*Clinical
Review*

LEARNING FROM PATIENT SAFETY INCIDENTS IN THE EMERGENCY DEPARTMENT: A SYSTEMATIC REVIEW

Sara Amaniyan, DOCTORAL CANDIDATE, MSCN, BSCN,* Bjørn Ove Faldaas, MSC,† Patricia A. Logan, PHD,‡ and
Mojtaba Vaismoradi, PHD, MSCN, BSCN†

*Student Research Committe, Semnan University of Medical Sciences, Semnan, Iran, †Faculty of Nursing and Health Sciences, Nord
University, Bodø, Norway, and ‡Faculty of Science, Charles Sturt University, Bathurst Campus, New South Wales, Australia
Reprint Address: Mojtaba Vaismoradi, PHD, MSCN, BSCN, Faculty of Nursing and Health Sciences, Nord University, 8049 Bodø, Norway

☐ **Abstract—Background: Patient safety incidents are commonly observed in critical and high demanding care settings, including the emergency department. There is a need to understand what causes patient safety incidents in emergency departments and determine the implications for excellence in practice. Objective: Our aim was to systematically review the international literature on patient safety incidents in emergency departments and determine what can be learned from reported incidents to inform and improve practice. Discussion: Patient safety incidents in emergency departments have a number of recognized contributing factors. These can be used as groundwork for the development of effective tools to systematically identify incident risk. Participation in efforts to diminish risk and improve patient safety through appropriate incident reporting is critical for removing barriers to safe care. Conclusions: This review enhances our awareness of contributing factors to patient safety incidents within emergency departments and encourages researchers from different disciplines to investigate the causes of practice errors and formulate safety improvement strategies. © 2019 The Author(s). Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (http:// creativecommons.org/licenses/by-nc-nd/4.0/).**

☐ **Keywords—patient care; adverse events; safety incidents; safety risks; incident reporting; emergency department**

INTRODUCTION

Patient safety has been defined as freedom from any harm associated with health care in clinical settings (1). It has been considered a priority in policy making and improvement strategies for all health care systems worldwide. According to the World Health Organization, a patient safety incident (PSI) is "an event or circumstance that could have resulted, or did result, in unnecessary harm to a patient." In the context of the International Classification for Patient Safety, each incident type is a category description so any single PSI event can belong to more than one incident type classification. For example, a PSI of "medication/intravenous fluids" incident type might also be classified as a "clinical process/procedure" incident type. PSI can be classified as more than one incident type, including adverse events and adverse drug reactions (2). PSIs represent a significant portion of the causes of morbidity and mortality in health care settings. In addition, they are considered a significant contributor to stress and psychological pressure for patients, their family members, and health care providers (3). It has been reported that the prevalence of PSIs among hospitalized patients in the United States and Canada ranges from 2.9% to 16.6% (4,5).

The high burden of PSIs holds particularly true in the emergency departments (ED). EDs are fast-paced health care settings with complex communication areas, and a high rate of work distractions and disruptions. In addition, health care providers are required to manage different types of patient care with conditions of varying severity. Therefore, EDs are characterized by a

potentially challenging environment with a high risk of PSIs (6).

Despite the critical role of emergency care in the overall quality and safety of health care services, health care staff, and quality managers working in EDs seem to remain challenged by patient safety and governance initiatives. PSIs often occur in a wide variety of emergency care aspects, including diagnosis, medication management, procedures, documentation, and communication (7). It is reported that between 6% and 8.5% of patients at EDs experience PSIs, of which 36–71% are preventable (8–10).

Improving our understanding of the causes of PSI and medical harm is a key factor influencing the development of a sound patient safety infrastructure to support practices that reduce the number of unintentional harm events. Despite the importance of PSIs in outpatient and transitional care settings, little attention has been paid to knowledge development of PSIs in EDs through systematic review and knowledge synthesis. Moreover, less is known about the learning implications of exploring PSIs and incident reporting in EDs. This study aimed to systematically review the international literature to answer the following questions: what are the causes of PSIs in EDs and what can be learned from reported incidents?

METHODS

Design

A systematic review of literature using an integrative design was applied. Applying an integrative approach for a systematic review helps with incorporating diverse research designs and provides a more comprehensive understanding of phenomenon under consideration (11). In this review, the heterogeneity in relation to design, objectives, and results did not lend themselves to meta-analysis.

