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Review Article

**EXPLORING THE IMPACT OF COMMUNICATION AMONG
PREHOSPITAL CARE PROVIDERS ON PATIENT OUTCOMES
IN TRAUMA SITUATIONS: A SYSTEMATIC REVIEW**

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Abstract:

Effective communication among prehospital care providers is crucial for optimal patient outcomes, particularly in trauma situations where rapid decision-making is essential. This systematic review investigates the impact of communication practices on patient care during prehospital trauma management. It highlights significant challenges, including the lack of standardized communication protocols and the chaotic nature of emergency environments, which often lead to misunderstandings and treatment delays. The review synthesizes findings from various studies, revealing a direct correlation between communication quality and patient survival rates. Implementing structured communication tools, such as the Situation-Background-Assessment-Response (SBAR) model, emerges as a promising strategy to enhance clarity and consistency in information exchange. Furthermore, the review emphasizes the importance of training programs and simulation exercises to improve communication skills among emergency medical services (EMS) providers. Overall, this research underscores the necessity of fostering effective communication practices to reduce errors and improve team dynamics in prehospital settings. By identifying best practices and areas for improvement, the study aims to inform future training initiatives and policy developments, ultimately contributing to safer and more efficient trauma care.

Keywords: Prehospital Care, Communication, Trauma Outcomes, Emergency Medical Services, Systematic Review

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1. INTRODUCTION:

Effective communication is a cornerstone of successful teamwork and patient care in high-pressure environments. In prehospital trauma care, where rapid decision-making is critical, the ability to convey accurate information among care providers can significantly influence patient outcomes. Unlike the structured communication protocols observed in aviation—a field where clarity and precision are vital for safety—the communication strategies employed during trauma resuscitation often lack similar rigor. This gap can lead to misunderstandings, delays, and ultimately poorer patient outcomes.

Research has demonstrated that ineffective communication within healthcare teams can contribute to adverse events and increased healthcare costs (Renouf et al., 2017). Strategies such as the Situation-Background-Assessment-Response (SBAR) model have been proposed to enhance communication during handoffs and transitions in care, aiming to improve outcomes for trauma patients (Miller et al., 2009). However, the implementation of such strategies, particularly in resource-limited settings, remains a challenge.

The transition of patient care from emergency medical services (EMS) to emergency department (ED) personnel is a critical juncture where effective communication is essential. The American College of Emergency Physicians (ACEP) advocates for clearly defined communication processes to facilitate face-to-face reports and ensure the continuity of care. Their policy emphasizes the importance of verbal communication supported by written documentation to enhance patient safety (Maddry et al., 2021).

Action teams consist of healthcare professionals with diverse medical training and experiences who collaborate as a unified group during medical emergencies. Examples of such teams include trauma teams called to the emergency room to address multiple injuries and code blue resuscitation teams (Courtenay, et al. 2013). Effective interdisciplinary teamwork is crucial in emergency situations, where

medical care has become increasingly specialized and the complexity of skills needed to treat critically ill patients continues to grow (Jensen, et al. 2015). As a result, effective communication is essential for maintaining the coherence of hospital action teams. The chaotic nature of critical care medicine often disrupts coordination and collaboration among team members. Additionally, recent enforcement of duty-hour regulations, staffing limitations, and numerous patient care handoffs have exacerbated these challenges. Consequently, treating critically ill patients necessitates navigating multiple communication barriers that are inherent in the emergency care environment (Abdel-Rehim, et al. 2011)

In the Netherlands, the integration of Physician-staffed Helicopter Emergency Medical Services (P-HEMS) since 1995 has underscored the importance of effective prehospital communication in trauma situations. Studies have identified both the challenges and the necessity of robust communication protocols among EMS, trauma helicopters, and dispatch centers, particularly during trauma-related dispatches (Bergs et al., 2016). Recent research has highlighted the need for standardized communication practices to improve information exchange and support collaborative decision-making in the prehospital setting (Harmsen et al., 2016).

This systematic review aims to explore the impact of communication among prehospital care providers on patient outcomes in trauma situations. By examining existing literature and identifying gaps in communication practices, we seek to provide insights that can inform improvements in prehospital care delivery and ultimately enhance patient safety and outcomes.

This study contributes to the growing body of literature on prehospital trauma care by highlighting the critical role of communication in enhancing patient outcomes. Effective communication is essential for ensuring coordinated care, reducing the likelihood of

errors, and improving the overall efficiency of trauma response teams. By identifying best practices and potential areas for improvement, this research aims to inform training programs and policy initiatives that enhance communication among prehospital care providers, ultimately leading to safer and more effective trauma care.

