Triage in disasters: A conceptual analysis

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Abstract

Background: Disaster triage faces significant challenges due to definitional conflicts and ambiguities. Conducting a concept analysis of disaster triage is essential for clarifying its meaning, improving decision-making, ensuring effective training, and enhancing disaster preparedness for healthcare professionals.
Purpose: Thus, this study aims to define the concept of disaster triage and identify its attributes, antecedents, and consequences using Walker and Avant's framework.
Methods: The methodology involved a comprehensive literature review from 2013 to 2024, focusing on nurse-related triage during emergencies and disasters. Articles were gathered from databases such as Web of Science, PubMed, Scopus, Cochrane Library, and Google Scholar. After screening the titles, abstracts, and full texts, 30 articles met the inclusion criteria.
Results: Following Walker and Avant's framework, the concept analysis revealed that disaster triage is influenced by various antecedents, attributes, and consequences. Antecedents such as education, working experience, and disaster training provide the foundation for effective triage practices, while attributes such as clinical judgment, assessment skills, and effective communication are crucial in the triage process itself. The consequences of effective disaster triage include enhanced patient safety and care delivery efficiency.
Conclusion: In conclusion, this study provides valuable insights that deepen the understanding of the concept of disaster triage and also provides valuable guidance for clinical practice and informs future research in the fields of disaster management and emergency nursing.

Keywords: concept analysis, disaster management, disaster triage, nurse, walker and avant

Introduction

Triage stands as a cornerstone of nursing practice, embodying the principles of prioritization, efficiency, and compassionate care based on the severity of the patient's condition (Johnson et al., 2021). Nurses, equipped with clinical acumen and empathy, play a pivotal role in triage, navigating the complexities of patient presentations and allocating resources judiciously (AlMarzooq, 2020). However, conventional triage methods often grapple with challenges such as overcrowding, prolonged wait times, and limited accessibility, especially during a disaster (Brown, 2023). Enter the innovative paradigm of the Walking Avant Step, poised to revolutionize the triage concept in disaster.

The term "disaster triage" faces significant challenges due to definitional conflicts and ambiguities. Disaster triage involves prioritizing patients based on the severity of their conditions and the availability of resources, particularly in the high-stakes context of emergencies (Hamdi & Al Thobaity, 2023). However, varying interpretations and implementations across disciplines and disaster scenarios contribute to this confusion. Different triage models, such as START (Simple Triage and Rapid Treatment) and SALT (Sort, Assess, Life-Saving Interventions, Treatment/Transport), use distinct criteria,

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creating disparities in practice (Bazyar et al., 2020). Additionally, cultural and ethical considerations can further complicate decision-making, as local norms may clash with standardized protocols (Cuthbertson & Penney, 2023). The lack of a universally accepted definition exacerbates these issues, resulting in inconsistent training and application during crises.

Concept analysis is a rigorous process designed to clarify, validate, and define abstract concepts, aiding in theory development and improving communication (Walker & Avant, 2019). With disasters occurring more frequently worldwide, registered nurses must be well-prepared to respond effectively (Setyawati et al., 2020). Despite the critical role of disaster triage in patient care, current systems face significant challenges, including overcrowding, prolonged wait times, and limited accessibility. The incorrect application of disaster triage can have dire consequences, including resource misallocation (Wiedenfeld et al., 2021), prolonged wait times (Tam et al., 2018), and ethical dilemmas (Canatan, 2020). For example, misjudging a patient's severity may delay critical interventions for those in need, while scarce resources might be wasted on patients with lower urgency (Fekonja et al., 2023).

Innovative concepts like the Walking Avant Step show promise but there is a lack of comprehensive research on its implementation and impact on disaster triage. Moreover, existing studies have not fully explored how Walker and Avant's method can systematically refine triage practices. This gap underscores the need for rigorous investigation into how the Walking Avant Step can enhance current systems, providing a more efficient framework for nurses. Research is necessary to validate and quantify its benefits, particularly in reducing overcrowding, decreasing wait times, and improving accessibility, ultimately optimizing resource allocation and patient care. Employing this systematic approach could offer deeper insights into disaster triage, leading to the refinement of current methods and the development of innovative strategies in healthcare settings.

