CODEN [USA]: IAJPBB ISSN : 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

SJIF Impact Factor: 7.187

https://doi.org/10.5281/zenodo.17280600

https://www.iajps.com/volumes/volume12-october-2025/13-issue-10-october-25/

Available online at: http://www.iajps.com *Review Article*

STANDARDIZING PATIENT HANDOVER FROM PARAMEDICS TO EMERGENCY DEPARTMENTS: A NARRATIVE REVIEW OF PROTOCOLS AND OUTCOMES

[1]Mousa Ahmad Mousa Asiri, [2]Amer Ali Amer Rajeh, [3]Alhmoud Moraya Ahmed M, [4]Alasiri Ahmed Mughram G, [5]Aseeri Ayed Mohammad A, [6]Yasir Hamzah Jaber Asiri, [7]Abdulaziz Abdulrhman A Alasiri, [8]Abdullah Mari M Alshehri, [9]Khalaf Ahmed Yahya Alasiri, [10]Omar Ahmed Ali Asiri

[1]Technician, Emergency medical services, Red Crescent Asir, mosa714@gmail.com
[2]Technician, Emergency medical services, Red Crescent Asir, alooo997@hotmail.com
[3]Technician, Emergency medical services, Red Crescent Asir, ma997000@gmail.com
[4]Technician, Emergency medical services, Red Crescent Asir, ahmad-3565@hotmail.com
[5]Technician, Emergency medical services, Red Crescent Asir, ayyd05@hotmail.com
[6]Technician, Emergency medical services, Red Crescent Asir, y-emar77@hotmail.com
[7]Technician, Emergency medical services, Red Crescent Asir, dfg23412341@gmail.com
[8]Technician, Emergency medical services, Red Crescent Asir, al_shehri89@hotmail.com
[9]Technician, Emergency medical services, Red Crescent Asir, Ukyam.uk@hotmail.com
[10]Technician, Emergency medical services, Red Crescent Asir, ammor.6@hotmail.com

Abstract:

The handover of patient care from paramedics to emergency department (ED) staff is a high-risk interface vulnerable to communication failures, with significant implications for patient safety and operational efficiency. This narrative review synthesizes existing literature to evaluate the impact of standardizing this handover process. It identifies and describes a range of mnemonic-based frameworks (e.g., SBAR, IMIST-AMBO, MIST) and technology-assisted solutions designed to structure information transfer. The evidence consistently demonstrates that standardized protocols significantly improve the completeness and accuracy of handovers, which in turn facilitates more timely clinical interventions, reduces errors, and decreases ambulance turnaround times. Furthermore, these protocols enhance interprofessional collaboration and staff satisfaction. Successful implementation, however, faces barriers including cultural resistance, time constraints, and inadequate training. The review concludes that effective standardization requires a systemic approach involving joint interdisciplinary training, cultural change, technological integration, and supportive policy, rather than merely the adoption of a specific tool.

Keywords: *Patient Handover, Standardized Protocol, Paramedic to Emergency Department, Communication in Healthcare, Patient Safety*

Corresponding author:
Mousa Ahmad Mousa Asiri,
mosa714@gmail.com

QR CODE

Please cite this article in press ***Mousa Ahmad Mousa Asiri*** *et al.,* ***Standardizing Patient Handover From Paramedics To Emergency Departments: A Narrative Review Of Protocols And Outcomes****, Indo Am. J. P. Sci, 2025; 12(10).*

1. INTRODUCTION:

1.1. The Handover as a Critical High-Risk Interface

The handover of patient care from paramedics to emergency department (ED) staff represents one of the most vulnerable transitions in the healthcare continuum. This brief exchange must convey critical information under conditions of inherent pressure and uncertainty. The process is uniquely challenging due to several factors: severe time pressure to clear ambulances for new calls, the high-acuity and often unstable nature of patients, diagnostic uncertainty in the prehospital environment, and significant environmental distractions within the busy ED (Troyer & Brady, 2020; Ehlers et al., 2021). This "hot handover" of an unstable patient creates a perfect storm where communication failures are both likely and consequential.

1.2. The Consequences of Ineffective Handover Communication

When handovers fail, the impacts are felt across both patient safety and operational efficiency. From a patient safety perspective, ineffective communication is a root cause of medication errors, delayed diagnoses, and missed critical information such as mechanism of injury or response to prehospital treatments (Bost et al., 2010; Reay et al., 2020). For example, a missed detail about a trauma patient's mechanism can lead to a failure to activate the trauma team appropriately, delaying life-saving interventions. Operationally, poor handovers contribute to delays in treatment, prolonged ambulance "wall time" (turnaround time), and exacerbate ED crowding (Meisel et al., 2015). Furthermore, these failures can strain the inter-professional relationships between paramedic and ED staff, creating a cycle of mistrust and defensive communication that further degrades future interactions (Kalyani et al., 2017; Haliq & AlShammari, 2025).

