


Golden Minutes: A Comprehensive Literature Review On Triage Accuracy And Response Time In Emergency Installations

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Article Info	ABSTRACT
<p>Keywords: Emergency Departement, Triage Accuracy, Response Time, Triage.</p>	<p>The implementation of the triage system is an effective indicator in the Emergency Departement (ED) and is crucial for assessing triage accuracy, improving response time, and enhancing the quality of medical and nursing care. This study aims to find scientific evidence on the golden minutes for triage accuracy and response time in the ED. This Study üsen a literature review approach, searching for articles from several database such a PubMed, Science Direct, Garuda, and Google Scholar within the last file years 2019-2024. Analysis of eight articles revealed that the accuracy of triage performed by ED nurses ranged between 73%-89%, with a response time of lens than 5 minutes. Conclusion: Helathcare Professional should enhance training on triage accuracy and response time in the ED.</p>
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INTRODUCTION

The implementation of a triage system in the Emergency Department (ED) is a crucial aspect of managing emergency patients (Pratama et al., 2024). Triage serves to establish treatment priorities based on the severity of patients' conditions, thereby enabling more efficient use of resources in situations that require rapid responses (Mailita & Rasyid, 2022). In this context, a quick response time can enhance the chances of saving lives and reducing mortality rates (Prahmawati et al., 2021). Research indicates that the use of standardized systems, such as the Australian Triage Scale (ATS), assists healthcare professionals in identifying patients requiring immediate attention. However, a lack of understanding regarding triage procedures and minimal skills can lead to assessment errors, adversely affecting the quality of healthcare services (Levis-Elmelech et al., 2022).

Nurse health literacy also plays a significant role in the effectiveness of the triage system. Nurses with low health literacy tend to perform triage with less accuracy, resulting in delayed responses in patient care (Djala et al., 2024). Most failures in managing emergency patients stem from a lack of understanding among nurses regarding triage procedures and patients' clinical conditions (Farilya et al., 2022). By enhancing health literacy through continuous training, it is expected that the success rate of patient management will

significantly improve (Gunarto et al., 2024). This highlights that ongoing education and training are essential for enhancing nurses' competencies in performing triage.

The success of the triage system relies not only on individual nurses' skills but also on the organizational structure and hospital management policies, especially in primary and secondary assessments (Aty & Blasius, 2021). Therefore, this study aims to seek scientific evidence about the golden minutes of triage accuracy and response time in the ED. Nurses with a solid understanding of triage have an improved ability to prioritize patient care, thus reducing wait times and enhancing clinical outcomes. For instance, the consistent application of a triage system, such as the Australian Triage Scale (ATS), has proven beneficial for nurses in delivering prompt and appropriate care according to patients' needs (Cahyaningsih & Daely, 2024). Furthermore, nurses with high knowledge levels are better equipped to assess patients' conditions accurately and swiftly, helping to reduce mortality and morbidity rates in the ED.

Training and education for nurses, along with the implementation of clear and effective triage standards, are vital for improving the quality of emergency services (Lidiana et al., 2024). Triage errors can occur due to insufficient training for nurses and poor understanding of the triage processes being applied (K. D. Johnson et al., 2021). Patient crowding in the ED often results from improper categorization of patients based on their urgency levels, leading to suboptimal care (Jingfen et al., 2020). As a strategy to address this issue, it is essential first to enhance nurses' training and education on the triage system, including the application of standards like the Australian Triage Scale (ATS) to improve classification accuracy. Secondly, emphasizing the need for effective information systems to support classification decision-making is crucial (Rossy et al., 2023). Thirdly, collaboration among medical teams and regular evaluations of the triage process should be implemented to adapt to patient needs.

Timely and efficient management in the ED can expedite the triage process when handling patients, thereby improving workflow efficiency (Surya & Setyowati, 2024). Research shows that factors such as wait times and environmental disturbances can influence triage outcomes (Sari et al., 2020). Therefore, special attention must be given to managing space, resources, and outpatients in the ED to ensure optimal triage execution (Rahmiati & Temesveri, 2020). The existence of racial disparities in wait times, along with the anxiety experienced by patients and their families, indicates service delivery issues that need to be addressed, one of which can be achieved through the implementation of therapeutic measures (Andrian et al., 2024). Therefore, this study to provide scientific evidence on the importance of the golden hour in improving triage accuracy and response time in the Emergency Departement (ED).

