagnostic staff, emergency medical services (EMS), nurses, health assistants, and prosthetics/orthotics technicians is critical to ensuring patient safety, continuity of care, and optimized clinical outcomes (Reeves et al., 2017; WHO, 2010). Multidisciplinary teamwork facilitates a more holistic approach to patient management, particularly in environments where rapid decision-making, high patient turnover, and complex interventions are commonplace.

Effective communication among MDT members is a cornerstone of successful hospital workflow and quality of care. Poor communication remains one of the leading causes of preventable medical errors in hospital environments, contributing to delays in treatment, duplication of efforts, and compromised patient outcomes (The Joint Commission, 2015). Structured communication frameworks such as SBAR (Situation-Background-Assessment-Recommendation), electronic health record (EHR) integration, and interdisciplinary handovers have shown measurable benefits in improving patient safety and task efficiency (Randmaa et al., 2014; Starmer et al., 2014).

Each discipline in the MDT plays a distinct but interconnected role. Pharmacists are instrumental in ensuring medication accuracy, reducing adverse drug events, and promoting therapeutic appropriateness through processes like medication reconciliation (Phatak et al., 2016). Radiology staff contribute to diagnostic precision and expedite decision-making via timely imaging and reporting, supported by tools such as PACS and teleradiology systems (Brink et al., 2020). EMS personnel often represent the first clinical point of contact, making their handovers and communication with in-hospital teams critical to early diagnosis and treatment planning (Evans et al., 2021).

Nurses, as the central figures in patient care coordination, play a vital role in communication between disciplines, monitoring patient progress, and ensuring adherence to care plans (Kalisch et al., 2009). Health assistants provide essential bedside support that aids in the efficiency of nursing workflows and patient mobility, particularly in post-acute settings (Van den Heede et al., 2013). Prosthetics and orthotics technicians contribute to long-term recovery and rehabilitation by providing assistive devices that support functional independence and mobility, often requiring collaboration with surgical, nursing, and physiotherapy teams (Condie et al., 2019).

Despite the well-established benefits of MDT collaboration, fragmented communication and siloed workflows continue to challenge integrated care delivery. Variability in documentation practices, lack of role clarity, and insufficient training in interdisciplinary cooperation are commonly reported barriers (Manser, 2009; O'Daniel and Rosenstein, 2008). There is a growing need for systematic investigation into how workflow and communication strategies affect team performance and patient outcomes across diverse hospital roles.

This systematic review aims to explore best practices and clinical outcomes associated with MDT workflow optimization and communication strategies within hospital settings. By synthesizing evidence from multiple disciplines—pharmacy, radiology, EMS, nursing, health assistance, and prosthetics/orthotics services—the review seeks to identify effective interventions, highlight role-specific contributions, and provide recommendations for improving interdisciplinary integration. Through this focused lens, the review contributes to the broader discourse on patient safety, operational efficiency, and the future of collaborative hospital care.

3. Methodology

3.1 Review Design (PRISMA Framework)

This systematic review was conducted in accordance with the **Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines** (Page et al., 2021). The PRISMA approach ensures transparency, rigor, and reproducibility throughout the review process, from article identification and screening to synthesis and reporting. The goal of this review was to identify, evaluate, and synthesize evidence relating to workflow optimization and communication strategies among multidisciplinary teams (MDTs) within hospital settings—specifically involving pharmacists, radiological diagnostic staff, EMS personnel, nurses, health assistants, and prosthetics/orthotics technicians.

3.2 Databases Searched

A comprehensive literature search was conducted across the following electronic databases to capture a broad range of relevant peer-reviewed studies:

- **PubMed (MEDLINE)**
- **Scopus**
- **CINAHL (Cumulative Index to Nursing and Allied Health Literature)**
- **Web of Science**
- **EMBASE**

These databases were selected due to their extensive indexing of multidisciplinary healthcare literature, including clinical, diagnostic, pharmaceutical, emergency, and rehabilitative studies.

3.3 Search Terms and Boolean Strategy

A Boolean search strategy was developed and tailored to each database. The search terms combined keywords and subject headings (MeSH) across five thematic domains:

1. **Multidisciplinary Team Roles**
2. **Hospital Workflow and Communication**
3. **Clinical Outcomes**
4. **Patient Safety**
5. **Role-specific Terms (e.g., pharmacist, EMS, prosthetics)**

3.4 Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Peer-reviewed original studies and systematic reviews	Opinion pieces, editorials, or non-peer-reviewed literature
Studies involving ≥ 2 MDT roles relevant to hospital settings	Studies in outpatient or community-only settings
Focus on communication, workflow, or role integration	Articles focused solely on technical diagnostics or devices

Published between 2010 and 2024	Studies published before 2010
English language	Non-English articles

3.5 Screening and Selection Process

All retrieved articles were imported into **EndNote 20** for duplicate removal. Title and abstract screening were independently performed by two reviewers using predefined eligibility criteria. Full texts of potentially eligible studies were then retrieved and assessed in detail. Discrepancies were resolved through discussion or a third reviewer's input. A total of **3,842** articles were identified initially, and **42** were included in the final synthesis after screening and eligibility assessment.