1.3. The Rationale for Standardization

The traditional, narrative handover is highly variable, relying on individual memory, communication style, and the prevailing pressures of the moment. Standardization offers a pathway from these ad-hoc, unreliable processes to structured, predictable ones. By providing a consistent framework, standardized handover tools, such as mnemonics and checklists, reduce cognitive load for both the giver and receiver of information, allowing clinicians to focus on clinical reasoning rather than remembering what to say (Iedema et al., 2012). The primary role of standardization is to mitigate communication failures by ensuring that essential information is transferred systematically, leaving less to chance (Aase et al., 2011).

1.4. Objective and Scope of the Review

Given the critical nature of this interface and the push for standardization, this narrative review aims to synthesize the existing literature on standardized handover protocols between paramedics and ED staff. Specifically, it will:

1. Identify and describe the various standardized handover tools and protocols that have been developed and implemented.
2. Review the evidence regarding the impact of these protocols on a range of outcomes, including clinical outcomes (patient safety), operational outcomes (efficiency and flow), and experiential outcomes (staff satisfaction and interprofessional collaboration).

2. METHODS:

2.1. Review Design

This study employed a narrative review methodology. This approach was selected to comprehensively map and synthesize the existing literature on standardized handover protocols between paramedics and emergency department staff. A narrative review is particularly suited to this objective, as the field is characterized by a diversity of study designs, interventions, and outcome measures, making a systematic review with strict homogeneity criteria less feasible. This design allows for the inclusion of a broad range of evidence, including qualitative and quantitative studies, to provide a rich, contextualized overview of the current state of knowledge, identify key themes, and highlight gaps for future research (Green et al., 2006).

2.2. Search Strategy and Information Sources

A systematic search of the literature was conducted to identify relevant publications. The following electronic bibliographic databases were searched from their inception through June 2024: PubMed, CINAHL (Cumulative Index to Nursing and Allied Health Literature), Embase, and Scopus. To ensure a comprehensive capture of all relevant evidence, the search strategy also included a review of grey literature sources, such as reports from professional colleges (e.g., American College of Emergency Physicians, National Association of Emergency Medical Services Physicians) and government health department guidelines.

The search strategy utilized a combination of Medical Subject Headings (MeSH) and free-text keywords related to the core concepts of the review. The primary Boolean search string was: ("patient handoff" OR "clinical handover" OR "handoff") AND ("paramedic" OR "emergency medical services" OR "prehospital")AND ("emergency department" OR "emergency room") AND ("standardization" OR "protocol" OR "SBAR" OR "ISBAR" OR "IMIST-AMBO" OR "MIST") The search syntax was adapted for the specific requirements of each database.

2.3. Study Selection and Eligibility Criteria

The study selection process focused on identifying literature that directly addressed the standardization

of the handover process at the paramedic-ED interface. The inclusion criteria were as follows:
Studies must evaluate, describe, or discuss the implementation, effectiveness, or outcomes of standardized handover tools or processes used during the transition of care from emergency medical services to the emergency department.

Peer-reviewed primary research of any design (e.g., Randomized Controlled Trials, quasi-experimental studies, observational cohorts, qualitative studies), systematic reviews, and influential opinion pieces or clinical practice guidelines from recognized professional bodies were included. Editorials and non-English publications were excluded.

2.4. Data Extraction and Synthesis

Data from the included publications were extracted and organized using a standardized approach. Key information extracted included: the study author(s) and year; country of origin; study design; description of the handover protocol or intervention; primary and secondary outcomes measured; and key findings related to implementation, effectiveness, and barriers/facilitators.

Given the methodological diversity of the included studies, a formal meta-analysis was not performed. Instead, a thematic synthesis was conducted. The extracted data were analyzed to identify, analyze, and report recurring patterns (themes) across the literature. The findings were structured to describe the landscape of existing handover tools, their measured impacts on various outcomes (safety, efficiency, culture), and the critical factors influencing their successful implementation.

3. Results

3.1. The Landscape of Standardized Handover Tools

The development of standardized handover protocols has produced various approaches to improve information transfer between paramedics and emergency department staff. These can be broadly categorized into mnemonic-based frameworks, technology-assisted solutions, and hybrid models that combine elements of both.

