

Quality of EMS to emergency department handoffs and communication barriers and challenges; Systematic review

Fares Mohammed Alabdullah ^{1,*}, Sultan Hussain Saeed Alqahtani ¹, Rayan Abdullah Almalki ², Abdullah Saleh Albalawi ¹, Osama Ali Alsallami ² and Rayan Mohammed Alqahtani ¹

¹ Emergency medical specialist, National Guard hospital, Riyadh, Saudi Arabia.

² Emergency medical specialist, National Guard hospital, Jeddah, Saudi Arabia.

World Journal of Advanced Research and Reviews, 2024, 24(03), 3311-3315

Publication history: Received on 22 October 2024; revised on 15 December 2024; accepted on 18 December 2024

Article DOI: <https://doi.org/10.30574/wjarr.2024.24.3.3670>

Abstract

Background: Patient safety is among the most significant issues that health care systems face. One of the top priorities for patient safety has been identified as improving communication during handovers. Our study's goal is to analyze research on pre-hospital and emergency department personnel' perceptions of the handover procedure, as well as studies that have aimed to improve the caliber of EMS-to-ED handoffs.

Method: The inclusion criteria were limited to English-language papers published between 2005 and 2024. We looked through the Google Scholar, Web of Science, Cochrane, and PubMed databases. The inclusion criteria were satisfied by studies that concentrated on care handoffs from EMS to ED physicians inside the ED setting. Only peer-reviewed, English-language research was included.

Result and conclusion: Fourteen of the 65 articles that were selected for full text examination satisfied the requirements for inclusion. Thematic synthesis revealed two types of barriers: cognitive and operational. Effective EMS to ED handovers were found to be hampered by descriptive themes of disrespect and disinterest, redundancy, environmental factors, poor recall, technological issues, information degradation, conflicting goals and perspectives, information loss, lack of training, lack of standardization, lack of feedback, and delays. Several types of interventions were found in the included interventional research, including educational, cultural, and technical ones.

Keywords: Emergency medical service; Emergency department; Communication barriers; Challenges

1. Introduction

One of the most important issues facing health care systems is patient safety, which keeps both systemic and human mistakes from hurting people who are seeking care. Communication improvement during handovers has been designated a high patient safety priority. Poor have been identified by WHO as the primary underlying cause of reported sentinel occurrences (1). Medical decision-making can be aided by the verbal and textual information that is passed along throughout these transitions. Relatively there is a lack of research especially on EMS handovers, despite the significance of the information exchange that takes place during care transitions. These handovers encounter unique constraints, including inter-professional interactions, the environment, and stress (2).

Prehospital clinicians frequently conduct evaluations and treatments prior to a patient's arrival at the hospital. Their knowledge of a patient's original presentation, which might differ significantly from their ED appearance, is often helpful in accurately triaging the patient's level of acuity. Important hints regarding medical or traumatic symptoms can also

* Corresponding author: Fares Mohammed Alabdullah

be obtained in the statements that EMS might give on the surroundings in which the patient was discovered. EMS handovers aim to provide this information and enable providers to coordinate treatment, advocate for their patients, and transfer responsibility (3,4).

Numerous review papers have previously been written on this subject because of the significance of handovers and how frequently EMS handovers take place every day (2,5,6). These have sought to identify EMS handovers, EMS handover-specific problems, evidence gaps, and challenges in transferring patients who are deteriorating. The purpose of our study is to review observational studies; surveys and interviews with pre-hospital and ED professionals regarding their opinions of the handover process; and interventional studies that have attempted to enhance the quality of handoffs from EMS to EDs

2. Methods

We carried out a systematic assessment of the obstacles to successful EMS to ED handoffs, with the aim of identifying obstacles through observational and qualitative data as well as objective data regarding potential treatments to lessen their effects. Because prehospital care's scope of practice and degree of training have changed dramatically over the past 20 years, studies that were published between 2005 and 2024 and were in English were eligible for inclusion.

We searched Pubmed, Web of Science, Cochrane and Google Scholar Database of Systematic Reviews. Search terms include; emergency medical services, handover, handoff, emergency medical technician, patient handoff, paramedic, quality improvement, and continuity of patient care. Studies focusing on care handoffs from prehospital providers to ED professionals inside the ED environment met the inclusion criteria. Only English-language, peer-reviewed research was included.