Data Collection

Search strategy. A comprehensive search was performed in electronic databases, such as PubMed (including Medline), Web of Science, Scopus, EBSCO, OVID Nursing, Embase, and Cinahl. The keywords related to EDs and PSIs were used to retrieve articles published in journals from January 21, 2010 to May 21, 2019. The complementary details of the search process were as follows: (*emergency medical services* OR *emergency care* OR *emergency department* OR *emergency room* OR *casualty*) AND (*patient safety* OR *safe care* OR *safe practice* OR *patient harm* OR *adverse event* OR *incident* OR *adverse health care event(s)* OR *health care error(s)*) AND (*learning* OR *learning system* OR *incident report-* *ing* OR *reporting system* OR *national reporting and learning system* OR *adverse event reporting system* OR *incident learning system* OR *hospital incident reporting*).

Inclusion criteria. Studies on the causes of PSIs and what might be learned from occurrences in EDs were sought. Inclusion criteria were scientific and experimental articles; written in the English language; various contributing factors to PSIs in EDs identified (including all types of incidents) and what was learned; and published in peer-reviewed journals with the possibility of access to the original full-text article.

Search and data extraction. Keywords were determined after performing a pilot search, consultation with a professional librarian, and holding frequent discussions by the authors (S.A., B.O.F., P.A.L., M.V.). Next, electronic databases were searched independently by each author using the selected keywords. To improve the coverage of our search, gray literature and cross-referencing from bibliographies were assessed for additional studies. The librarian assisted the researchers with the search process and provided guidance and support when it was required. For the next step, two authors (S.A., M.V.) independently screened each retrieved study resulting from the search strategy by applying the inclusion criteria to the titles, abstracts, and full texts of studies. Disagreements about inclusion of any selected study were resolved through discussion to reach consensus. A pre-piloted data extraction table was used to collate the included studies' data. These data comprised the core details (author's name, year of publication, country, study's length), background (design, sample size, setting, intervention or details of observers, definitions of the type of PSIs, reporting system of incident), and results (cause of PSIs and learning outcomes of reported incidents). The review process was presented using the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) Statement (2009) as the equator (12) (Figure 1). EndNote X9 software was used for data management.

Quality appraisal of studies. The full text of selected articles were appraised using appropriate tools to each study's methodology from the Enhancing the Quality and Transparency of Health Research website and the Hawker et al. criteria addressing five specific methodological domains: clearly defined study aim; sound and appropriate research structure; explicit theoretical/conceptual research framework; explicit conclusion; and, relevant references (13,14). No scoring system was used for the quality appraisal due to appraisal items not holding an equal weighting for final article inclusion. However, discussions on the importance and quality of each article were held between the researchers to reach consensus on article inclusion for data analysis and synthesis.
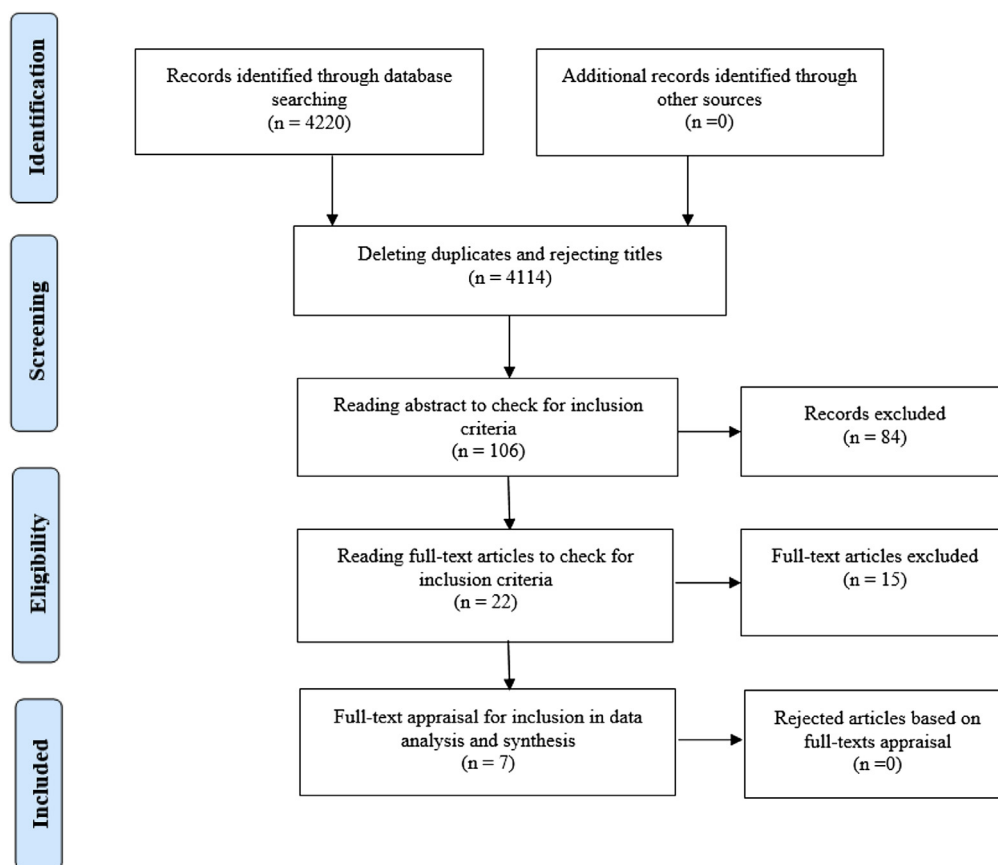
Figure 1. The study flow diagram according to the Preferred Reporting Items for Systematic Reviews and Meta-analysis.