3.1.1. Mnemonic-Based Communication Frameworks

Mnemonic-based tools provide structured frameworks for verbal handovers, ensuring consistent information delivery. Several key frameworks have emerged:

SBAR (Situation, Background, Assessment, Recommendation) represents one of the most widely adapted communication tools in healthcare. In the prehospital context, SBAR provides a logical sequence for handovers, beginning with the immediate situation (patient acuity), followed by relevant background (history), current assessment (vital signs, physical findings), and clear recommendations for ongoing care. Studies have shown its adaptation helps create a common language between prehospital and hospital providers, though some find it may lack specificity for trauma cases (Shah et al., 2016; Koval, 2015).

ISBAR (Identify, Situation, Background, Assessment, Recommendation) builds upon SBAR by explicitly adding patient identification as the first step. This crucial enhancement addresses a fundamental patient safety requirement by ensuring proper patient identification before transmitting clinical information, making it particularly valuable in busy ED environments where multiple handovers may occur simultaneously (Aase et al., 2011).

For specialized cases, several condition-specific mnemonics have been developed:

MIST (Mechanism/Medical complaint, Injuries/Information, Signs, Treatment**)** provides a trauma-focused framework that emphasizes mechanism of injury, a critical element in trauma triage and management. Its concise format makes it particularly useful in high-acuity trauma resuscitations where time is critical (Wood et al., 2015).

ATMIST (Age, Time, Mechanism, Injuries, Signs, Treatment) offers another trauma-specific approach, similar to MIST but explicitly including patient age and time of injury - both crucial elements in trauma decision-making. This tool has gained particular traction in systems with specialized trauma centers (Cowan et al., 2023).

AHOUET (Age, History, Observations, Units/Investigations, ETA, Treatment**)** represents a more comprehensive tool designed for broader application beyond trauma. Its inclusion of "Units/Investigations" (referring to blood products or medications administered) and "ETA" (estimated time of arrival) makes it particularly useful for medical cases and interfacility transfers (Guasconi et al., 2022).

3.1.2. Technology-Assisted Handover Solutions

Beyond verbal mnemonics, technological solutions are increasingly playing a role in standardizing handover processes:

Electronic Patient Care Records (ePCRs) have transformed handovers by enabling pre-arrival notification and providing a structured digital record of prehospital care. When effectively integrated with ED systems, ePCRs can transmit critical patient information ahead of ambulance arrival, allowing ED teams to prepare resources and initiate early planning. However, their effectiveness depends on interoperability between systems and the reliability of data entry by paramedics under time pressure (Meisel et al., 2015; Troyer & Brady, 2020).

The potential of digital platforms and mobile applications extends beyond traditional ePCRs. Emerging solutions include secure messaging systems that can transmit key handover elements directly to receiving physicians' mobile devices, and integrated dashboard systems that provide real-time visualization of incoming patients and their key clinical data. These technologies show promise for creating more seamless data transfer but face challenges related to implementation costs, cybersecurity, and workflow integration (Ehlers et al., 2021).

3.1.3. Hybrid and Customized Models

In practice, many healthcare systems develop customized approaches that blend elements from established frameworks:

IMIST-AMBO represents a prominent example of a customized tool specifically designed for the paramedic-ED interface. Developed through rigorous research, it combines the structured approach of mnemonic tools with specific elements relevant to prehospital care, including "Allergies," "Medications," "Background history," and "Other information." This hybrid approach has demonstrated improved information transfer completeness compared to unstructured handovers (Iedema et al., 2012).

Individual EDs and EMS systems frequently adapt existing frameworks to fit local needs, resources, and specific patient populations. For instance, some systems have developed stroke-specific handover protocols that incorporate critical time metrics and neurological assessment findings to accelerate door-to-intervention times (Mastrogiovanni & Moccia, 2022). These customized models often emerge through collaborative efforts between paramedic and ED staff, reflecting local workflows and priorities while maintaining the core principles of standardized communication (Reay et al., 2020).

3.2. Measured Outcomes of Standardized Handover Implementation

The implementation of standardized handover protocols has demonstrated significant, measurable impacts across multiple domains of emergency care, from the quality of information transfer to clinical outcomes and professional satisfaction.