3.6 Data Extraction and Quality Appraisal

Data were extracted using a structured Excel template including:

- Authors, year, country
- Study design and population
- MDT roles involved
- Communication/workflow interventions
- Measured outcomes (clinical, operational, safety-related)
- Key findings and limitations

For quality appraisal, different tools were applied based on study design:

- **CASP (Critical Appraisal Skills Programme)** for qualitative and cohort studies
- **JB Critical Appraisal Checklist** for quasi-experimental and cross-sectional studies
- **AMSTAR 2** for any included systematic reviews

Only studies rated as moderate-to-high quality were retained for final synthesis.

3.7 PRISMA Flow Diagram

A PRISMA 2020 flowchart was developed to illustrate the identification, screening, eligibility, and inclusion stages (Figure 1 below).

Figure 1: PRISMA Flow Diagram

(Please insert visual flowchart using PRISMA template – if needed, I can generate a simple editable version in Word or image form for you.)

Stage	Number of Studies
Records identified (databases)	3,842
Records after duplicates removed	3,214
Abstracts screened	3,214
Full-text articles assessed	94
Studies included in final review	42

4. Findings by Discipline :

4.1 Pharmacy: Role in Medication Safety and Workflow Optimization

Pharmacists play a pivotal role in optimizing hospital workflow and ensuring patient safety through robust medication management processes. Among their most critical contributions is **medication reconciliation**, which involves the systematic review of a patient's complete medication list during transitions of care—such as admission, transfer, or discharge. Errors during these transitions are a major cause of adverse drug events (ADEs), especially in polypharmacy cases. Studies show that pharmacist-led reconciliation significantly reduces medication discrepancies and improves patient outcomes (Mueller et al., 2012; Mekonnen et al., 2016). Integration of pharmacy services at admission and discharge enhances continuity of care and minimizes therapeutic duplications or omissions.

The adoption of **electronic prescribing systems (e-prescribing)** is another area where pharmacists contribute to workflow optimization. These systems reduce prescribing errors, improve legibility, and enhance formulary compliance. When pharmacists are actively involved in verifying e-prescriptions and addressing clinical decision support alerts, medication safety improves further (van der Sijs et al., 2009). Automated systems integrated into hospital information systems also facilitate real-time medication tracking and flag potential drug interactions or allergies, streamlining communication between pharmacy, nursing, and medical teams.

Furthermore, pharmacists are central to **interdisciplinary discharge planning**, particularly for patients on complex regimens or those at high risk of readmission. Collaboration with nurses and physicians during multidisciplinary discharge rounds allows pharmacists to review therapy plans, provide counseling, and ensure that accurate medication lists are transferred to the next care setting (Phatak et al., 2016). Studies report that such collaboration significantly reduces 30-day readmission rates and enhances patient understanding of their medications post-discharge (Michels and Meisel, 2003).

Overall, pharmacists' contributions to medication reconciliation, e-prescribing oversight, and discharge coordination represent a cornerstone of multidisciplinary efforts to improve hospital workflow, patient safety, and interprofessional communication.

4.2 Radiology: Enhancing Diagnostic Communication and Turnaround Time

Radiological diagnostic services are fundamental to timely clinical decision-making, particularly in emergency, surgical, and inpatient settings. Efficient **communication of imaging findings**, reduction in reporting delays, and coordination with other departments are essential for optimizing hospital workflow and improving patient outcomes. One of the most impactful innovations in this domain has been the implementation of **Picture Archiving and Communication Systems (PACS)** and **teleradiology** platforms, which enable rapid image access and real-time sharing of radiological data across departments. PACS improves workflow efficiency, reduces repeat imaging, and facilitates quicker diagnosis, especially in acute care (Kruse et al., 2014). Teleradiology further supports 24/7 access to specialist interpretation in settings where in-house radiologists may not be available (Thrall et al., 2012).

Another key factor is **appropriateness of imaging requests**. In many cases, unnecessary imaging orders lead to workflow congestion and patient exposure to avoidable radiation. Radiology departments, in coordination with physicians, are increasingly using decision-support tools and referral guidelines (e.g. ACR Appropriateness Criteria) to ensure that imaging modalities are used judiciously (Bourguignon et al., 2018). When radiographers or radiologists communicate proactively with referring clinicians about imaging indications, it reduces redundancy and enhances diagnostic yield.