Statistical assessments of significance were not feasible because of the included studies' heterogeneity and the qualitative approaches they employed. Since the primary goal of this study was to analyze data from observational studies and qualitative interviews, no formal critical appraisal forms were employed; instead, the interviewees' selection and the suitability of the study's methodology for evaluating the aforementioned goals were taken into account. Data extraction and analysis were conducted using a theme synthesis process.

3. Results and discussion

We included 14 studies in this review. Different intervention types were tested in included articles: staffing changes, feedback, mnemonics, simulation education, multidisciplinary collaboration, web-based education, simplified electronic reports, multimedia usage, partial return to paper forms, simplified electronic reports and prealert innovation. Multiple qualitative research proposed five treatments was found: EMR integration, patient engagement, automation of data collection, cross-monitoring other people's handovers, and use of readback.

Environmental influences, knowledge deterioration, poor memory, and information loss were the cognitive barriers found in the included investigations. These disruptions are recorded at a wide range of frequencies in the observational studies that are included. At the lower end of the spectrum, Yong et al. (7) evaluated 621 handovers of 311 ambulance arrivals and discovered that 90% of them had minimal or no disruptions. Sumner et al. (8) and Manser et al. (9), on the other hand, found that interruptions occurred in 51% and 50% of handovers, respectively. Sumner et al. (8) conducted all of their observations in the pediatric resuscitation room and found that the medical team leader's inquiries for information that had not previously been given accounted for 65% of the disruptions they saw. According to survey data, disruptions also often occur. According to a 2016 survey by Jundi et al. (10) of 308 EMS personnel, ED nurses, and ED doctors, 82% of participants said they often experienced communication breakdowns during handovers.

The phenomenon known as "Chinese whispers," was documented in some studies (11,12) which arises from repetition of handovers in which information is passed from the patient to the EMS provider to the triage nurse to the ED nurse or doctor who will eventually care for the patient, was documented in a number of the included studies.

Environmental concerns, duplication, technology problems, competing aims and views, and delays were some of the operational hurdles found in the investigations. According to Jenkin et al. (13) study of EMS and ED providers, the most frequent cause of repeat visits was the absence of the healthcare practitioner who would be providing the patient's care at the first handover. EMS providers had to hand over information an average of 3.5 times, according to Cuk et al. (14). This was confirmed by a 2012 research by Bost et al. (15) which showed paramedics passing information to ED registration, the ED triage nurse, and the ED attending nurse. Bost et al. (15) observed that the ED physician and

specialist physicians frequently repeated certain points with critically sick patients in the resuscitation room. This procedure is obviously inefficient, but there is also, as far as we are aware, an unresearched variation in the amount of information delivered in each of these repeated handovers.

There have been a number of proposed solutions that might help cut down on repeats. Since they would offer textual references for specific data points, a number of technical solutions have been proposed that might reduce the need for verbal handover. If a triage nurse is added, staffing interventions may increase the number of repeats; if handover with the attending nurse is guaranteed, they may decrease the number of repetitions (16). By changing ambient conditions, there may be less inattention and fewer repeats as a result of providers asking for explanation.

Rohrer et al. (17) came to the conclusion that two-way information transmission between EMS and ED personnel via an integrated EMR might be advantageous for a number of reasons after speaking with paramedics and emergency physicians about the needs and requirements of electronic health records. A large portion of the patient care report, including as prescriptions, allergies, and prior medical history, may be filled in automatically by paramedics, saving them time that might be spent providing patient care. Additionally, it may provide them access to vital medical records and the medical histories of patients who are changed or unresponsive, which might impact on-scene care.

Because paramedics wouldn't have to waste time inputting data that had already been captured elsewhere, ED personnel would probably be able to view electronic reports earlier. One research revealed that pre-hospital clinicians were completing electronic reports on average 39 minutes after arriving at the hospital in non-integrated systems (18). By simplifying the documentation process for paramedics, ambulances would be ready to serve their communities sooner and their care reports would be accessible to help doctors make medical decisions.

In their discussion with paramedics and emergency department personnel in the UK, Altuwaijiri et al. (19) discovered that providers believed that handover paperwork was simpler before the invention of ePCRs. The significantly reduced number of data fields on written PCRs, according to paramedics, allowed for quicker completion. Participants in the ED staff survey agreed that they hardly ever used ePCRs for a number of reasons, such as accessibility delays, wide variations in the amount and quality of information, and trouble obtaining them via their computer system.

