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The relationship between the accuracy of nurse triage and initial stabilization time in pediatric emergency patients in the emergency department

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Abstract

Background: Pediatric emergency care in the Emergency Department (ER) requires rapid and appropriate treatment because children are highly susceptible to delays in treatment. Accurate nurse triage is a crucial factor in determining treatment priority and the speed of initial patient stabilization.

Purpose: To determine the relationship between the accuracy of nurse triage and the initial stabilization time of pediatric emergency patients in the Emergency Room.

Method: This study used an observational analytical design with a cross-sectional approach. The study was conducted in the Emergency Room of Bina Kasih Hospital in October–November 2025 with 25 pediatric emergency patients as respondents. The sampling technique used total sampling. Data were collected through observations of nurse triage accuracy and recording of initial stabilization times based on the ABC principle. Data analysis was performed using univariate and bivariate methods with a significance level of $p < 0.05$.

Results: The results showed that most nurses performed triage correctly and that most pediatric emergency patients achieved rapid initial stabilization times. Bivariate analysis revealed a significant association between nurse triage accuracy and initial stabilization times in pediatric emergency patients in the emergency department.

Conclusion: There is a significant relationship between nurse triage accuracy and initial stabilization time in pediatric emergency patients. Accurate triage plays a crucial role in accelerating initial treatment and improving the quality of pediatric emergency services.

Keywords: Initial Stabilization Time; Pediatric Emergency Patients; Triage Accuracy.

INTRODUCTION

Emergency care is a crucial component of the modern healthcare system, addressing life-threatening acute conditions that require immediate and structured intervention. The Emergency Department (ED) serves as the primary entry point for patients to hospital care, including the ICU and ward. It also serves as the location for initial diagnosis and stabilization, which are crucial for patient outcomes (Kim, Seo, Kim, Hong, Kang, Kim, & Kim, 2021). The characteristics of ED care demand speed and accuracy, as delays in the care process, whether in triage, resuscitation, or transfer to the ward or operating room, have been shown to be associated with increased morbidity, 30-day mortality, and length

of stay (Jones, Moulton, Swift, Molyneux, Black, Mason, & Mann, 2022). Research shows that emergency conditions such as acute myocardial infarction, stroke, cardiac arrest, sepsis, trauma, and oncological emergencies require management within a "golden hour" framework, where every minute of delay in treatment significantly reduces the chance of survival and worsens the patient's functional outcome (Guru, Mathur, Kumar, Sharma, Dalai, & Mitra, 2025).

Pediatric patients are a highly vulnerable group in emergency care because they have anatomical and physiological characteristics that differ significantly from those of adults, requiring age-specific

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assessment and management (Soni & Agrawal, 2025). In emergency situations, children are often unable to clearly express their symptoms and are often not adequately involved in communication about their condition and treatment. Therefore, clinical information is highly dependent on parents and caregivers, making miscommunication prone, especially when language barriers exist (Müller, Schröder, Schäning, Schmid, & Noack, 2023). This situation makes the accuracy, competence, and sensitivity of healthcare professionals' communication key factors in clinical assessment, including complete vital sign taking, pain assessment, and early recognition of signs of deterioration, which are more often underdocumented in the pediatric population than in adults (Cercione, Ramgopal, & Martin-Gill, 2024).

One of the important stages in emergency room service is triage, which is the activity of selecting and sorting patients who arrive at the emergency room to determine which patients require immediate treatment and which patients can wait based on their level of urgency and therapeutic needs. Through triage, patients are classified into categories such as true emergencies and false emergencies, or in red, yellow, green, and black, so that patients with the most critical and life-threatening conditions receive priority treatment based on the limitations of available facilities and resources (Damansyah, Umar, & Lihawa, 2025).

Nurses play a central role in triage implementation in the emergency department (ED) because they are on the front lines and are the first to interact with patients and are responsible for sorting patients based on their level of urgency quickly and accurately. The duties of triage nurses require the ability to conduct systematic clinical assessments, assess treatment priorities while considering resource availability, and make decisions that directly impact patient safety and the flow of emergency services. Accurate triage performance has been shown to be significantly influenced by internal factors within nurses, particularly knowledge, skills, job-related competencies, motivation, and work experience. Triage skills emerge as the most dominant factor in determining the quality of nurse performance in the ED (Anggara, Firdaus, Syafwani, Ruslinawati, & Muthmainnah, 2024).

Inaccuracy in triage determination has been shown to prolong response time and initial treatment time that should be received immediately by patients according to their clinical condition, thus increasing the risk of decreased patient safety, disability, and even death. Decreased triage scale assessment or misclassification of the degree of emergency causes critical patients to not receive proper priority, prolongs waiting time, and hinders the success of emergency nursing care management (Purwacaraka, Farida, Erwansyah, Anggraini, Islamy, Munawaroh, & Prasetyo, 2025). In the ER, the phenomenon of inaccurate triage is associated with delayed assistance that has fatal consequences and reduces the quality of service, because patients are not immediately stabilized according to ABC (airway, breathing, circulation) requirements (Damansyah et al., 2025).

