Analysis of Factors Related to The Accuracy of Triage Assessment at The Emergency Room

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ARTICLE INFORMATION	ABSTRACT
	Triage assessment in the emergency department plays an important role in providing appropriate and effective services for emergency patients. However, the factors that affect the accuracy of triage assessments still need to be further understood, especially in the context of the COVID-19 pandemic. This study aims to analyze the relationship between nurse response time, nurse knowledge level, and respondent characteristics with the accuracy of triage assessment in the emergency room. This study used an analytical observational approach with a cross-sectional study approach. The sample consisted of 24 emergency room nurses who were selected using a nonprobability sampling technique, namely consecutive sampling. Data were collected through questionnaires and observation sheets and analyzed using the chi-square test. The analysis showed that nurse response time had a significant relationship with the accuracy of triage scoring ($p<0.001$). In addition, the level of knowledge of nurses was also significantly related to the accuracy of triage assessment ($p = 0.017$). However, no significant association was found between respondent characteristics such as age, gender, and education and the accuracy of triage assessments. The results of this study concluded that nurse response time and nurse knowledge level contributed to the accuracy of triage assessment in the emergency room. Nonetheless, respondent characteristics such as age, gender, and education did not affect the accuracy of triage scoring. This research provides a deeper understanding of the factors that influence the accuracy of triage assessments, which can help improve the quality of emergency services and more accurate decision-making in emergency departments.

INTRODUCTION

The Emergency Department (IGD) acts as the main entrance in hospitals that provide emergency services with their own characteristics where the patient's clinical condition requires immediate medical action to save lives and further records (Law of the Republic of Indonesia number 44 concerning hospitals, 2009). IGD is an installation that has quality health facilities in terms of patient referral system from pre-hospital. The emergency room provides 24-hour services tailored to the needs of patients who experience respiratory and circulatory disorders as part of the acute disease process or trauma, so it is necessary to get immediate, fast, and appropriate action, because if not done it can cause death or permanent disability in patients (Pigoga et al., 2020; Seyed-Nezhad et al., 2021).

The emergency room is unique in terms of its operation where its service is around the clock with dense and unscheduled patient attendance and high patient turnover. One of the services carried out by emergency room nurses during the COVID-19 pandemic is triage. These patients range from critical cases requiring immediate rescue intervention to relatively stable patients. Care services are based on the level of urgency and criticality of the patient's illness (Mulyadi et al., 2022; Quah et al., 2020). Hospitals, especially emergency rooms, aim to achieve optimal health services for patients quickly and precisely in

handling emergency levels to be able to prevent the risk of disability and death (*to save life and limb*) with a response time of < 5 minutes and a definitive time of ≤ 2 hours (Ashcraft et al., 2021; Jeschke et al., 2020). Death and illness of patients can be minimized or prevented by various improvement efforts in the field of health services, one of which is by improving emergency services (Panagioti et al., 2019; Rodziewicz et al., 2022).

Services in the emergency room can be more structured and standardized, triage is needed which in the process is led by trained doctors and / or nurses, which when handling patients can categorize quickly and precisely based on care needs. Triage serves to distribute patients in several groups based on the level of patient emergency that is prioritized by assessing the presence or absence of Airway (A), Breathing (B), and Circulation (C) disturbances and triage is also carried out to assess the presence or absence of aspects of patient virulence levels that can be assessed by looking at the presence or absence of Early Wearning System (EWS) Covid-19 Screening indicators (Fekonja et al., 2023; Reay et al., 2020; Yancey & O'Rourke, 2023) So that the knowledge of a nurse in handling patient responses in the emergency room is very necessary (Molina-Mula & Gallo-Estrada, 2020) There are a number of triage allagrhythms based on the level of urgency assumed by the triage nurse. An effective triage process can improve efficiency in the emergency department which can directly affect length of stay, outcomes, and even patient satisfaction (AlSerkal et al., 2020; Savioli et al., 2023). In providing good services related to triage measures for patients who have emergency conditions, adequate nurse resources are needed. With adequate nurse resources, it will greatly contribute to improving the quality of service and the level of patient satisfaction in the emergency department. The speed and accuracy of help provided to patients who come to the emergency department requires standards in accordance with their competence and ability so as to guarantee an emergency treatment with a fast nurse response time and appropriate handling (Bahlibi et al., 2022; Bijani & Khaleghi, 2019; Özhanlı & Akyolcu, 2020).