Theoretical Framework

To classify the findings and connect them to the international literature, the framework for analyzing risk and safety in clinical medicine outlined by Vincent et al. was used (15). This is a comprehensive and systematic framework to investigate factors influencing safe health care and how to encounter PSIs at various organizational levels, including EDs. The framework uses patient, health care provider, task, work environment, and organization and management as major categories.

Two of the authors (S.A., M.V.) reviewed the included articles to allocate each to a category. To ensure the accuracy of the categorization of data, the articles were rescreened by two other authors (B.O.F., P.A.L.). If a study addressed more than one category, it was allocated to both and analyzed accordingly. Frequent discussions through e-mail and electronic media were used to resolve disagreements.

RESULTS

Search Results and Study Selections

The search strategy resulted in 4220 articles (Table 1). The results were compared to exclude duplicates and obviously

irrelevant titles. To improve coverage, a manual search was conducted in the more well-known journals that published articles relevant to the study topic, which led to no more studies. Next, 106 articles' abstracts were read and, based on the inclusion criteria, possibly relevant articles were chosen to proceed to full-text reading. The full texts of 22 articles were obtained from the Norwegian and U.K. libraries and a careful assessment was made to select only those studies with a precise focus on the review topic. Due to focus on patient safety–related issues other than practice errors and in prehospital emergency settings, an additional 15 articles were excluded. Finally, full-text articles of 7 studies were appraised and incorporated into data analysis and synthesis. A manual search was performed in the reference lists of the studies, which identified no more articles. No article was excluded during full-text appraisal due to poor quality and all selected studies were included to the data analysis process. The PRISMA flowchart is shown in Figure 1. Table 2 summarizes the characteristics and results of the included studies.

General Characteristics of the Selected Studies

Among seven selected studies, six were conducted in the United States, and one was conducted in Australia

Table 1. The Results of the Phases of the Systematic Review

Year	Database	Total	Selections Based on Titles	Selections Based on Abstracts	Selections Based on Full-Text Appraisal
2010–2019	PubMed	1154	54	10	3
	Web of Science	2000	29	7	2
	Scopus	607	17	4	1
	Ebsco	187	4	—	—
	Ovid Nursing	129	1	1	1
	Embase	74	—	—	—
	Cinahl	69	1	—	—
Total		4220	106	22	7

(16–22). The studies were published during 2010 through to 2018. Most studies focused on the identification and categorization of contributing factors to PSIs in EDs (16–18,22). However, three studies reported the implementation of processes for PSI monitoring systems (19–21). Regarding the studies' methods, four studies used a cross-sectional design (17,18,21,22), one used a retrospective cohort design (16), two used an intervention design as the development of a digital tool for incident reporting (20), and one was a pilot project study of emergency medicine events register (19).