3.2.1. Impact on Information Transfer and Quality

The most consistently documented benefit of standardized handovers is the marked improvement in the completeness and accuracy of clinical data transfer. Studies evaluating mnemonics like IMIST-AMBO and structured protocols have shown a significant increase in the transmission of critical information, including patient history, mechanism of injury, vital signs, and treatments administered (**Iedema et al., 2012; Maddry et al., 2021**). This structured approach directly reduces the incidence of omitted critical information, such as a patient's response to prehospital analgesia or a key detail of the mechanism of injury, which are frequently missed in unstructured narratives (**Bost et al., 2010; Reay et al., 2020**). By ensuring a consistent framework, standardization mitigates the risk of cognitive bias and memory lapses under pressure.

3.2.2. Impact on Patient Safety and Clinical Care

Improved information quality directly translates to enhanced patient safety and more timely clinical care. Research indicates that standardized handovers can lead to reductions in time to key interventions. For example, the use of a structured stroke handover protocol has been associated with faster door-to-computed tomography times and improved eligibility for thrombolysis (Mastrogiovanni & Moccia, 2022). Similarly, clearer communication of a patient's condition and prehospital treatment can reduce medication errors, such as duplicate analgesic administration or missed antibiotic doses in sepsis, and decrease the likelihood of missed injuries in trauma patients (Cowan et al., 2023; Dawson et al., 2013).

3.2.3. Impact on Operational Efficiency

A common concern regarding standardized handovers is that they may prolong the process. However, evidence suggests a more nuanced reality. While some studies note a modest increase in handover duration initially, this is often an "investment" in accuracy that yields efficiency gains downstream. Structured handovers can reduce the need for clarifying questions and repeated calls for information, ultimately contributing to a decrease in total ED bed occupancy time for ambulance patients (Meisel et al., 2015). Furthermore, by streamlining the transition, these protocols can significantly reduce ambulance "wall time" (turnaround time), a critical metric for EMS system efficiency that helps return units to service more quickly (Troyer & Brady, 2020).

3.2.4. Impact on Professional and Cultural Outcomes

Beyond clinical and operational metrics, standardized handovers profoundly impact the human elements of care. The implementation of a shared communication framework has been shown to improve perceptions of interprofessional collaboration and mutual respect between paramedic and ED staff (Kalyani et al., 2017). When all parties understand and use the same structured process, it fosters a sense of teamwork and reduces hierarchical barriers. Consequently, both paramedics and ED nurses report higher satisfaction with the handover process and greater confidence that critical information has been effectively communicated, leading to a more positive and psychologically safe work environment (Sanjuan-Quiles et al., 2019; Haliq & AlShammari, 2025).

3.3. Barriers and Facilitators to Implementation

The successful implementation of standardized handover protocols is not guaranteed and is highly dependent on navigating key barriers and leveraging critical facilitators.

3.3.1. Key Barriers

Several significant obstacles can hinder adoption:

- Deeply ingrained habits and a "this is how we've always done it" mentality are powerful deterrents. Furthermore, professional tribalism—where paramedics and ED staff operate as separate tribes with different cultures and priorities—can create resistance to a unified protocol (Kalyani et al., 2017; Wood et al., 2015).
- As noted, the belief that a structured tool will unnecessarily lengthen the handover process is a major barrier to buy-in from clinicians who are already time-pressured (Meisel et al., 2015).
- Implementing a tool without adequate, interdisciplinary training ensures failure. If ED staff are unfamiliar with the mnemonic paramedics are using, or vice versa, the protocol becomes a source of confusion rather than clarity (Guasconi et al., 2022).
- The failure of Electronic Patient Care Record (ePCR) systems to integrate seamlessly with ED electronic health records creates a major technological barrier. When data cannot be transferred electronically, it undermines the efficiency gains of standardization and leads to duplication of effort (Troyer & Brady, 2020).

3.3.2. Critical Facilitators

Conversely, several factors are consistently linked to successful implementation:

- The active involvement and endorsement of respected clinical leaders from both the paramedic and ED teams are crucial. These champions can model the behavior, advocate for the protocol, and persuade their peers of its value (Iedema et al., 2012).
- Protocols that are developed collaboratively with input from frontline paramedics, ED nurses, and physicians are far more likely to be accepted and used. Co-design ensures the tool is practical, relevant, and addresses the real-world needs of all users (Reay et al., 2020).
- Joint training sessions that bring paramedics and ED staff together are transformative. Simulation-based training, in particular, allows teams to practice the new handover protocol in a realistic but low-risk environment, building competence and confidence (Sauter et al., 2016; Flynn et al., 2016).
- Building the standardized handover framework directly into ePCR systems and ED tracking boards "hardwires" the process into the clinical workflow. This integration prompts users for required information and ensures the structure is followed consistently, making compliance the default (**Maddry et al., 2021**).

