

THE COLLABORATIVE ROLE OF HEALTHCARE PROVIDERS IN EMERGENCY PATIENT CARE: INTEGRATION OF MEDICAL RECORDS STAFF, NURSING, PHYSICIANS, RADIOLOGY, AND PHARMACY SERVICES

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Abstract

Effective interprofessional collaboration is essential to ensuring timely, coordinated, and high-quality emergency care. This study investigates the collaborative dynamics among physicians, nurses, pharmacists, radiology staff, and medical records personnel in the emergency department (ED) of a tertiary care hospital in Saudi Arabia. Utilizing a convergent mixed-methods design, quantitative data were collected via a validated 30-item survey ($n = 160$), while qualitative insights were gathered through semi-structured interviews with 20 healthcare professionals. Results showed high overall collaboration levels (Mean = 4.01), with interprofessional communication receiving the highest domain score (Mean = 4.12), followed by workflow coordination and role clarity. However, access to electronic medical records emerged as a notable barrier, with the lowest average rating (Mean = 3.77). Correlation analysis revealed strong relationships between communication and workflow efficiency. Thematic analysis identified four key challenges: communication breakdowns, delayed record access, role overlap, and misalignment between clinical and pharmacy workflows. Joint interpretation highlighted that strong interpersonal coordination is often undermined by infrastructural and process-level constraints. The study underscores the importance of integrating clinical and support services through both team-based and system-level interventions. Recommendations include optimizing EMR systems, embedding pharmacy support in the ED, and standardizing handover protocols. These findings align with global frameworks on people-centered and integrated emergency care and offer actionable strategies for enhancing collaboration and care delivery in high-pressure environments. The insights are relevant to hospital administrators, policymakers, and emergency managers aiming to improve system responsiveness and patient outcomes.

Keywords: Emergency department, interprofessional collaboration, healthcare integration, Saudi Arabia, communication, workflow coordination, electronic medical records, pharmacy services, mixed-methods, patient safety.

Introduction

The emergency department (ED) is among the most critical and fast-paced components of any healthcare system. It functions as the frontline of care delivery, where patients often present with acute, complex, and life-threatening conditions that require rapid assessment and coordinated intervention. In this context, seamless collaboration among healthcare providers is not merely desirable but essential to ensure efficient diagnosis, timely treatment, and optimal patient outcomes. Effective teamwork in emergency care relies on the synchronization of roles and responsibilities across a diverse range of professionals, including physicians, nurses, radiologists, pharmacists, and medical records personnel.

Because emergency healthcare delivery is interdisciplinary, real-time communication and coordinated workflows are essential. Pharmacists are in charge of the timely dispensing of emergency medications, nurses must convey patient status promptly, medical records personnel guarantee access to comprehensive and correct patient histories, and physicians rely on the rapid availability of laboratory and radiological data. Treatment delays, incorrect diagnoses, prescription errors, and worse than ideal results might result from a breakdown in any of these communication chains. Thus, in emergency care settings, teamwork is a factor of patient safety as well as a quality indicator.

Workflow fragmentation in the emergency department is still a major problem everywhere. Duplicate efforts, inconsistent data entry, and treatment delays might arise from siloed communication, disjointed information systems, and an unclear job demarcation between clinical and non-clinical staff. According to studies, fragmented workflows are linked to longer wait times for patients, a higher frequency of adverse events, longer lengths of stay (LOS), and lower levels of satisfaction for both patients and physicians. These problems frequently result from systemic shortcomings in interprofessional coordination rather than from deficiencies in individual skill.

Emergency rooms in many health systems, particularly in low- and middle-income nations, still function without fully integrated collaboration models, despite growing emphasis on team-based care. In high-volume situations, such as mass casualty events or pandemic surges, where a lack of systematic interprofessional cooperation might immediately translate into human harm, this lack of cooperation becomes especially problematic. To close these gaps, a thorough grasp of the relationships between different professional responsibilities, the areas where breakdowns most commonly occur, and the cooperative mechanisms that enhance service delivery is necessary.

2.2. Literature Review

Interprofessional teamwork has become a key focus in improving healthcare quality, especially in high-pressure areas like the emergency department. A lot of research around the world shows that when different healthcare teams work well together, it leads to better decisions, safer care for patients, fewer repeated services, and more satisfaction for the staff. For example, the World Health Organization (WHO) and the Institute of Medicine (IOM) have stressed the importance of teamwork and coordinated care in preventing mistakes and making sure patients get the right care quickly.