Classification of the Findings Based on the Vincent's Model

Extracted data from the selected studies were grouped according to the Vincent's model (15). This framework was used to provide a comprehensive picture of various aspects influencing PSIs in EDs. Alignment of the studies to this framework enables it to be used as a guideline for health care staff and policy makers with regard to the role of each factor and respective strategies to improve the current condition of practice. Accordingly, the findings have been summarized under the categories of patient, health care provider, task, work environment, and organization and management.

Patients. The description of patient-related factors in connection to PSIs in EDs had a relatively lower emphasis than other factors. Only one study provided the example of the patient role as the contributing factor to PSIs. Accordingly, communication with patients and engagement of patients and families in reporting PSIs were emphasized for improving the safety of care in EDs (22).

Health care provider. With regard to the role of health care provider, communication was highlighted. Inadequate and poor staff communication were stated as a well-recognized safety challenge that was even more evident in EDs (17,18,22). Problems with the transfer of medical information and orders were considered an

important communication-based factor that impacted patient safety. For example, failing to communicate changes in vital signs to the attending physician was an important factor for staff-related communication incidents in EDs (18). Delayed treatment of patients and safety events was associated with handoff communication failure (22). In addition, medication management issues in terms of wrong dose, incorrect medicines, delayed or missing doses, and miscalculations; lack of compliance with patient safety protocols, such as infection control, clerical or laboratory processes, and incomplete discharge instructions were emphasized by the majority of the studies (17–22).

Task. The nature and complexity of tasks provided in EDs were of the upmost importance. Failure to assess and understand the severity of the patient's situation, that is, triage, was one of the commonly mentioned contributing factor to PSIs. For example, during triage, a lack of recognition of abnormal vital signs as a potential sign of shock resulted in significant risk to patient safety (18). Also, decision-making and diagnosis errors, including patient identification and test or intervention on wrong patients or body parts, were reported (18,20,21).

Work environment. Overcrowding and the presence of an excessive number of patients waiting to receive care were factors intertwined with the workflow within EDs. A direct association was found between overcrowding and risk of PSIs (16). Failure in patient assessment and follow-up care plan, delayed treatment, and increased risk of preventable medical errors, including medication adverse events, occurred subsequent to overcrowding in EDs (16,22). In addition, PSIs were found to be associated with imbalances between EDs technological capacities and demands for different types of care services, for example, triage or medical imaging. Lack of equipment and resources or equipment malfunction, misuse or maldesign also presented threats to patient safety (17,18).

Organization and management. The issue of risk associated with teamwork and shared responsibility with regard

Table 2. Characteristics of the Studies Selected for Data Analysis and Synthesis (n = 7)

Title	First Author, Year	Country	Aim	Setting and Samples	Methods	Learning Clues of Patient Safety Incidents
Emergency Department Crowding and Risk of Preventable Medical Errors (16)	Epstein, 2012	USA	To examine the association between ED crowding and preventable medical errors	533 patients enrolled in the National ED Safety Study in four Massachusetts EDs	A retrospective cohort study	Overcrowding and the increased risk of preventable medical errors
Reported Medication Events in a Paediatric Emergency Research Network: Sharing to Improve Patient Safety (17)	Shaw, 2013	USA	To analyze pediatric medication events reported in EDs in a pediatric research network	597 medication event reports from 18 EDs in a pediatric research network	A cross-sectional study	Issues with medication errors in terms of wrong dose, incorrect medication, and delayed or missing doses; human factors including failure to comply with established procedures, communication failure, and errors in medicines calculation or decision-making; systems factors including equipment and information sharing problems
Emergency Department Patient Safety Incident Characterization: An Observational Analysis of the Findings of a Standardized Peer Review Process (18)	Jepson, 2014	USA	To identify patient safety incidents identified by the peer-review process and characterize those leading to harm	A large tertiary-care ED and 469 incidents over a 2-year period	A cross-sectional study	Systems failures including teamwork and work environment in terms of lack, malfunction, or mal-design of equipment; practitioner-based errors including mismanagement and decision-making errors
Piloting an Online Incident Reporting System in Australasian Emergency Medicine (19)	Schultz, 2014	Australia	To implement an online incident-reporting system specified to ED	Three EDs and 77 incident reports	A pilot study of a voluntary, online, anonymous incident-reporting system	Issues with medicines/intravenous fluids; organization management in terms of incident-reporting systems
Voluntary Medical Incident Reporting Tool to Improve Physician Reporting of Medical Errors in an Emergency Department (20)	Okafor, 2015	USA	To develop a web-based, password-protected tool to report incidents impacting patient safety	Two EDs and 1229 incident reports	An interventional study using a web-based, password-protected tool	Delays in care and diagnostic error
A Patient Reported Approach to Identify Medical Errors and Improve Patient Safety in the Emergency Department (21)	Glickman, 2016	USA	To describe the use of patient-reported data in the ED for assessing patient safety incidents	Patient-reported data collected over a 1-year period in one ED, including 7103 reports	A cross-sectional study	Diagnostic error including test/procedure ordered on wrong patient or body part; medication errors including delay or failure to order medicines, wrong dose, wrong medication administration; clinical services issues including delayed/incomplete interventions, laboratory error, incomplete discharge instructions; poor communication and patient engagement; issues in general following up of infection control precautions

