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Review Article

CLINICAL DECISION-MAKING AMONG EMERGENCY MEDICAL TECHNICIANS AND PARAMEDICS IN PREHOSPITAL CARE: A SYSTEMATIC REVIEW OF INFLUENCING FACTORS, DECISION STRATEGIES, AND PATIENT-SAFETY OUTCOMES

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Abstract:

Background: Clinical decision-making is a critical component of prehospital emergency care, where emergency medical technicians (EMTs) and paramedics must frequently make rapid clinical judgments under conditions of uncertainty, limited diagnostic resources, time pressure, and environmental complexity. Decisions regarding assessment, treatment, triage, transport, referral, and non-conveyance may directly influence patient safety and subsequent clinical outcomes.

Objective: This systematic review aims to synthesize the available evidence on clinical decision-making among EMTs and paramedics in prehospital settings, with particular attention to factors influencing decision-making, decision strategies, barriers and facilitators, and implications for patient care and safety.

Methods: A systematic search will be conducted across major electronic databases, including PubMed/MEDLINE, CINAHL, Embase, Scopus, Web of Science, and PsycINFO. Quantitative, qualitative, and mixed-methods studies examining clinical decision-making among frontline prehospital EMS professionals will be considered. Study selection and data extraction will be undertaken independently by two reviewers. Methodological quality will be assessed using appropriate Joanna Briggs Institute critical appraisal tools. Owing to anticipated methodological and clinical heterogeneity, findings will primarily be synthesized using structured narrative and thematic approaches.

Results: Evidence will be synthesized according to clinician-related, patient-related, environmental, organizational, and technological factors influencing clinical decisions, together with reported decision-making approaches and patient-safety outcomes.

Conclusion: This review will provide an integrated understanding of how clinical decisions are made in prehospital EMS practice and identify factors that may support or hinder effective decision-making. The findings may inform EMS education, clinical governance, protocol development, decision-support systems, and future research.

Keywords: Emergency Medical Services; Emergency Medical Technicians; Paramedics; Clinical Decision-Making; Clinical Reasoning; Prehospital Care; Patient Safety; Systematic Review

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1. INTRODUCTION:

Emergency medical services (EMS) are an essential component of healthcare systems because they provide rapid assessment, initial treatment, stabilization, and transportation for patients experiencing acute illness or injury. Prehospital care is particularly important because decisions made during the first stage of an emergency can influence subsequent treatment and patient outcomes. The World Health Organization (WHO, 2025) emphasizes that effective prehospital systems require trained providers, appropriate clinical protocols, medical oversight, communication systems, and mechanisms that support clinical decision-making in the field. Unlike hospital-based healthcare professionals, emergency medical technicians (EMTs) and paramedics frequently provide care in uncontrolled environments with limited diagnostic resources and incomplete information.

Clinical decision-making is therefore a fundamental competency in prehospital emergency care. It involves collecting information, interpreting clinical findings, considering possible explanations, evaluating available options, and selecting an appropriate course of action. EMTs and paramedics may need to make decisions concerning patient assessment, immediate treatment, medication administration, triage, transport urgency, destination selection, referral, or non-conveyance. These decisions are often made within a short period and under conditions characterized by uncertainty, stress, environmental distractions, and rapidly changing patient conditions. Perona et al. (2019) highlighted that paramedics routinely make time-sensitive decisions in dynamic out-of-hospital environments, often with limited information and equipment.

Clinical reasoning and decision-making in EMS are complex processes rather than simple applications of clinical guidelines. Andersson et al. (2019) found that EMS clinical reasoning involves continuously collecting and interpreting information while adapting to unpredictable situations. Their integrative review also demonstrated that decision-making may be influenced by organizational structures, available guidelines, professional experience, patient circumstances, and the wider clinical environment. Similarly, Sedlár (2020) identified situation awareness and decision-making as important non-technical cognitive skills in EMS practice. Effective situation awareness requires practitioners to gather relevant information, interpret its meaning, anticipate potential changes, and use this understanding when selecting and evaluating clinical actions.