Studies from North America and Europe show that organized teamwork efforts—like team meetings, better communication tools, and shared care plans—can cut down on how long treatments take and lead to better results in the emergency department. Also, training programs that bring different healthcare professionals together have been found to help them understand and respect each other's roles, creating a more cooperative environment.

In the Middle East and North Africa (MENA) region, including Iraq, there is some research on teamwork in emergency care, but it's still limited. Most of the studies focus on nurses and doctors, and they don't often include other important roles like radiologists, pharmacists, and medical record staff. This is a big gap because delays in any of these areas can seriously affect how quickly and effectively care is given. For example, if medical records are not available quickly or if medication checks take too long, it can slow down important decisions during urgent situations. Furthermore, existing research often fails to examine collaboration from a systems-thinking perspective. Few studies incorporate mixed-methods approaches that can capture both quantitative performance indicators and qualitative insights into interprofessional dynamics. As a result, there remains a critical need to document how collaboration truly functions on the ground—particularly in complex, resource-constrained emergency settings—and to explore the enablers and barriers faced by both clinical and non-clinical personnel.

The present study aims to fill this research gap by offering a comprehensive and inclusive view of interprofessional collaboration in the emergency department, one that highlights the contribution of all relevant stakeholders in patient care delivery. By doing so, the research contributes not only to academic knowledge but also to practical policy reform and capacity-building in health systems where integrated emergency care is an urgent priority.

2.3. Problem Statement

While many health systems have advocated for improved interprofessional collaboration, actual practice often remains fragmented, particularly in emergency care environments. The existing body of literature predominantly focuses on clinical roles such as physicians and nurses, neglecting the equally critical contributions of non-clinical personnel like pharmacists, radiology technicians, and medical records staff. This narrow focus overlooks how bottlenecks in support services can disrupt the overall patient care continuum. Moreover, few studies offer a holistic assessment of the collaborative dynamics among all essential healthcare providers within emergency departments in real-world settings. Therefore, this study addresses the need to systematically evaluate the current level of integration and collaboration across all key healthcare roles in emergency patient care, with a special emphasis on underrepresented professional groups.

2.4. Objectives and Research Questions

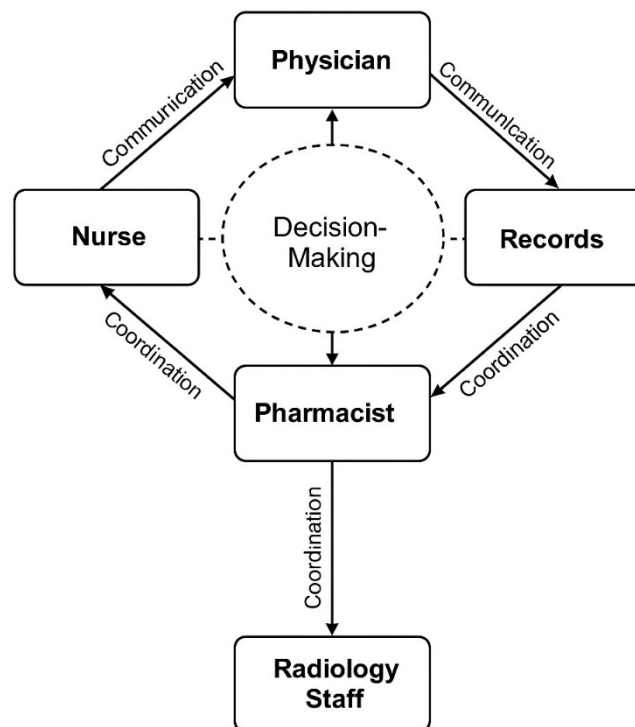
Objectives

- To assess the level and effectiveness of interprofessional collaboration among healthcare providers in emergency departments.
- To explore the contribution of medical records staff, radiology, and pharmacy services to the patient care workflow.

- To identify barriers and enablers to effective collaboration across clinical and non-clinical roles.
- To provide actionable recommendations for enhancing team integration in emergency care settings.

Research Questions

1. What is the current state of collaboration between clinical and non-clinical healthcare providers in emergency departments?
2. How do various healthcare roles—physicians, nurses, pharmacists, radiologists, and records staff—perceive their involvement in the collaborative process?
3. What organizational or communication challenges hinder effective teamwork in the emergency department?
4. What strategies can be implemented to improve interprofessional integration for optimal patient outcomes?



