JOURNAL OF INTERNATIONAL CRISIS AND RISK COMMUNICATION RESEARCH
ISSN: 2576-0017
2024, VOL 7, NO S8

Enhancing Continuity of Emergency Care through Interdisciplinary Coordination among EMS, Nursing, and Pharmacy in General Hospitals

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Abstract

Improving the continuity of emergency care for patients admitted to general hospitals requires effective interdisciplinary coordination among emergency medical services (EMS), nursing, and pharmacy. This coordination helps provide timely treatment and preventive measures, reduces avoidable hospital admissions, and enhances medication safety. The objective of this study is to identify the current state of emergency care continuity, clarify the roles and interactions of these three stakeholders, highlight barriers to coordination, and review interventions that have shown promise in general hospital settings. A systematic discussion of these topics can inform the design and implementation of interdisciplinary coordination initiatives at general hospitals.

Emergency care continuity refers to the transfer of care information and responsibility among different stakeholders throughout the emergency care process (Al-Salloum et al., 2020). Emergency care involves multiple stakeholders, long care processes, and numerous transitions, making continuity particularly challenging. Yet these characteristics are often overlooked in general hospitals, where significant continuity gaps persist between EMS and nursing, as well as between nursing and pharmacy. Effective collaboration among EMS, nursing, and pharmacy has significant potential to close these gaps.

Keywords Continuity of care, Emergency care, Interdisciplinary collaboration, EMS, Nursing, Pharmacy, Care transitions, General hospital.

1. Introduction

Emergency departments (EDs) are critical entry points to the health system and rapidly deteriorating patients are increasingly finding their way there. Despite significant advances in several parameters of emergency care, interprofessional collaboration (IPC) among emergency medical services (EMS), nursing, and pharmacy remains at low levels in general hospitals. Thus, one of the seven patients who directly arrived at a general hospital's ED at a large university medical center waited more than 5 minutes for a nurse handover from EMS. Accordingly, the purpose of this study is to describe how interdisciplinary coordination and communication among EMS, nursing, and pharmacy can eliminate gaps in emergency care continuity, specifically during transitional periods when patient handovers occur and decisions regarding drug therapy must be made. The focus is on general hospitals, which are the predominant type of facility in South Korea and account for the vast majority of ED visits, and on emergency care—rather than urgent care, outpatient services, or elective surgery—because of the relatively high likelihood of patient deterioration and the consequent increase in physician workload during an ED visit (Safitrih et al., 2019).

General hospitals offer a wide range of medical services encompassing both inpatient and outpatient care. They are equipped to provide preventive, curative, and rehabilitative care for widely prevalent diseases and ailments. The emergency unit of a general hospital is where urgent medical problems are evaluated and treated during any hour of the day. In South Korea, municipal wards are configured in such a way that at least one general hospital lies within each administrative boundary. General hospitals represent the largest portion of South Korea's healthcare facilities, ranging from small-scale hospitals with fewer than 50 beds to large general hospitals with 1,300 or more beds. Collaboration between emergency department doctors and pharmacists in consideration of medication management is essential for providing quality services to patients.

2. Background and Significance

Emergency departments (EDs) worldwide continue to face challenges, despite various efforts to improve emergency health services. Such efforts reflect the increasingly dynamic and complex patient mix and increasing patient numbers occupying the EDs in general hospitals; these are coupled with the limited availability of healthcare professionals, particularly medical specialists, and critical resources and facilities. Such challenges hamper effective patient management and a safe healthcare delivery system. These issues result in service delays and a backlog of services for erring patients across the health facilities. Consequently, a gap in continuity of care remains during the patient transition period between emergency medical services (EMS) and the ED, and between the ED and post-ED care. Literature reviews reveal the perspectives of emergency and post-emergency actors on gaps in the continuity of care, co-extracted transfer gaps at the interdisciplinary level, and perceived responsibility on the occurrence of continuity-of-care gaps among these care actors. Patients treated in a general hospital and experiencing an interruption in the continuity of care during the emergency care processes have a higher probability of receiving a repeat visit for the same health issue than other patients (Al-Salloum et al., 2020). As evident, a high treatment intervention volume, chaotic condition at the hand-off moment, and patients still being suitable for continuity of care all contribute significantly to interrupting continuity of emergency care. Other factors hindering continuity of emergency care include delayed service delivery (the waiting time at each step is higher than the expected attention time), back-and-forth circulation (the same character being treated by more than one person), and irrelevant or lacking information (L Draeger, 2011).