(Continued)

Table 2. Continued

Title	First Author, Year	Country	Aim	Setting and Samples	Methods	Learning Clues of Patient Safety Incidents
Incident Reporting to Improve Patient Safety: The Effects of Process Variance on Pediatric Patient Safety in the Emergency Department (22)	O'Connell, 2018	USA	To describe and measure reported medical errors related to process variance in EDs in a pediatric research network	17 EDs and 2906 incident reports	A cross-sectional study	Delayed treatment, overcrowding, communication/handoff, and patient identification issues

ED = emergency department.

to the role of organization and management in PSIs was an important finding. It was characterized by failure in staff shared responsibility and accountability for sharing patient-related information and facilitating work flow in EDs (18).

Insufficient development of the incident report systems was mentioned as a key barrier to the development of safety improvement intervention. The presence of an online, non-punitive, secure and independent system that included a high-quality data collection method had an important role in accurate PSI reporting and supported the development of preventive strategies (19).

Delayed and incomplete therapeutic interventions were reported as affecting PSIs in EDs. While they were attributed to various factors, such as overcrowding, lack or malfunction of equipment, and communication issues between health care staff, they mainly happened due to issues in the management of clinical services and lack of organization and supervision of the work process (20–22).

DISCUSSION

This systematic review provided integrative knowledge of PSIs in EDs and identified the lessons that can be learned. Empirical evidence from this systematic review demonstrated that various factors contributed to PSIs in EDs. Health care providers and specific ED environment-related factors were recognized, as well as organization and task-related issues. The findings of this review were classified and connected to the international notion of patient safety via the Vincent's framework and are discussed here (15). Furthermore, based on the discussion of the findings, possible solutions are presented in Table 3.

Patients

In this review, communication with patients and their participation in reporting PSIs in EDs was emphasized. The necessity of patient involvement and participation in patient safety initiatives through inclusive strategies should be implemented, as well as potentially including their significant family as members of the health care team. Such a collaborative involvement ensures accurate transfer of information, prevents misunderstandings, and facilitates the assessment of safety interventions (23–25). It is noted that misperceptions and misunderstandings in patients can impact the quality and safety of health care and a large proportion of PSIs have been attributed to communication with patients and their involvement in their own care (25–27). However, in EDs, the significance of this issue for patient safety has been investigated rarely (28). Overcoming communication and involvement barriers requires detecting and reporting

Table 3. Synthesis of the Findings Based on the Vincent's Framework and Suggestions of Solutions

The Vincent's Framework	Synthesis of Findings	Suggestions of Solutions
Patient	Engagement of patients in safety initiatives	Offering and providing assistance services for reporting safety incidents and near misses by patients
Health care provider	Failure in communication, handoffs, and transfer of information, lack of knowledge of medication management and following up patient safety protocols	Development of a structure for verbal and writing communication, improvement of knowledge and skills of communication and medication management through regular education and training, transition of care using appropriate guidelines, regular education and training on patient safety protocols
Task	Failure in patient assessment or estimating the severity of diseases during triage, Errors in decision-making and diagnosis	Streaming by which patients are categorized to less sick and sicker patients using a quick assessment, Improvement of knowledge and skills in staff in accordance of the identity of tasks through regular education and training
Work environment	Overcrowding of EDs, malfunction, inappropriate resources, and equipment	Setting appropriate guidelines and protocols to organize overcrowding condition and heavy workloads, use of strategies such as fast track and close interprofessional collaborations, frequent inspection of equipment, application of innovative assistant devices, improvement of accountability and teamwork
Organization and management	Failure in team work, poor incident-reporting systems, clinical management and organization issues	Clarification of roles and improvement of shared responsibility and accountability, development of registries for adverse events and incidents and performing risk assessment and root-cause analyses with the aim of learning from errors and planning for improvement strategies, education of the principles of organization and management in EDs

ED = emergency department.

of barriers through routine safety checks and the development of direct collaboration channels (24,25).