Initial stabilization time is an important indicator of the quality of emergency care, as it is closely related to the speed of response of healthcare workers from the time the patient first arrives until initial treatment is administered (Wulandari & Sahrudi, 2024). A rapid and appropriate response in the initial phase of an emergency aims to secure the airway, breathing, and circulation (ABC) according to the principles of emergency management, so that hypoxemia, circulatory disorders, and organ failure can be prevented as early as possible (Anugrah, Chayati, & Purnomo, 2025). The shorter the initial response and stabilization time, the greater the chance of the patient achieving a more stable clinical condition, reducing the risk of deterioration and further complications, and increasing satisfaction and perception of the quality of emergency care by patients and families (Wulandari & Sahrudi, 2024).

Several studies have shown that triage accuracy is closely related to response time, waiting time, and speed of patient care in the ER; accurate triage has been shown to accelerate response time and improve the success of emergency nursing care, while inaccurate triage prolongs treatment time and reduces service quality and patient safety (Maghfiroh, Priyanti, & Mubarrok, 2019; Purwacaraka et al., 2024). However, studies specifically examining the relationship between nurse triage accuracy and initial stabilization time are still very limited, especially in pediatric emergency patient populations and in type

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B/C hospitals or regional health care facilities, which generally have limited resources compared to large referral hospitals (Damansyah et al., 2025).

Understanding the relationship between nurse triage accuracy and initial stabilization time is crucial for improving the quality of nursing care in the emergency department (ED), as triage accuracy has been shown to impact the speed of intervention, waiting time, and smoothness of emergency care (Majeed, Alkubaisi, Harikumar, Al Mujalli, Shah, Khan, & Socor, 2023). Accurate triage classification allows critically ill patients to be prioritized for initial stabilization, thereby minimizing the risk of delayed intervention and improving clinical outcomes (Purwacaraka et al., 2024).

RESEARCH METHOD

This study used an observational analytical design with a cross-sectional approach. The study was conducted at the Emergency Department (ER) of Bina Kasih Hospital from October to November 2025. The population in this study were all pediatric emergency patients who came to the ER of Bina Kasih Hospital during the study period. The sampling technique used was total sampling, so that the entire population that met the research criteria were included as respondents with a total of 25 respondents. The independent variable in this study

was the accuracy of nurse triage, while the dependent variable was the initial stabilization time in pediatric emergency patients.

Data collection was conducted through direct observation using observation sheets to assess the accuracy of nurses' triage based on triage categories in the Emergency Department and recording initial stabilization time according to the Airway, Breathing, and Circulation (ABC) principles. The data obtained were analyzed univariately to describe the characteristics of the respondents and bivariate to determine the relationship between nurses' triage accuracy and initial stabilization time. The statistical tests used were adjusted to the type and distribution of the data based on the results of the normality test, with the statistical significance level set at $p < 0.05$.

The inclusion criteria for this study included pediatric patients who visited the Bina Kasih Hospital Emergency Department during the study period, pediatric emergency patients who underwent triage by nurses, patients with complete medical records and observation data, and parents or guardians who were willing to participate. Exclusion criteria included pediatric patients who were referred to other healthcare facilities before initial stabilization, patients with incomplete observation data, and patients who arrived at the Emergency Department with a Death on Arrival (DOA) condition.

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RESEARCH RESULTS

Table Characteristics of Respondent (N=25)

Variable	Results	P-value
Age (Mean±SD) (Range) (Years)	(5.00±3.71) (0-12)	
Infant (0–1 years)	6/24.0	
Toddler (2–5 years)	10/40.0	
Child (6–12 years)	9/36.0	
Gender (n/%)		
Male	14/56.0	
Female	11/44.0	
Triage Category (n/%)		
Red (Emergency)	8/32.0	
Yellow (Urgent)	11/44.0	
Green (Non-urgent)	6/24.0	
Triage Accuracy (n/%)		0.003
Correct	16/64.0	
Incorrect	9/36.0	

The table above shows the results of the average age of respondents and the standard deviation is (5.00±3.71) with an age range of (0-12). The majority of respondents were in the toddler age group (40.0%) and male (56.0%). The most common triage category was yellow triage (44.0%), with most triage implementations being performed correctly by nurses (64.0%). The results of the correlation analysis showed that patients who received. The Chi-Square statistical test showed a p-value of 0.003 ($p < 0.05$), which indicates a significant relationship between the accuracy of nurse triage and the initial stabilization time in pediatric emergency patients in the Emergency Department appropriate triage tended to experience faster initial stabilization times (81.3%) compared to patients who received inappropriate triage (22.2%). The Chi-Square statistical test showed a p-value of 0.003 ($p < 0.05$), which indicates a significant relationship between the accuracy of nurse triage and the initial stabilization time in pediatric emergency patients in the Emergency Department.