A range of individual, organizational, and environmental factors may support or interfere with effective clinical decisions. In a qualitative study of

EMS personnel, Bijani et al. (2021) identified professional capabilities, occupational and environmental conditions, organizational management, and ethical issues as major factors influencing clinical decision-making. Clinical knowledge, experience, judgment, teamwork, time management, availability of equipment, organizational support, and clear clinical guidance can therefore affect how practitioners respond to complex prehospital situations. More recent theoretical work also suggests that EMS reasoning involves interaction between rapid intuitive processes and slower analytical reasoning, with metacognitive monitoring potentially helping clinicians recognize uncertainty and reduce cognitive bias (Dercksen et al., 2026).

Although previous studies and reviews have examined clinical reasoning, cognitive skills, and specific aspects of paramedic decision-making, the evidence remains distributed across different professional groups, decision contexts, methodologies, and healthcare systems. Moreover, earlier broad reviews primarily synthesized evidence available before or around 2018–2019. An updated synthesis is therefore needed to integrate contemporary evidence concerning the factors that influence clinical decisions, the strategies used by EMS professionals, and the implications of these decisions for patient care and safety. Accordingly, this systematic review aims to synthesize the available evidence on clinical decision-making among EMTs and paramedics in prehospital settings, focusing on influencing factors, decision-making strategies, barriers and facilitators, and associated patient-care and safety outcomes.

2. METHODS:

2.1 Review Design and Reporting

This systematic review will examine evidence concerning clinical decision-making among emergency medical technicians (EMTs) and paramedics working in prehospital settings. The review will be conducted and reported according to the **Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020** guidelines (Page et al., 2021). PRISMA 2020 provides a structured approach for reporting the identification, screening, eligibility, and inclusion of studies in systematic reviews. Where eligible, the review protocol will be registered prospectively in the International Prospective Register of Systematic Reviews (PROSPERO) before completion of the study-selection process.

2.2 Eligibility Criteria

Studies will be included if they examine clinical decision-making, clinical reasoning, clinical judgement, or related decision processes among EMTs, paramedics, ambulance clinicians, or comparable frontline EMS professionals working in

prehospital or out-of-hospital emergency settings. Eligible studies may investigate decisions related to patient assessment, triage, treatment, medication administration, transport, destination selection, referral, escalation of care, or non-conveyance.

Quantitative, qualitative, and mixed-methods primary research studies will be considered to provide a comprehensive understanding of both measurable outcomes and practitioners' experiences of clinical decision-making. Studies conducted exclusively among hospital-based professionals, students without independent clinical practice, or non-clinical ambulance personnel will be excluded. Editorials, commentaries, conference abstracts without full-text data, protocols, and narrative reviews will also be excluded. No restrictions will initially be applied according to geographical location or EMS system.

2.3 Information Sources and Search Strategy

A comprehensive electronic literature search will be conducted using **PubMed/MEDLINE, Embase, CINAHL, Scopus, Web of Science, and PsycINFO**. Databases will be searched from their inception to the final search date. Reference lists of included studies and relevant review articles will also be manually examined to identify additional eligible publications.

Search terms will combine controlled vocabulary, where available, with free-text keywords relating to EMS professionals and clinical decision-making. Key terms will include combinations of *emergency medical technician, EMT, paramedic, ambulance clinician, emergency medical services, prehospital, clinical decision-making, clinical reasoning, clinical judgement, and decision-making*. Boolean operators **AND** and **OR** will be used to combine search concepts. The search strategy will be adapted according to the indexing requirements of each database.

2.4 Study Selection

All retrieved references will be exported to reference-management software, and duplicate records will be removed. Two reviewers will independently screen titles and abstracts against the predefined eligibility criteria. Articles considered potentially relevant will undergo full-text assessment by the same reviewers. Reasons for excluding studies at the full-text stage will be recorded. Any disagreement between reviewers will be resolved through discussion and consensus, with consultation of a third reviewer when necessary. The study-selection process will be presented using a PRISMA 2020 flow diagram.

2.5 Data Extraction

Data will be independently extracted using a standardized data-extraction form. Information collected will include author, publication year, country, study design, sample size, type of EMS

professional, participant experience, EMS setting, decision context, decision-making approach, influencing factors, barriers and facilitators, and relevant patient-care or safety outcomes. Key findings and authors' conclusions will also be recorded.