Health Care Providers

Communication by health care providers and information sharing were mentioned as contributing factors to PSIs in EDs. Effective communication among health care staff is a central tenet of safe care. Communication complexities in EDs and their relationships with PSIs are well-understood in ED settings, as are the main sources of satisfaction with quality of care (29). The Joint Commission on Accreditation of Healthcare Organizations has identified communication between health care professionals as one of the leading contributors to sentinel events resulting in practice errors (30). The transfer of medical information has been indicated as of the most important challenge in patient safety, as poor interpersonal exchanges of information are associated with a higher rate of PSIs (31). Verbal and ambiguous orders are considered particularly problematic, and often result in duplications or omissions of medication treatment (32). Information exchange in EDs is especially difficult due to challenges such as time pressure, multidisciplinary teams, high level of distractions, multiple handovers, high degree of nonverbal communications, and limited resources for documentation (33). Communication problems are also responsible for many medication errors in EDs (34). To reduce the rate of medication errors, the development of a structure for verbal and written commu-

nication that supports direct communication channels and the use of specialized terms to eliminate ambiguity among health care professionals should be implemented (34). Furthermore, patient handoffs are important parts of communication in EDs. Standardizing the format and the content of patient handoffs and transition care in a separate, protected area free from noise is needed to prevent harm (35). Therefore, education and training about appropriate communication processes can significantly improve communication skills and safety of care in EDs (36,37).

In this review, health care providers' knowledge of the care process, including medicines management and compliance with safe care protocols in EDs, influenced the occurrence of PSIs. Inadequate education of medication and medicines management is a well-recognized contributor to PSIs in all health care settings (38). It is believed that knowledge deficit in health care staff is one of the main causes of errors in the ED (39). It has been shown that appropriate training can consequently reduce PSIs and improve problem-solving abilities when health care providers encounter patient safety issues in acute situations (40,41).

Tasks

In this review, the task-related issues of the triage process were identified as an important contributing factor to PSIs in EDs. Emergency patients need to be reliably assessed and managed within minutes of arrival. Lack of a fast-

response system can lead to inappropriate prioritizing and consequently inappropriate therapeutic procedures (42). Several interventions have been developed to reduce the negative effects of traditional triage that aim to prevent seriously ill patients from dying while waiting for their turn for attention. For instance, "streaming" is an approach where patients are categorized into less sick and sicker patients based on a quick assessment (43). Taking care of patients with non-emergency conditions by separate staff has indicated that fast tracking is effective and can significantly reduce waiting times for high-level triage categories (43). The failure to recognize the severity of a patient's condition may be attributed to insufficient work competencies or experience among health care providers, which can be improved through regular education and training (44–46).

In this review, issues in decision-making and diagnosis errors were the causes of PSIs in EDs. The identification of tasks and competition for timely responses due to heavy workloads in EDs requires that health care staff efficiently follow ED standards and routines. The competition between tasks and their varying natures impact on quality of care. Therefore, the balance between task requirements and quality of care needs an appropriate description of task structure, along with cooperation with other practitioners through the creation of a flexible work environment (47,48). Organizational changes, such as taking emergent actions toward safety-related issues in terms of the reduction of workloads and provision of educational interventions on workload management, can contribute to the reduction of medication errors in EDs (49). The task-related issues, including failure in patient assessment and adherence to comply with safe care techniques to prevent PSIs, are rarely discussed in literature and require further consideration by future researchers.