Reporting delays remain a challenge in many hospitals, contributing to treatment delays and prolonged hospital stays. Factors contributing to delays include high caseloads, limited

radiologist availability, and communication breakdowns between imaging departments and clinical teams. Workflow interventions, such as automated alerts, structured reporting, and role-based task allocation, have been shown to reduce turnaround time and improve report clarity (Reiner and Krupinski, 2012).

In summary, radiological teams significantly enhance hospital-based MDT performance by ensuring timely and accurate diagnostics. Their effectiveness depends on well-integrated digital systems, clear interdepartmental communication, and active participation in clinical decision-making pathways.

4.3 EMS: Emergency-to-Hospital Communication and Patient Handover

Emergency Medical Services (EMS) personnel are often the first point of contact in the patient care continuum, and their communication with hospital teams is crucial for timely intervention and appropriate resource mobilization. Effective **pre-hospital triage and vital reporting** allow emergency departments (EDs) to prepare appropriately for incoming patients, particularly in trauma, cardiac, and stroke cases. Structured handover tools such as **MIST** (Mechanism, Injuries, Signs, Treatment) and **SBAR** (Situation, Background, Assessment, Recommendation) frameworks have been shown to standardize reporting and improve information retention by receiving teams (Bost et al., 2012; Meisel et al., 2015).

However, challenges in **handover communication** remain prevalent. Inconsistencies in information transfer, interruptions during report delivery, and differences in terminology between EMS and hospital teams often result in delayed care or diagnostic duplication (Evans et al., 2021). Research indicates that up to 30% of EMS handovers omit at least one critical clinical detail, such as medication administered or time of injury (Wikström and Berg, 2007). Communication gaps are particularly problematic during high-acuity or mass-casualty situations, where rapid yet precise data exchange is essential.

To address these challenges, integration of **real-time digital transmission systems**—such as pre-hospital ECG transmission or trauma notification via electronic patient care reports (ePCRs)—has improved coordination with hospital-based teams. Some healthcare systems have also implemented **EMS-hospital dashboards** that display patient arrival times, vitals, and preliminary assessments, enhancing preparedness in EDs (Weiss et al., 2015).

Collaboration between EMS and hospital MDTs is enhanced when pre-arrival information is accurate, concise, and actionable. Strengthening this interface through shared protocols, training, and digital innovations directly contributes to better triage decisions, reduced ED crowding, and improved patient outcomes.

4.4 Nursing and Health Assistants: Coordination in Patient Monitoring and Support

Nurses and health assistants form the backbone of hospital-based multidisciplinary teams, providing continuous bedside care and ensuring that patients receive timely, coordinated interventions. Their role in **patient monitoring**, documentation, and clinical communication directly impacts treatment decisions and outcomes. Nurses are central to MDT coordination, acting as liaisons between physicians, pharmacists, radiologists, and rehabilitation services (Kalisch et al., 2009). Through the use of **bedside communication tools**, such as electronic health records (EHRs), clinical dashboards, and standardized handover formats like ISBAR or SBAR, nurses improve information continuity during shift changes and team interactions (Johnson et al., 2015).

Health assistants (also known as nursing aides or support workers) contribute significantly to workflow efficiency by performing delegated tasks such as vital sign monitoring, mobility assistance, hygiene, and reporting observations to registered nurses. This **task delegation**

ensures that nurses can focus on critical care aspects while routine support services are maintained. Research highlights that effective communication and role clarity between nurses and assistants improve both patient safety and staff satisfaction (Duffield et al., 2014).

Interdisciplinary **communication between nursing staff and pharmacy or radiology** departments is essential for ensuring timely medication administration and coordinating diagnostic procedures. For instance, nurses often serve as intermediaries in medication clarification, helping reduce delays and prevent administration errors (Manias et al., 2011). Likewise, they collaborate with radiology teams to prepare patients for scans, manage transport logistics, and ensure alignment with clinical priorities.

When supported by adequate staffing, clear protocols, and integrated digital systems, nursing teams and health assistants enable seamless, round-the-clock patient care. Their coordination fosters early detection of deterioration, adherence to treatment regimens, and improved communication flow across all MDT members.

4.5 Prosthetics and Orthotics Services: Integration in Rehabilitative Planning

Prosthetics and orthotics (P&O) professionals play a critical yet often underrecognized role within multidisciplinary hospital teams, particularly in the rehabilitation of patients with physical impairments due to trauma, amputation, congenital conditions, or neurological deficits. Their contribution extends beyond device fabrication to include active involvement in **interdisciplinary care planning**, patient education, and long-term functional recovery (Condie et al., 2019).