4. Discussion and Synthesis

4.1. Interpretation of the Evidence

This review synthesizes compelling evidence that standardized handover protocols significantly improve the quality and safety of care at the paramedic-ED interface. A key consideration in protocol selection involves the trade-off between brevity and comprehensiveness. Tools like MIST offer speed crucial for trauma resuscitations, while more comprehensive mnemonics like IMIST-AMBO or AHOUET ensure thorough information transfer for complex medical cases (Guasconi et al., 2022; Cowan et al., 2023). Crucially, the evidence reveals a fundamental distinction between merely implementing a tool and fostering a culture of effective communication. A protocol's success depends less on its specific acronym and more on its integration into a cultural framework that values collaboration, psychological safety, and continuous improvement (Kalyani et al., 2017; Iedema et al., 2012).

4.2. Implications for Practice

For clinical practice, this review underscores the necessity of mandatory, joint training on a standardized handover framework. Isolated training for paramedics or ED staff alone is insufficient; true competency develops through interdisciplinary education that builds shared understanding and mutual respect (Reay et al., 2020). Furthermore, the variation in tools across different services highlights the need for policy and protocol alignment at a regional or national level. Standardization across systems would reduce confusion and improve efficiency when multiple EMS agencies deliver to the same ED, or when staff work across different facilities (Wood et al., 2015).

4.3. Implications for Policy

At a policy level, accrediting bodies for both prehospital and emergency medicine should mandate standardized handover competencies within their educational and certification requirements. This would ensure all new clinicians enter the workforce with this essential skill (Shah et al., 2016). Additionally, policymakers must prioritize funding and support for interoperable health information technology. The current fragmentation between ePCRs and ED electronic health records represents a critical systems-level failure that undermines handover safety and efficiency (Troyer & Brady, 2020).

4.4. Limitations of the Review and the Existing Literature

As a narrative review, this synthesis is limited by its methodology, which, while comprehensive, does not include the formal quality assessment and quantitative synthesis of a systematic review. More significantly, the existing literature itself has important limitations, characterized by a predominance of single-center, before-and-after studies that are vulnerable to various biases. There is

a conspicuous lack of high-quality RCTs demonstrating causal effects on hard patient outcomes, reflecting the practical challenges of conducting such research in dynamic emergency settings (Reay et al., 2020; Guasconi et al., 2022).

4.5. Future Directions

To advance the field, future efforts should focus on:

- Conducting multi-center studies and cost-effectiveness analyses to provide higher-level evidence and demonstrate the economic value of standardization.
- Formally exploring the implementation strategies, such as the specific impact of "handover champions" and the use of audio-recording for feedback and quality improvement.
- Accelerating the development and evaluation of integrated digital handover solutions that seamlessly connect prehospital and hospital data systems, moving beyond standalone mnemonics to truly connected care (Meisel et al., 2015; Ehlers et al., 2021).

5. CONCLUSION:

In conclusion, standardized handover protocols represent a vital, evidence-based intervention to enhance patient safety and operational efficiency at the critical paramedic-ED interface. The evidence convincingly demonstrates that structured communication improves information transfer, facilitates timely interventions, and strengthens interprofessional collaboration. However, successful implementation requires more than just adopting a mnemonic; it demands a systemic approach involving joint training, cultural change, and technological support. Ensuring that every patient handover is structured, complete, and safe requires a concerted effort from frontline clinicians, administrators, and policymakers to prioritize, fund, and sustain this fundamental aspect of patient care. The goal is not merely to standardize communication, but to build a more reliable, respectful, and effective system for transitioning care for our most vulnerable patients.

REFERENCES:

