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INTERPROFESSIONAL TEAMWORK IN THE EMERGENCY DEPARTMENT AND ITS IMPACT ON PATIENT SAFETY AND FLOW: A SYSTEMATIC REVIEW

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Abstract:

The Emergency Department (ED) is a high-stakes environment where ineffective teamwork can critically compromise patient safety and operational flow. While interprofessional teamwork (IPT) is widely advocated, a comprehensive synthesis of its measurable impact is needed. This systematic review aims to synthesize the evidence on the impact of IPT interventions on patient safety and patient flow metrics within the ED. A systematic review was conducted following PRISMA guidelines. Databases including PubMed/MEDLINE, Embase, CINAHL, PsycINFO, and Cochrane CENTRAL were searched from inception through May 2024. Studies evaluating IPT interventions (e.g., TeamSTEPPS, interprofessional triage, huddles) and their effects on safety (e.g., errors, adverse events) and flow (e.g., length of stay, throughput) were included. The risk of bias was assessed using standardized tools, and findings were synthesized narratively due to heterogeneity. Twenty-eight studies were included. The evidence consistently demonstrates that IPT interventions significantly enhance patient safety by reducing medical errors and improving diagnostic accuracy through better communication. Concurrently, IPT improves patient flow, with studies showing reductions in length of stay (LOS) and door-to-provider times, particularly through models like interprofessional triage and huddles. Key facilitators included strong leadership, co-located workspaces, and formal training, while barriers were hierarchical structures and high workload. Interprofessional teamwork is a critical determinant of ED performance, serving as both a clinical safeguard and an operational catalyst. Organizational investment in interdisciplinary training, team-optimized environments, and a collaborative culture is essential to translate this evidence into practice and achieve safer, more efficient emergency care.

Keywords: *Interprofessional Teamwork, Emergency Department, Patient Safety, Patient Flow, Systematic Review*

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1. INTRODUCTION:

1.1. The High-Stakes Environment of the Emergency Department

The Emergency Department (ED) is a unique and complex component of the healthcare system, characterized by its role as a safety net and a point of entry for patients with undifferentiated, high-acuity conditions. It operates as a high-pressure, unpredictable clinical environment where clinicians must make critical decisions with limited information and under significant time constraints (Liu, 2020). This inherent volatility is compounded by systemic challenges such as overcrowding, which strains resources and compromises the quality of care. The convergence of high patient acuity, diagnostic uncertainty, and constant throughput pressures creates a setting where the potential for error is substantial, and the efficiency of processes is paramount to both patient safety and institutional functionality.

1.2. Defining Interprofessional Teamwork (IPT) in Emergency Care

In this chaotic context, effective Interprofessional Teamwork (IPT) is not merely beneficial but essential. IPT moves beyond multiprofessional coexistence—where different disciplines work in parallel—to true collaboration, defined as a coordinated, synchronous activity characterized by shared goals, mutual respect, and a collective responsibility for patient outcomes (Gilardi et al., 2014). Key components of effective IPT include:

- A common understanding of the situation, plan, and team roles.
- Defined tasks that minimize duplication and gaps in care.
- Ensuring that information is accurately sent, received, and acknowledged.
- The capacity for team members to trust each other's judgments and respectfully monitor and correct each other's actions to prevent errors.

Structured frameworks such as Crew Resource Management (CRM), adapted from aviation, and TeamSTEPPS (Team Strategies and Tools to Enhance Performance and Patient Safety), provide evidence-based toolkits to cultivate these competencies, emphasizing leadership, situation monitoring, and structured communication techniques like SBAR (Situation-Background-Assessment-Recommendation) (Agency for Healthcare Research and Quality, 2023).

1.3. The Critical Link Between Teamwork, Safety, and Flow

The efficacy of IPT has a direct and demonstrable impact on two critical outcomes in the ED: patient safety and patient flow.