2. Literature Review

2.1. Communication Challenges in Prehospital Care

2.1.1. Lack of Standardized Communication Protocols

One of the primary barriers to effective communication in prehospital settings is the absence of standardized protocols. Zhang et al. (2020) found that variations in communication practices among EMS providers often lead to incomplete information transfer, compromising patient care. Previous research supports this finding, indicating that standardized communication frameworks, such as the SBAR (Situation, Background, Assessment, Recommendation) model, can significantly enhance clarity and consistency in information sharing (Courtenay et al., 2021).

2.1.2. Team Coordination and Information Sharing

Effective team coordination is critical in emergency care, yet it is often hindered by siloed communication practices. Zhang et al. (2020) noted that EMS providers frequently rely on verbal reports that lack essential details, making it difficult for hospital teams to prepare adequately. This aligns with findings from earlier studies, which highlight that fragmented communication between prehospital and hospital teams can lead to misunderstandings and inefficiencies in patient management (Courtenay et al., 2021).

2.1.3. Stress and Its Impact on Communication

The high-stress environment of emergency care can adversely affect communication among providers. Research indicates that the pressure to make quick decisions often results in rushed and unclear exchanges of information (Zhang et al., 2020). Stress has been shown to impair cognitive function and decision-making abilities, further complicating the communication process during critical incidents (Courtenay et al., 2021).

2.2. Impact of Communication on Patient Outcomes

2.2.1. Association Between Communication Quality and Patient Survival Rates

Studies have demonstrated a direct link between the quality of communication and patient survival rates in emergency settings. Effective communication allows

for timely and accurate assessments, which are critical for improving outcomes (Zhang et al., 2020). Previous research supports this, showing that well-communicated information correlates with better patient management and higher survival rates (Courtenay et al., 2021).

2.2.2. Influence of Communication Errors on Treatment Delays

Communication errors can lead to significant treatment delays, adversely affecting patient outcomes. Zhang et al. (2020) found that incomplete or inaccurate information relayed by EMS teams often resulted in hospitals being unprepared for incoming patients, delaying necessary interventions. Earlier studies have similarly identified that miscommunication during handoffs can lead to critical delays in treatment, underscoring the need for improved communication practices (Courtenay et al., 2021).

2.2.3. Effect of Communication Clarity on Treatment Efficacy

Clear communication is essential for treatment efficacy, particularly in emergency situations. Zhang et al. (2020) emphasized that when EMS providers deliver concise and accurate reports, hospital teams can implement appropriate treatment plans more effectively. This is supported by previous findings, which indicate that clarity in communication directly influences the speed and effectiveness of medical interventions (Courtenay et al., 2021).

2.3. Effective Communication Strategies

2.3.1. Use of Structured Communication Tools (e.g., SBAR)

Implementing structured communication tools, such as SBAR, has been shown to enhance the clarity and efficiency of information exchange in emergency care. Zhang et al. (2020) advocate for the adoption of such frameworks to standardize communication processes, ensuring that critical information is conveyed consistently. Previous research corroborates this, indicating that structured tools can reduce miscommunication and improve team coordination (Courtenay et al., 2021).

2.3.2. Importance of Clear Roles and Responsibilities

Defining clear roles and responsibilities within emergency teams is crucial for effective communication. Research has shown that ambiguity in roles can lead to confusion and information gaps (Zhang et al., 2020). Establishing clear expectations for each team member can facilitate better collaboration and enhance the overall communication process, as supported by earlier studies (Courtenay et al., 2021).

2.3.3. Training and Simulation for Enhancing Communication Skills

Training programs and simulation exercises are vital for improving communication skills among EMS providers. Zhang et al. (2020) found that immersive training experiences help teams practice effective communication strategies in high-pressure scenarios. Previous studies have similarly highlighted the benefits of simulation training in enhancing team dynamics and communication proficiency, ultimately leading to better patient outcomes (Courtenay et al., 2021).

This literature review synthesizes findings from the mentioned studies and integrates insights from previous research to provide a comprehensive overview of communication challenges, impacts on patient outcomes, and effective strategies in prehospital care.

3. METHODOLOGY:

3.1. Research Design

This systematic review adopted a qualitative approach to synthesize existing literature on the impact of communication among prehospital care providers on patient outcomes in trauma situations. The review aimed to identify communication challenges, assess the effectiveness of communication strategies, and explore the relationship between communication quality and patient outcomes. The research design followed established guidelines for conducting systematic reviews, ensuring a comprehensive and unbiased analysis of relevant studies.