2.6 Methodological Quality Assessment

The methodological quality of included studies will be assessed independently by two reviewers using the appropriate **Joanna Briggs Institute (JBI) critical appraisal tools** according to study design. JBI provides separate appraisal instruments for qualitative, cross-sectional, cohort, randomized, quasi-experimental, and other study designs, allowing assessment to reflect the specific methodological characteristics of each study. Disagreements in appraisal will be resolved through consensus.

2.7 Data Synthesis

Because substantial variation is anticipated in study designs, EMS systems, decision contexts, and outcome measures, findings will primarily be synthesized using a structured narrative and thematic approach. Findings will be grouped into clinician-related, patient-related, environmental, organizational, and technological factors. Decision-making strategies, barriers, facilitators, and patient-safety consequences will also be synthesized. If sufficiently homogeneous quantitative studies and outcomes are identified, statistical pooling will be considered; otherwise, results will be presented descriptively in tables and narrative form.

3. RESULTS:

3.1 Study Selection

Provisional PRISMA figures — replace with the actual database-search counts before journal submission. For manuscript planning, the study-selection flow may be presented as follows: [N = 2,486] records identified through searches of PubMed/MEDLINE, Embase, CINAHL, Scopus, Web of Science, and PsycINFO, with an additional [N = 18] records identified through reference-list and citation searching. After removal of [N = 742] duplicates, [N = 1,762] records remained for title and abstract screening. Following initial screening, [N = 1,648] records were excluded because they did not focus on clinical decision-making among prehospital EMS clinicians. The full texts of [N = 114] articles were assessed for eligibility. After full-text review, [N = 82] articles were excluded for reasons including an ineligible population, hospital-only setting, absence of a clinical decision-making outcome, review or commentary design, or insufficient primary data. This would leave [N = 32 studies] for qualitative or quantitative synthesis. These figures are illustrative only and must not be reported as actual systematic-review results until verified from the database exports.

For comparison, an earlier integrative review by Andersson et al. (2019) identified 3,690 records and ultimately included 38 articles examining clinical

reasoning in EMS, demonstrating both the breadth and heterogeneity of the literature in this field.

Table 1. Provisional PRISMA Study-Selection Flow

Stage	Number of records*
Records identified from six databases	[2,486]
Additional records from citation/reference searching	[18]
Total records	[2,504]
Duplicates removed	[742]
Records screened	[1,762]
Records excluded after title/abstract screening	[1,648]
Full-text reports assessed	[114]
Full-text reports excluded	[82]
Studies included in final synthesis	[32]

3.2 Characteristics of the Evidence

The verified literature showed considerable variation in geographical setting, methodological approach, clinical context, and type of decision examined. Studies originated from countries including the United Kingdom, Canada, Iran, Norway, Australia, and the United States. Qualitative approaches were particularly common, reflecting the importance of understanding how paramedics interpret uncertain situations and make decisions in complex field environments.

Reay et al. (2018), for example, interviewed 13 experienced Canadian paramedics and conducted 60 hours of observations covering 22 EMS responses. Their grounded-theory analysis described decision-making as “**creative adapting in a fluid environment**,” in which clinicians continually revise an evolving understanding of the patient, scene, safety considerations, and available options. O'Hara et al. (2015) observed 57 ambulance personnel during 34 shifts, supplemented by digital diaries and focus groups. Nine types of care decisions and seven major systemic influences were identified, including demand, performance priorities, availability of alternative care pathways, risk tolerance, training, communication, and resources.

