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Patient Safety in Emergency Medical Departments: A Systematic Review

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Abstract

Introduction: Emergency medicine is a complex and high-risk specialty, and the environment of the emergency department (ED) is significantly different from traditional care environments such as ambulance, operating rooms, and outpatient clinics. The main objective of this review is to examine the impact of emergency department (ED) overcrowding on patient safety and public health, as well as to identify the various contributing factors and potential solutions to the overcrowding crisis.

Methods: Systematic searches were conducted in October 2022 using the databases MEDLINE (EBSCO), PubMed, CINAHL (EBSCO), and EMBASE (OVID). The searches were not limited by year of publication and included all types of peer-reviewed systematic reviews, as well as quantitative or qualitative studies in real clinical practice or simulation situations. After full-text inclusion, reference lists were hand-searched to identify relevant studies. All articles were screened on title and abstract by two independent reviewers. The search strategies used in this study were designed to identify terms related to patient safety in emergency department. Due to the heterogeneity of the studies in terms of patient populations, interventions, and outcomes, a meta-analysis was not feasible.

Results: The search yielded a total of 177 potential articles that were reviewed for relevance, and 23 articles were selected for this review. Some of these cases of delayed treatment resulted in unexpected deaths. the number of critically ill patients presenting to California emergency departments (EDs) increased by 59% from 2000 to 2020. In California, a 12.3% decrease in the number of EDs from 2000 to 2010 led to a 27% increase in the number of visits per ED. ED overcrowding was found to be a complex problem with roots in "issues of inpatient capacity, inadequacy of alternatives for hospitalization, and hospital resource shortages.

Conclusions: Much of the research on patient safety in emergency departments (EDs) has focused on errors, with the assumption that errors can lead to harm. However, it is becoming increasingly recognized that efforts to improve patient safety should focus on both preventing errors and preventing adverse events.

Keywords: ***Safety, Emergency, Nurses, Ambulance, Overcrowding.***

Introduction

Emergency department overcrowding is a widespread problem in the United States that has been described as reaching crisis proportions. This issue poses a threat to patient safety and public health and is caused by a complex array of factors. Emergency departments play a crucial role in the healthcare systems, serving as a provider of last resort for indigent patients, the uninsured, and the homeless. In order to address this issue, it will be necessary to implement multidisciplinary and system-wide solutions. The Institute of Medicine has recognized emergency departments as safety net providers due to their commitment to caring for all patients, regardless of their ability to pay, and the fact that vulnerable populations make up a significant portion of their patient population [1].

Patient safety incidents (PSIs) are events or circumstances that could cause harm or did cause harm to a patient. They are a major contributor to morbidity and mortality in healthcare settings and can also cause stress and psychological pressure for patients, their families, and healthcare providers. According to the World Health Organization, the prevalence of PSIs among hospitalized patients in the United States and Canada ranges from 2.9% to 16.6%. Emergency departments (EDs) are particularly prone to experiencing high rates of PSIs. Improving patient safety is a priority in policy making and improvement strategies for all healthcare systems worldwide, and addressing PSIs in EDs will be an important part of this effort [2,3]. By proactively designing systems that take into account the strengths and limitations of individual healthcare professionals, HROs can improve patient safety and minimize the risk of harm. One way to do this is by implementing computerized physician order entry (CPOE) systems, which can help improve the quality and safety of care provided in emergency departments (EDs). ED leaders can also initiate activities that help create a culture in which all team members feel comfortable speaking up about safety concerns. For example, hospital executives or clinical and operational leaders and managers can walk around care units and talk directly with staff who

identify potential safety issues. This helps to bridge the gap between leadership and front-line staff perspectives on safety [4]. In safety-sensitive fields such as operative or emergency medicine, effective communication and information flow is essential for maintaining patient safety. To ensure that patient safety is prioritized in the emergency department (ED), it is important for ED physicians, nurses, and staff to make it a part of their everyday thought process. However, there are significant barriers to progress in the field of patient safety, including the politics surrounding medical errors. It would be helpful to have a single, easily measurable metric for patient safety in the ED, similar to the way industries measure serious injuries per 100,000 worker hours.