METHODS

The analysis method in this literature review begins with article selection using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach. Relevant articles are selected based on clear inclusion and exclusion criteria, covering studies related to the topics of "emergency/ED," "response time," and "triage/triage accuracy," published within a five-year period (2019-2024). Articles that do not meet these criteria are excluded.

After selection, the key data from each article are systematically extracted, including information on study design, sample population, methods for measuring response time and triage accuracy, and research outcomes. Qualitative analysis is then performed to assess the quality of the findings from each study, identifying recurring patterns or themes and potential limitations in the existing research. Descriptive analysis is subsequently used to present the findings in tables or graphs, illustrating the distribution of study types and key findings related to response time and triage accuracy. In the synthesis phase, the author combines the results from various articles to provide a comprehensive overview of how response time and triage accuracy impact the effectiveness of emergency department case management, considering factors such as medical staff training and the information systems used. Finally, conclusions and recommendations are drawn based on the analysis, offering insights into potential improvements in triage systems and response time management, and suggesting directions for future research to enhance the quality of emergency department services.

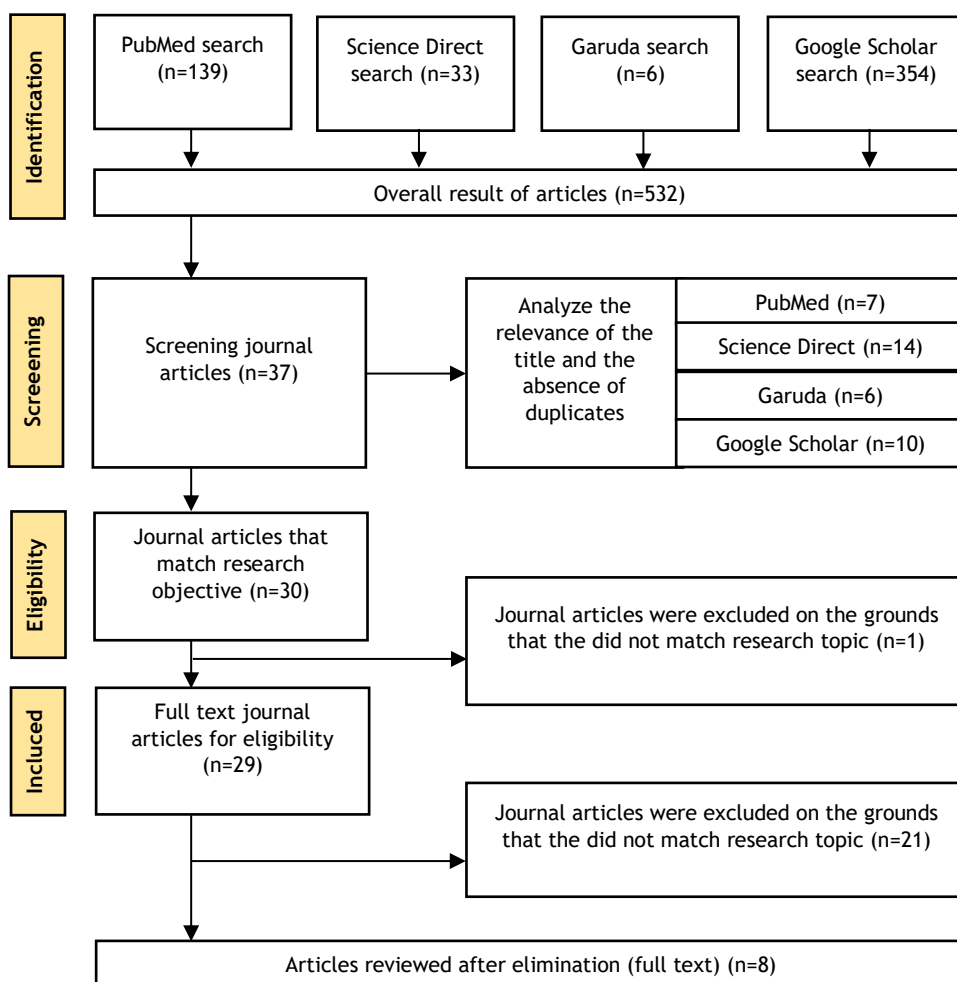


Figure 1. PRISMA Flowchart

From the search results, a total of 532 journal articles were found in the PubMed database (139 articles), Science Direct (33 articles), Garuda (6 articles), and Google Scholar (354 articles). Articles discussing the accuracy of emergency patient management in the

emergency department based on triage were grouped and analyzed through screening to detect plagiarism. This process resulted in the selection of 37 articles relevant to the topic. These articles were then further filtered based on publication year, keywords, abstracts, methods, and research outcomes, yielding 30 relevant articles. In the final stage, the articles were categorized according to the established topics and objectives, and 8 articles were chosen for review.