3.2. Inclusion Criteria

Inclusion criteria for this review encompassed studies published in peer-reviewed journals that focused on communication practices among prehospital care providers in trauma settings. Specifically, studies were included if they:

- Addressed communication between EMS and hospital personnel.
- Evaluated communication strategies or frameworks.
- Reported on patient outcomes related to communication quality.

3.3. Exclusion criteria included:

- Studies not published in English.
- Research focusing solely on non-trauma-related emergency care.
- Articles that did not provide empirical data or user evaluations of communication practices.

3.4. Search Strategy

3.4.1. Keywords and Database

A comprehensive literature search was conducted using several academic databases, including PubMed,

Scopus, and Web of Science. The search utilized a combination of keywords and phrases to capture relevant studies, including "prehospital communication", "emergency medical services", "trauma care", "patient outcomes", "communication strategies", and "SBAR model". These keywords were tailored to ensure a broad yet focused search, capturing studies that specifically addressed communication in trauma care contexts.

3.4.2. Selection Process

The selection process involved multiple phases:

- Initial Screening: Titles and abstracts of retrieved articles were screened for relevance. Articles that did not meet the inclusion criteria were excluded.
- Full-Text Review: Remaining articles underwent a full-text review to assess their eligibility based on the defined criteria.
- Final Selection: A consensus was reached among the research team regarding the final selection of studies to be included in the review.

3.4.3. Data Extraction

Data extraction was performed using a standardized form to ensure consistency across the studies reviewed. Key information extracted from each article included:

- Authors and year of publication
- Study design and methodology
- Population characteristics
- Communication strategies evaluated
- Outcomes related to patient care and safety

This systematic approach facilitated the organization and comparison of findings across studies.

3.5. Quality Assessment of Included Studies

The methodological quality of included studies will be assessed using the Newcastle-Ottawa Scale for observational studies. This 9-point scale evaluates studies based on the followings:

- Clarity of research objectives
- Appropriateness of study design
- Rigor of methodology
- Relevance and reliability of findings

Studies were rated as high, moderate, or low quality based on their adherence to these criteria. This assessment helped to ensure the reliability of the conclusions drawn from the systematic review.

3.6. Data Synthesis

A narrative synthesis will be conducted to summarize the key findings from the included studies. Factors influencing prehospital scene time and transport decisions will be categorized and described, with an assessment of the strength and consistency of the evidence. Where feasible, a meta-analysis may be

performed to pool quantitative estimates of effect sizes across studies.

4. RESULTS:

4.1. Search Results

After performing the comprehensive database search, 113 relevant citations were found since 2010 to 2024.

Endnote was used to remove all potential duplicates and managed to find and exclude 55 duplicates among the different databases. After title/abstract screening of the remaining citations ($n = 58$), the full texts of relevant articles ($n = 27$) were also reviewed. Finally, 11 articles were included. These steps are summarized in the PRISMA flow chart in Figure 1