Work Environment

According to this review, the characteristics of ED environments, including overcrowding, influenced the rate and type of PSIs in EDs. High patient turnover has been recognized as influencing the quality of patient care (50). The investigation of the relationship between overcrowding and mortality among patients in EDs shows that overcrowding is significantly associated with the increased risk of mortality (51,52). Increased length of stay and hospital readmission are recognized as other important negative outcomes of ED overcrowding (53–55). Overcrowding is associated with increased stress and reduction in productivity and effectiveness. Strategies aimed at the improvement of inpatient flow and reduction of overcrowding, such as fast-track point-of-care testing and close collaboration by all health care

providers, are designed to tackle this issue (56). Also, communication, accountability, flexibility, work distribution guidelines, and teamwork are suggested strategies to manage incomplete post-discharge instructions and follow-up care due to overcrowded EDs (57).

Lack of equipment or malfunction of equipment was found to affect PSIs in EDs. The correct and timely use of facilities and equipment has been shown to improve patient safety, while any limitation in resources and facilities has been described as a barrier to the improvement of patient safety (58,59). Moreover, the use of cognitive aids and innovative assistant devices, such as preparation and monitoring systems that facilitate the flow of acute interventions in EDs, has been shown to help with reducing the rate of PSIs (60–62).

Organization and Management

Individual's and institutional roles and responsibility, as well as reporting systems, were factors influencing PSIs in EDs. A well-designed care process depends on the presence of appropriate structures and organizations (63). Effective interprofessional collaboration needs role clarification and increased knowledge of other health care staff roles and related boundaries, as well as improvement in teamwork skills (64,65). Incident reporting systems are one of the critical components of a comprehensive quality improvement process. However, focusing on the frequency of PSIs may not change the situation. Emphasis should be placed on the systematic analysis of recognized PSIs and their implications for organizational learning and long-term improvement (66,67). For example, root-cause analysis has been shown to be an effective method for the detection of individual and system factors that lead to PSIs in EDs and serve as a framework for interventions aiming at the improvement of patient safety initiatives (68,69).

Lack of organization and supervision of the work process affected PSIs in EDs, according to this review. Effective team management and organization of the workplace is the core element of efficient emergency practice. While training in emergency medicine often has focused on medical and technical skills, the need for education of principles for the smooth running of EDs, including communication, leadership, knowledge of environment, anticipation and planning, financial management and budgeting, obtaining timely assistance, task allocation, and workload distribution, has been highlighted (70–72).

CONCLUSIONS

The results of this review can enhance our awareness of contributing factors to PSIs that occur in EDs and encourage researchers from different disciplines to

investigate causes of practice errors, as well as frame safety improvement strategies. The results of this review indicate that removing communication and collaboration barriers, improving appropriate interprofessional communication, standardization of tasks and use of protocols, role clarification, teamwork and division of labor, reducing overcrowding, work distribution, use of appropriate equipment and innovative assist devices, registering and documenting PSIs, risk assessment, presenting safety-related education and training, and improving organization and management of EDs can reduce PSIs. There is also a need for further quantitative analysis of PSIs and evaluation of monitoring systems to better devise preventive strategies. This systematic review indicated the need for additional studies on unexplored factors that appear to influence the occurrence of PSIs in EDs and designing effective strategies for reducing PSIs.

Relevance to Clinical Practice

The current systematic review highlighted the presence of a variety of factors that contributed to the occurrence of PSIs. The conscious application of these findings will improve patient safety in EDs and further research in PSIs will grow knowledge in the field to improve the current quality of care. To address this multifaceted problem effectively, it is necessary to have a shared commitment among health care providers, managers, educators, and researchers to develop preventive solutions. Inclusion of PSIs to the health policy agenda is considered imperative and essential for quality improvement in EDs.

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ARTICLE SUMMARY

1. Why is this topic important?

Emergency departments (EDs) are characterized as stressful environments with a high risk of practice errors. To date, little attention has been paid to knowledge development of patient safety incidents (PSIs) in EDs through systematic review and knowledge synthesis. Exploration of PSI reports to develop systematic identification of mechanisms to decrease PSI numbers is a priority for improving the quality of care.

2. What does this review attempt to show?

This review outlines the identification of contributing factors and causes of PSIs that can be used for increasing practitioner awareness to improve patient safety in the ED.

3. What are the key findings?

The causes of PSIs are varied. Contributing factors can be categorized into patients, health care providers, tasks, work environment, and organization, and management in order to develop improvement strategies.

4. How is patient care impacted?

A comprehensive approach is needed to improve patient safety in the ED consisting of individual and system approaches. Strategies are suggested to improve patient safety.