The purpose of this study is to analyze and provide a practical definition for disaster triage in nursing by using the systematic approach proposed by Walker and Avant within the prehospital context. By employing this step, nurses and healthcare professionals can gain deeper insights into the intricacies of disaster triage practice, leading to the refinement of existing methods and the development of innovative approaches to enhance patient care and optimize resource allocation in healthcare settings.

Methods

Walker and Avant's concept analysis involves several steps to thoroughly examine and clarify abstract concepts (Walker & Avant, 2019). The goal is to provide a practical definition of disaster triage in nursing by applying a systematic approach based on Walker and Avant's method. This approach involves defining the concept, determining the purpose of the analysis, and identifying its attributes, antecedents, consequences, empirical references, and case studies.

The analysis begins with a literature review. The current study examines the literature on the concept of triage in emergency and disaster situations. Articles published between 2013 and 2024 were gathered from databases such as Web of Science, PubMed, Scopus, Cochrane Library, and Google Scholar, using keywords such as triage, nurse, emergency, and disaster. The inclusion criteria were that the studies were written English and Bahasa Indonesia, published after 2013, focusing specifically on nurse-related triage in emergencies and disasters. The exclusion criteria included articles not focused on nurse-led triage in these settings. Initially, 16,864 relevant articles were identified then after filtering by date, excluding irrelevant articles, identifying duplicates using EndNote, and manually reviewing titles and abstracts, the count was reduced to 30. These 30 articles were deemed eligible for inclusion after a final assessment (Figure 1).

Results

Definition of disaster triage

The term originates from the French word "trier," meaning to sort or select. In essence, triage serves as a critical decision-making tool during emergencies, disasters, and everyday healthcare scenarios, ensuring that the limited resources are allocated efficiently to those who need them most urgently (Christian, 2019). Triage is a systematic process used in healthcare settings to prioritize patient care based on the severity of their condition and the available resources (Dippenaar, 2019).

Meanwhile, disaster triage can be defined as the process by which patients are assessed, classified, and sorted based on their presenting complaint and clinical urgency, providing assurance for timely access to emergency care during a disaster (Peta et al., 2023). Others argue that disaster triage is a critical process in emergency response, where healthcare professionals assess and prioritize patients based on the severity of their injuries to provide efficient and timely care (Ghanbari et al., 2019). This approach is particularly vital during large-scale disasters like earthquakes and floods where resources are limited, and immediate decision-making is necessary to minimize mortality and morbidity (Bazyar et al., 2019). Disaster triage aims to rapidly evaluate all victims, prioritize life-saving interventions, and allocate resources effectively under extreme conditions (Aldossari & Al Bensaad, 2024).

In conclusion, disaster triage is a systematic method used during emergencies to assess and prioritize patient treatment based on severity and resource availability. Its goal is to maximize survival

when casualties exceed healthcare capacity by quickly assessing, categorizing, and allocating resources to ensure the best possible outcomes in mass casualty situations.

Attributes for Disaster Triage

A review of disaster triage suggests that there are a handful of attributes commonly found in the references, including clinical judgment, assessment and intervention, the management of medical resources, timely decision-making, and communication. Clinical judgment refers to the nurse's ability to recognize, understand, and respond to a patient (Zhu et al., 2022). Moon and Cho (2022) emphasize that nurses need to have clinical judgment, which includes the ability to detect critical details, interpret data from diverse sources of knowledge, pick out essential elements from patient histories, prioritize tasks effectively, formulate nursing diagnoses, anticipate interventions, and reassess potential consequences.