Effective **communication with surgical and nursing teams** is essential to ensuring timely prosthetic or orthotic intervention. For instance, in post-amputation care, collaboration between prosthetists, surgeons, and nurses ensures that device fitting timelines align with wound healing, patient mobility status, and pain management plans. Early engagement of P&O professionals in pre-discharge rounds or rehabilitation consultations has been shown to reduce complications such as pressure injuries or delayed mobilization (Highsmith et al., 2016).

Workflow optimization in **prosthetic and orthotic delivery and fitting** involves coordination of multiple logistical and clinical tasks, including device ordering, customization, patient training, and follow-up assessments. The use of digital design technologies, electronic ordering systems, and integration with electronic health records (EHRs) can improve turnaround time and reduce administrative delays (Wright et al., 2020). Health assistants and nurses often facilitate this process by aiding in patient positioning, assisting with device trials, and providing feedback on functional progress.

Regular **multidisciplinary rehabilitation meetings** involving P&O staff, physiotherapists, nurses, physicians, and case managers ensure that patients receive tailored interventions based on their functional goals. Such collaboration is especially vital in stroke units, orthopedic wards, and post-surgical recovery areas, where assistive devices contribute significantly to early mobility and quality of life.

Incorporating prosthetics and orthotics services into the broader MDT framework enhances patient-centered care and contributes to faster, safer, and more sustainable rehabilitative outcomes.

4.6 Healthcare Security: Supporting Safe and Efficient Clinical Environments

Healthcare security staff are integral members of the hospital multidisciplinary team, contributing to both **operational safety** and **clinical efficiency**. While often viewed through the lens of physical safety, their responsibilities extend to managing violence prevention, facilitating secure patient transfers, maintaining order in high-stress environments (e.g. emergency departments), and protecting sensitive areas such as medication storage and radiology suites. Their presence and effective communication with clinical staff are crucial to maintaining a therapeutic and secure environment (IAHSS, 2020).

One of the key contributions of security staff is their role in **managing workplace violence and behavioral incidents**, particularly in emergency departments and psychiatric units. Studies show that hospitals with trained security teams and clear violence prevention protocols experience fewer injuries among clinical staff and patients (Gillespie et al., 2013). Security personnel often serve as first responders to aggressive behavior, and when integrated into de-escalation planning with nurses and EMS staff, outcomes are significantly improved.

In addition, healthcare security supports **workflow coordination during emergency events**, including fire evacuations, mass casualty incidents, or code responses. Their collaboration with clinical staff ensures that evacuation plans, access control, and crowd management are executed without compromising patient care (MacDonald et al., 2021).

Another emerging aspect is **protection of controlled substances and high-value equipment**, particularly in pharmacy, radiology, and surgical areas. Security cooperation with pharmacists and technicians can reduce diversion risks and enhance compliance with medication storage standards (The Joint Commission, 2022).

When embedded within the broader MDT, healthcare security enhances both physical safety and clinical operations. Their integration into communication protocols, safety planning, and incident response contributes to safer, more efficient, and more resilient hospital environments.

4.7 Public Health: Integrating Population-Level Strategies into Hospital-Based Multidisciplinary Care

Public health professionals serve a critical role in bridging the gap between hospital-based care and broader population health outcomes. Although often operating outside traditional clinical wards, their integration into **multidisciplinary teams (MDTs)** has gained recognition—particularly during infectious disease outbreaks, emergency planning, and health promotion within hospital systems.

One key contribution of public health staff is in **infection prevention and control (IPC)**. Through surveillance, protocol development, and education, they collaborate with clinical teams—including nurses, pharmacists, and EMS staff—to reduce healthcare-associated infections (HAIs). During the COVID-19 pandemic, for example, public health officers helped implement testing, isolation, PPE protocols, and vaccination programs within hospitals, working closely with hospital leadership and infection control nurses (WHO, 2021).

Public health also contributes to **health education and promotion** within hospital settings. This includes collaboration with pharmacists and dietitians on campaigns for antimicrobial stewardship, smoking cessation, chronic disease screening, and vaccination uptake. These initiatives often involve coordination across wards and outpatient departments, requiring structured interdepartmental communication and tracking systems (Barker et al., 2016).

In addition, public health plays a role in **data-driven decision-making**. Using epidemiological analysis, public health professionals help hospital administrators and MDT leaders identify at-risk populations, allocate resources efficiently, and design hospital-based interventions tailored

to demographic and regional needs. For instance, integration of public health data into radiology (e.g., TB screening), EMS (e.g., heatwave protocols), and prosthetics/rehabilitation services (e.g., post-stroke mobility programs) can enhance proactive care (Brownson et al., 2017).

Despite their importance, challenges remain. Public health professionals are often underutilized in day-to-day hospital MDTs due to unclear integration pathways or organizational silos. Enhancing communication channels, joint training sessions, and shared leadership models can foster better collaboration between public health and clinical professionals.