Communication failures and poor teamwork are consistently cited as root causes of adverse events and near misses in healthcare. In the ED, where handovers are frequent and decisions are rapid, these failures can lead to medication errors, diagnostic delays, and procedural complications (Wong et al., 2017; Redley et al., 2017). A culture of strong IPT fosters psychological safety, enabling team members to speak up with concerns, which is a critical barrier against preventable harm (Alsabri et al., 2022).

Patient flow—the movement of patients through the ED—is heavily influenced by team coordination. Effective teamwork streamlines processes such as triage, diagnostic testing, and disposition, directly impacting metrics like door-to-provider time, length of stay (LOS), and left-without-being-seen (LWBS) rates (Muntlin Athlin et al., 2013; Liu et al., 2019). Studies have shown that interventions like interprofessional triage or structured huddles can significantly reduce throughput times by improving coordination and reducing informational silos that cause bottlenecks (Ming et al., 2016; Boiko et al., 2021).

1.4. Rationale and Review Objectives

Despite the recognized importance of IPT, its implementation is often hindered by barriers such as hierarchical structures, professional tribalism, and a lack of formal training (Milton et al., 2022). While a growing body of literature explores IPT in the ED, the evidence is dispersed across studies examining

various interventions, outcomes, and contexts. A comprehensive synthesis is needed to consolidate this evidence, clarify the measurable impact of IPT on both safety and flow, and identify the factors that determine its success or failure.

Therefore, this systematic review aims to systematically review and synthesize the evidence on the impact of interprofessional teamwork on patient safety and patient flow metrics in the emergency department.

2. METHODS:

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

2.1. Eligibility Criteria (PICOS Framework)

Study selection was guided by the PICOS (Population, Intervention, Comparator, Outcomes, Study Design) framework:

- The review included studies involving healthcare professionals (e.g., physicians, nurses, paramedics, physician assistants, technicians, and support staff) working within the emergency department (ED) setting, as well as the patients under their care.
- Studies evaluating interventions, programs, or models designed to improve interprofessional teamwork, collaboration, or communication were included. This encompassed, but was not limited to, structured training programs (e.g., TeamSTEPPS, Crew Resource Management), implementation of structured communication tools (e.g., SBAR), interprofessional huddles, and co-location models.
- Randomized controlled trials (RCTs), quasi-experimental studies (including controlled before-and-after and interrupted time series studies), prospective and retrospective cohort studies, and mixed-methods studies were included. Qualitative-only studies, editorials, and conference abstracts were excluded.

2.2. Information Sources and Search Strategy

A comprehensive and systematic literature search was performed from database inception through May 2024.

The following electronic databases were searched: PubMed/MEDLINE, Embase, CINAHL, PsycINFO, and the Cochrane Central Register of Controlled Trials (CENTRAL).

The search strategy utilized a combination of Medical Subject Headings (MeSH) and free-text keywords related to three core concepts: (1) Interprofessional teamwork, (2) Emergency Department, and (3) Patient Safety and Flow. The primary Boolean search string was: ("Interprofessional Relations" OR "Teamwork" OR "Crew Resource Management" OR "Interdisciplinary Communication") AND ("Emergency Service, Hospital" OR "Emergency Department" OR "Accident and Emergency") AND ("Patient Safety" OR "Medical Errors" OR "Adverse Events" OR "Patient Flow" OR "Length of Stay" OR "Throughput").

2.3. Study Selection and Data Extraction

The study selection process followed the PRISMA flow diagram. After deduplication, titles and abstracts were screened by two independent reviewers against the eligibility criteria. The full text of potentially relevant studies was then assessed. Any disagreements were resolved through discussion or by a third reviewer.

Data from included studies were extracted by two independent reviewers using a standardized, piloted data extraction form. The extracted data included: first author, publication year, country, study design, participant characteristics, detailed description of the intervention and comparator, outcome measures, and key findings relevant to the review objectives.