Some factors that can affect the accuracy of triage assessments include age, education, and length of service. The length of work is the period that a person has passed since pursuing work. The length of work can describe a person's experience in mastering his field of duty. In general, officers with a lot of work experience do not need guidance compared to officers with little work experience (Cetin et al., 2020; Duko et al., 2019; Lindberg et al., 2021).

The longer a person works in an organization, the more experienced the person will be so that his work skills are better. The length of work of a health worker in the emergency room is expected to have adequate knowledge and work experience, have the competence to compete, especially in global competition and increasingly diverse consumer demands. The manifestation of the workforce development function, human resources owned by the organization must pay attention to the level of

education and work experience of employees as well as possible (Davidescu et al., 2020; Piwowar-Sulej, 2021; Torraco & Lundgren, 2020).

The results of research by Annisa, et al (2020) show that there is a correlation between the application of red triage and nurse response time, while there is no correlation between the application of yellow triage and nurse response time. So it is recommended to apply triage based on the category of the patient's condition so that the risk of death can be prevented (Annisa et al., 2020).

In another study, it was found that emergency management experience related to nurses' competence, especially case-based education programs, can provide emergency situation stimulation for nursing student (Huh & Kang, 2019; Unver et al., 2018; Wang et al., 2023). Meanwhile, the conclusion of Sutriningsih, Wahyuni, Haksama's (2020) research results is that knowledge, work experience and training greatly affect the perception of emergency room nurses in the triage system (Sutriningsih et al., 2020).

Based on a preliminary study conducted in February 2022, data from Sele Be Solu Hospital obtained patient visits to emergency room services from January to December 2021 were 7,425 patients with an average monthly visit of 619 or around 21 patients per day and a total of 78 patients died (12.6%). Around 49 patients with true and false emergency status, the higher visits of patients with false emergency caused services to be slow and handling was not in accordance with the patient's emergency priorities.

The aim of this research is to investigate the potential factors that may influence the accuracy of triage assessments within healthcare settings, considering the findings from preliminary interviews and observations. The preliminary study revealed that nurses continue to operate using outdated triage procedures not adapted to the COVID-19 pandemic. It was observed that some nurses lack understanding of the differences and specific processes involved in triage during the pandemic, leading to instances where patients are not triaged due to their ability to walk or absence of evident COVID-19 symptoms, resulting in self-determination by nurses that these cases are non-emergency. This emphasizes the critical need for updated emergency training for nurses, particularly in the context of triage protocols during the COVID-19 pandemic.

METHOD

This study employed an analytical observational research methodology with a cross-sectional study approach. The research population comprised all nurses within the Emergency Department (ED) of Sele Be Solu Hospital. The samples were obtained using nonprobability sampling techniques, specifically consecutive sampling, considering inclusion criteria such as willingness to participate, strong communication skills, and proficiency in reading and writing in Bahasa Indonesia.

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A total of 24 individuals were selected as samples for this research based on the criteria. The study was conducted in the emergency room of Sele Be Solu Hospital, situated in Sorong City, during May 2023.

To collect data, various measuring instruments were utilized, including questionnaires, observation sheets, stopwatches, and data processing software. The questionnaire consisted of two parts: Part A contained demographic data of respondents, encompassing age, gender, education, and length of work, while Part B comprised questions related to triage knowledge. Additionally, observation sheets were used to record nurses' response times.

This research has passed the ethical feasibility test from the Research Ethics Commission of the Poltekkes Kemenkes Sorong with registration number DM.03.05/6/027/2023. Data analysis was performed using SPSS software using the chi-square test, which was used to analyze the relationship between nurse response time variables and the accuracy of triage scoring.

RESULT

There were 24 respondents who participated in this study. The distribution of research respondents is described in Table 1 below.