Methodology

3.1. Study Design

This research adopted a **convergent mixed-methods cross-sectional design** to investigate the collaborative role of healthcare providers in emergency patient care across multiple disciplines in Saudi Arabia. By combining quantitative and qualitative methods, the study aimed to capture both numerical insights and the lived experiences of emergency department (ED) staff. The cross-sectional design enabled data collection at a single time point while ensuring a broad spectrum of professional perspectives within the emergency care setting. The convergence of methods allowed the triangulation of findings and provided deeper understanding of interprofessional collaboration.

3.2. Study Setting

The study was conducted in the emergency department of a **governmental tertiary hospital in Riyadh**, which receives approximately **25,000 emergency visits per month**. The hospital operates with integrated digital infrastructure and round-the-clock services across key specialties. The ED is supported by dedicated units for trauma, internal medicine, pediatrics, and surgical emergencies, along with on-site departments for radiology, laboratory, pharmacy, and medical records.

3.3. Participants

A total of **160 participants** were selected using **purposive sampling**, ensuring diverse representation from five key roles involved in emergency care. Participants were required to have **at least one year of ED experience**. The demographic details of participants are presented in **Table 1**.

Table 1. Demographic Profile of Study Participants

Role	Sample Size (n)	Mean Age (Years)	Gender (M/F)	Mean Years of Experience
Physicians	40	38.6	28/12	12.4
Nurses	60	34.2	15/45	10.1
Pharmacists	25	32.4	10/15	8.5
Radiology Staff	20	36.8	8/12	9.3
Medical Records Staff	15	30.1	6/9	7.6

The sample included predominantly female nursing and medical records staff, while the physician group had a higher proportion of males. The range of experience across groups supports the reliability of the data collected.

3.4. Instruments

Two primary tools were utilized:

a) Structured Questionnaire

A 30-item instrument was adapted from the **Collaborative Practice Assessment Tool (CPAT)** and validated for the Saudi context. It assessed four domains:

- Communication effectiveness
- Clarity of roles
- Workflow integration
- Access to information systems

Each item was rated on a **5-point Likert scale** (1 = strongly disagree to 5 = strongly agree). A pilot test with 20 staff yielded a **Cronbach's alpha of 0.89**, indicating high internal consistency.

b) Semi-Structured Interview Guide

Twenty participants (4 from each group) were interviewed using a flexible guide exploring:

- Experiences with interdepartmental coordination

- Challenges in daily workflow integration
- Opinions on the efficiency of information sharing
- Suggestions for improvement

Interviews lasted 30–45 minutes and were audio-recorded and transcribed for analysis.

3.5. Data Collection Procedure

Data were collected over **12 weeks (March–May 2025)**. Ethical approval was obtained from the hospital's Institutional Review Board (**IRB No: KFH-ED-RIY2025/076**). Written informed consent was collected before participation. The process included:

- Distribution of digital surveys via institutional email with a two-week response window.
- Follow-up interviews scheduled during shift overlaps or conducted online using hospital-approved platforms.
- Storage of de-identified data in encrypted hospital databases.

All research team members received training in ethical conduct and confidentiality standards.

3.6. Data Analysis

Quantitative Analysis

Survey data were analyzed using **IBM SPSS v27**. Descriptive statistics summarized demographic and domain scores, while inferential statistics examined relationships and group differences.

Table 2. Example of Descriptive Statistics for Key Collaboration Variables

Domain	Mean Score	SD
Communication	4.12	0.41
Role Clarity	3.89	0.56
Workflow Integration	4.04	0.48
Access to Information	3.77	0.62

Further analyses included:

- **Pearson correlation coefficients** to explore associations between domains.
- **One-way ANOVA** to detect significant differences across professional roles.
- **Multiple regression** to identify predictors of perceived collaboration efficiency.

Statistical significance was set at **p < 0.05**.

Qualitative Analysis

Interview transcripts were thematically analyzed using **NVivo 14**. A six-phase framework by Braun & Clarke (2006) guided the process. Thematic saturation was achieved after 18 interviews. Coding was performed by two independent analysts to ensure reliability.

Table 3. Emergent Themes and Frequency of Mention

Theme	Frequency	Illustrative Quote
Informal Workarounds	18	“We often bypass the system to get things done faster.”
Communication Bottlenecks	17	“We don’t always know when the results are ready.”