Assessment in disaster triage means quickly and accurately determining patient priority through thorough examinations and understanding their needs. Interventions focus on addressing immediate needs and preventing further health decline by following triage protocols and guidelines (Bazyar et al., 2020; Mackway-Jones et al., 2014; Vatnøy et al., 2013). The Simple Triage and Rapid Treatment (START) system is used in many countries including Indonesia and was created in 1983, quickly assesses and categorizes patients based on injury severity by checking RPM (respiration, perfusion, and mental status). It is possible to determine disaster triage status within 60 seconds by checking pulse, breathing, capillary refill, bleeding, and responsiveness. Patients who can walk are marked green, those who can't but meet certain criteria are yellow, and those with severe abnormalities are red. Apnoeic patients are classified as black/expectant (Purwadi et al., 2021; Reinhardt, 2017; START, 2023).

In disaster triage, managing medical resources involves prioritizing patients based on the severity of their condition and collaborating with team members (Moon & Cho, 2022). Immediate care is given to life-threatening cases, while less urgent cases are addressed as resources allow. Effective management also includes allocating personnel, equipment, and facilities to ensure timely and appropriate care (Christian, 2019; Hick et al., 2012). Timely decisions in disaster triage means the ability to work under stressful situations, confidence about decisions made, flexibility, and agility (Moon & Cho, 2022; Moon & Park, 2017). Timely decision-making is essential for effectively prioritizing patient care, optimizing resource use, and improving overall survival rates in high-stress, resource-limited environments. When responders act quickly and efficiently when assessing patient needs, they ensure that the most critically injured receive immediate attention, which can be lifesaving (Shackelford et al., 2022). Confidence in decision-making also serves as a cornerstone, enabling swift and decisive actions without hesitation or doubt (Reay et al., 2020).

Communication in disaster triage means the ability to interview, listen actively, support non-verbally and verbally, and coordinate with other healthcare professionals, emergency responders, and patients (Hitchcock et al., 2014; Moon & Cho, 2022). The ICN framework highlights the importance of maintaining communication channels for information sharing and team coordination in high-stress situations (ICN, 2019). Clear and effective communication channels ensure the dissemination of disaster triage instructions, patient status updates, resource availability, and the coordination of patient transfers and evacuations during a disaster (Khorram-Manesh et al., 2021).

Antecedents of Disaster Triage

Effective disaster triage relies on triage education, working experience, and disaster training. Triage education equips healthcare professionals with the theoretical understanding and practical techniques necessary for patient prioritization and resource allocation (AlShatarat et al., 2022). The experience of nurses of disaster triage is crucial, as incorrect decisions can risk patient safety. Studies show that years of experience significantly influence the accuracy of triage decisions (Ghazali et al., 2020; Reblora et al., 2020) and provide guidance and reassurance to less experienced colleagues, fostering a secure triage team environment (Fathoni et al., 2013; Fekonja et al., 2024).

Disaster training programs emphasize disaster triage protocols, ensuring that healthcare professionals can swiftly assess and prioritize patients during mass casualty incidents (MCIs) (Bazyar et al., 2020). These programs include simulation-based exercises and hands-on training to develop practical skills for real-world emergencies (Loke et al., 2021). By integrating training with experiential learning from past disasters, healthcare professionals can enhance their triage skills, resilience, and response capabilities (Xue et al., 2020). Continuous training and education improve disaster response outcomes for both patients and responders.

Consequences of Disaster Triage

The consequences of disaster triage decisions extend across various dimensions, including patient safety, and the efficiency of care delivery within healthcare settings. Additionally, the safety of patients hinges on the accuracy and effectiveness of disaster triage decisions. Errors or delays in prioritizing patients based on acuity levels can jeopardize patient outcomes and result in adverse events. Ensuring patient safety is paramount in disaster triage scenarios. Vigilant monitoring and strict adherence