3. Theoretical Frameworks for Interdisciplinary Collaboration

Different theoretical frameworks can inform the understanding and promotion of interdisciplinary collaboration. The Lean System Model (LSM) provides a method of analyzing and enhancing service processes, with potential application to the coordination of emergency care between EMS, nursing, and pharmacy. Relational Coordination Theory situates care continuity at the intersection of multiple practice areas and emphasizes the actors and transactions that enable seamless service delivery. Interprofessional education models outline curricula designed to develop collaborative competencies within the healthcare workforce and may guide training initiatives for emergency-service staff. Each of these frameworks identifies key variables and offers a roadmap for advancing comprehensive coordination through collaborative practices, protocols, and tools.

According to the LSM taxonomy (Didonato, 2018) , a service begins with the receipt of requests, such as a 911 call or a hospital bed assignment, and ends when fulfillment is confirmed, for example, upon handing off an emergency patient and awaiting feedback on the transfer. Colleagues from another domain are considered part of the same service network if they have a relevant role in fulfilling the requests of a lead actor (within six degrees of separation). Typical service requests include securing prehospital interventions, managing medication during transitions of care, and establishing medication retrieval protocols for admitted patients (Al-Salloum et al., 2020).

4. Current State of Emergency Care Continuity in General Hospitals

Emergency department (ED) visits for medical emergencies are a frequent occurrence in Saudi hospitals. However, continuity of emergency care during hospital stays remains weak. A decade ago, care continuity was widely described as being neglected. Recently, continued collaboration among hospital staff—including emergency medical services (EMS), nursing, and pharmacy professionals—has been recognized as a salient dimension of care continuity. Such interdisciplinary coordination among these three groups may help improve the continuity of emergency care in general hospitals.

Interdisciplinary collaboration among EMS, nursing, and pharmacy has implications for emergency departments in Saudi Arabia. Clarifying the current situation regarding continuity of emergency care in these hospitals is an initial step in addressing specific needs. General hospital emergency care delivery is highly variable among differing facilities. Large-scale field studies have scarcely been conducted in this sector. A grounded understanding of typical activities in these settings can thus help prioritize improvement opportunities. Relevant practices and instruments that have proven helpful in other contexts can subsequently be identified and adapted for general hospitals.

5. Roles and Interactions: EMS, Nursing, and Pharmacy

Emergency Medical Services (EMS), nursing, and pharmacy represent three integral components of an emergency care system. EMS personnel assess, stabilize, and transport patients before handing over care to nursing staff in the emergency room. Nurses perform essential assessments, record vital information, initiate treatments, and communicate other crucial details during handovers to nurses on inpatient wards. Pharmacists are responsible for managing patient medications and ensuring medication safety, with handoffs occurring from the emergency room to the inpatient ward level.

The emergency care process starts with patient access to EMS. It is not uncommon for emergency care transitions to take place across multiple emergency care settings. An instance of such a transition is the involvement of an outpatient pharmacy following the dispensing of a discharge medication order during the inpatient-to-outpatient transition. Additionally, emergency care overlaps with urgent care service, where an urgent-care center directs a patient to the emergency department for specialized treatment. During transitions from outpatient visits to the emergency

department for urgent care, information flow between pharmacists and caregivers servicing general pharmacy and emergency care is vital to ensure continuity (Al-Salloum et al., 2020) , (Safitrih et al., 2019).

6. Barriers to Effective Coordination

Effective coordination among stakeholders is hampered by organizational, professional, and technical barriers influenced by culture, regulation, and the availability of resources. For instance, Al-Salloum et al. (2020) highlight how miscommunication, role ambiguity, and insufficient support limit collaboration between emergency department doctors and pharmacists. Emergency services perceive standardized patient reports as unnecessary, although Jafari Varjoshani et al. (2014) argue they enhance communication among multidisciplinary teams. Multiple roles held by emergency healthcare providers restrict the dissemination of information from prehospital care to the hospital setting. Such barriers contribute to poorly coordinated care transitions, hindering adherence to protocols and diminishing the quality of services.