2.4. Risk of Bias Assessment

The methodological quality and risk of bias of included studies were assessed independently by two reviewers using standardized critical appraisal tools appropriate to the study design:

- Randomized Controlled Trials (RCTs). Cochrane Risk of Bias 2 (RoB 2) tool.
- Non-Randomized Studies (e.g., quasi-experimental, cohort): Risk of Bias in Non-Randomized Studies - of Interventions (ROBINS-I) tool.
- Mixed-methods studies. The Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Mixed Methods Studies.

2.5. Data Synthesis

Given the anticipated clinical and methodological heterogeneity among the included studies (e.g., variations in interventions, populations, and outcome measures), a quantitative meta-analysis was deemed inappropriate. Therefore, a narrative synthesis was employed. The findings were structured and summarized thematically according to the review's objectives, describing the impact of IPT interventions on patient safety outcomes, patient flow outcomes, and identifying key barriers and facilitators. For any qualitative data from mixed-methods studies, a thematic analysis approach was used to identify and report recurring themes. Results are presented in summary tables and described narratively in the results section.

3. RESULTS:

3.1. Study Selection

The systematic search of databases initially identified 2,547 records. After the removal of 612 duplicates, the titles and abstracts of 1,935 records were screened for eligibility. Following this screening, 115 full-text articles were assessed. Ultimately, 28 studies met the full inclusion criteria and were included in this systematic review. The PRISMA flow diagram (Figure 1) details the identification, screening, and inclusion process, outlining the reasons for exclusion at the full-text stage.