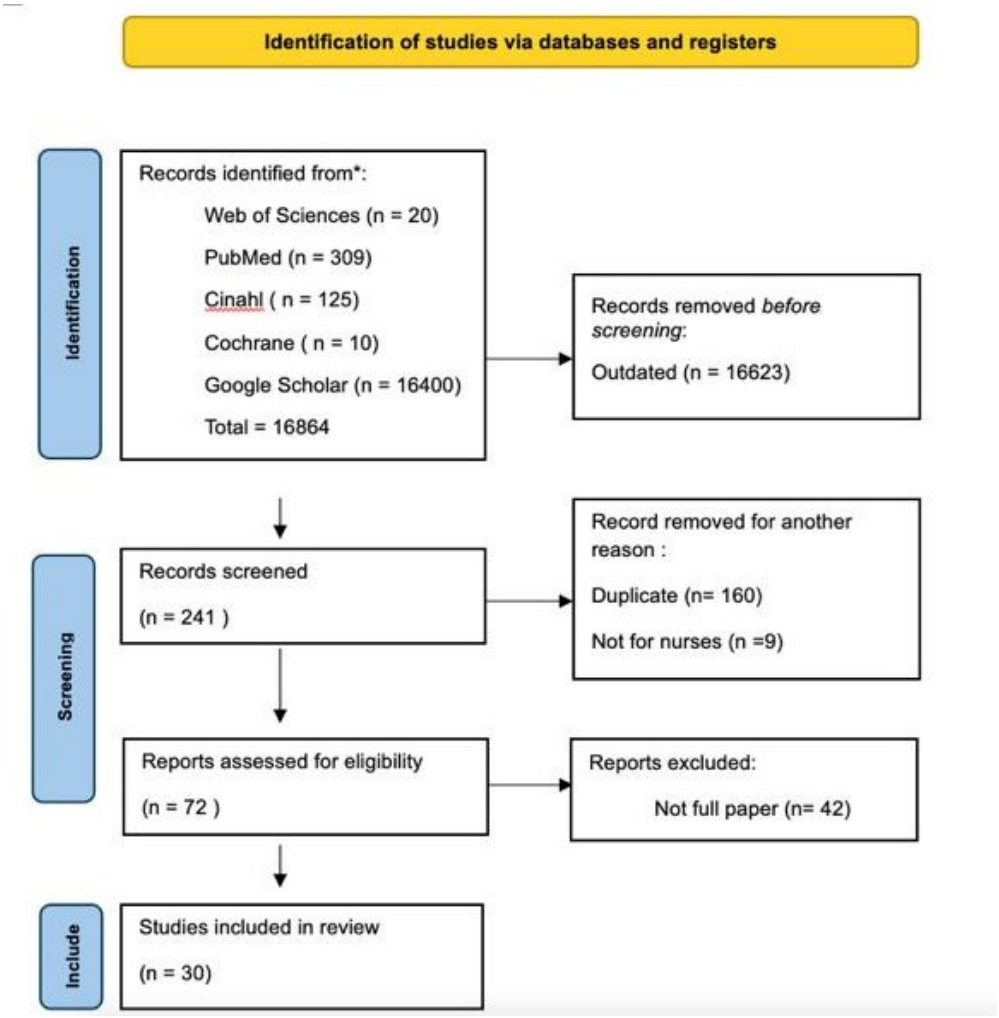

Figure 1. The Process of Literature Search and Study Selection for Disaster Triage