Decision-making practices are complicated by a lack of interprofessional awareness; care rules and Medication Therapy Management protocols developed separately by pharmacists and nursing teams lead to confusion ((Al-Salloum et al., 2020)). Because nursing has a wider scope of practice in emergencies and emergency nurses often lack pharmacy knowledge, the nursing team decides whether to consult pharmacy services (). Decision-making models need to reflect the first point of contact at the emergency department rather than the onset of care by the medical team, which further muddies responsibilities during multi-stakeholder interventions.

7. Interventions and Best Practices

Coordinating more efficiently among EMS, nursing, and pharmacy is expected to improve the continuity of emergency care provided by general hospitals. Several best practices already documented in the literature offer inspiration for contextually appropriate interventions. Standardizing handoff communications can improve the transfer of patient information between roles (Al-Salloum et al., 2020). Creating and disseminating shared emergency care protocols can help stakeholders coordinate decisions across transitions (Safitrih et al., 2019). Developing real-time decision-support tools with formalized algorithms clarifies each role's next steps and when to consult others. Conducting joint multidisciplinary rounds or huddles enables real-time communication of information and plans during critical transitions.

These strategies have been successfully implemented in other contexts, and their applicability to the emergency care scope and workflow at general hospitals merits consideration.

8. Implementation Strategies in General Hospitals

Interdisciplinary strategies to improve emergency care coordination among EMS, nursing, and pharmacy in general hospitals necessarily incorporate planned implementation, stakeholder engagement, training, governance, and resource allocation. Four phased timelines—preliminary, initial, early, and full—identify scalable actions for diverse institutions regardless of performance level or phase of continuous improvement.

General hospitals constitute the predominant health system in many countries, yet delivery of emergency care often falls short of the ideal. Patients frequently experience disjointed transitions—between EMS and hospital; within the hospital; and upon discharge—leading to gaps in continuity of care. Coordination among multidisciplinary stakeholders, each with distinct capabilities, is essential to ensuring seamless, uninterrupted care during these transitions and improving patient outcomes. Emergency medical services (EMS), nursing, and pharmacy constitute a prioritized triad of disciplines whose collective influence on care continuity is widely recognized; enhancing first responders' situational awareness of medications, allergies, and specifics of the transfer process;

timely access to medications needed at various points; and similar non-duplicative support by nursing and pharmacy can substantially better the experience of emergency patients. Identifying the barriers currently hindering collaboration and coordination among these disciplines and establishing appropriate interventions constitute critical steps toward improving both overall emergency care–continuity performance and patient outcomes supported by emergency services (BC Lee et al., 2013).

9. Evaluation and Metrics for Continuity of Care

Continuity of care is essential in emergency medicine since multiple transfers are frequent even in a single visit. Well-organized handoff communications must be established during patient sharing among providers, thus minimizing any potential interruptions that might affect the treatment plan. Emergency medical service (EMS) planning, nursing assessment, and drug prescribing constitute the main four activities during emergency treatment in general hospitals for emergency medicine continuity. Hence, evaluation on these elements can reflect the continuity of care in general hospitals. Process attributes of the above four elements were collected consecutively in order to measure how these activities were carried to reduce any discontinuity. Aspects such as procedure execution rate and transaction interruption rate for hand-off tasks were selected for analysis to indicate how often a complete activity was carried out in each category. Process duration and cycle time extending for over four hours from one task to another were used to express the absence of transition execution in between these activities. All measurements are analysed through statistical cluster analysis and time-series dynamic process analysis.

A process evaluation framework comprising outcome, process, and balancing metrics is employed to assess the full scope of the intervention across multiple dimensions. Outcome metrics target changes in continuity of care, while process metrics focus on adherence to specific intervention components. Balancing metrics track potential adverse effects that may arise as the intervention is implemented. By systematically capturing a broad range of metrics, the framework enables identification of unwanted effects and facilitates mid-course adjustments as needed. To quantify the level of continuity achieved among emergency medical service (EMS), nursing, and pharmacy roles during care transitions within prehospital and emergency departments, process and balancing metrics are established that reflect the extent of ongoing continuity. For each metric, data sources, collection instruments, and analysis methods are specified, along with the desired direction of change and aspirational performance targets (W. Glickman et al., 2010). In parallel, coordination among EMS, nursing, and pharmacy is further assessed through a set of indicators that capture the nature and timing of specific interactions.