RESULTS AND DISCUSSION

Based on the 10 articles that met the inclusion criteria related to the topic and objectives, the majority of the studies used observational research design (5 articles), correlational design (1 article), randomized controlled trial (RCT) (1 article), and cross-sectional design (3 articles). All 10 articles involved varying sample sizes, ranging from large to small respondent groups, totaling 36 respondents. The respondent criteria included patients who visited and were examined in the Emergency Department (ED). The standards and quality of the research were relatively high or substantial. The research locations spanned several countries, including the United States, Switzerland, Austria, China, and various regions in Indonesia, such as Aceh, Ambon, Tulungagung, and Sumedang.

Table 1. List of Selected Articles Bibliography Review

No	Author, Title	Purpose	Method	Result
1.	Thalib et al., (2022), Efektifitas Penggunaan Australian Triage Scale (ATS) Modifikasi terhadap Respon Time Perawat Di Instalasi Gawat Darurat (IGD) Rumah Sakit Hative Passo Tahun 2021	Analyzing the effectiveness of using the modified Australian Triage Scale (ATS) to improve nurse response time in the Emergency Department of Hative Passo Hospital in Ambon.	Observational study	The results of the study showed that the use of the Australian Triage Scale (ATS) significantly increased the speed of nurse response in the Emergency Department (IGD), with 65.3% of nurses responding in less than 5 minutes.
2.	Assunta et al., (2024), Feasibility and Acceptability of a Serious Game to Study The Effects of Environmental Distractors on Emergency Room Nurse Triage Accuracy: A Pilot Study	To evaluate the feasibility and acceptability of triage in emergency rooms in Switzerland and to collect baseline data on the impact of environmental noise on triage accuracy.	Randomized Controlled Trial (RCT)	The results of the study showed that 55 nurses achieved a triage accuracy rate of 89%, although there was no significant difference between the group exposed to the disorder and the control group, and nurses gave a positive assessment of the game used as a simulation tool.

No	Author, Title	Purpose	Method	Result
3.	Purwacaraka et al., (2024), Hubungan Ketepatan Triase dengan Keberhasilan Penatalaksanaan Tindakan Keperawatan Kegawatdaruratan Ruang IGD Di Rumah Sakit Daerah Tulungagung	Determining the relationship between triage accuracy and management success in the Emergency Department of Tulungagung Regional Hospital.	Quantitative Correlational	The results of the study showed that 73.1% of respondents succeeded in carrying out triage correctly and 80.8% succeeded in emergency management, with statistical analysis producing a p-value of 0.000 which indicates a significant relationship between the accuracy of triage and the success of nursing management in the Emergency Installation.
4.	Jingfen et al., (2020), Reliability and Validity of The Four-Level Chinese Emergency Triage Scale in Mainland China: A Multicenter Assessment	Assessing the reliability and validity of the Chinese Emergency Triage Scale (KETS) used by nurses in eight emergency units in China.	Cross Sectional Approach	The results showed that the average accuracy of triage using CETS was 89.4%, with a slightly higher rate of over-triage than under-triage (6.5% vs. 4.1%), inter-rater reliability reached 0.96, and the ability of CETS to predict mortality was very good with an AUC of 0.968, indicating its effectiveness in identifying patients who needed treatment.
5.	Aklima et al., (2023), Pengukuran Triage Time pada Pasien Masuk IGD	Measuring the time of triage implementation on patients in the Emergency Room of Dr. Zainoel Abidin Regional Hospital, Banda Aceh.	Observational study	The results of the study showed that the average triage time in the Emergency Room of Dr. Zainoel Abidin Hospital, Banda Aceh was 02.96 seconds, with the fastest time being 00.08 seconds and the longest being 10.05 seconds.
6.	Allif et al., (2024), Hubungan Response Time Perawat berdasarkan Level	To determine the relationship between nurse response time and the Canadian	Cross Sectional Approach	The results of the study showed that there was no significant relationship between