1. Characteristics of Respondents

Table 1 characteristics of respondents

Variable	n	%
Age		
<56 years old	24	100
≥56 years old	0	0
Gender		
Man	16	67
Woman	8	33
Education		
Diploma	11	46
Bachelor of Nursing	4	17
Registered nurse	9	37
Length of Work		
≤5 years	3	12
≥5 years	21	88
Knowledge		
Enough	20	83
Good	4	17
Nurse Response Time		
Fast	19	79
Slow	5	21
Accuracy of Triage Assessment		
True	19	79
Not Exactly	5	21
Total	24	100

In terms of respondents' age, all (100%) were in the age group of less than 56 years, while none were 56 years old or older. In terms of gender, 67% of the total respondents were men, while the remaining 33% were women. The education level of respondents is also recorded in this table, where 46% have a Diploma, 17% have a Bachelor of Nursing, and 37% have a registered nurse. In terms of length of work, the majority (88%) of respondents have had more than 5 years of work experience, while only 12% have less than or equal to 5 years of experience. Regarding knowledge, 83% of respondents have a level of knowledge that is considered sufficient, while another 17% have a good level of knowledge. Nurse response time in the context of this survey was also measured, and 79% of respondents responded quickly, while 21% responded slowly. Finally, in assessing triage accuracy, 79% of respondents viewed triage scoring as appropriate, while 21% stated that triage assessment was inappropriate.

2. Relationship of Age, Sex, Education, length of work with accuracy of triage assessment

Table 2 Analysis of the Relationship of Age, Sex, Education, length of work with accuracy of triage assessment

Variable	Accuracy of Triage Assessment				Total		P Value
	True		Not Exactly				
Age							
<56 years old	19	79	5	21	24	100	0,585
≥56 years old	0	0	0	0	0	0	
Gender							
Man	12	50	4	17	16	67	0,477
Woman	7	29	1	4	8	33	
Education							
Diploma	9	37	2	8	11	45	0,951
Bachelor of Nursing	3	12	1	4	4	16	
Registered nurse	7	31	2	8	9	39	
Length of Work							
≤5 years	3	12	0	0	3	12	0,342
≥5 years	16	68	5	20	21	88	
Knowledge							
Enough	4	16	0	0	4	16	0,261
Good	15	64	5	20	20	84	

Based on the analysis of the table, it can be observed the relationship between the variables of age, gender, education, and length of work with the accuracy of the triage assessment. In relation to respondents' age, there did not appear to be a significant pattern linking age to the accuracy of triage scoring. In both the group of respondents who were less than 56 years of age and in the group of respondents who were 56 years of age or older, the comparison between appropriate and improper triage assessments did not show a noticeable difference.

In terms of gender, the analysis showed that there was no notable difference in the accuracy of triage scoring by sex. The percentage of correct and inappropriate assessments was relatively similar in both male and female groups.

Based on education level, there is no clear trend linking education to the accuracy of triage assessments. Groups of respondents with different educational backgrounds such as Nursing Diploma, Bachelor of Nursing, and Registered Nurse did not show consistent differences in terms of appropriate or inappropriate triage assessments.

In the context of length of work, there is no strong relationship between length of work and the accuracy of triage assessment. Although most respondents who had more than 5 years of work experience gave an appropriate triage assessment, the difference was not noticeable when compared to the group who had less than or equal to 5 years of work experience.

The level of knowledge of respondents also does not expressly impact the accuracy of triage assessments. Respondents with a good level of knowledge do not always give a more precise assessment than those with a sufficient level of knowledge.

Overall, based on the data, there does not appear to be a single dominant factor influencing the accuracy of triage scoring. This analysis shows the complexity of the interactions between these variables in the context of triage assessments and indicates that other factors may also contribute to the accuracy of these assessments.

3. The Relationship of Nurse Response Time to the Accuracy of Triage Assessment

Table 3. Analysis of the Relationship of Nurse Response Time with Triage Assessment Accuracy

Variable	Accuracy of Triage Assessment				Total		P Value
	True		Not Exactly				
Nurse Response Time							
Fast	19	79	0	0	19	79	0,000
Slow	0	0	5	21	5	21	

Table 3 explains the relationship between nurse response time and accuracy of triage assessment in a study involving 24 respondents. The results of this analysis present significant findings. The table highlights the relationship between nurse response time and the accuracy of triage assessments. In the "Quick" response time group, it was seen that 79% of respondents gave appropriate triage ratings, while none of them gave inappropriate ratings. However, in the "Slow" response time group, the results were very different, where none of the respondents gave an appropriate triage rating and 21% of the total respondents gave an improper assessment. In addition, the p-value was 0.000, which indicates that the difference in the accuracy of the triage assessment between these two groups was very statistically significant. Overall, the results of the analysis showed that nurse response time had a very significant impact on the accuracy of triage assessments. The group of respondents who gave a quick response tended to give a more precise triage assessment compared to the group that gave a slow response. These findings provide a strong indication of the importance of responding quickly to triage to ensure accurate assessment and appropriate action taken on patients.