Additionally, medical error and patient safety should be more explicitly addressed in medical school and residency curricula [5]. According to a study, operating room teams considered the quality of their teamwork to be acceptable, despite differences in team members' understanding of team roles and structure. This may suggest the need to raise awareness about the importance of teamwork in patient safety. Theoretical models of communication in medical teams can be used to develop training curricula that improve team functioning and patient safety. Other research has found that while clinicians generally have positive attitudes towards safety-relevant behaviours, they may also believe they are personally immune to stress and fatigue [6]. In recent decades, ambulance care has evolved from simply transporting patients to the hospital to providing advanced out-of-hospital care for both life-threatening and non-life-threatening conditions. This evolution has put increasing demands on ambulance systems and capacity, as well as the emergency department (ED) and broader healthcare system, potentially compromising patient safety, healthcare quality, and access. It has been reported that up to 30% of patients who received on-scene

emergency care from an ambulance crew were not transported to the hospital. As ambulance care has become more complex, ambulance professionals must make decisions about multiple care options, including transporting patients to the ED or other non-emergency services, releasing them after treatment, or referring them to other healthcare professionals [7]. Emergency medicine is a complex and high-risk specialty, and the environment of the emergency department (ED) is significantly different from traditional care environments such as wards, operating rooms, and outpatient clinics [8,9]. The increasing number of ED attendances and the phenomenon of exit block, which leads to overcrowding, are global issues that contribute to the challenges of minimizing adverse events and ensuring patient safety. In the UK, ED attendances are increasing at a rate of 5% per year, and there is a shortage of trained emergency physicians. Professional societies, such as the UK Royal College of Emergency Medicine, have developed safety toolkits that outline the structures, processes, and skills that characterize a "safe" ED [10]. These toolkits propose metrics such as missed diagnosis rates, staff vacancy rates, information and communication technology system reliability, and occupancy/boarding rates as objective measures of ED safety [11]. The main objective of this review is to examine the impact of emergency department (ED) overcrowding on patient safety and public health, as well as to identify the various contributing factors and potential solutions to the overcrowding crisis..

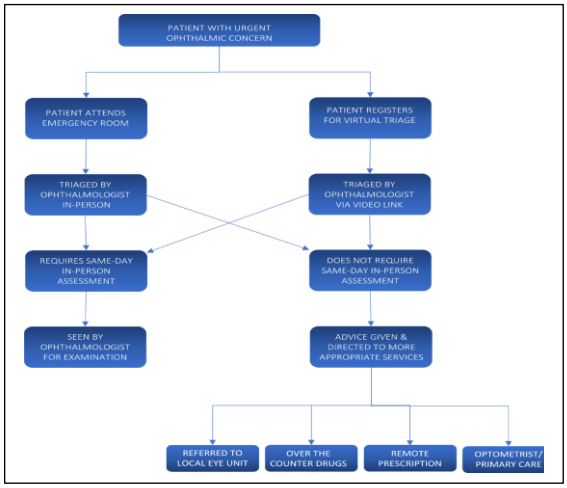
Methods

T Systematic searches were conducted in October 2022 using the databases MEDLINE (EBSCO), PubMed, CINAHL (EBSCO), and EMBASE (OVID). The searches were not limited by year of publication and included all types of peer-reviewed systematic reviews, as well as quantitative or qualitative studies in real clinical practice or simulation situations. After full-text inclusion, reference lists were hand-searched to identify relevant studies. All articles were screened on title and abstract by two independent reviewers. The search strategies used in this study were designed to identify terms related to patient safety in emergency department. Conference abstracts, narrative reviews, editorials, personal communications, and unpublished studies were excluded from the search. For non-randomized studies, the Cochrane collaboration recommends adding additional domains. Due to the heterogeneity of the studies in terms of patient populations, interventions, and outcomes, a meta-analysis was not feasible. Instead, the studies were extensively analyzed and synthesized by scrutinizing and categorizing data and formulating (sub)themes. Patients who died or left the scene before the ambulance arrived were not included in the non-conveyance rates. Patient safety refers to the absence of harm associated with healthcare in clinical settings. The data for this study included core details (such as the author's name, year of publication, country, and duration of the study), background information (such as the design, sample size, setting, intervention or details of observers, definitions of the type of patient safety incidents [PSIs], and reporting system of incidents), and results (including the cause of PSIs and learning outcomes of reported incidents). The search process included the following complementary details: (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 healthcare event(s) OR healthcare error(s)) AND (learning OR learning system OR incident reporting OR reporting system OR national reporting and learning system OR adverse event reporting system OR incident learning system OR hospital incident reporting). Keywords were determined through a pilot search, consultation with a professional librarian, and regular discussions among the authors. The search and data extraction process involved using these keywords to identify relevant studies.