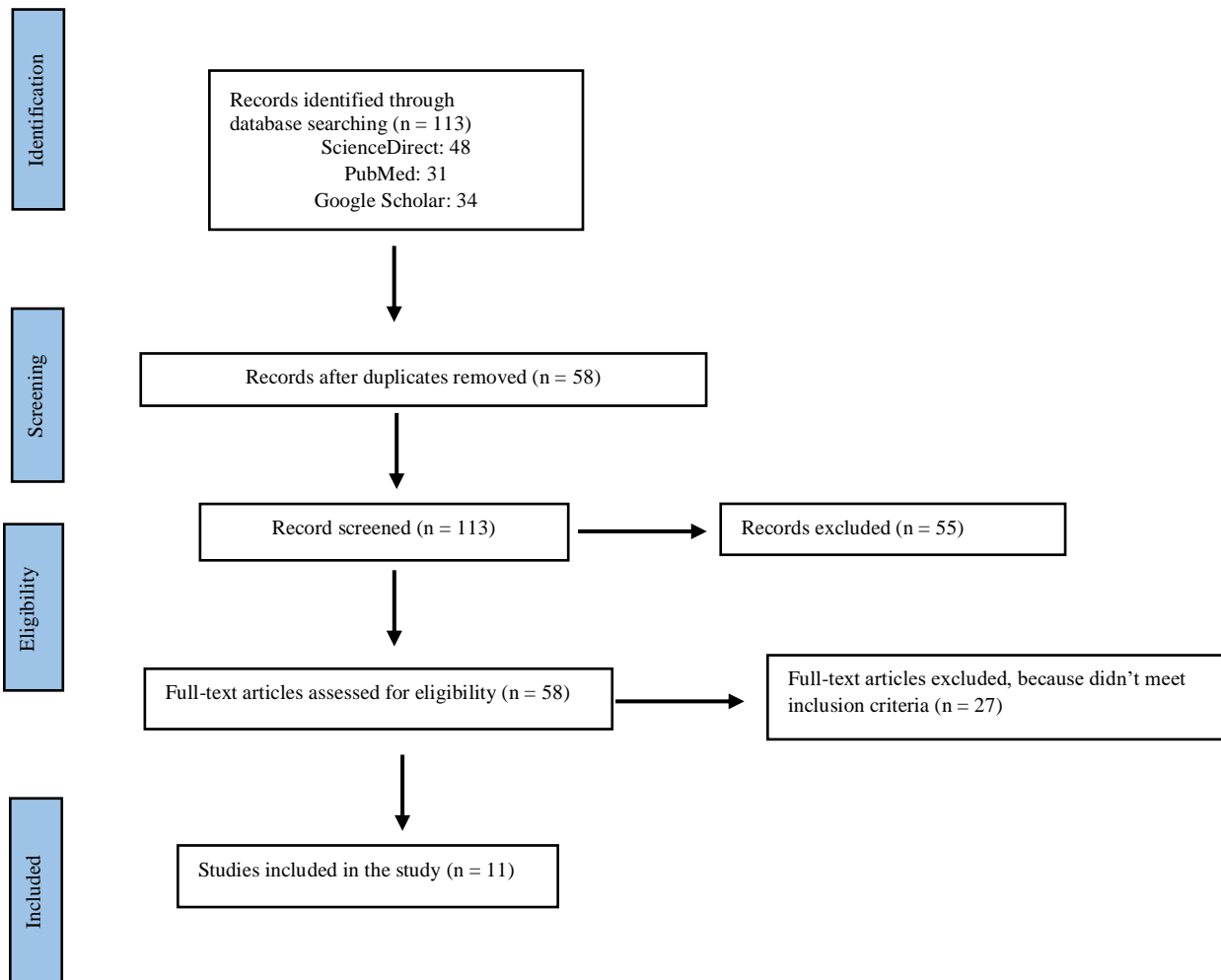


Figure 1: the PRISMA flow Char

4.2. Integrate Research Results

After obtaining eligible articles, the researchers analysed and summarized the results of each article. Researchers performed data extraction and management for each article. Data about the author, publication year, method, and findings for each article were extracted by researchers. All article evaluations used the PRISMA guidelines. Next, the researchers summarize the research articles based on impact of communication among prehospital care provider.

4.3. Previous Studies

This section presents the findings from the systematic review of studies examining the impact of communication among prehospital care providers on patient outcomes in trauma situations. We provide an overview of the included studies, summarizing their methodologies and key characteristics. The synthesized findings highlight the critical role of effective communication in enhancing patient care and outcomes. Additionally, we identify key communication factors linked to improved patient survival rates and treatment efficacy. By analyzing these results, we aim to illuminate the significant

relationship between communication practices and patient outcomes, setting the stage for a deeper discussion on the implications and recommendations for future research and practice.

Communication among prehospital care providers is critical for effective trauma management. A systematic review by Zhang et al. (2020) evaluated various technologies developed to enhance communication and coordination between emergency medical services (EMS) and hospital emergency departments (ED). The review encompassed 17 studies published between 2000 and 2019, highlighting the importance of user-centered design in prehospital communication technologies. The findings indicated that while technologies such as ambulance-based telemedicine, handheld devices, and wearable equipment showed high user acceptance, significant challenges persisted. These challenges were categorized into technical, usability, and organizational issues. Technical problems included unstable mobile network connections and interoperability between systems, which could hinder real-time communication. Usability concerns revolved around the complexity of devices and their potential to distract EMS providers during critical situations. Organizational challenges included integrating new technologies into existing workflows and fostering collaboration between dispersed teams.

The management of geriatric trauma patients in prehospital settings presents unique challenges, as highlighted in Eichinger et al. (2021). This scoping review synthesizes findings from 131 studies, revealing that older adults, particularly those over 65, are increasingly presenting with traumatic injuries. Key challenges identified include undertriage, altered physiological responses, and the complexities of multi-morbidity. The authors emphasize that low-energy falls are prevalent among this demographic, yet often lead to severe injuries due to factors like frailty and osteoporosis. The review underscores the importance of accurate injury recognition and triage, suggesting that standard protocols may inadequately address the needs of older patients. Notably, the study points out that vital signs in older adults can be misleading, leading to potential undertriage and adverse outcomes. Communication among prehospital care providers is essential for the effective assessment and management of these patients. The authors call for increased education and training focused on the distinct needs of older trauma patients to enhance patient outcomes and reduce mortality rates.