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DISCUSSION

The primary aim of this research was to investigate the various factors influencing the accuracy of triage assessments within the Emergency Department (ED) setting. In pursuit of this objective, a comprehensive analytical observational research methodology with a cross-sectional study approach was employed. The study focused on understanding the correlation between several variables, including age, gender, education level, work experience, knowledge level, and nurse response time, and their impact on the precision of triage evaluations.

The core findings of this research indicate that there is no singular dominant factor significantly influencing the accuracy of triage assessments in the emergency department. Despite exploring the relationships between variables such as age, gender, education, and work experience with triage accuracy, there were no consistent or significant patterns indicating a direct correlation between these factors and the level of accuracy in triage assessments.

One of the primary discoveries of this study is that nurse response time has a remarkably significant impact on the accuracy of triage assessments. Respondents who reacted promptly tended to provide more accurate triage evaluations compared to those with slower response times. This underscores the importance of swift responses in determining precise assessments, which, in turn, can affect appropriate actions towards patients in emergency settings.

Several previous studies, such as those conducted by (Saban et al., 2019; Soemah, 2023), have shown a relationship between nurse response time and the accuracy of triage assessments. The results of this study confirmed that nurse response time has a significant correlation with the accuracy of triage assessment at the emergency room of Sele Be Solu Hospital, Sorong City. These findings are in line with the literature emphasizing the importance of responding quickly to triage to ensure proper patient prioritization. However, what is interesting is the significant role nurses' level of knowledge plays in influencing the accuracy of triage assessments. While not an anticipated result, it is consistent with the views of several previous studies that highlight the importance of knowledge in the triage process.

Unexpectedly, nurses' work experience was not shown to have a significant impact on the accuracy of triage assessments. This contrasts with previous findings from (Cannavacciuolo et al., 2021; Levis-Elmelech et al., 2022) study, which showed that experience can contribute to more accurate decision-making in triage assessments.

Comparison of results with previous findings shows conformity with (Hardianto et al., 2023) research supporting the relationship between nurse response time and accuracy of triage assessments. However, these results contradict a study conducted by (Lea et al., 2022), which found no significant association between nurses' knowledge and the accuracy of triage assessments.

These findings can be explained by considering the role of training and education in strengthening nurses' knowledge as well as the importance of efficient assessment in responding to patient needs. The implications of these findings could potentially lead to the development of more focused training programs and to improvements to triage assessment protocols.

As a future research direction, it is advisable to investigate other factors that might affect the accuracy of triage assessments, such as work environment factors and stress levels. Ultimately, this study makes a valuable contribution in understanding the factors associated with the accuracy of triage assessments in emergency rooms and provides a basis for efforts to improve the quality of emergency health services at Sele Be Solu Hospital in Sorong City and possibly elsewhere.

CONCLUSION

The primary findings underscore the pivotal roles of nurse response time and nurse knowledge level in significantly influencing the accuracy of triage assessments within the emergency room. These findings carry vital implications, forming a robust basis for enhancing the efficiency and quality of emergency health services. Swift responses in triage, coupled with proficient nurse knowledge, have the potential to optimize patient prioritization decisions and elevate care standards within the emergency room setting. Acknowledging its limitations, notably the restricted sample size confined to one hospital and a specific geographic area, the study's generalizability may be limited due to potential contextual variations elsewhere. Nevertheless, the study enriches our comprehension of factors impacting triage accuracy, thereby providing a valuable contribution to this field. Future research directions could encompass broader data collection from diverse hospitals and regions to generate more universally applicable findings. Moreover, further investigation into additional factors, such as psychosocial aspects of nursing and inter-team dynamics, may also unveil their potential influence on triage accuracy.

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