Results and discussion

The search yielded a total of 177 potential articles that were reviewed for relevance, and 23 articles were selected for this review. Some of these cases of delayed treatment resulted in unexpected deaths. For example, the number of critically ill patients presenting to California emergency departments (EDs) increased by 59% from 2000 to 2020. In California, a 12.3% decrease in the number of EDs from 2000 to 2010 led to a 27% increase in the number of visits per

ED. ED overcrowding was found to be a complex problem with roots in "issues of inpatient capacity, inadequacy of alternatives for hospitalization, and the



hospital resource shortages [12]." The overcrowding problem was only resolved after hospital administration and the local department of health recognized the need for system reform. Emergency departments (EDs) are characterized by a high-risk environment for patient safety incidents (PSIs). To reduce the number of unintentional harm events, it is important to improve our understanding of the causes of PSIs and medical harm and develop a sound patient safety infrastructure [13]. An integrative approach to systematic review, which incorporates diverse research designs, can provide a more comprehensive understanding of the phenomenon under consideration. A framework, such as the PRISMA flowchart, can be used to provide an overview of the various factors influencing PSIs in EDs and serve as a guide for healthcare staff and policy makers in identifying strategies to improve the current state of practice. The presence of an online, non-punitive, secure, and independent system with a high-quality data collection method can support accurate PSI reporting and the development of preventive measures [14].

For example, failing to communicate changes in vital signs to the attending physician was identified as an important factor in staff-related communication incidents in Eds [15, 16]. Delayed treatment and safety events were also linked to failure in handoff communication [17]. Additionally, medication management issues, such as wrong doses, incorrect medicines, delayed or missing doses, and miscalculations, as well as lack of compliance with patient safety protocols, such as infection control, clerical or laboratory processes, and incomplete discharge instructions, were emphasized in the majority of the studies. The nature and complexity of tasks performed in EDs were also noted as important factors. Decision-making and diagnosis errors, including patient identification and test or intervention on wrong patients or body parts, were also reported [18]. The complexity and nature of tasks performed in emergency departments (EDs) were identified as important factors that may contribute to patient safety incidents (PSIs). Decision-making and diagnosis errors, including patient identification errors and test or intervention on wrong patients or body parts, were also reported [19]. Overcrowding and the presence of an excessive number of patients waiting to receive care were factors that affected the workflow within EDs. There was a direct association between overcrowding and the risk of PSIs. Overcrowding was found to lead to failure in patient assessment and follow-up care plans, delayed treatment, and an increased risk of preventable medical errors, including medication adverse events. PSIs were also associated with imbalances between EDs' technological capabilities and the demand for different types of care services, such as triage or medical imaging. Lack of equipment and resources, or equipment malfunction, misuse, or mal-design, were also identified as threats to patient safety [20].

A study among pediatric emergency patients found that , the rate at which doses were administered incorrectly ranged from 68% to 73% [21]. This rate is similar to the rate found in a previous study by which found that emergency medical technicians (EMTs) failed to use the BLT (a type of medication) in 50% of asthma cases and used it incorrectly in 47% of cardiac arrest cases. During the study period, a total of 5547 children received care from EMS, with 230 (4.1%) of these children receiving a total of 360 drug administrations. These patients, who received drugs, represented 2.5% of all pediatric encounters and 0.16% of all EMS patient encounters during the study period [22]. There have been numerous reports of