Table 2. Examples of Verified Studies Relevant to Clinical Decision-Making in Prehospital EMS

Study	Country	Design/sample	Decision context	Main findings
O'Hara et al. (2015)	UK	Multi-method qualitative; 57 staff observed	Conveyance and care transitions	Demand, resources, risk tolerance, training and access to alternatives influenced decisions
Reay et al. (2018)	Canada	Grounded theory; 13 paramedics + field observations	General prehospital decisions	Decision-making was iterative, contextual and adaptable
Bijani et al. (2021)	Iran	Qualitative; 25 EMS personnel	General clinical decisions	Professional capability, environment, management and ethical factors affected decisions
Hetherington & Jones (2021)	UK	Qualitative interviews	Paediatric emergencies	Education, experience, confidence, emotion, protocols and referral availability influenced decisions
Guterud et al. (2024)	Norway	14 interviews	Stroke triage	Structured NIHSS assessment supported assessment and communication
Villani et al. (2024)	Australia	Retrospective cohort	Discharge/non-conveyance	222,571 paramedic-initiated discharges; serious adverse events occurred in 0.3% within 72 h
Alqurashi et al. (2025)	UK	Qualitative; 20 paramedics	TBI triage	Diagnostic uncertainty and limitations of existing tools complicated decisions

McAllister et al. (2025)	USA	Simulation evaluation	Clinical judgement	Clinical-judgement rubric showed 88.1% overall concordance with physician evaluation
Gustavsen & Simensen (2026)	Norway	Focus groups; 11 paramedics	Analgesic selection	Experience, pharmacology, local norms and protocols influenced drug selection

3.3 Clinician-Related Factors

Clinical knowledge, experience, confidence, judgement, and ability to manage uncertainty emerged repeatedly as important influences. Bijani et al. (2021) identified four broad themes among 25 EMS personnel: professional capabilities, occupational and environmental factors, inefficient organizational management, and ethical issues. Clinical competence incorporated knowledge, experience, practical skills, teamwork, time management, and judgement. Fatigue, mission conditions, emotional demands, and organizational limitations could interfere with effective decisions. Experience appeared especially important when standardized guidance did not completely address the clinical situation. Reay et al. found that paramedics repeatedly modified their initial understanding as new information became available rather than following a strictly linear decision pathway. Similarly, Gustavsen and Simensen's 2026 study of 11 Norwegian solo-response paramedics found that experience and intuitive judgement contributed substantially to choices between fentanyl and morphine. Informal local practices also filled perceived gaps in formal guidance, demonstrating that organizational culture may influence apparently individual clinical choices.

3.4 Patient, Environmental and Organizational Factors

Patient presentation, age, severity, communication ability, family expectations, and availability of alternative services influenced clinical decisions. In paediatric care, Hetherington and Jones (2021) identified five themes: education and training; exposure, experience and confidence; emotion and social circumstances; equipment and protocols; and provision of care. Greater paediatric exposure was associated with greater clinician confidence, whereas emotional pressure from clinicians or families and limited community referral options contributed to decisions to transport children to emergency departments.

System-level influences were similarly important. O'Hara et al. identified emergency service demand, organizational targets, availability of care alternatives, risk tolerance, professional development, feedback, and resources as factors influencing paramedic disposition decisions. These findings indicate that clinical decision-making cannot be understood solely as an individual cognitive process because the range of clinically

realistic choices is partly determined by the healthcare system surrounding the clinician.

3.5 Decision Support, Triage and Clinical Judgement

Recent evidence demonstrated increasing interest in structured assessment and decision-support mechanisms. In a 2024 qualitative study involving seven paramedics and seven stroke physicians, Guterud et al. found that use of the prehospital National Institutes of Health Stroke Scale supported clinical assessment and communication. Participants accepted some degree of over-triage more readily than under-triage, highlighting the role of perceived risk in destination decisions.

For traumatic brain injury, Alqurashi et al. (2025) interviewed 20 paramedics with four to 24 years of experience. Difficulties included recognition of less obvious TBI, particularly among older patients or those with comorbidities. Participants emphasized the need for simple, evidence-based and condition-specific decision tools while also stressing the importance of implementation, training, feasibility, and clinical effectiveness.

McAllister et al. (2025) provided evidence that clinical judgement itself may be assessed more systematically. Twenty recorded EMS simulations generated 80 clinical-judgement decisions. Agreement between an objective rubric based on an EMS clinical-judgement framework and EMS physician assessments was **88.1%**, with concordance for individual decision domains ranging from **79.9% to 95.0%**.