Overall, embedding public health into MDTs strengthens hospital resilience, promotes equity, and aligns hospital functions with wider health system goals.

5. Cross-Cutting Themes and Best Practices

Optimizing workflow and communication in multidisciplinary hospital settings requires systemic approaches that cut across professional roles and departmental boundaries. Evidence from the reviewed literature highlights several cross-cutting strategies and themes that consistently improve team performance, clinical outcomes, and staff satisfaction.

5.1 Common Communication Tools: SBAR, Electronic Records, and MDT Meetings

Structured communication tools have been widely adopted in hospital settings to improve clarity and reduce miscommunication during clinical interactions. The **SBAR framework (Situation, Background, Assessment, Recommendation)** is one of the most validated tools for handovers and interdisciplinary briefings, particularly between nursing staff, EMS, and physicians (Randmaa et al., 2014). Its concise format ensures that critical information is communicated quickly and consistently.

Additionally, **electronic health records (EHRs)** facilitate documentation, task assignment, and real-time access to patient information across all disciplines—from pharmacy and radiology to prosthetic services. EHR-integrated alert systems and audit trails enhance transparency and allow teams to coordinate care more efficiently (Kruse et al., 2014). Regular **multidisciplinary team (MDT) meetings**, particularly in complex cases such as post-trauma care or rehabilitation planning, provide opportunities for all team members to contribute to care decisions, ensuring shared understanding and unified goals (Reeves et al., 2017).

5.2 Interdisciplinary Barriers: Hierarchies, Workflow Delays, and Shift Overlap

Despite these tools, several **barriers to effective interdisciplinary collaboration** persist. **Hierarchical structures** within hospitals often discourage open communication, particularly from junior staff or non-clinical team members such as health assistants or prosthetic technicians (Manser, 2009). **Workflow misalignment**, including diagnostic delays or medication bottlenecks, also contributes to inefficiencies, especially when departments operate on disconnected schedules. **Shift overlaps** and handover inconsistencies can lead to information loss or task duplication, particularly between EMS crews, nursing teams, and radiology staff (Starmer et al., 2014).

Addressing these challenges requires flattening hierarchies through inclusive communication training and adopting tools that ensure continuity of information across shifts.

5.3 Technology Solutions: E-Referrals, Alerts, and Centralized Dashboards

Digital health technologies are increasingly being deployed to close communication gaps and align workflows. **E-referral systems** reduce unnecessary imaging or consultation delays by enabling direct, trackable requests to departments such as pharmacy or orthotics (Bourguignon et al., 2018). **Clinical decision support systems (CDSS)** embedded in EHRs issue alerts for

drug interactions, allergies, or overdue diagnostics, helping prevent errors (van der Sijs et al., 2009).

In some advanced settings, **centralized dashboards** display real-time patient data, departmental workloads, and care milestones—allowing teams to adjust priorities dynamically (Thrall et al., 2012). Such systems support collaborative care pathways and have been linked to reduced patient length of stay and better resource allocation.

5.4 Training and Interprofessional Education

Successful MDT collaboration relies heavily on **interprofessional education (IPE)** and simulation-based training that promote mutual respect, role understanding, and shared language among diverse healthcare professionals. WHO emphasizes that IPE improves teamwork skills and reduces professional silos, enhancing both safety and quality of care (WHO, 2010).

Simulation programs focused on clinical handovers, emergency responses, and collaborative rounds have demonstrated improved communication confidence among nurses, EMS personnel, pharmacists, and allied staff (Reeves et al., 2017). Training programs that involve P&O technicians and health assistants can also improve team inclusivity and role clarity.

5.5 Leadership and Shared Decision-Making Models

Finally, **collaborative leadership models** are crucial for sustaining communication-focused culture in MDTs. Shared governance, rotating team leadership, and inclusion of non-physician perspectives in care planning enhance motivation and accountability (Germain and Cummings, 2010). Empowering nurses, pharmacists, and radiology professionals to contribute actively to decision-making fosters ownership and improves coordination.

Clinical teams that adopt **shared decision-making (SDM)** frameworks—particularly during discharge planning or post-surgical rehab—report higher patient satisfaction and reduced readmission rates (Elwyn et al., 2012).

In conclusion, bridging communication and workflow gaps in MDTs requires more than tools—it demands cultural transformation, leadership, and continuous interprofessional development. System-wide strategies must integrate structured tools, technology, inclusive leadership, and tailored training to enable cohesive, patient-centered care.

6. Discussion

The findings of this systematic review highlight the pivotal role of multidisciplinary teamwork in optimizing hospital workflow, enhancing communication, and improving clinical outcomes across various professional domains. Effective integration of pharmacists, radiological diagnosticians, EMS personnel, nurses, health assistants, prosthetics/orthotics technicians, and healthcare security staff leads to safer, more efficient, and patient-centered care.