Before arriving at the hospital, Schooley et al. (18) created a smart phone application that allows EMS to record and send digital voice, video, and photos of patients and event details. It gave providers more freedom and lacked required data fields, in contrast to computerized records. A baseline set of vitals, digital photos or videos from the site, demographic information that facilitated a quicker patient registration process, and audio clips of EMS providing a quick verbal handover were examples of common usage. The paramedics' median time from clicking "start" to clicking "send" was 103 seconds. The submitted data was accessible to ED staff using web browsers. During follow-up interviews, ED nurses said that because the reports enabled asynchronous communication, they caused less disruption to their productivity. Additionally, they thought that the ability to pre-register patients expedited the care process and that the pictures showed how a patient's health changed and how they responded to prehospital care. The fact that it let them rely less on memory and prevented the Chinese whispers phenomena was praised by ED doctors. The capacity to make sure patients were sent to a hospital with the right resources and the opportunity to hire experts sooner were two other advantages that were mentioned during follow-up. Data transfer rates, distracting graphics, the difficulty to transcribe audio into a PCR, and the lack of perceived advantage for brief transit periods were among the difficulties.

According to the theory put forward by Sujana et al. (4), EMS providers deal with these competing objectives on an individual basis, mostly influenced by their experience rather than their official training. They pointed out that verbal communication was especially crucial in these situations because it made possible what they dubbed "the secret handover," a phenomena unique to time-pressed medical professionals. The hidden handover permitted clinicians to provide an extra, informal handover to the nurse who would be caring for the patient, instead of according to a handover process set forth by their agency that was meant to speed up turnaround times. In order to manage the pressures of meeting agency-designed time criteria without sacrificing care, this enabled the medic to communicate their sincere concerns about a patient.

In order to investigate the impact of emergency department personnel on handover delays, Clarey et al. (20) developed a computer simulation that quantified the correlation between the length of delays and a dedicated triage nurse. Two models were tested: one with a steady ambulance arrival rate of four per hour, and the other with daily variations in arrivals. According to their simulation, the average wait time for handover would be 19 minutes with a single triage nurse and 1 minute with two nurses. However, they estimated that with two triage nurses, they would only actively spend 38% of their time taking handovers. Increasing employment would, of course, come with inherent cost issues, as would the requirement to fill in the intervals between handovers with other duties.

4. Conclusion

Important obstacles to efficient EMS-to-ED handover have been found by the current evaluation, which can direct efforts toward quality enhancement. Numerous single-center interviews and surveys of practitioner groups have detailed each of those obstacles. Standardization is the only intervention that has shown a substantial improvement in the amount of data communicated during handovers, and no interventional trials have shown a significant improvement in provider recall to far.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