3.6 Disposition Decisions and Patient Safety

Non-conveyance and discharge-at-scene decisions represented an important patient-safety area. Villani et al. (2024) examined 375,758 adults discharged at scene in Victoria, Australia; **222,571 (59.2%)** were paramedic-initiated discharge decisions. Within 72 hours, **6.8%** recontacted EMS, **5.0%** presented to an emergency department, **2.4%** were hospitalized, and **0.3%** experienced a serious adverse event. Abnormal vital signs were particularly important, with an adjusted odds ratio of **4.81 (95% CI 3.87–5.98)** for serious adverse events.

Overall, the evidence indicates that prehospital clinical decision-making is a dynamic process produced by interactions among clinician expertise, patient characteristics, environmental uncertainty, organizational constraints, protocols, available care pathways, and decision-support resources. The

heterogeneity of study designs and outcome measures also suggests that a structured thematic synthesis is more appropriate than a single pooled estimate for the overall review.

4. DISCUSSION:

This systematic review highlights the complexity of clinical decision-making among emergency medical technicians (EMTs) and paramedics in prehospital settings. Overall, the evidence indicates that clinical decisions are not determined by clinical knowledge alone. Instead, they emerge from the interaction of practitioner experience, patient characteristics, environmental conditions, organizational systems, available protocols, communication, and access to decision-support resources. This finding is consistent with earlier research showing that clinical reasoning in EMS requires practitioners to gather and interpret information continuously while adapting to unpredictable situations (Andersson et al., 2019). Similarly, Sedlár (2020) identified situation awareness and decision-making as closely related cognitive skills that are essential for safe prehospital practice.

A major finding is the importance of practitioner experience and professional judgement. Experienced clinicians may recognize patterns and identify relevant clinical cues more rapidly, particularly when working in uncertain or time-sensitive situations. However, prehospital decision-making is rarely a simple linear process. Paramedics often develop an initial interpretation of the patient's condition and then continuously modify that interpretation as additional information becomes available. Andersson et al. (2019) similarly concluded that EMS reasoning involves continuous adjustment to unpredictable situations and the level of control perceived by the clinician. This suggests that EMS education should go beyond memorization of protocols and should develop clinicians' ability to interpret changing information, recognize uncertainty, consider alternative explanations, and reassess previous decisions.

The findings also demonstrate that clinical decision-making is strongly affected by the environment in which EMS professionals operate. Unlike hospital clinicians, EMTs and paramedics frequently work with limited diagnostic information, changing scene conditions, safety concerns, distressed relatives, restricted resources, and significant time pressure. Such conditions may increase cognitive workload and make accurate interpretation more difficult. Sedlár (2020) emphasized that EMS clinicians must simultaneously gather information, interpret its meaning, anticipate possible developments, select appropriate actions, and review the effects of their decisions. Therefore, clinical decision-making should be considered an important non-technical

competency alongside communication, teamwork, leadership, and situation awareness.

Another important issue concerns the relationship between clinical protocols and professional judgement. Clinical guidelines provide standardization and can reduce inappropriate variation in care, but protocols cannot anticipate every combination of patient characteristics and environmental circumstances. Recent evidence illustrates this challenge. Gustavsen and Simensen (2026) found that paramedic decisions regarding prehospital opioid selection were influenced not only by pharmacological knowledge and formal protocols but also by experience, local practice patterns, and individual judgement. This indicates that high-quality EMS systems require a balance between standardized evidence-based guidance and sufficient professional flexibility to respond appropriately to complex or atypical presentations. Disposition decisions are particularly important because they directly connect clinical judgement with patient safety. Decisions to transport, select a destination, refer to another service, or leave a patient at scene involve estimating both current clinical severity and the possibility of future deterioration. Villani et al. (2024) examined 222,571 paramedic-initiated discharge-at-scene cases and found that 6.8% of patients recontacted EMS, 5.0% subsequently attended an emergency department, 2.4% were hospitalized, and 0.3% experienced a serious adverse event within 72 hours. Abnormal vital signs were strongly associated with serious adverse outcomes (adjusted OR = 4.81, 95% CI 3.87–5.98). Although serious adverse events were uncommon, these findings demonstrate the importance of systematic assessment, recognition of deterioration risk, safety-netting, and careful documentation when non-conveyance is considered. The review also identifies a growing role for structured clinical decision-support tools. Such tools may be especially valuable when patients present with conditions that are difficult to identify using routine prehospital assessment alone. Alqurashi et al. (2025), for example, found that paramedics reported difficulties recognizing less obvious traumatic brain injury, particularly in older patients and those with comorbid conditions. Participants supported the development of simple and evidence-based condition-specific tools while emphasizing that new technologies should demonstrate clinical effectiveness, feasibility, and usability and should be accompanied by appropriate training. These findings suggest that technology should support rather than replace professional judgement.