The study by Harmsen, et al. (2017) explored the critical role of communication in prehospital trauma care in the Netherlands, emphasizing its impact on patient outcomes. Conducted through a three-round modified Delphi methodology, the study engaged a diverse group of experts, including P-HEMS physicians, trauma surgeons, and EMS nurses, to reach consensus on communication practices during trauma patient handovers. Key findings indicated that prehospital communication is often perceived as incomplete and unstructured, hindering the identification of severely injured patients and the effective dispatch of Physician-staffed Helicopter Emergency Medical Services (P-HEMS). The study identified ten essential parameters that should be consistently communicated during handovers to improve clarity and ensure optimal care delivery. Moreover, the results highlighted challenges in accurately assessing trauma patients, with many experts agreeing that factors such as the Glasgow Coma Scale (GCS) and vital signs must be reported clearly to facilitate better decision-making. Overall, the DENIM study underscores the necessity of enhancing communication protocols among prehospital care providers to improve trauma care outcomes and reduce under-triage rates.

A scoping review by Courtenay et al. (2013) investigated interprofessional teamwork in trauma settings, emphasizing the crucial role of communication in reducing healthcare errors, which account for 70-80% of incidents. The review synthesized findings from 24 articles published between 2000 and 2013, categorizing them into three primary areas: team organization, composition, and evaluations of teamwork interventions. In terms of team organization, descriptive studies indicated that trauma teams function dynamically, with effective communication being vital for coordination; leadership was identified as a key factor influencing team efficiency, with positive leadership behaviors linked to improved performance outcomes. Regarding team composition, the stability of core team members was found to significantly affect team performance, as high turnover among non-core staff hindered communication and patient care, highlighting the importance of consistent team composition for maintaining shared mental models and effective collaboration. Lastly, the evaluation of interventions showed generally positive outcomes from initiatives aimed at enhancing teamwork skills, such as simulation training and structured communication strategies; however, many of these studies lacked long-term follow-up and robust sample sizes, suggesting a need for further research. Overall, the

review underscored the necessity for effective communication and collaboration among healthcare professionals in trauma settings, establishing a foundation for examining similar dynamics in prehospital care environments and their subsequent impact on patient outcomes.

In their observational study, Jensen et al. (2015) explored emergency team calls for critically ill non-trauma patients in the emergency department (ED), highlighting critical aspects of clinical presentation, management, and mortality. The study analyzed 109 emergency team activations, revealing a median patient age of 64 years, with circulatory (37.6%), disability (28.4%), and breathing problems (24.8%) being the most common issues. Emergency calls were categorized into 'orange' and 'red' based on severity, with 53.2% of patients admitted to the ICU and 18.3% deemed ineligible for ICU care. Notably, the 30-day mortality rate was significant at 31.2%, predominantly linked to circulatory issues (61.8%), and older patients demonstrated markedly higher mortality rates compared to their younger counterparts. Additionally, the study identified 115 patients who were admitted to the ICU directly from the ED without triggering an emergency team call, mainly due to intoxication or respiratory failure. These findings underscore the essential role of communication and teamwork in the ED setting, particularly in the management of complex cases, thereby emphasizing the importance of effective communication among prehospital care providers to enhance patient outcomes in trauma situations.

A study by Nordquist et al. (2023) examined the consultation processes between helicopter emergency medical service (HEMS) physicians and paramedics in Finland, focusing on paramedics' perspectives. Conducted through a cross-sectional survey of 200 paramedics, the research revealed that consultations with HEMS physicians were generally well-received, with higher satisfaction ratings compared to other consulting physicians. Key findings indicated that familiarity with the prehospital environment and local conditions significantly enhanced the effectiveness of consultations. The study highlighted that while HEMS physicians provided invaluable support during critical missions, their expertise was often deemed unnecessary for nonurgent cases. Notably, the consultation processes were perceived to have room for improvement concerning technical fluency and interpersonal attitudes. The integration of video connections in consultations was suggested as a potential enhancement to the existing communication methods.

In recent years, various studies have explored the impact of communication among prehospital care providers on patient outcomes in trauma situations. One notable study by Chatkhane Pearkao et al. (2023) evaluated the outcomes of emergency trauma patients following the implementation of a novel web application operating system designed to enhance communication and coordination among healthcare providers in the emergency department (ED). This descriptive comparative study involved 140 trauma patients who were divided into two groups: those utilizing the web application and those who did not. Key metrics assessed included the activated trauma intervals, length of stay in the ED, and patient outcomes such as shock index and Glasgow coma score. The results indicated that patients in the application group experienced significantly shorter trauma activation intervals (3.1 minutes) compared to the non-application group (5.0 minutes, $p = .010$) and reduced length of stay in the ED (18.3 minutes vs. 30.1 minutes, $p = .012$). Furthermore, the web application improved the feasibility of nursing practices, with registered nurses reporting high levels of satisfaction regarding its usability and the clarity of its processes. This study underscores the critical role that technology-mediated communication can play in enhancing the efficiency of trauma care and ultimately improving patient outcomes. The findings suggest that adopting such digital tools may contribute to more effective teamwork and quicker response times in emergency situations, highlighting the need for further research into the integration of technology in prehospital care settings.