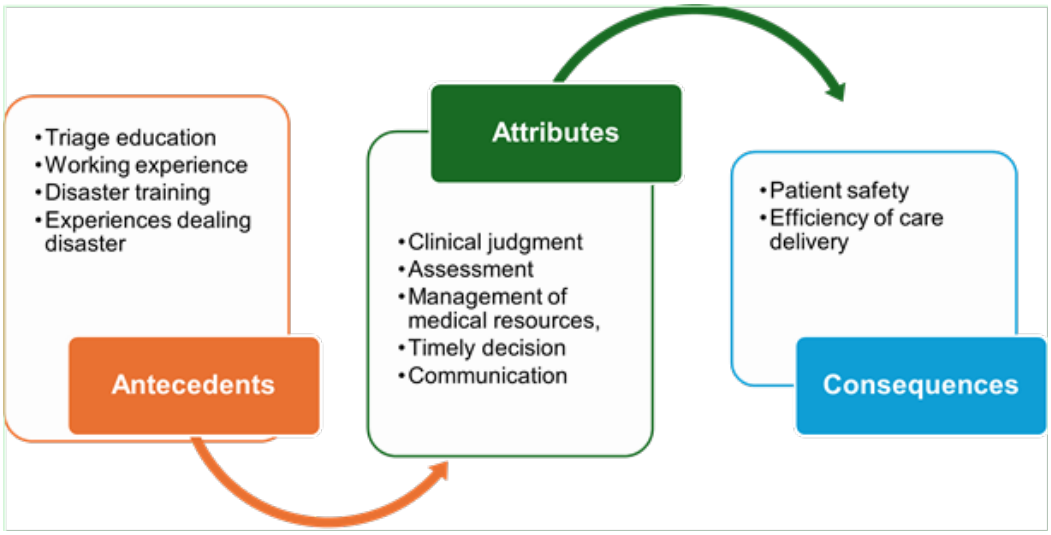

Figure 2. Concept Analysis for Disaster Triage

to established protocols are essential for reducing mortality (Ghanbari et al., 2019; Ghanbari et al., 2021). This approach allows healthcare providers to make rapid, informed decisions that prioritize critical cases and improve patient outcomes, even under challenging conditions (Zachariasse et al., 2019). Timely and appropriate allocation of resources based on patient needs optimizes workflow and reduces the length of the hospital stay (Williams et al., 2014), contributing to enhanced patient experiences and overall healthcare system performance (Phiri et al., 2020).

Empirical References

Empirical references for triage can be found in various research studies, guidelines, and standards established by healthcare organizations and academic institutions. One notable empirical reference is the Emergency Severity Index (ESI), a widely used triage algorithm developed to prioritize patient care based on the severity of their condition and resource availability (Gilboy et al., 2012). The ESI provides a standardized framework for triage assessment and decision-making, guiding healthcare providers in identifying patients who require immediate intervention versus those who can safely wait for treatment. Numerous studies have evaluated the reliability and validity of the ESI in different clinical settings, supporting its effectiveness in enhancing patient outcomes and optimizing resource utilization (Jafari-Rouhi et al., 2013). The use of standardized triage protocols, such as the Simple Triage and Rapid Treatment (START) system, has been validated through empirical research. Purwadi et al. (2021) confirmed that the START system enhances the consistency and reliability of triage decisions in disaster settings. Moreover, empirical references for disaster triage also encompass research articles examining various aspects of triage practice, including the impact of triage education on nursing performance (Faheim et al., 2019), the factors influencing triage accuracy (Tam et al., 2018), and the role of experience in triage decision-making (Hategeka et al., 2017).

Case Study

Three case study categories expand on the concept of disaster triage: the model case shows all defining attributes, the borderline case that includes most but not all attributes, and the contrary case illustrating what the concept is not (Walker & Avant, 2005; Yazdani et al., 2016).

Model Case

After earthquake 7,0 SR, a patient is found by the triage team with signs of respiratory distress. Drawing on years of experience, a triage nurse immediately recognizes the urgency and assesses the patient's vital signs and symptoms, assigning the highest priority level. After checking their respiration, perfusion and the mental status of the patient, the nurse alerts the other members of the team to prepare for immediate intervention, managing the medical resources and ensuring that the resuscitation room is ready with the necessary equipment and personnel. As the patient is rapidly assessed and stabilized, the triage nurse continues to communicate updates to the medical team, facilitating the smooth transition of care. Despite the chaos, the nurse remains calm and makes

Table 1. Analysis of Disaster Triage Attributes by Source, Discipline, and Thematic Cluster