1. Aase, K. A. R. I. N. A., Soeyland, E. L. S. A., & Hansen, B. S. (2011). A standardized patient handover process: Perceptions and functioning. *Safety Science Monitor*, *15*(2), 1-9.
2. Bost, N., Crilly, J., Wallis, M., Patterson, E., & Chaboyer, W. (2010). Clinical handover of patients arriving by ambulance to the emergency department–a literature review. *International emergency nursing*, *18*(4), 210-220.
3. Cowan, S., Murphy, P., Kim, M., Mador, B., Chang, E., Kabaroff, A., ... & Widder, S. (2023). Paramedic to trauma team verbal handover optimization—a complex interaction. *Canadian Journal of Surgery*, *66*(3), E290.
4. Dawson, S., King, L., & Grantham, H. (2013). Improving the hospital clinical handover between paramedics and emergency department staff in the deteriorating patient. *Emergency Medicine Australasia*, *25*(5), 393-405.
5. Ehlers, P., Seidel, M., Schacher, S., Pin, M., Fimmers, R., Kogej, M., & Gräff, I. (2021). Prospective observational multisite study of handover in the emergency department: Theory versus practice. *Western Journal of Emergency Medicine*, *22*(2), 401.
6. Flynn, D., Francis, R., Robalino, S., Lally, J., Snooks, H., Rodgers, H., ... & Price, C. (2016). A review of enhanced paramedic roles during and after hospital handover of stroke, myocardial infarction and trauma patients. *BMC emergency medicine*, *17*(1), 5.
7. Guasconi, M., Bonacaro, A., Tamagnini, E., Biral, S., Brigliadori, L., Borioni, S., ... & Artioli, G. (2022). Handover methods between local emergency medical services and Accident and Emergency: is there a gold standard? A scoping review. *Acta Bio Medica: Atenei Parmensis*, *93*(4), e2022288.
8. Haliq, S. A., & AlShammari, T. (2025). Communication handover barriers among nurses and paramedics in emergency care settings. *BMC nursing*, *24*(1), 634.
9. Iedema, R., Ball, C., Daly, B., Young, J., Green, T., Middleton, P. M., ... & Comerford, D. (2012). Design and trial of a new ambulance-to-emergency department handover protocol:'IMIST-AMBO'. *BMJ quality & safety*, *21*(8), 627-633.
10. Kalyani, M. N., Fereidouni, Z., Sarvestani, R. S., Shirazi, Z. H., & Taghinezhad, A. (2017). Perspectives of patient handover among paramedics and emergency department members; a qualitative study. *Emergency*, *5*(1), e76.
11. Koval, V. (2015). *The use of standardized communication protocol for patient handover in emergency department setting* (Doctoral dissertation, University of British Columbia).
12. Maddry, J. K., Simon, E. M., Reeves, L. K., Mora, A. G., Clemons, M. A., Shults, N. M., ... & Walrath, B. D. (2021). Impact of a standardized patient hand-off tool on communication between emergency medical services personnel and emergency department staff. *Prehospital emergency care*, *25*(4), 530-538.
13. Mastrogiovanni, M. J., & Moccia, J. M. (2022). Optimizing handover in patients with stroke symptoms utilizing an organized protocol between emergency department providers and emergency medical personnel. *International Emergency Nursing*, *61*, 101129.

14. Meisel, Z. F., Shea, J. A., Peacock, N. J., Dickinson, E. T., Paciotti, B., Bhatia, R., ... & Cannuscio, C. C. (2015). Optimizing the patient handoff between emergency medical services and the emergency department. *Annals of emergency medicine*, *65*(3), 310-317.
15. Reay, G., Norris, J. M., Alix Hayden, K., Abraham, J., Yokom, K., Nowell, L., ... & Lang, E. S. (2017). Transition in care from paramedics to emergency department nurses: a systematic review protocol. *Systematic reviews*, *6*(1), 260.
16. Reay, G., Norris, J. M., Nowell, L., Hayden, K. A., Yokom, K., Lang, E. S., ... & Abraham, J. (2020). Transition in care from EMS providers to emergency department nurses: a systematic review. *Prehospital Emergency Care*, *24*(3), 421-433.
17. Sanjuan-Quiles, Á., del Pilar Hernández-Ramón, M., Juliá-Sanchis, R., García-Aracil, N., Castejón-de la Encina, M. E., & Perpiñá-Galvañ, J. (2019). Handover of patients from prehospital emergency services to emergency departments: a qualitative analysis based on experiences of nurses. *Journal of nursing care quality*, *34*(2), 169-174.
18. Shah, Y., Alinier, G., & Pillay, Y. (2016). Clinical handover between paramedics and emergency department staff: SBAR and IMIST-AMBO acronyms. *International Paramedic Practice*, *6*(2), 37-44.
19. Troyer, L., & Brady, W. (2020). Barriers to effective EMS to emergency department information transfer at patient handover: a systematic review. *The American Journal of Emergency Medicine*, *38*(7), 1494-1503.
20. Wood, K., Crouch, R., Rowland, E., & Pope, C. (2015). Clinical handovers between prehospital and hospital staff: literature review. *Emergency Medicine Journal*, *32*(7), 577-581.