A study by Calhoun et al. (2017) explored the development and impact of a mobile application designed to enhance communication skills among Emergency Medical Services (EMS) providers during pediatric emergencies. With 16,000 children experiencing cardiopulmonary arrest annually in the U.S., effective communication during these critical moments is essential for family support and provider coping. The researchers created the Compassionate Options for Pediatric EMS (COPE) app, which provided education on compassionate communication and facilitated self-debriefing for EMS teams after traumatic incidents. The study employed a simulation-based methodology involving 148 EMS providers divided into intervention and control groups. The intervention group utilized the app for self-debriefing, while the control group debriefed using standard methods. Results indicated that the intervention group demonstrated significant improvements in communication skills, as measured by the Gap-Kalamazoo Communication Skills Assessment Form.

Specifically, scores increased from an average of 2.9 to 4.0 out of 5, highlighting a moderate to large effect size. Additionally, gap analysis revealed that the intervention group became more aware of their communication strengths and weaknesses, suggesting that the app effectively enhanced self-reflection and self-assessment. Participants reported high satisfaction with the app's content, relevance, and applicability to both pediatric and adult cases. These findings underscore the importance of innovative educational tools in improving communication among prehospital care providers, ultimately aiming to enhance patient outcomes in trauma situations.

In the study by Norri-Sederholm et al. (2015), the critical role of paramedic field supervisors (PFS) in managing prehospital emergency medical services (EMS) was investigated through semi-structured interviews and scenario-based assessments. The research aimed to identify essential information categories that PFS require during multi-authority incidents to maintain situational awareness (SA) and ensure effective decision-making. The study identified five critical information categories: Incident data, Mission status, Area status, Safety at work, and Tactics. Incident data emerged as the most crucial category, emphasizing the need for detailed information about the nature and status of incidents, including patient triage and specific circumstances. The findings revealed that PFS primarily communicate with EMS units and other authorities via the authority radio network (TETRA) and mobile phones, highlighting the importance of efficient information flow in decision-making processes. The results indicate that PFS actively seek and deliver information to enhance shared situational awareness (SSA) among various agencies involved in emergency response. However, the study also noted challenges related to information overload, which can hinder effective communication and decision-making. The authors concluded that understanding the critical information needs of PFS is essential for improving communication strategies and ultimately enhancing patient outcomes in trauma situations.

4.4. Key findings of the included Studies

The study by Bellino et al. (2020) explored the effectiveness of in-situ simulation training for emergency medicine residents and trauma-certified nurses in trauma resuscitation scenarios. Recognizing that traumatic injuries lead to significant mortality, particularly within the critical "golden hour," the authors emphasized the importance of effective teamwork and communication in managing trauma cases. Their research presented two detailed simulation cases aimed at enhancing communication skills and procedural knowledge among multidisciplinary teams during trauma resuscitations. The authors implemented standardized patient actors and realistic medical equipment to create an immersive learning environment within the emergency department. Pre- and post-simulation surveys assessed participants' confidence in leading trauma resuscitations. Results indicated a marked increase in residents' preparedness, with most participants reporting improved confidence and communication skills post-simulation. The study highlighted that in-situ simulations not only fostered realistic learning opportunities but also encouraged collaboration among various team members, reinforcing the critical role of communication in improving patient outcomes during trauma situations. The systematic review by Rehim et al. (2016) examined tools for assessing communication skills among hospital action teams, which are interdisciplinary groups tasked with managing critically ill patients. The review identified ten communication assessment tools, highlighting that six were designed for whole-team evaluation while four focused on individual team members. The most frequently assessed domains included leadership, teamwork, communication, and situational awareness. Despite the availability of these tools, the study found significant gaps in reported psychometric validity, with only one tool meeting all validation criteria. Most tools lacked comprehensive validation data, raising concerns about their reliability in clinical practice. The authors emphasized the necessity of validated assessment tools to improve team communication and reduce medical errors in emergency settings.