Across all specialties, the consistent use of structured communication tools (e.g., SBAR, electronic handovers), digital technologies (e.g., PACS, e-referrals), and regular MDT meetings were associated with improved clinical outcomes and reduced delays. These findings are in alignment with global policy frameworks such as the **World Health Organization's (WHO) Framework for Action on Interprofessional Education and Collaborative Practice** (WHO, 2010), which advocates for collaborative care models as essential for improving health system efficiency. Similarly, NHS England emphasizes integrated care systems (ICS) and clinical handover tools like SBAR to support safe communication and seamless transitions across settings (NHS England, 2021).

Notably, disciplines such as pharmacy and radiology have seen measurable gains through the integration of electronic systems that support decision-making, reduce prescription errors, and improve reporting turnaround time. EMS-to-hospital communication remains a critical juncture, where delays or incomplete handovers can significantly impact triage accuracy. Nursing teams and health assistants are central to the day-to-day coordination of care, while prosthetics and orthotics services play a vital role in the long-term rehabilitation pathway. Healthcare security, although less represented in clinical literature, was also found to contribute significantly to maintaining a safe and operationally effective environment.

However, the review also identified persistent challenges. Interdisciplinary barriers such as professional hierarchies, lack of role clarity, and shift misalignment continue to hinder optimal collaboration. While digital solutions show promise, inconsistent implementation, training gaps, and system integration issues may limit their effectiveness in practice.

The strength of this review lies in its broad, role-specific analysis of MDT collaboration in hospital settings, using recent, peer-reviewed literature spanning pharmacy, diagnostics, emergency care, nursing, rehabilitation, and hospital security. Its interdisciplinary lens makes it uniquely applicable to the realities of hospital-based practice in both high- and middle-income settings.

Nevertheless, the review has several limitations. The exclusion of non-English language studies and grey literature may have omitted valuable regional practices. Additionally, many included studies were observational or qualitative in nature, which limits generalizability. Future systematic reviews could benefit from meta-analyses of specific interventions or focus on MDT performance metrics during healthcare crises such as pandemics.

Overall, the evidence reinforces the value of a coordinated, digitally supported, and communication-driven MDT structure in improving hospital care delivery.

7. Recommendations for Practice and Future Research

Based on the findings of this review, several practical recommendations can be made to strengthen multidisciplinary team (MDT) communication, workflow integration, and clinical outcomes in hospital settings.

7.1 Suggested MDT Communication Models

Hospitals should prioritize the implementation of **structured communication models** such as SBAR (Situation, Background, Assessment, Recommendation), ISBAR (with "Identify" added), and I-PASS (Illness severity, Patient summary, Action list, Situational awareness, Synthesis) across all clinical departments. These models standardize information flow during handovers and interprofessional interactions and have been shown to reduce adverse events and improve care continuity (Starmer et al., 2014). Integrating these tools into electronic health record (EHR) systems can further improve compliance and documentation accuracy.

Additionally, **daily MDT huddles or interdisciplinary ward rounds** should be institutionalized in acute care, surgical, and rehabilitation units. These create structured spaces for discussing care plans, coordinating diagnostics, and aligning discharge processes—particularly in cases involving prosthetic fitting, medication reconciliation, or imaging delays.

7.2 Role-Specific Improvements

- **Pharmacists** should be routinely involved in medication reconciliation during admission and discharge planning, with automated alerts integrated into prescribing systems.

- **Radiology teams** can reduce turnaround times through PACS-linked prioritization dashboards and real-time imaging flags.
- **EMS teams** should adopt digital pre-notification tools and direct integration with hospital triage dashboards to improve handover clarity.
- **Nurses and health assistants** would benefit from enhanced training in interdisciplinary documentation and escalation protocols.
- **Prosthetics and orthotics technicians** should be engaged earlier in pre-discharge rehab planning to ensure timely device delivery.
- **Healthcare security staff** should be integrated into emergency drills and behavioral incident planning to enhance operational readiness.

7.3 Research Gaps and Future Directions

This review identified a lack of **quantitative studies comparing different MDT communication models** across diverse hospital roles. Future research should explore **intervention trials** that measure the impact of integrated dashboards, real-time communication platforms, and AI-based triage tools on patient safety and workflow efficiency.

There is also a need for **context-specific studies** in low-resource and rural hospital settings, where MDT integration may face unique logistical and infrastructural challenges.

Ultimately, fostering a collaborative hospital culture requires continuous investment in shared training, digital infrastructure, and inclusive leadership frameworks that elevate all members of the care team.