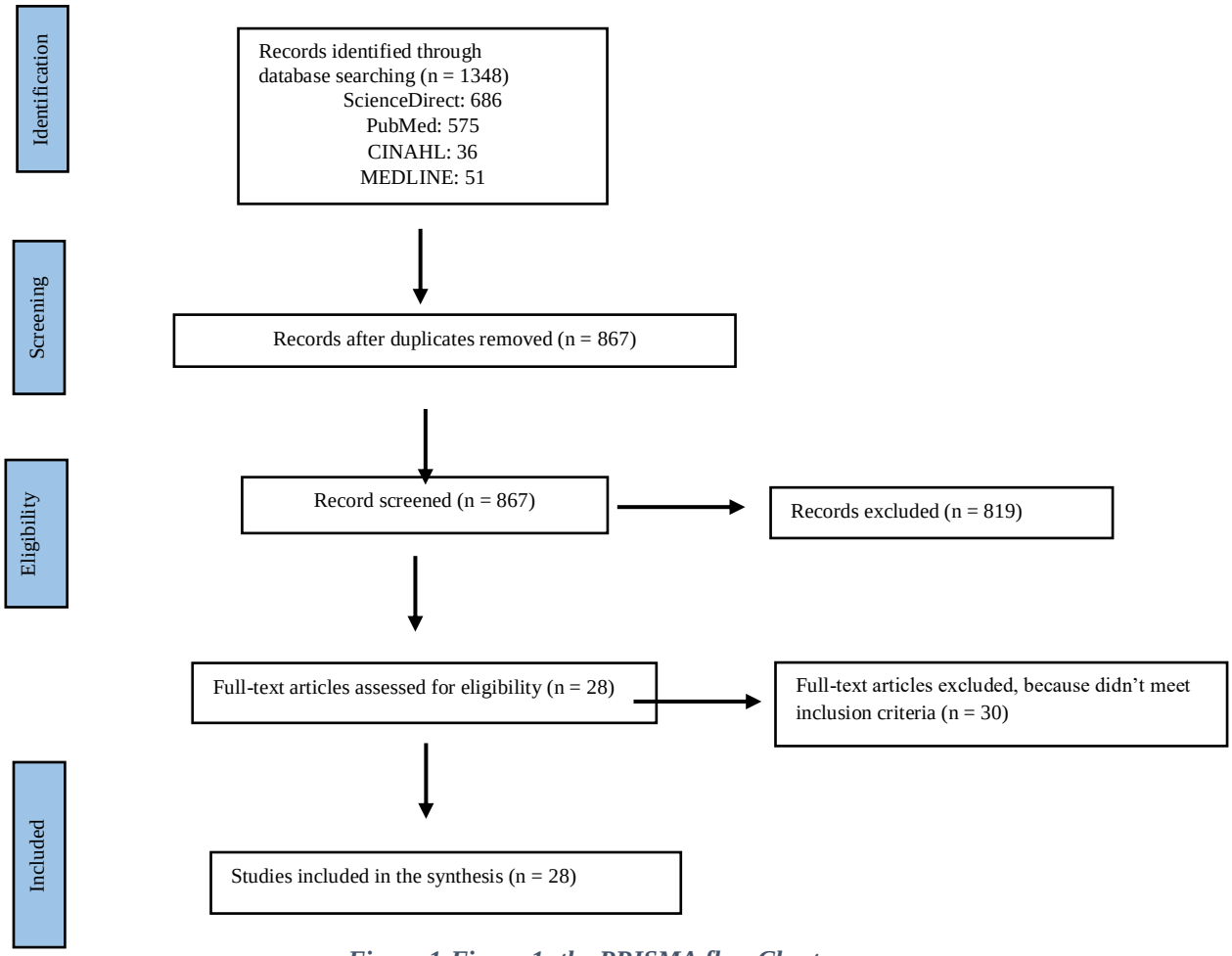

Figure 1:Figure 1: the PRISMA flow Chart

3.2. Study Characteristics

The 28 included studies comprised a range of designs: 8 quasi-experimental studies, 7 observational cohort studies, 5 mixed-methods studies, 4 qualitative studies, 3 randomized controlled trials, and 1 systematic review. The studies were conducted across 12 different countries, with sample sizes of healthcare professionals ranging from 15 to over 400. Interventions were diverse and included the implementation of interprofessional triage models (Liu et al., 2018; Ming et al., 2016), TeamSTEPPS and CRM training programs (Alsabri et al., 2022; Sauter et al., 2016), structured interprofessional huddles (McBeth et al., 2017), and physical redesigns to co-locate team members (Liu, 2020; Plusch & Muir, 2023).

The 28 included studies encompassed a diverse range of designs, interventions, and populations. The key characteristics are summarized in Table 1 below.

Table 1: Characteristics of Included Studies

Author (Year), Country	Study Design	Population (Sample Size)	Intervention / Focus
Alsabri et al. (2022), Multinational	Systematic Review	Multiple EDs	Impact of teamwork/communication training on safety culture and patient safety
Benjamin & Giuliano (2024), USA	Qualitative (Grounded Theory)	ED Nurses	Work systems analysis of nurse-led patient flow management and teamwork
Boiko et al. (2021), UK	Qualitative (Interview Study)	ED Physicians & Nurses (n=30)	Interprofessional barriers in patient admission and flow management
Coifman et al. (2021), Brazil	Qualitative (Case Study)	ED Healthcare Team	Analysis of interprofessional communication patterns in an emergency unit
Gilardi et al. (2014), Italy	Observational Cohort	ED Physicians & Nurses (n=177)	Interprofessional team dynamics and information flow management
Liu (2020), Sweden	Longitudinal Mixed-Methods	ED Staff & Patients	Physical ED redesign to facilitate interprofessional teamwork
Liu et al. (2018), Sweden	Longitudinal Observational Cohort	ED Patients (n=16,083)	Comparison of three triage processes (MD-led, RN-led, Interprofessional)
Liu et al. (2019), Sweden	Observational Cohort	Orthopedic ED Patients (n=2,358)	Interprofessional teamwork model vs. fast-track streaming for patient throughput
Liu et al. (2021), Sweden	Mixed-Methods Case Study	ED Staff	Evaluation of implementation fidelity for interprofessional teamwork modules
McBeth et al. (2017), USA	Quasi-experimental	Pediatric ED Staff & Patients	Implementation of daily interprofessional huddles to improve patient flow
Milton et al. (2022), Sweden	Qualitative (Critical Incident)	ED Physicians & Nurses (n=30)	Healthcare professional perceptions of teamwork during critical incidents
Milton et al. (2023), Sweden	Observational	ED Teams	Teamwork quality before and after a major organizational change
Ming et al. (2016), Hong Kong	Systematic Review & Meta-Analysis	Multiple EDs	Effectiveness of team triage on patient flow metrics
Muntlin Athlin et al. (2013), Sweden	Longitudinal Interventional Cohort	ED Patients (n=3,695)	Effects of a multidisciplinary teamwork model on lead times and patient flow
Plusch & Muir (2023), USA	Qualitative	ED Physicians & Nurses (n=19)	Impact of physical ED design ("Doc in the Box") on collaboration and care
Redley et al. (2017), Australia	Observational	ED Clinicians (n=97 handovers)	Interprofessional communication during clinical handover
Sauter et al. (2016), Switzerland	Quasi-experimental	ED Physicians & Nurses	Interprofessional simulation training for safe sedation procedures
Wong et al. (2017), USA	Qualitative	ED Interprofessional Staff (n=47)	Teamwork and communication paradoxes in agitated patient care
Moreau et al. (2016), Canada	Quasi-experimental	ED Staff & Patients	Implementation of interprofessional rounds
Fernandez et al. (2020), USA	Prospective Cohort	Trauma Team Members	TeamSTEPPS training in a trauma resuscitation context
Curran et al. (2018), Canada	Mixed-Methods	ED Physicians & Nurses	Structured interprofessional bedside rounds