patient safety issues in acute care hospitals, including in Sweden, which align with international figures. A pre-hospital patient safety project in Canada identified clinical reasoning and decision-making as major concerns in pre-hospital care [23]. These findings were not based on structured medical record reviews, highlighting the importance of further investigating pre-hospital providers' clinical reasoning and decision-making in order to make necessary system changes. Additionally, there is no universal requirement for special training in pre-hospital care, and the number of nurses and requirement for specialized training varies across different organizations [24]. The role of organization and management in patient safety incidents (PSIs) in emergency departments (EDs) is an important issue, particularly with regards to teamwork and shared responsibility. Failures in staff shared responsibility and accountability for sharing patient-related information and facilitating workflow in EDs were identified as contributing factors [25]. Insufficient development of incident report systems was also noted as a key barrier to the development of safety improvement interventions. Delayed and incomplete therapeutic interventions that affected PSIs in EDs were attributed to various factors, such as overcrowding, lack or malfunction of equipment, and communication issues between healthcare staff. However, these incidents were often caused by issues in the management of clinical services and lack of organization and supervision of the work process [26].

Conclusions

Much of the research on patient safety in emergency departments (EDs) has focused on errors, with the assumption that errors can lead to harm. However, it is becoming increasingly recognized that efforts to improve patient safety should focus on both preventing errors and preventing adverse events. Studies have consistently shown that errors are more common in EDs than actual adverse events caused by these errors. There have been several studies examining the frequency and incidence of errors and adverse events in the general ED patient population. Safety incidents in the ED are relatively rare, even though errors are common. Most of the studies on EDs used various methods to determine rates of safety incidents, although it is noted that using retrospective notes analysis may be well-suited for this purpose. Additionally, most patient safety surveillance systems rely on self-reporting, which may not be effective at identifying patient safety incidents, particularly those resulting in harm.

Conflict of interests

The authors declared no conflict of interests.

References

1. and Trzeciak, S. Emergency department overcrowding in the United States: an emerging threat to patient safety and public health. (2003) Emergency Medicine Journal. 20(5); 402-405.

2. and Manser, Tanja. Teamwork and patient safety in dynamic domains of healthcare: a review of the literature. (2009) 53(2); 143-151.

3. Atack, Lynda., Maher, Janet., Acker, Joe., Anton, Andy., Beard, Paula., Blanchard, Ian., Bowles, Ron., Bucholz, Ken., Deschamps, Pierre., Dingwall, Orvie., Dobson, Tom., Greco, Paula., Karasiuk, Lyle., Kossey, Sandi., Lewis, John., Macdonald, Russell., Owen, Marie., Schwartz, Brian., Singleton, Bryan., Wheaton, Jennifer., Morrison, Laurie. and Bingham, Blair. Emergency Medical and Health Providers' Perceptions of Key Issues in Prehospital Patient Safety. (2010) Prehospital Emergency Care. 14(1); 95-102.

4. Bigham, Blair., Buick, Jason., Brooks, Steven., Morrison, Merideth., Shojania, Kaveh., Morrison, Laurie., Anton, Andy., Beard, Paula., Blanchard, Ian., Bowles, Ron., Bucholz, Ken., De-Schamps, Pierre., Dingwall, Orvie., Dobson, Tom., Greco, Paula., Karasiuk, Lyle., Kossey, Sandi., Lewis, John., Macdonald, Russell., Owen, Marie., Schwartz, Brian., Singleton, Bryan., Wheaton, Jennifer., More, ., Acpf, . and Rescu, . Patient Safety in Emergency Medical Services: A Systematic Review of the Literature. (2012) Prehospital Emergency Care. 16(1); 20-35.

5. Amaniyan, Sara., Faldaas, Bjørn., Logan, Patricia. and Vaismoradi, Mojtaba. Learning from Patient Safety Incidents in the Emergency

Department: A Systematic Review. (2020) The Journal of Emergency Medicine. 58(2); 234-244.

6. and Levitan, Richard. Patient safety in emergency airway management and rapid sequence intubation: Metaphorical lessons from skydiving. (2003) Annals of Emergency Medicine. 42(1); 81-87.

7. Eisenberg, Eric., Murphy, Alexandra., Sutcliffe, Kathleen., Wears, Robert., Schenkel, Stephen., Perry, Shawna., Vanderhoef, Mary., Murphy, Florida. and Stephen, Florida. Communication in Emergency Medicine: Implications for Patient Safety1 This study was funded by a generous grant from the National Patient Safety Foundation.. (2005) Communication Monographs. 72(4); 390-413.