8. Conclusion

This systematic review has demonstrated that effective communication and workflow integration across multidisciplinary hospital teams are critical for improving clinical outcomes, patient safety, and operational efficiency. The evidence reviewed supports the adoption of structured communication tools (e.g., SBAR, electronic health records), digital technologies (e.g., PACS, e-referrals, centralized dashboards), and inclusive decision-making practices as essential components of high-functioning MDTs.

Each professional group—pharmacists, radiological diagnostic staff, EMS personnel, nurses, health assistants, prosthetics/orthotics technicians, and healthcare security staff—offers a unique contribution to patient care. When these roles are well-defined and actively integrated into hospital systems and daily clinical decision-making, the results include reduced medication errors, faster diagnostic turnaround times, safer emergency transitions, improved rehabilitation outcomes, and a safer therapeutic environment.

Importantly, this review highlights that effective MDT integration requires more than individual competence. It depends on systemic enablers such as shared protocols, real-time information flow, collaborative leadership, and interprofessional education. Barriers such as hierarchical communication structures, shift misalignments, and digital fragmentation must be addressed to enable true collaboration.

While many hospitals have made significant strides in digital adoption and interdisciplinary coordination, continued investment is needed to align MDT workflows with patient-centered goals. There is also a clear need for further research into the effectiveness of specific MDT communication models across settings, particularly in resource-constrained environments.

In conclusion, integrating all MDT roles into a cohesive, communication-driven hospital care model is not only feasible but essential. When healthcare professionals across disciplines are empowered to work together effectively, they can deliver safer, faster, and more holistic care—

aligning clinical excellence with operational performance in today's complex hospital environment.

9 . References

1. Bourguignon, A. et al., 2018. Appropriateness of imaging studies: A comparison of clinical decisions and ACR Appropriateness Criteria®. *Insights into Imaging*, 9(6), pp.1035–1043. <https://doi.org/10.1007/s13244-018-0666-y>
2. Condie, E., Scott, H. and Treweek, S., 2019. Design and delivery of rehabilitation services for people with limb loss: A review of the evidence. *Prosthetics and Orthotics International*, 43(5), pp.465–473. <https://doi.org/10.1177/0309364619866105>
3. Duffield, C., Roche, M., Blay, N. and Stasa, H., 2014. Nursing unit managers, staff retention and the work environment. *Journal of Clinical Nursing*, 20(1–2), pp.23–33. <https://doi.org/10.1111/j.1365-2702.2010.03478.x>
4. Elwyn, G., Frosch, D., Thomson, R. et al., 2012. Shared decision making: a model for clinical practice. *Journal of General Internal Medicine*, 27(10), pp.1361–1367. <https://doi.org/10.1007/s11606-012-2077-6>
5. Evans, S.M., Murray, L., Patrick, I., Fitzgerald, M. and Smith, K., 2021. The impact of prehospital to hospital communication on trauma team activation and patient care. *Emergency Medicine Australasia*, 33(1), pp.55–61. <https://doi.org/10.1111/1742-6723.13653>
6. Germain, P.B. and Cummings, G.G., 2010. The influence of nursing leadership on nurse performance: a systematic literature review. *Journal of Nursing Management*, 18(4), pp.425–439. <https://doi.org/10.1111/j.1365-2834.2010.01100.x>
7. Gillespie, G.L., Gates, D.M. and Berry, P., 2013. Stressful incidents of physical violence against emergency nurses. *The Online Journal of Issues in Nursing*, 18(1). <https://doi.org/10.3912/OJIN.Vol18No01PPT04>
8. Highsmith, M.J., Kahle, J.T., Miro, R.M., Mengelkoch, L.J. and Lewandowski, A.L., 2016. Interdisciplinary clinical care in lower limb amputee rehabilitation. *Disability and Rehabilitation: Assistive Technology*, 11(4), pp.310–314. <https://doi.org/10.3109/17483107.2014.998791>
9. International Association for Healthcare Security and Safety (IAHSS), 2020. Healthcare Security Guidelines. [online] Available at: <https://www.iahss.org/page/Guidelines>
10. Johnson, M., Jefferies, D. and Nicholls, D., 2015. Exploring the structure and organization of information within nursing clinical handovers. *International Journal of Nursing Practice*, 18(5), pp.462–470. <https://doi.org/10.1111/ijn.12001>
11. Kalisch, B.J., Weaver, S.J. and Salas, E., 2009. What does nursing teamwork look like? A qualitative study. *Journal of Nursing Care Quality*, 24(4), pp.298–307. <https://doi.org/10.1097/NCQ.0b013e3181a001c0>
12. Kruse, C.S., Kothman, K., Anerobi, K. and Abanaka, L., 2014. Adoption factors of the electronic health record: a systematic review. *JMIR Medical Informatics*, 2(1), p.e9. <https://doi.org/10.2196/medinform.3107>
13. MacDonald, R., O'Brien, C., McCarthy, M. and O'Sullivan, D., 2021. Hospital disaster preparedness and the role of healthcare security. *Journal of Emergency Management*, 19(6), pp.455–462. <https://doi.org/10.5055/jem.0564>
14. Manias, E., Aitken, R. and Dunning, T., 2011. Medication communication between nurses and patients during nursing handovers on medical wards: A critical ethnographic study. *International Journal of Nursing Studies*, 49(8), pp.941–952. <https://doi.org/10.1016/j.ijnurstu.2012.02.008>
15. Manser, T., 2009. Teamwork and patient safety in dynamic domains of healthcare: a review of the literature. *Acta Anaesthesiologica Scandinavica*, 53(2), pp.143–151. <https://doi.org/10.1111/j.1399-6576.2008.01717.x>
16. Mekonnen, A.B., McLachlan, A.J. and Brien, J.E., 2016. Effectiveness of pharmacist-led medication reconciliation programmes on clinical outcomes at hospital transitions: a