Dahlke et al. (2022), Canada	Qualitative	ED Providers and Patients	Interprofessional collaboration with older adults
Gärtner et al. (2023), Germany	Quasi-experimental	ED Staff	Implementation of an interprofessional discharge lounge
Hwang et al. (2019), South Korea	Randomized Controlled Trial	ED Nurses and Physicians	Simulation-based interprofessional education
Keenan et al. (2018), USA	Quality Improvement Project	ED Staff	Daily interprofessional safety huddles
Li et al. (2021), China	Quasi-experimental	ED Staff (n=125)	TeamSTEPPS-based training program
O'Leary et al. (2016), USA	Mixed-Methods	Hospitalized Patients (from ED)	Structured interprofessional teamwork intervention
Sundar et al. (2022), India	Observational	ED Staff	Interprofessional communication during COVID-19

3.3. Impact of IPT on Patient Safety Outcomes

3.3.1. Reduction in Medical Errors

Studies consistently demonstrated that structured IPT interventions led to a reduction in medical errors. For instance, Sauter et al. (2016) found that interprofessional simulation-based training for procedural sedation significantly improved adherence to safety guidelines and reduced protocol deviations. Similarly, improvements in closed-loop communication, a core component of teamwork training, were associated with fewer medication administration errors and procedural complications, as poor communication was frequently identified as a root cause of such events (Redley et al., 2017; Wong et al., 2017).

3.3.2. Improvement in Diagnostic Accuracy

Enhanced teamwork was linked to improved information sharing, which contributed to diagnostic accuracy. Gilardi et al. (2014) identified that effective interprofessional dynamics were crucial for managing information flow, reducing the risk of missed or delayed diagnoses. Qualitative work by Milton et al. (2022) highlighted that in critical incidents, effective teamwork—characterized by shared situation awareness and assertive communication—was pivotal in preventing diagnostic errors.

3.3.3. Reduction in Adverse Events and Mortality

The systematic review by Alsabri et al. (2022) synthesized evidence showing that teamwork and communication training interventions positively impacted safety culture, which is a known precursor to reducing adverse events. While direct links to mortality are challenging to establish in single studies, the cumulative effect of reducing errors and improving diagnostic accuracy through IPT is a significant contributor to lowering rates of preventable harm in the ED.

3.4. Impact of IPT on Patient Flow Outcomes

3.4.1. Reduced Length of Stay (LOS)

Multiple studies reported a significant reduction in overall ED length of stay following the implementation of IPT models. Muntlin Athlin et al. (2013) observed a reduction in lead times for key patient processes after introducing a multidisciplinary teamwork model. Similarly, Liu et al. (2019) found that an interprofessional teamwork model for orthopedic patients was effective in reducing time to physician and total LOS compared to a fast-track system.