8. Meckler, Garth., Leonard, Julie. and Hoyle, John. Pediatric Patient Safety in Emergency Medical Services. ( )

9. Guise, Jeanne-Marie., Hansen, Matthew., O'brien, Kerth., Dickinson, Caitlin., Meckler, Garth., Engle, Phil., Lambert, William. and Jui, Jonathan. Emergency medical services responders' perceptions of the effect of stress and anxiety on patient safety in the out-of-hospital emergency care of children: a qualitative study. (2017) BMJ Open. 7(2); e014057.

10. El-Khani, Ussamah., Ashrafian, Hutan., Rasheed, Shahnawaz., Veen, Harald., Darwish, Ammar., Nott, David., Darzi, Ara. and Research, . The patient safety practices of emergency medical teams in disaster zones: a systematic analysis. (2019) BMJ Glob Health. 4(6); e001889.

11. None. (None)

12. and Schenkel, Stephen. Promoting Patient Safety and Preventing Medical Error in Emergency Departments. (2000) Acad Emergency Med. 7(11); 1204-1222.

13. Bigham, Blair., Bull, Ellen., Morrison, Merideth., Burgess, Rob., Maher, Janet., Brooks, Steven., Morrison, Laurie., Acpf, Msc. and Rescu, . Patient safety in emergency medical services: executive summary and recommendations from the Niagara Summit. (2011) CJEM. 13(01); 13-18.

14. Smith, Stephen. and Monico, Edward. Book and media review. (2009) Annals of Emergency Medicine. 54(4); 643-644.

15. Ramlakhan, Shammi., Qayyum, Hasan., Burke, Derek. and Brown, Ruth. The safety of emergency medicine. (2016) Emerg Med J. 33(4); 293-299.

16. Andersson Hagiwara, Magnus., Nilsson, Lena., Strömsöe, Anneli., Axelsson, Christer., Kängström, Anna. and Herlitz, Johan. Patient safety and patient assessment in pre-hospital care: a study protocol. (2016) Scand J Trauma Resusc Emerg Med. 24(1);

17. Ebben, Remco., Vloet, Lilian., Speijers, Renate., Tönjes, Nico., Loef, Jorik., Pelgrim, Thomas., Hoogeveen, Margreet. and Berben, Sivera. A patient-safety and professional perspective on non-conveyance in ambulance care: a systematic review. (2017) Scand J Trauma Resusc Emerg Med. 25(1);

18. Patient Safety in the Pediatric Emergency Care Setting. (2007) 120(6); 1367-1375.

19. Farmer, B. M. (2016). Patient safety in the emergency department. Emerg Med, 48(9), 396-404.

20. Bleetman, A., Sanusi, S., Dale, T., & Brace, S. (2012). Human factors and error prevention in emergency medicine. Emergency Medicine Journal, 29(5), 389-393.

21. Meade, C. M., Kennedy, J., & Kaplan, J. (2010). The effects of emergency department staff rounding on patient safety and satisfaction. The Journal of emergency medicine, 38(5), 666-674.

22. Rigobello, M. C. G., de Carvalho, R. E. F. L., Guerreiro, J. M., Motta, A. P. G., Atila, E., & Gimenes, F. R. E. (2017). The perception of the patient safety climate by professionals of the emergency department. International emergency nursing, 33, 1-6.

23. Kelly, J. J., Thallner, E., Broida, R. I., Cheung, D., Meisl, H., Hamedani, A. G., ... & Beach, C. (2010). Emergency medicine quality improvement and patient safety curriculum. Academic Emergency Medicine, 17, e110-e129.

24. Källberg, A. S., Ehrenberg, A., Florin, J., Östergren, J., & Göransson, K. E. (2017). Physicians' and nurses' perceptions of patient safety risks in the emergency department. International emergency nursing, 33, 14-19.

25. Hansen, M., Meckler, G., Dickinson, C., Dickenson, K., Jui, J., Lambert, W., & Guise, J. M. (2015). Children's safety initiative: a national assessment of pediatric educational needs among emergency medical services providers. Prehospital Emergency Care, 19(2), 287-291.

26. Oredsson, S. (2011). Triage and patient safety in emergency departments. Bmj, 343.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