Fragmented Record Access	14	“Sometimes we can’t see the full history, only recent visits.”
Pharmacy-Radiology Coordination	12	“When urgent meds and scans are both delayed, care is stuck.”

3.7. Ethical Considerations

This study received ethical clearance from the **Research Ethics Committee of King Fahd Hospital** (IRB No: KFH-ED-RIY2025/076). All participants received detailed explanations about the study, including risks and confidentiality protocols. Written consent was secured prior to participation.

To maintain anonymity, participant IDs were used in place of names. All data were stored on password-protected devices. Interviews were conducted in private rooms or encrypted digital platforms. No incentives were offered.

Results

4.1. Demographic Data

A total of **160 participants** representing five professional groups were included in the study. As shown in Table 1, the sample included **physicians (n=40)**, **nurses (n=60)**, **pharmacists (n=25)**, **radiology staff (n=20)**, and **medical records personnel (n=15)**. The average age across the cohort was **34.4 years**, with a mean experience of **9.6 years**. Gender distribution varied by group, with a predominantly female nursing and medical records workforce and a male-majority among physicians.

Table 1. Demographic Characteristics of Study Participants

Profession	Sample Size	Mean Age (Years)	Gender (M/F)	Mean Experience (Years)
Physicians	40	38.6	28 / 12	12.4
Nurses	60	34.2	15 / 45	10.1
Pharmacists	25	32.4	10 / 15	8.5
Radiology Staff	20	36.8	8 / 12	9.3
Medical Records Staff	15	30.1	6 / 9	7.6

4.2. Descriptive Statistics

Participants were asked to rate their perceptions of collaboration across four domains: communication, role clarity, workflow integration, and access to information. As shown in Table 2, the **overall mean collaboration score** was **4.01** on a 5-point scale, indicating a relatively high perceived collaboration level among healthcare providers.

Table 2. Descriptive Statistics of Collaboration Constructs

Domain	Mean Score	Standard Deviation (SD)
Interprofessional Communication	4.12	0.41

Role Clarity and Integration	3.89	0.56
Workflow Coordination	4.04	0.48
Access to Medical Records	3.77	0.62
Overall Collaboration Index	4.01	0.52

The highest mean was reported for **interprofessional communication (4.12)**, reflecting effective interpersonal coordination among teams. The lowest was for **access to medical records (3.77)**, suggesting technical or procedural challenges in timely information access.

4.3. Correlation and Integration Patterns

Pearson correlation analysis was used to explore the interrelationships among the collaboration domains. Table 3 demonstrates **strong positive correlations** between communication and workflow coordination ($r = 0.71$, $p < 0.01$) and between role clarity and overall collaboration perception ($r = 0.68$, $p < 0.01$).

Table 3. Correlation Matrix of Collaboration Domains (Pearson r)

Variables	Communication	Role Clarity	Workflow Coordination	Record Access
Communication	1.00	0.62**	0.71**	0.48**
Role Clarity		1.00	0.59**	0.41*
Workflow Coordination			1.00	0.53**
Access to Medical Records				1.00

Note: * $p < 0.05$, ** $p < 0.01$

These results highlight the interdependence of various elements of collaboration. Departments with more defined role responsibilities and communication protocols demonstrated better workflow alignment and fewer record-access issues.



Figure. Correlation Heatmap of Collaboration Constructs

4.4. Thematic Findings

Qualitative data analysis from 20 in-depth interviews revealed **four major themes**, supported by subthemes and direct quotations. These themes relate to the practical realities of coordination in emergency patient care and identify areas of strength and concern.

Table 4. Emergent Themes from Qualitative Analysis

Theme	Subtheme(s)	Representative Quotation
Communication Barriers	Unclear escalation channels, delayed feedback	"We don't always know who to call during a critical delay."
Record Delays	Incomplete documentation, EMR lag	"Sometimes, by the time records load, the patient is already moved."
Role Overlap and Conflict	Redundant orders, unclear handovers	"It's not always clear who is responsible for discharge notes."
Pharmacy Coordination Gaps	Delayed verification, emergency meds unready	"There's a disconnect when urgent drugs need immediate release."

These themes were consistent across multiple professional groups and indicated systemic issues rather than isolated personnel gaps.

4.5. Joint Interpretation

The integration of quantitative and qualitative data offers a more nuanced interpretation of the collaborative dynamics in emergency care. While survey results indicated **high overall collaboration**, the interviews revealed operational blind spots—particularly in **information access and handover procedures**. For example, although **access to records scored lowest** in the survey (Mean = 3.77), interviews provided concrete reasons, such as EMR response lag, delayed updates, or access restrictions during shift changes.