DISCUSSION

The study results showed that the majority of pediatric emergency department patients were toddlers and predominantly male. This is consistent with child development theory, which states that toddlers are at higher risk of experiencing emergency conditions due to limited physiological adaptation capabilities. While increased physical activity and motor skills at an early age are associated with more frequent risky behaviors and injuries requiring emergency department visits or hospitalization (Pischetola, Boncompagni, & Bondi, 2025). Boys are generally more physically active and more frequently engage in moderate-to-vigorous play

and activities than girls, resulting in higher rates of injuries and ER visits due to physical activity and sports in boys (Gong, Lu, Ma, Zheng, Hu, Liu, & Xu, 2021).

into the yellow triage category. According to emergency triage theory and systems, the yellow/delayed category describes patients who are not in immediate danger to life but still require medical attention within a certain timeframe (generally 2–4 hours) to prevent their condition from worsening (Selvi, 2018). In a multi-level triage system like Manchester, the yellow level is also classified as an urgent condition that can still wait a short time but

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is at risk of deterioration if treatment is delayed too long (Shaheen, Afzal, & Mukhtar, 2023).

The study also showed that the majority of triage procedures were performed correctly by nurses. This triage accuracy reflects the nurse's ability to perform a rapid and accurate initial assessment. According to emergency nursing theory, triage accuracy is strongly influenced by a combination of knowledge, clinical experience, and adequate emergency training, as these three elements form the basis of nurses' ability to quickly and accurately assess the severity of patients in the ED (Soemah, 2023). A systematic review showed that nurse characteristics (education level, ED experience, specific triage experience, and triage certification) and repeated triage training correlated with classification accuracy, including in the pediatric context (Suamchaiyaphum, Jones, & Markaki, 2024).

Research findings indicate that most patients who receive appropriate triage experience faster initial stabilization times. According to emergency management theory, proper prioritization through triage allows patients with higher degrees of emergency to receive immediate and structured interventions based on their urgency, allowing for faster and more systematic initial stabilization interventions such as airway security, respiratory support, and circulation optimization. Structured approaches such as the ABC/ABCDE algorithm are designed to ensure that the most life-threatening problems are addressed first, thus minimizing the time to critical interventions (e.g., bleeding control, adequate ventilation, and circulatory resuscitation) and increasing the chances of successful resuscitation (Ferrari, 2020).

Conversely, patients who receive incorrect triage often experience slower initial stabilization times. This can be caused by delays in recognizing the severity of the emergency, preventing patients from receiving the necessary interventions immediately. According to patient safety principles, delays in treatment in the early stages of an emergency risk reducing the chances of successful rescue, increasing the likelihood of organ damage, disability, and even death, and negatively impacting overall patient quality of care and safety (Widyastuti, Arso, & Suryoputro, 2025).

Statistical test results indicate a significant relationship between nurse triage accuracy and initial stabilization time for pediatric emergency patients in the emergency department (ED). This finding aligns with the emergency care system theory, which views triage as the primary entry point for directing patients to the appropriate care pathway, thereby enhancing the subsequent care flow (Peta et al., 2023). Accurate triage category determination contributes to improved patient flow, reduced waiting times, and faster physician response times, ultimately accelerating the initial stabilization process and improving the overall quality of emergency care (Mitchell, O'Reilly, Banks, Nou, McKup, Kingston, & Cameron, 2025).

The results of this study are consistent with previous studies showing that triage accuracy is significantly related to treatment speed, waiting time, and length of stay in the Emergency Department (ED), where triage accuracy has been shown to play a crucial role in accelerating access to medical examinations and necessary interventions (Balu, Syed, Kotian, Padala, Gupta, Tiwari, & Kamboj, 2025). Another study confirms that triage errors, particularly undertriage, can delay critical clinical interventions and prolong decision-making time, with significant impacts on vulnerable patient groups such as children and patients with high-risk conditions (Berkowitz, Cohen, McCollum, Rojas, & Chamberlain, 2023).

Previous research has also shown that improving nurse competency through triage and pediatric emergency training, whether using high-fidelity simulations, paper-based cases, or comprehensive programs such as ETAT+, has successfully improved triage accuracy, accelerated early intervention, and reduced stabilization time and child mortality (Alruwaili, Alshammari, Alhaiti, Elsharkawy, Ali, & Ramadan, 2025). A systematic review and scoping review of triage education confirmed that various forms of training (lectures, simulations, blended learning, and periodic refreshers) consistently improve triage decision accuracy and service efficiency in the emergency department (Hinds, Kay, & Evans, 2025).

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CONCLUSION

The accuracy of nurse triage is significantly associated with the initial stabilization time of pediatric emergency patients in the emergency department of Bina Kasih Hospital. Accurate triage prioritization allows patients to receive prompt initial treatment tailored to their clinical needs. Therefore, it is recommended that future researchers expand the study with a larger sample size, involve multiple hospitals, and include other variables such as work experience, triage training, and nurse workload to obtain a more comprehensive picture of the factors influencing the quality of emergency care.

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