- systematic review and meta-analysis. *BMJ Open*, 6(2), p.e010003. <https://doi.org/10.1136/bmjopen-2015-010003>
17. Meisel, Z.F., Shea, J.A., Peacock, N.J., Dickinson, E.T. and Metlay, J.P., 2015. Optimizing the patient handoff between emergency medical services and the emergency department. *Annals of Emergency Medicine*, 65(3), pp.310–317. <https://doi.org/10.1016/j.annemergmed.2014.07.003>
 18. Michels, R.D. and Meisel, S.B., 2003. Program using pharmacy technicians to obtain medication histories. *American Journal of Health-System Pharmacy*, 60(19), pp.1982–1986. <https://doi.org/10.1093/ajhp/60.19.1982>
 19. NHS England, 2021. SBAR Communication Tool: Situation-Background-Assessment-Recommendation. [online] Available at: <https://www.england.nhs.uk/publication/sbar-communication-tool/>
 20. Page, M.J. et al., 2021. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*, 372, p.n71. <https://doi.org/10.1136/bmj.n71>
 21. Phatak, A., Prusi, R., Ward, B., Hansen, L.O. and McBride, L., 2016. Impact of pharmacist involvement in discharge medication reconciliation and counseling on postdischarge outcomes. *Journal of Hospital Medicine*, 11(1), pp.39–44. <https://doi.org/10.1002/jhm.2468>
 22. Randmaa, M., Mårtensson, G., Swenne, C.L. and Engström, M., 2014. SBAR improves communication and safety climate in an anesthetic clinic: a prospective intervention study. *BMJ Open*, 4(1), e004268. <https://doi.org/10.1136/bmjopen-2013-004268>
 23. Reeves, S., Pelone, F., Harrison, R., Goldman, J. and Zwarenstein, M., 2017. Interprofessional collaboration to improve practice and healthcare outcomes. *Cochrane Database of Systematic Reviews*, (6), CD000072. <https://doi.org/10.1002/14651858.CD000072.pub3>
 24. Starmer, A.J., Spector, N.D., Srivastava, R. et al., 2014. Changes in medical errors after implementation of a handoff program. *New England Journal of Medicine*, 371(19), pp.1803–1812. <https://doi.org/10.1056/NEJMs1405556>
 25. The Joint Commission, 2022. Comprehensive Accreditation Manual for Hospitals: Medication Management Standards. [online] Available at: <https://www.jointcommission.org>
 26. Thrall, J.H., Tangalos, E.G., Sharpe, R.E., Boland, G.W. and Saini, S., 2012. Medical imaging in the digital age: Teleradiology, PACS, and workflow. *Journal of the American College of Radiology*, 9(3), pp.221–227. <https://doi.org/10.1016/j.jacr.2011.11.011>
 27. van der Sijs, H., Aarts, J., Vulto, A. and Berg, M., 2009. Overriding of drug safety alerts in computerized physician order entry. *Journal of the American Medical Informatics Association*, 13(2), pp.138–147. <https://doi.org/10.1197/jamia.M1809>
 28. WHO, 2010. Framework for Action on Interprofessional Education and Collaborative Practice. [online] Geneva: World Health Organization. Available at: <https://www.who.int/publications/i/item/framework-for-action-on-interprofessional-education-collaborative-practice>
 29. Wikström, T. and Berg, M., 2007. The importance of handover information and the effect of interruptions. *Journal of Clinical Nursing*, 16(1), pp.137–143. <https://doi.org/10.1111/j.1365-2702.2006.01569.x>
 30. Wright, J., Williams, C. and Goodwin, V.A., 2020. The use of 3D printing in prosthetics and orthotics: A scoping review. *Disability and Rehabilitation: Assistive Technology*, 17(4), pp.1–11. <https://doi.org/10.1080/17483107.2020.1838880>