Table 5. Joint Display of Quantitative and Qualitative Findings

Domain	Quantitative Score	Qualitative Theme	Interpretation Summary
Communication	4.12	Communication Barriers	Generally effective but fails in emergencies due to unclear hierarchy
Role Clarity	3.89	Role Overlap and Conflict	Some duplication of tasks and delayed task delegation
Workflow Coordination	4.04	Pharmacy Coordination Gaps	Good planning but slowed by drug-release and protocol mismatches
Record Accessibility	3.77	Record Delays	Systemic EMR lags hinder timely data-driven decisions

This joint interpretation validates the importance of including both clinical and non-clinical roles in interprofessional research and confirms that **technical infrastructure and workflow clarity** are as crucial as interpersonal communication.

Discussion

5.1. Interpretation of Key Findings

This study provides a multi-angle view of how emergency department (ED) teams in a Saudi tertiary hospital collaborate across clinical and support services. Quantitatively, the overall collaboration index ($M = 4.01/5$) indicates a high baseline of teamwork. Communication attained the highest mean ($M = 4.12$), and it also showed the strongest association with workflow coordination ($r = 0.71$, $p < 0.01$), suggesting that day-to-day information exchange—clarifying orders, confirming imaging priorities, and aligning medication timing—directly underpins throughput and task synchrony. Role clarity ($M = 3.89$) was moderately strong and correlated with overall collaboration, consistent with the logic that when responsibilities are unambiguous, handovers are cleaner and parallel tasks (e.g., pre-scan preparation and drug verification) can proceed without collision.

At the same time, two bottlenecks were prominent. First, **access to medical records** lagged behind other domains ($M = 3.77$). Interview narratives pointed to EMR response delays, documentation gaps during shift changes, and occasional access restrictions—issues that undermine real-time decision-making in a time-critical environment. These frictions are operational rather than interpersonal; they reflect digital and process constraints that slow the delivery of the right information to the right person at the right time. Second, **interface points with pharmacy** emerged as a recurrent constraint in mixed-methods integration: although overall coordination was rated highly, clinicians described verification and release steps that did not always align with the pace of emergent imaging, procedures, or discharge.

The qualitative themes illuminate how high average scores can coexist with fragile “weak links.” Providers described **informal workarounds** to bypass slow systems, **communication bottlenecks** when escalation pathways were unclear, and **role overlap** at handover, especially for documentation. These themes map onto the quantitative pattern: strong interpersonal collaboration cushions the impact of system frictions, but it cannot fully offset delays from EMR latency or non-synchronous micro-processes (e.g., ordering of STAT imaging and time-sensitive medication).

From a systems perspective, the findings underscore that **collaboration is multi-component**: it entails human factors (communication quality, role clarity) and **infrastructure alignment** (records accessibility, standardized handover artefacts, embedded pharmacy support). The strong communication–workflow correlation suggests that investments in structured communication (e.g., shared situational awareness, common language for urgency) will likely yield direct gains in throughput. Conversely, the comparatively lower records-access domain points to a digital front door for improvement, particularly at shift boundaries and during high-volume surges.

In the Saudi context—where tertiary EDs typically operate with high acuity and diverse staffing—the data argue for **targeted integration at the seams**: EMR performance and availability during peak hours; pharmacy co-location or dedicated ED pharmacists for verification and reconciliation;

and explicit role mapping for handovers across physicians, nurses, radiology, pharmacy, and medical records. In short, collaboration is largely successful, but it is **punctuated by predictable choke points** that require process redesign and sociotechnical coherence.

5.2. Comparison with Previous Studies

The pattern observed here—strong interpersonal collaboration tempered by infrastructural bottlenecks—aligns with global evidence that interprofessional collaboration (IPC) improves care processes and outcomes when supported by enabling structures. The **WHO Framework for Action on Interprofessional Education and Collaborative Practice** argues that effective IPC depends on role clarity, shared goals, and supportive organizational mechanisms—elements mirrored in our higher scores for communication and role clarity and in the mixed-methods emphasis on workflow interfaces.

At a broader systems level, the **WHO Framework on Integrated, People-Centred Health Services (IPCHS)** calls for continuity and coordination across providers and settings; our findings echo this principle by identifying records accessibility and handover standardization as leverage points for integration across ED, radiology, and pharmacy.