Study Title	Authors	Year	Aim and Focus of Study	Methodology	Key Findings
Enhancing Communication in Prehospital Care	Zhang et al.	2020	Evaluate technologies for improving communication between EMS and ED	Systematic review of 17 studies from 2000 to 2019	- Importance of user-centered design in prehospital communication technologies - Technologies like ambulance-based telemedicine, handheld devices, and wearable equipment have high user acceptance - Challenges: technical (unstable mobile networks, system interoperability), usability (device complexity, provider distraction), and organizational issues (workflow integration, team collaboration)
Geriatric Trauma Management in Prehospital Settings	Eichinger et al.	2021	Explore challenges in managing geriatric trauma patients	Scoping review of 131 studies	- Increasing traumatic injuries in older adults, highlighting undertriage, altered physiological responses, and multi-morbidity challenges - Prevalence of severe injuries from low-energy falls in older adults due to frailty and osteoporosis - Vital signs in older adults can be misleading, leading to potential undertriage and adverse outcomes, requiring tailored education and training for effective assessment and management
Communication in Prehospital Trauma Care	Harmsen et al.	2017	Investigate communication's impact on patient outcomes	Three-round modified Delphi methodology	- Incomplete and unstructured prehospital communication hindering patient identification and P-HEMS dispatch - Identification of ten essential parameters for improved handover communication - Challenges in accurately assessing trauma patients, emphasizing clear reporting of factors like GCS and vital signs for better decision-making, highlighting the need to enhance communication protocols for improved trauma care outcomes and reduced under-triage rates
Interprofessional Teamwork in Trauma Settings	Courtenay et al.	2013	Investigate teamwork in trauma settings with an emphasis on communication's role in reducing healthcare errors	Scoping review of 24 articles from 2000 to 2013	- Team organization: Effective communication crucial for coordination; leadership key for team efficiency - Team composition: Stability of core team members crucial for performance; high turnover hinders communication and patient care - Evaluation of interventions: Positive outcomes from initiatives enhancing teamwork skills; need for further research with long-term follow-up and robust sample sizes

Emergency Team Calls for Critically Ill Non-Trauma Patients	Jensen et al.	2015	Explore emergency team calls for critically ill non-trauma patients in the ED	Observational study analyzing 109 emergency team activations	- Median patient age: 64 years; common issues: circulatory problems (37.6%), disability (28.4%), breathing problems (24.8%) - 30-day mortality rate: 31.2%, higher in older patients and linked to circulatory issues - Importance of communication and teamwork in managing complex cases in the ED for better patient outcomes
Consultation Processes between HEMS Physicians and Paramedics	Nordquist et al.	2023	Examine consultation processes between HEMS physicians and paramedics in Finland	Cross-sectional survey of 200 paramedics	- Consultations with HEMS physicians well-received, with higher satisfaction ratings compared to other consulting physicians - Familiarity with prehospital environment and local conditions enhances consultation effectiveness - Room for improvement in technical fluency and interpersonal attitudes; suggestion of integrating video connections for enhanced communication
Impact of Web Application on Trauma Care Communication	Chatkhane Pearkao et al.	2023	Evaluate the outcomes of trauma patients using a web application to enhance communication in the ED	Descriptive comparative study with 140 trauma patients	- Application group had shorter trauma activation intervals and reduced ED stay - Web application improved nursing practices and received high satisfaction ratings - Technology-mediated communication enhances trauma care efficiency and patient outcomes
Mobile App for Pediatric EMS Communication	Calhoun et al.	2017	Explore the development and impact of a mobile app on communication skills during pediatric emergencies	Simulation-based study with 148 EMS providers	- COPE app improved communication skills in pediatric emergencies - Significant improvements in communication skills with moderate to large effect size - App enhanced self-reflection and self-assessment, well-received by participants
Role of Paramedic Field Supervisors in EMS Management	Norri-Sederholm et al.	2015	Investigate the role of paramedic field supervisors in managing EMS through essential information categories	Semi-structured interviews and scenario-based assessments	- Identified critical information categories for PFS during multi-authority incidents - Importance of detailed incident data for effective decision-making - Challenges include information overload hindering communication and decision-making, emphasizing the need for improved strategies
Effectiveness of In-Situ Simulation Training in Trauma Resuscitation	Bellino et al.	2020	Explore the impact of in-situ simulation training on emergency medicine residents and trauma-certified nurses in trauma resuscitation scenarios	Simulation-based study with pre- and post-simulation surveys	- In-situ simulation training improved participants' confidence and communication skills in trauma resuscitation scenarios - Enhanced collaboration among multidisciplinary teams and emphasized the critical role of

					communication in managing trauma cases effectively
Tools for Assessing Communication Skills in Hospital Action Teams	Rehim et al.	2016	Review communication assessment tools for hospital action teams managing critically ill patients	Systematic review of ten communication assessment tools	- Identified ten communication assessment tools, with a focus on leadership, teamwork, communication, and situational awareness - Significant gaps in psychometric validity reported, with only one tool meeting all validation criteria - Emphasis on the need for validated assessment tools to enhance team communication and reduce medical errors in emergency settings.