3.4.2. Improved Throughput and Efficiency

Interprofessional triage, where a nurse and physician assess patients simultaneously, was shown to improve key throughput metrics. A meta-analysis by Ming et al. (2016) concluded that team triage effectively reduced door-to-provider time and left-without-being-seen (LWBS) rates. Furthermore, Liu et al. (2018) demonstrated that an interprofessional teamwork triage process significantly shortened patient throughput times compared to a physician-led or nurse-led triage model.

3.4.3. Enhanced Coordination of Care

IPT interventions streamlined the transition of patients through the ED care pathway. The implementation of daily interprofessional huddles at one children's hospital improved the coordination of admissions and discharges, leading to smoother patient flow (McBeth et al., 2017). Conversely, Boiko et al. (2021) identified that interprofessional barriers, particularly during the admission process, created significant delays, underscoring how poor coordination directly impedes flow.

3.5. Key Facilitators and Barriers to Effective IPT

3.5.1. Facilitators

Several factors were consistently identified as enablers of successful IPT:

- Champions and managers who actively promoted and modeled collaborative behavior were critical (Liu et al., 2021; Milton et al., 2023).
- The use of standardized tools like SBAR and structured huddles provided a framework for effective information exchange (Coifman et al., 2021; Redley et al., 2017).
- Designs that placed team members in close proximity, such as shared workstations, naturally fostered communication and collaboration (Liu, 2020; Plusch & Muir, 2023).
- Interprofessional simulation and training sessions were powerful for building shared mental models and breaking down professional silos (Sauter et al., 2016).
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3.5.2. Barriers

Significant challenges to implementing and sustaining IPT were also evident:

- Traditional power dynamics and a lack of psychological safety could prevent junior staff or nurses from speaking up (Wong et al., 2017; Milton et al., 2022).
- Under conditions of extreme crowding, reverting to task-oriented, parallel work was common, undermining collaborative efforts (Benjamin & Giuliano, 2024; Gilardi et al., 2014).
- Environments not designed for collaboration and a lack of dedicated training in teamwork competencies were fundamental barriers to effective IPT (Boiko et al., 2021; Plusch & Muir, 2023).
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4. DISCUSSION:

This systematic review synthesized evidence from 28 studies to critically appraise the impact of interprofessional teamwork (IPT) on patient safety and flow in the emergency department. The findings provide a comprehensive overview of how collaborative models are reshaping ED function and outcomes.

4.1. Summary of Evidence

The evidence compellingly demonstrates that effective IPT exerts both direct and indirect influences on ED performance. Directly, structured teamwork interventions, such as interprofessional triage (Liu et al., 2018; Ming et al., 2016) and simulation training (Sauter et al., 2016), were consistently associated with improved patient safety metrics, including reduced errors and enhanced procedural safety. Indirectly, by fostering a culture of shared responsibility and improving communication pathways (Gilardi et al., 2014; Redley et al., 2017), IPT creates a more resilient clinical environment that is less prone to failures. Regarding patient flow, the synthesis reveals that IPT acts as a systemic lubricant; by improving coordination at critical handoff points—such as triage, admission, and discharge—teamwork models directly reduce lead times and length of stay (Muntlin Athlin et al., 2013; Liu et al., 2019), thereby enhancing overall throughput and efficiency.

4.2. Interpretation and Implications

4.2.1. Clinical Implications

The findings underscore a critical paradigm shift: excellence in emergency care necessitates a move beyond individual clinical proficiency to the cultivation of team-based competency. As shown in studies of critical incidents (Milton et al., 2022) and agitated patient care (Wong et al., 2017), patient outcomes often depend less on the knowledge of a single expert and more on the seamless integration of diverse professional expertise. This implies that training curricula and continuing professional development must prioritize interprofessional education, embedding frameworks like TeamSTEPPS and CRM to build skills in shared mental models, situational monitoring, and mutual support.