No	Author, Title	Purpose	Method	Result
	Canadian Triage Acuity Scale (CTAS) dalam Penanganan Kegawatan Di IGD RSUD Sumedang	Triage Acuity Scale (CTAS) level in emergency handling at the Sumedang Regional Hospital Emergency Department.		nurse response time and the Canadian Triage Acuity Scale (CTAS) level in the Sumedang Regional Hospital Emergency Department, with a p-value of 1,000, although most nurses had a fast response time.
7.	Kienbacher et al., (2022), Factors Influencing Door-to-Triage- and Triage-to-Patient Administration-Time	Identifying structural and situational factors influencing the time from entrance to triage and from triage to patient administration in an Austrian emergency hospital.	Observational study	The results showed that the time from entrance to triage averaged 6 minutes, was shorter on weekends and increased with the number of ESI 2 patients and those transported by ambulance, while the time from triage to patient administration averaged 5 minutes and increased for patients with higher severity, with no significant differences by day.
8.	T. J. Johnson et al., (2022), Racial Differences in Pediatric Emergency Department Wait Times	To determine whether there are racial/ethnic disparities in wait times for children in pediatric emergency departments (PEDs) and to analyze differences in wait times between locations and within the same location in the United States.	Observational study	The study results showed that non-Hispanic Black, Hispanic, and other racial children experienced longer wait times than non-Hispanic White children.

The search results for articles matching the keywords yielded 8 articles discussing triage accuracy and response time in the Emergency Department (ED). Next, the similarities and differences among these studies were examined. The similarities include the research methods employed. The studies conducted by Thalib et al. (2022), Aklima et al. (2023), Kienbacher et al. (2022), and T. J. Johnson et al. (2022) all utilized observational study methods. In contrast, the articles by Jingfen et al. (2020) and Allif et al. (2024) employed a cross-sectional approach. The article by Assunta et al. (2024) used a randomized controlled

trial (RCT) method, while Purwacaraka et al. (2024) applied a correlational quantitative research method.

The findings from these eight articles reveal that the majority employed observational study analysis and correlational design to identify and analyze factors contributing to the accuracy of triage and response time in the ED. Observational studies using correlational design represent a type of quantitative research that observes phenomena in their natural environment without intervention. On the other hand, correlational studies aim to determine the relationship between two or more variables without altering those variables (Adiputra et al., 2021).

Based on the triage accuracy results from the eight articles, two studies reported similar findings, indicating an average triage accuracy of 73% to 89%. These studies were conducted by Assunta et al. (2024) and Jingfen et al. (2020). The effectiveness of emergency services significantly impacts triage accuracy. One crucial factor identified is the need for adequate training for nurses regarding triage procedures, including understanding emergency conditions, nurse training, and nurse health literacy.

In terms of differences, first, the year of the studies reflects developments in triage and response time. The articles by Assunta et al. (2024), Purwacaraka et al. (2024), and Allif et al. (2024), published in 2024, indicate the latest trends in utilizing technology, such as gaming, to enhance triage accuracy. Meanwhile, the article by Aklima et al. (2023) highlights improvements made in the triage accuracy and response time process. Conversely, the articles by Thalib et al. (2022), Kienbacher et al. (2022), and T. J. Johnson et al. (2022) reflect ongoing efforts that influence triage times in the ED. The differences in research years also indicate changes in innovations and technologies affecting the quality of healthcare services in triage accuracy and response times in the ED.

Second, the research locations varied, including the United States, Switzerland, Austria, China, and several regions in Indonesia, such as Aceh, Ambon, Tulungagung, and Sumedang. Third, the number of participants varied, which impacts nurses' understanding of triage; better comprehension enhances their ability to prioritize patient care, thereby reducing wait times and improving clinical outcomes.

Fourth, the triage accuracy results ranged between 2 to 6 minutes, indicating optimal conditions where external factors such as patient volume and healthcare staff availability reflect the challenges of overcrowding that affect triage accuracy. Finally, the response times in ED services ranged from as quick as 0.2 seconds to 5 minutes, demonstrating the effectiveness of triage accuracy in handling patients. Conversely, the article by T. J. Johnson et al. (2022) reported slower response times reaching up to 10 minutes due to patient overload and case severity. Longer response times can increase the risk of delays in managing critical patients.

CONCLUSION

Based on the analysis of 8 articles, the findings indicate that the triage accuracy of emergency department (ED) nurses ranges from 73% to 89%, with a response time of less than 5 minutes. Both triage accuracy and response time are crucial for the effective implementation

of a triage system in the ED. This implementation needs to be supported by nurses' skills, health literacy, good time management, and the use of standardized triage systems. As a recommendation, to improve the effectiveness of the triage system, it is suggested to strengthen ongoing training for nurses, leverage technology to accelerate the triage process, and conduct regular evaluations of the applied triage system to ensure that accuracy and response time are consistently maintained at an optimal level.

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