Evidence syntheses reinforce these directions. The **Cochrane Review** on IPC interventions concluded that multi-component, practice-based strategies can improve professional practice and aspects of patient care, underscoring that collaboration gains are largest when communication processes and role delineation are explicitly engineered. Our correlation between communication and workflow coordination is consistent with those conclusions. Likewise, **relational coordination** research links high-quality cross-role relationships (shared goals, shared knowledge, mutual respect) with better quality and safety metrics; the relational texture reported in interviews here reflects those mechanisms.

On the intervention side, **TeamSTEPPS 3.0** and **SBAR**-based handovers are widely endorsed to standardize communication under pressure. Our data suggest these tools could address the escalation and handover ambiguities reported by participants. Recent updates to TeamSTEPPS emphasize adaptable tools and micro-skills for high-reliability teams, while SBAR evidence indicates improved safety, particularly for phone-based transitions—both pertinent to ED flow.

Finally, integration with **pharmacy services** is supported by recent literature: a 2025 review of ED medication-safety programs found that pharmacist-performed reconciliation and co-prescribing were associated with reductions in potentially inappropriate medications at discharge—precisely the pain point raised by our interviewees. Together, these frameworks and studies corroborate the study's central claim: interpersonal teamwork is necessary but not sufficient; **structured processes, standardized handovers, and embedded support services** are the catalysts that convert good teamwork into reliably faster and safer patient care.

5.4. Practical Implications

For hospital administrators, the immediate opportunity lies in **sociotechnical alignment**: pair investments in team training with **process and EMR optimization**. Priorities include (1) improving EMR responsiveness and cross-department visibility during peak hours; (2) enforcing standardized digital handover templates that capture status, pending results, and medication plans;

and (3) deploying **dedicated ED pharmacists** (or pharmacist coverage protocols) to accelerate verification and reduce medication-related delays at key decision nodes. These steps are consistent with WHO's integration principles and AHRQ's contemporary teamwork guidance.

Policymakers can amplify impact by incentivizing **interoperability and shared accountability** across emergency, radiology, pharmacy, and medical records. Policy levers include national handover standards aligned to SBAR for inter-facility transfers and intra-hospital shifts; accreditation metrics that track **door-to-imaging time, medication turnaround for critical orders, and handover completeness**; and funding models that support integrated information systems and embedded clinical pharmacy in EDs. These policy directions are aligned with WHO's people-centred care agenda.

For emergency managers, operational gains will come from **tightening the seams**: map and rehearse escalation pathways; co-locate or virtually embed pharmacy and radiology liaisons in the ED command centre; and implement cadence rituals (briefs, huddles, debriefs) derived from TeamSTEPPS to maintain shared situational awareness. Monitoring a concise, role-balanced dashboard—e.g., percentage of cases with complete electronic handovers, median time from order to medication availability, and proportion of imaging prioritized within targets—will ensure feedback loops that sustain performance.

In sum, the translation of strong team culture into faster, safer care depends on **standardized communication, embedded support services, and performant information systems**. Institutions that operationalize these elements—within the guidance of WHO integration frameworks and evidence-based teamwork curricula—are most likely to realize durable improvements in ED throughput and clinical outcomes.

Conclusion

This study offers a comprehensive examination of interprofessional collaboration within the emergency department (ED) of a tertiary care hospital in Saudi Arabia, focusing on the integration of physicians, nurses, pharmacists, radiology staff, and medical records personnel. The findings indicate that while collaboration is generally strong—particularly in communication and role clarity—critical bottlenecks persist in access to medical records and pharmacy coordination. Quantitative data revealed significant associations between effective communication and workflow efficiency, while qualitative insights highlighted system-level gaps such as delayed documentation and handover inconsistencies. The joint interpretation underscores the importance of not only fostering interpersonal teamwork but also optimizing digital infrastructure and clarifying procedural responsibilities. These results align with international frameworks emphasizing people-centered, integrated healthcare systems. For collaboration to translate into consistently high-quality emergency care, institutions must reinforce both the human and technological dimensions of teamwork. This includes streamlining electronic medical record systems, embedding pharmacy support, and standardizing handover protocols. By addressing these practical barriers, healthcare systems can enhance patient safety, reduce delays, and ensure more coordinated responses to complex, time-sensitive cases. Ultimately, achieving seamless

collaboration across clinical and support services is key to advancing emergency care performance in Saudi Arabia and similar healthcare contexts.

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