Citation	Dicipline	Thematic Cluster	Attribute
Zhu, Brenna, McCoy, Atkins, and Das (2022); Moon and Cho (2022)	Nursing, Clinical Care	Recognition, understanding, response, prioritization, diagnosis formulation, intervention anticipation, reassessment	Clinical judgment
Bazyar et al. (2020); Mackway-Jones, Marsden, and Windle (2014); Vatnøy, Fossum, Smith, and Slettebø (2013); Purwadi, Breaden, McCloud, and Pranata (2021); Reinhardt (2017); START (2023)	Emergency Medicine, Disaster Response	Priority determination, immediate needs intervention, injury categorization (RPM: respiration, perfusion, mental status)	Assessment
Moon and Cho (2022); Christian (2019); Hick, Hanfling, and Cantrill (2012)	Health Administration, Emergency Management	Patient prioritization, personnel allocation, equipment management, facility use	Management of medical resources
Moon and Cho (2022); Moon and Park (2017); Shackelford et al. (2022); Reay, Smith-MacDonald, Then, Hall, and Rankin (2020)	Psychology, Emergency Medicine	Decision-making under stress, flexibility, agility, confidence	Timely decision
Hitchcock, Gillespie, Crilly, and Chaboyer (2014); Moon and Cho (2022); ICN (2019); Khorram-Manesh et al. (2021)	Communication Studies, Healthcare Coordination	Active listening, verbal/non-verbal support, coordination, information sharing	Communication

timely decisions, prioritizing critical interventions. Coordinating with other healthcare professionals, the nurse ensures that the patient receives prompt and appropriate treatment, optimizing outcomes.

Borderline Case

After an earthquake, the triage nurse observes another patient complaining of moderate abdominal pain and nausea. While the symptoms are concerning, they do not immediately indicate a life-threatening condition. After tagging patient with green, another triage team uses their clinical judgment and the nurse conducts a brief assessment, asking the patient about their medical history and any recent changes in their health. The nurse also checks the availability of medical resources, ensuring that essential equipment and staff are on hand if the patient's condition worsens. The nurse explains the assessment process to the patient and informs them of the plan for their ongoing observation. Additionally, the nurse communicates with the medical team to keep them informed of the patient's status and any changes in their condition. Nevertheless, the triage nurse experiences uncertainty when making a timely decision, as they weigh the urgency of the patient's symptoms against those of other cases in the ED.

Contrary Case

After a huge earthquake, a new nurse, inexperienced in disaster triage, faces a patient with severe chest pain and difficulty breathing. Overwhelmed and unsure how to allocate resources or make timely decisions, the nurse struggles with making a clinical judgment and engaging in communication. This situation highlights the need for proper training and experience in triage to ensure effective patient care.

Discussion

Effective disaster triage hinges on several critical attributes, including clinical judgment, assessment skills, the management of medical resources, timely decision-making, and communication. Clinical judgment is the cornerstone of disaster triage, enabling that healthcare providers quickly assess the severity of the patients' condition and prioritize treatment based on the likelihood of survival and the availability of resources (Aysha & Allam, 2020). This judgment is informed by both experience and education, allowing responders to make rapid yet accurate decisions under pressure (Alfaro-LeFevre, 2015). Closely tied to clinical judgment is the ability to conduct swift and accurate assessments. In disaster scenarios, where the volume of casualties can be overwhelming, the ability to efficiently assess each patient's condition is vital for effective triage. This assessment must be thorough yet expedited to ensure that patients receive the appropriate level of care (McCuistion et al., 2021).