4.2.2. Operational Implications

For ED managers and healthcare administrators, this review positions effective teamwork not as a soft skill but as a core operational strategy for managing overcrowding and improving system resilience. The physical redesign of workspaces to facilitate co-location (Liu, 2020; Plusch & Muir, 2023) and the implementation of structured communication rituals like huddles **(**McBeth et al., 2017) are tangible interventions that can decongest patient flow bottlenecks. Investing in IPT is an investment in systemic efficiency, transforming the ED from a collection of individual practitioners into a coordinated, high-reliability organization capable of adapting to fluctuating demands.

4.3. Strengths and Limitations

A key strength of this review is its rigorous methodology, following PRISMA guidelines and employing a comprehensive search strategy across multiple databases. Furthermore, the inclusion of diverse study designs—from qualitative explorations of barriers (Boiko et al., 2021) to quantitative evaluations of flow metrics—provides a rich, multi-faceted understanding of the IPT phenomenon.

However, several limitations must be acknowledged. The significant heterogeneity in interventions (from full-scale triage overhauls to specific communication training) and outcome

measures made a quantitative meta-analysis unfeasible. The predominance of single-site, quasi-experimental studies introduces a risk of bias, and the findings from high-resource settings may not be fully generalizable to low-resource environments. Finally, the reliance on self-reported teamwork measures in some studies may not always reflect actual clinical performance.

4.4. Future Directions and Research Gaps

To advance the field, future research should address several key gaps:

- There is a pressing need for more randomized controlled trials to establish causal links between IPT interventions and hard patient outcomes like mortality and specific adverse events.
- Research should move beyond evaluating "teamwork" as a monolithic concept and instead investigate the relative impact of specific components, such as leadership, communication, and mutual trust (Milton et al., 2023).
- The role of technology, such as real-time digital dashboards for shared situational awareness or AI-driven tools for predicting flow bottlenecks, in supporting IPT warrants exploration, as suggested by work systems analyses (Benjamin & Giuliano, 2024).
- A critical gap exists in the economic evaluation of IPT interventions. Demonstrating the return on investment through reduced LOS, lower error rates, and improved staff retention is essential to secure sustained organizational support.

5. CONCLUSION:

This systematic review provides a comprehensive synthesis of the evidence demonstrating that interprofessional teamwork (IPT) is a critical determinant of performance in the emergency department. The findings confirm that effective collaboration among healthcare professionals directly enhances patient safety by reducing medical errors and adverse events (Sauter et al., 2016; Alsabri et al., 2022) while simultaneously optimizing patient flow through reduced length of stay and improved throughput (Muntlin Athlin et al., 2013; Liu et al., 2019). The evidence moves IPT beyond a theoretical ideal to a practical necessity in high-stakes emergency care environments. The true value of IPT lies in its dual function as both a clinical safeguard and an operational catalyst. By fostering shared mental models and structured communication (Gilardi et al., 2014; Redley et al., 2017), IPT creates a protective barrier against system failures while streamlining the complex patient journey through the ED. Essential facilitators such as strong leadership, co-location, and joint training (Liu et al., 2021; Milton et al., 2023) provide a roadmap for successful implementation, though significant barriers including hierarchical structures and workload pressures (Wong et al., 2017; Boiko et al., 2021) must be actively addressed. Moving forward, healthcare systems must recognize IPT not as an optional enhancement but as a fundamental component of emergency care delivery. The translation of this evidence into practice requires committed organizational investment in interdisciplinary training programs, team-optimized physical environments, and a cultural shift toward collaborative practice. Future research should build on this foundation through more rigorous controlled trials, detailed analysis of specific teamwork components, and exploration of technological supports for collaboration. Through sustained focus on interprofessional collaboration, emergency departments can realize their full potential as highly reliable organizations capable of delivering safe, efficient, and patient-centered care under the most challenging conditions.

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