The development of frameworks for assessing clinical judgement may also have important implications for EMS education and competency assessment. McAllister et al. (2025) evaluated an EMS clinical judgement framework in simulated

cases and found 88.1% overall concordance between framework-based assessment and physician evaluation. Related work conceptualizes clinical judgement as including recognition and analysis of clinical cues, development of possible explanations, generation of solutions, action, and evaluation of outcomes. Such frameworks could provide EMS educators with more objective methods for evaluating how practitioners think rather than assessing technical performance alone.

From a practice perspective, the findings support increased emphasis on simulation-based education, scenario training, structured reflection, case review, and feedback. Training should expose clinicians to uncertain and atypical cases in which several reasonable options initially exist. Particular attention should also be given to cognitive bias, communication, teamwork, and reassessment after interventions. Clinical governance systems could complement training by examining difficult cases and providing structured feedback on decision outcomes instead of focusing only on protocol compliance.

Several research gaps remain. Much of the existing evidence is qualitative, and there is limited standardization in the measurement of decision quality. Future studies should use prospective designs that link prehospital decisions with subsequent patient outcomes. Research is also needed to determine whether structured decision-support systems, artificial intelligence, telemedicine, and advanced diagnostic technologies improve clinical decisions without increasing unnecessary complexity or over-reliance on technology. In addition, differences among national EMS systems, scopes of practice, training requirements, and referral pathways limit the direct transferability of findings between countries.

EMS is a dynamic and multidimensional process. Effective decisions depend on the ability of EMTs and paramedics to combine clinical knowledge, experience, situational awareness, patient information, protocols, communication, and available resources. Improving decision-making therefore requires more than additional clinical guidelines. It requires education that develops reasoning skills, organizational systems that support professional judgement, reliable feedback mechanisms, and carefully evaluated decision-support technologies. Strengthening these areas may contribute to safer, more consistent, and patient-centered prehospital emergency care.

5. Implications for Practice, Education, and Policy

The findings of this review have important implications for prehospital clinical practice, EMS

education, organizational governance, and the development of decision-support systems. Because clinical decision-making in emergency medical services is influenced by multiple interacting factors, improvement strategies should address not only clinical knowledge but also professional judgement, situational awareness, communication, organizational support, and the conditions in which decisions are made.

For clinical practice, EMS organizations should provide clear evidence-based protocols while allowing appropriate flexibility for complex or atypical cases. Protocols can promote consistency and patient safety; however, they should not be designed as rigid instructions that replace professional judgement. Clinicians should also have access to consultation and escalation pathways when uncertainty is high, particularly for decisions involving non-conveyance, referral, destination selection, or patients with unclear presentations. Structured reassessment and safety-netting procedures may help reduce the risk of deterioration after a decision to leave a patient at scene.

Education and professional development should place greater emphasis on clinical reasoning and decision-making rather than technical competencies alone. Simulation-based training, case discussions, reflective practice, and scenario-based learning can expose EMTs and paramedics to realistic situations involving incomplete information, time pressure, competing priorities, and diagnostic uncertainty. Training should also address cognitive bias, risk perception, communication, teamwork, and recognition of clinical deterioration. Regular review of complex cases may provide clinicians with feedback that supports continuous improvement in judgement and decision-making.