- [1] Joint Commission International. Patient safety solutions preamble— May 2007. Available from: <http://www.jointcommissioninternational.org/assets/3/7/%0APreambleandSolutionsENGLISH.pdf>; 2007
- [2] JENSEN SM, LIPPERT A, ØSTERGAARD D. Handover of patients: a topical review of ambulance crew to emergency department handover. *Acta Anaesthesiol Scand.* 2013 Sep;57(8):964–70. Available from: <https://onlinelibrary.wiley.com/doi/10.1111/aas.12125>
- [3] Sujan MA, Chessum P, Rudd M, Fitton L, Inada-Kim M, Cooke MW, et al. Managing competing organizational priorities in clinical handover across organizational boundaries. *J Health Serv Res Policy.* 2015 Jan 2;20(1_suppl):17–25. Available from: <https://journals.sagepub.com/doi/10.1177/1355819614560449>
- [4] Sujan M, Spurgeon P, Cooke M. The role of dynamic trade-offs in creating safety—A qualitative study of handover across care boundaries in emergency care. *Reliab Eng Syst Saf.* 2015 Sep;141:54–62. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0951832015000642>
- [5] Bost N, Crilly J, Wallis M, Patterson E, Chaboyer W. Clinical handover of patients arriving by ambulance to the emergency department – A literature review. *Int Emerg Nurs.* 2010 Oct;18(4):210–20. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S1755599X09000974>
- [6] Dawson S, King L, Grantham H. Review article: Improving the hospital clinical handover between paramedics and emergency department staff in the deteriorating patient. *Emerg Med Australas.* 2013 Oct 18;25(5):393–405. Available from: <https://onlinelibrary.wiley.com/doi/10.1111/1742-6723.12120>
- [7] Yong G, Dent AW, Weiland TJ. Handover from paramedics: Observations and emergency department clinician perceptions. *Emerg Med Australas.* 2008 Apr 6;20(2):149–55. Available from: <https://onlinelibrary.wiley.com/doi/10.1111/j.1742-6723.2007.01035.x>
- [8] Sumner BD, Grimsley EA, Cochrane NH, Keane RR, Sandler AB, Mullan PC, et al. Videographic Assessment of the Quality of EMS to ED Handoff Communication During Pediatric Resuscitations. *Prehospital Emerg Care.* 2019 Jan 2;23(1):15–21. Available from: <https://www.tandfonline.com/doi/full/10.1080/10903127.2018.1481475>
- [9] Manser T, Foster S, Gisin S, Jaeckel D, Ummenhofer W. Assessing the quality of patient handoffs at care transitions. *BMJ Qual Saf.* 2010 Dec 1;19(6):e44–e44. Available from: <https://qualitysafety.bmj.com/lookup/doi/10.1136/qshc.2009.038430>
- [10] Jundi I, Abujaber A, Alinier G, Campbell C, Meyer J, Al Shaikh L, et al. Qatar ambulance service and Hamad General Hospital Emergency Department staff's perception of current patient handover practice. *J Emerg Med Trauma Acute Care.* 2016 Oct 9;2016(2). Available from: <https://www.qscience.com/content/journals/10.5339/jemtac.2016.icepq.105>
- [11] Owen C, Hemmings L, Brown T. Lost in translation: Maximizing handover effectiveness between paramedics and receiving staff in the emergency department. *Emerg Med Australas.* 2009 Apr 21;21(2):102–7. Available from: <https://onlinelibrary.wiley.com/doi/10.1111/j.1742-6723.2009.01168.x>
- [12] Sarcevic A, Burd RS. Information handover in time-critical work. In: *Proceedings of the 2009 ACM International Conference on Supporting Group Work.* New York, NY, USA: ACM; 2009. p. 301–10. Available from: <https://dl.acm.org/doi/10.1145/1531674.1531720>

- [13] Jenkin A, Abelson-Mitchell N, Cooper S. Patient handover: Time for a change? *Accid Emerg Nurs.* 2007 Jul;15(3):141-7. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S096523020700046X>
- [14] Cuk S, Wimmer H, Powell L. Problems associated with patient care reports and transferring data between ambulance and hospitals from the perspective of emergency medical technicians. *Issues in Information Systems* 2017;18(4):16-26.
- [15] Bost N, Crilly J, Patterson E, Chaboyer W. Clinical handover of patients arriving by ambulance to a hospital emergency department: A qualitative study. *Int Emerg Nurs.* 2012 Jul;20(3):133-41. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S1755599X11001108>
- [16] Fairbanks RJ, Bisantz AM, Sunm M. Emergency Department Communication Links and Patterns. *Ann Emerg Med.* 2007 Oct;50(4):396-406. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0196064407003575>
- [17] Rohrer K. Electronic Health Records in Prehospital Care. *Stud Health Technol Inform.* 2017;236:227-34. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/28508800>
- [18] Schooley B, Murad A, Abed Y, et al. A mHealth system for patient handover in emergency medical services. *Proceedings of the 10th international ISCRAM conference; 2013.* p. 188-98.
- [19] Altuwaijri EA, Budgen D, Maxwell S. Factors impeding the effective utilisation of an electronic patient report form during handover from an ambulance to an emergency department. *Health Informatics J.* 2019 Dec 17;25(4):1705-21. Available from: <https://journals.sagepub.com/doi/10.1177/1460458218797984>
- [20] Clarey A, Allen M, Brace-McDonnell S, Cooke MW. Ambulance handovers: can a dedicated ED nurse solve the delay in ambulance turnaround times? *Emerg Med J.* 2014 May;31(5):419-20. Available from: <https://emj.bmj.com/lookup/doi/10.1136/emermed-2012-202258>