Our findings confirm that effective management during disaster triage is essential for directing critical supplies like medication, equipment, and personnel to where they are most needed (Rezapour et al., 2018). In a disaster, resources are often limited, so this careful allocation ensures that the most critical patients receive the necessary care, ultimately improving outcomes even in challenging conditions (Zhou et al., 2018). Timely decision-making is another essential attribute, as delays can exacerbate patient outcomes and strain already scarce resources. Quick, informed decisions are necessary to maintain the flow of triage and treatment in chaotic environments (Alanazi et al., 2019). Finally, communication plays a crucial role in disaster triage. Clear, concise communication among team members, and between different levels of command, ensures that everyone is aware of the situation, resource availability, and any changes in patient condition (Gamst-Jensen et al., 2017; Liu et al., 2018). Effective communication is also key when it comes to coordinating the efforts among multiple agencies and responders, which is often required in large-scale disasters (Steigenberger, 2016). These attributes collectively support a robust disaster triage process, enabling responders to deliver the best possible care under challenging circumstances.

The effectiveness of disaster triage is heavily influenced by several antecedents, including triage education, working experience, disaster training, and prior experiences dealing with disasters. Disaster triage education lays the groundwork for a competent disaster response by teaching healthcare professionals how to prioritize care in mass casualty situations (Natareno, 2018). Simulation exercises and real-world scenarios are crucial for building the knowledge and skills required in such high-stakes environments (Cicero et al., 2019). Alongside formal education, working experience, particularly in emergency and trauma care settings, enhances a responder's ability to make swift, informed decisions under pressure. This hands-on experience is invaluable, as it builds the practical skills and situational awareness that are critical during disasters (Fathoni et al., 2013). Furthermore, targeted disaster training, using seminars and workshops which focus on specific scenarios such as natural disasters, terrorist attacks, or pandemics, prepares responders for the unique challenges they may encounter (Gorick & Rai, 2024). Regular drills and interprofessional training sessions can improve coordination and communication among the response teams (Olvera et al., 2020). Lastly, past experiences in dealing with actual disasters provide insights that cannot be fully replicated in training environments. These experiences help responders develop their resilience, adaptability, and a deeper understanding of the complexities involved in disaster management (Xue et al., 2020). Together, these factors create a robust foundation for effective disaster triage, ensuring that responders are prepared to act decisively and efficiently in crisis situations.

Finally, the consequences of effective disaster triage, namely patient safety and the efficiency of care delivery, are well-supported by the literature. Research supports that effective triage significantly enhances patient safety and care efficiency, as noted by Fekonja et al (2024), and that accurate triage leads to better patient outcomes and streamlined healthcare delivery. While our findings align with the existing literature, they also point to areas needing further study, such as balancing formal education with practical experience and integrating technology into clinical judgment. These considerations are crucial for the continued development of triage practices in emergency care.

Clinical Implications and Limitations

Understanding disaster triage is crucial for clinical practice as it helps allocate resources effectively, improves patient outcomes by prioritizing severe cases, and enhances overall efficiency. Standardized disaster triage protocols ensure consistency and better training for healthcare professionals. However, limitations such as unaddressed cultural or socio-economic factors and practical implementation challenges highlight the need for ongoing research and validation to improve healthcare delivery.

Conclusions

Disaster triage is a complex process that involves sorting and prioritizing patients based on their medical needs. Through a concept analysis following Walker and Avant's framework, we discovered that disaster triage is influenced by several key factors. Antecedents like education, experience, and disaster training form the groundwork for effective triage. Attributes such as clinical judgment, assessment skills, resource management, decision-making, and communication are crucial for healthcare providers to navigate triage situations effectively. The outcomes of efficient disaster triage include improved patient safety and streamlined care delivery, as critical cases receive prompt attention and resources are utilized optimally. This framework not only delineates the components necessary for effective triage but also illustrates how enhancing these elements can lead to significant improvements in patient care. Additionally, the recognition that triage outcomes extend beyond individual patient care to encompass overall healthcare system efficiency adds depth to the understanding of disaster response dynamics.

Declaration of Interest

The author(s) declare that there is no conflict of interest regarding the publication of this article titled "Triage in Disasters: A Conceptual Analysis".

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This article did not produce specific findings or results. The focus of this work is on [provide a brief description of concept analysis.

Data Availability

The analysis is based on theoretical and conceptual frameworks drawn from existing literature

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