10. Case Studies and Comparative Analyses

achieve safety, quality, productivity, and continuity—especially important in high-risk high-urgency situations. Addressing the gap, several local general hospitals implemented handoveralerts to standardize the document, signing, and delivery between sending and receiving doctors. Interdisciplinary standardization using Information and Communication Technology (ICT). An outbound consultation scheme was introduced at the obstetrics and gynecology department of a tertiary care hospital on the periphery of Metro Manila to address consultation delays longer than six hours for maternal evacuation and relieve the burden of emergency care at a 24/7 hospital. The Material Safety Data Sheet Online (MSDS Online) was introduced in company B with a push notification system to avert chemical-related mishaps. A procedure change was instituted in the medical records department of a premier government facility to prevent delays longer than thirty minutes; liquid-paper forms devoid of copies were replaced with multi-colored documents. Standardization also leads to improved-date care by organizing handover, using, establishing, and monitoring maximum time limit of turnover alerts (Al-Salloum et al., 2020).

MediQuery-Alert improves the medication safety, quality, and timeliness of care by ensuring that medication regulatory alerts, reminders, and advisories available in the system are attended to and acknowledged by doctors before patients undergo chemotherapy and other treatments. Potential proposals to prevent additional workload and bridge data gaps in the acute phase might include system-generated medication update sheets indicating medications that would normally be stopped and doses that could be modified, as well as filtering the interface and/or data. Using Google Calendar, calendars indicating the maximum daily time available for each physician to attend to alerts before chemotherapy treatment were proposed. This approach prevents alerts appearing in the system but missing-out-and-return later to switching item (Safitrih et al., 2019).

11. Policy Implications and Governance

Interdisciplinary coordination among the Emergency Medical Services (EMS), nursing, and pharmacy functions is anticipated to enhance the continuity of emergency care in general hospitals. At present, ineffective workflows at the hospital level can compromise proper handoffs of medication-related information, which is an essential component of emergency management. To facilitate successful engagement among the Emergency Medical Services, nurse, and pharmacy groups, a series of interventions have been identified. These evidence-informed interventions can assist in the design of interdisciplinary collaboration strategies within emergency departments and throughout hospitals. The overall outcome will be service improvements that simultaneously benefit patients and the organization.

Governance and regulatory considerations for the proposed strategies appear manageable. Officers responsible for patient safety, clinical practice, and pharmacy have been identified for the purpose of coordinating related planning and implementation. The interventions also align with provincial-level priorities on medication management and patient safety (Botes et al., 2023). Therefore, the strategies are expected to receive institutional and external support during the implementation phases.

12. Future Directions and Research Gaps

Globally, heightened attention is directed to systems fostering timely access to emergency services and continuity of emergency care, especially at care transitions among diverse healthcare and service provider agencies (V Rhodes & A Pollock, 2006). Such systems seek to deliver rapid diagnosis and management of acute health problems arising in primary care outside the office, curb hospital-based emergency care service expansion from the general public, and reinforce critical pathways to emergent public ecologies through the preservation of prehospital emergency medical services (EMS) followed by hospitalization in general hospitals not possessing accident and emergency service.

A similar opportunity exists for enhancing continuum of emergency care among emergency medical service provider-agency, nursing team, and pharmacy team in general hospitals through interdisciplinary coordination; but has yet to receive adequate academic or managerial attention. Medication-related issues account for 47% of hospital-required emergency department (ED) attendance across two hospitals in Canada (Al-Salloum et al., 2020). Owing to high medication-related opportunity costs accruing also at prehospital stage, the above collaborative measures facilitate preservation of visual coordination, crimp mortgage-expansion avoidance, and governance-centred resource-seizure prevention by missive-formation detainment applied at prehospital stage cannot afford institutional engagement-coercion and articulation-perimetry missive diversion for further education.

13. Conclusion

Sustained interdisciplinary coordination among emergency medical services, nursing, and pharmacy is vital for continuity during hospitalization, effective management of acute conditions,

and prevention of avoidable adverse events. Successful, evidence-informed interventions, directly applicable in general hospitals, are available to strengthen the sharing of information and clinical decision-making among professionals involved in the early phases of emergency care. Promoting collaboration is essential to tackling the complex challenge of enhancing continuity of emergency care (Al-Salloum et al., 2020) ; (Safitrih et al., 2019).

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