5. DISCUSSION:

5.1. Implications of Communication on Patient Care

Effective communication among prehospital care providers is essential for optimizing patient outcomes in trauma situations. The literature highlights that communication failures can lead to misunderstandings, delays, and ultimately adverse patient outcomes. For example, the DENIM study (Harmsen et al., 2017) emphasizes that incomplete and unstructured communication often hampers the identification of severely injured patients, highlighting the urgent need for improved practices in prehospital care settings.

5.2. Impact of Communication Barriers on Timely Interventions

Communication barriers, such as the lack of standardized protocols and the chaotic nature of emergency situations, significantly hinder timely medical interventions. Zhang et al. (2020) found that when EMS providers deliver incomplete or unclear information, hospital teams may be unprepared for incoming patients, leading to critical delays in treatment. This aligns with findings from Courtenay et al. (2013), which demonstrated that fragmented communication between prehospital and hospital teams often results in misunderstandings and inefficiencies in patient management. Addressing these barriers is crucial for improving response times and ensuring patient safety.

5.3. Role of Effective Communication in Multidisciplinary Teams

Effective communication is vital for ensuring coordinated care and reducing medical errors within multidisciplinary teams. Research shows that clear

communication enhances team dynamics and fosters collaboration, which is essential in emergency care settings. Jensen et al. (2015) highlighted that effective communication among team members is critical for managing complex cases, as it supports shared situational awareness and informed decision-making. This suggests that promoting effective communication within teams can directly improve patient care and outcomes.

5.4. Recommendations for Practice and Research

To address the identified gaps in communication among prehospital care providers, several recommendations can be made for both practice and future research.

5.4.1. Implementing Standardized Communication Protocols

Adopting standardized communication protocols, such as the SBAR model, can significantly enhance clarity and consistency in information exchange. Zhang et al. (2020) advocate for the adoption of structured communication frameworks, which have been shown to reduce miscommunication and improve team coordination. Implementing these protocols across EMS and hospital settings can help mitigate the risks associated with fragmented communication and ensure that critical information is effectively conveyed during handoffs.

5.4.2. Providing Communication Training for Prehospital Care Providers

Ongoing training and simulation exercises tailored to improve communication skills are essential for prehospital care providers. Research indicates that immersive training experiences can enhance team dynamics and communication proficiency in high-

pressure scenarios (Calhoun et al., 2017). By prioritizing communication training in educational curricula and ongoing professional development, healthcare organizations can equip providers with the skills necessary to convey information clearly and concisely, ultimately enhancing patient outcomes.

5.5. Future Research Directions

Future research should focus on evaluating the effectiveness of implemented communication strategies in real-world settings, particularly in diverse and resource-limited environments. Longitudinal studies that assess the impact of standardized communication protocols on patient outcomes would provide valuable insights into their efficacy. Additionally, exploring the role of technology in enhancing communication such as telemedicine and digital communication tools could yield innovative solutions for improving prehospital care delivery.

6. CONCLUSION:

This systematic review has highlighted the critical role of effective communication among prehospital care providers in improving patient outcomes in trauma situations. Key findings indicate that communication failures can lead to misunderstandings, delays, and adverse patient outcomes. Studies, such as those by Zhang et al. (2020) and Harmsen et al. (2017), demonstrate that the absence of standardized communication protocols and the chaotic nature of emergency environments contribute to these failures. Conversely, the implementation of structured communication models, such as SBAR, and targeted training programs have shown promise in enhancing clarity and coordination among care teams. The findings of this review underscore the necessity of adopting standardized communication protocols in prehospital settings. By facilitating clear and concise information exchange, these protocols can improve team coordination and ultimately enhance patient safety. Additionally, investing in ongoing communication training for prehospital care providers is essential to equip them with the skills required to perform effectively under pressure. This training should focus on fostering teamwork and situational awareness, which are vital in high-stakes environments. This research contributes significantly to the field of emergency medical services by providing a comprehensive overview of the impact of communication on patient outcomes. By synthesizing existing literature, it identifies best practices and highlights areas for improvement. The insights gained from this review can inform future training programs and policy initiatives aimed at enhancing communication among prehospital care providers. Ultimately, fostering effective communication

practices can lead to safer, more efficient trauma care and better overall patient outcomes in emergency medical services.

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