At the organizational level, clinical governance systems should monitor decision quality and patient outcomes rather than relying exclusively on measures of protocol compliance. Difficult cases, adverse events, repeated EMS contacts, unexpected hospital admissions, and potentially unsafe non-conveyance decisions can be used as learning opportunities. Organizations should also consider the effects of workload, fatigue, staffing, available resources, and access to alternative care pathways on clinical decision-making.

Digital technologies may further support decision quality. Electronic clinical decision-support tools, telemedicine, structured assessment instruments, and artificial intelligence may help clinicians interpret information and identify high-risk patients. However, such systems should be carefully validated in real-world prehospital environments and designed to support rather than replace

professional judgement. Future implementation should therefore consider usability, workflow integration, training requirements, data quality, and patient safety.

At a policy level, EMS authorities should recognize clinical decision-making as a core professional competency. National competency frameworks, continuing professional development requirements, and quality indicators should include clinical reasoning, judgement, reassessment, and safe disposition decisions. Strengthening these areas may contribute to more consistent, evidence-based, and patient-centered prehospital emergency care.

6. Strengths and Limitations

This systematic review has several strengths. First, it addresses an important aspect of prehospital emergency care by examining clinical decision-making among emergency medical technicians and paramedics across a range of clinical situations. The review considers not only clinical outcomes but also cognitive, environmental, organizational, and professional factors that may influence decision-making. This broader perspective provides a more complete understanding of how decisions are made in real prehospital environments.

A further strength is the planned use of multiple major databases, including PubMed/MEDLINE, Embase, CINAHL, Scopus, Web of Science, and PsycINFO. Including qualitative, quantitative, and mixed-methods studies also allows the review to capture both measurable outcomes and the experiences of EMS professionals. The use of two independent reviewers for screening, data extraction, and quality assessment can further reduce selection bias and improve methodological reliability. In addition, applying study-design-specific Joanna Briggs Institute appraisal tools supports a structured assessment of methodological quality.

Several limitations should also be acknowledged. Considerable heterogeneity is expected across studies because EMS systems differ in professional roles, scopes of practice, clinical protocols, training requirements, and healthcare structures. Definitions of clinical decision-making, clinical reasoning, and clinical judgement may also vary between studies, which may limit direct comparison. Differences in study design and outcome measures are likely to restrict the feasibility of statistical meta-analysis.

The review may also be affected by publication bias, as studies reporting significant or clinically important findings may be more likely to be published. In addition, evidence from some countries and EMS systems may be limited, which can reduce the generalizability of findings to other healthcare settings. Finally, many studies in this field

use qualitative or observational designs, meaning that causal relationships between identified factors and decision quality cannot always be established.

CONCLUSION:

Clinical decision-making is a fundamental component of safe and effective prehospital emergency care. This review shows that decisions made by emergency medical technicians and paramedics are shaped by multiple interacting factors, including clinical knowledge, professional experience, patient characteristics, environmental conditions, organizational structures, clinical protocols, communication, and access to decision-support resources. Prehospital clinicians must often make important decisions under conditions of uncertainty, limited information, time pressure, and rapidly changing clinical situations.

The findings also indicate that effective decision-making depends on more than compliance with protocols. Professional judgement, situational awareness, reassessment, communication, and the ability to adapt to complex situations are equally important. Decisions related to triage, treatment, transport, referral, and non-conveyance are particularly significant because they may directly influence patient safety and subsequent outcomes.

These findings have important implications for EMS education and clinical governance. Training programs should strengthen clinical reasoning, simulation-based learning, reflective practice, recognition of cognitive bias, and decision-making under uncertainty. EMS organizations should also provide clear escalation pathways, access to clinical consultation, regular case review, and feedback mechanisms that support continuous improvement.

Emerging technologies, including electronic decision-support systems, telemedicine, and artificial intelligence, may further assist prehospital decision-making; however, such tools should complement rather than replace professional judgement and should be carefully evaluated for safety, accuracy, and usability in real-world EMS environments.

Overall, improving prehospital clinical decision-making requires an integrated approach involving education, evidence-based protocols, supportive organizational systems, professional development, and appropriately designed technologies. Future research should focus on standardized measures of decision quality, prospective evaluation of patient outcomes, and the effectiveness of interventions designed to improve clinical judgement among EMTs and paramedics.

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