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Relationship of Emergency Ambulance Response Time to Australasian Triage Scale (ATS) Level in Non-Trauma Case Patients

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ABSTRACT

Emergency ambulance is an emergency service carried out outside the hospital, both trauma and non-trauma, which is carried out to prevent death and further disability. This service is carried out by increasing the ambulance response time. Emergency ambulance response time in pre-hospital emergency services can impact the assessment of patient triage levels in the development of modern triage, one of which is the Australasian Triage Scale (ATS). This study aims to determine the relationship between emergency ambulance response time and the Australasian Triage Scale (ATS) triage level in non-trauma case patients in Samarinda. The design of this study used a quantitative method, namely descriptive correlation, using a cross-sectional research design. The population in this study was 78 patients. Sampling used the total sampling technique. The instruments used in this study were observation sheets, stopwatches (response time), and the Australasian Triage Scale (ATS). This study was conducted for 3 months from March to May in Public Hospital Samarinda in 2024. Meanwhile, the person correlation test results found a p-value of 0.000<0.05, which means there is a relationship between the emergency ambulance response time to ATS Triage and an r-value of 0.767 where the strength of the relationship is high/strong. With a positive correlation result, the direction of the relationship is in the same direction. This means that the faster the emergency ambulance response time, the better (lower) the emergency condition of non-trauma patients based on the ATS triage level.

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INTRODUCTION

Emergency ambulance is an emergency service carried out outside the hospital, either trauma or non-trauma, which is carried out to prevent death and continued disability (Ryynänen et al., 2010). The standard emergency ambulances themselves must be equipped with complete basic and advanced emergency equipment, as well as equipment for emergencies related to problems (airway, breathing, circulation), emergency ambulances are equipped with advanced emergency equipment such as defibrillators, portable monitors, portable ventilators, for emergency handling. this service is part of the emergency service that provides first aid for patients in critical condition in pre-hospital (Bahrami et al., 2011). Emergency ambulance services aim to improve emergency services, speed up response time, and reduce mortality. This service is carried out by increasing the ambulance response time (Ministry of Health of the Republic of Indonesia, 2016).

Response time in ambulance services is defined as the duration required for an ambulance and paramedics to arrive at a location after the call center receives a call (Prince Edward Island, 2023). According to Narad R (in Al-Shaqsi, 2010), in several years, the 8-minute target has become the primary standard for emergency service operations that remains. In extreme cases, ambulance services are sanctioned for not meeting the eight-minute standard. In the United States, the US EMS Act states that in urban areas, 95% of emergency calls must be served within 10 minutes, while the UK National Health Service stipulates that in urban environments, 75% of emergency calls must be served within 8 minutes and 95% within a maximum of 19 minutes (Cabral et al., 2018). Several factors affect the response time for emergency calls, such as whether the team will treat the patient at home or work if the service will take place on weekdays, weekends, weekdays, or holidays, and

the number of vehicles available after allocating vehicles for emergency call services in advance. Other aspects are traffic, road surface conditions, weather, and visibility (Colla et al., 2023). In Asian countries such as Malaysia, the average ambulance response time is 15 minutes. Malaysia has yet to reach the international standard for ambulance response time. However, there have been some improvements after implementing the Emergency Medical Dispatcher (EMD) program (Shaharudin et al., 2008). In Indonesia, based on the minimum service standards in hospitals issued by the Ministry of Health, the emergency ambulance response time is less than 30 minutes from receiving the news until the ambulance arrives at the location (Ministry of Health RI, 2008).

The importance of the emergency ambulance response time in pre-hospital emergency services can impact assessing the patient's triage level. The emergency ambulance response time and the speed and accuracy in handling patients in both trauma and non-trauma cases during the pre-hospital stage can impact the status of the patient's emergency condition, which is identified after the patient arrives at the ER. The patient's condition in the emergency installation can be assessed at the triage level (Mardalena, 2021). One of the developments of modern triage is the Australasian Triage Scale (ATS). The study showed that triage using the ATS system showed better and more consistent results than triage, which determines the emergency based on the cause of the disease, namely trauma and non-trauma (Atmojo et al., 2020). From the research conducted by Sabry et al. (2023), 9,766 and 22,936 patients each underwent three and five-level triage, where this five-level triage using the Australasian Triage Scale (ATS) led by senior doctors was able to reduce the mortality rate in the Emergency Department (ED) from 5.26% to 1.46%, the LOS (Length of Stay) decreased from 170.1±88.7 to 72.00±109.8 minutes. All changes were statistically significant, $p<0.05$. Significant predictors of mortality in the ED were three-level triage, medical emergencies, initial code-1, clinical decision-making time of more than 60 minutes, more than five differential diagnoses, more interventions, and longer LOS in the ED with different Odds ratios. ATS triage can reduce the rate of triaging errors, mortality in the ED, resource utilization, and LOS in the ED. The results of Elsayed research (2020) conclude the other five-level triage were also obtained, namely ESI (Emergency Severity Index) compared to ATS, that the use of the ESI triage level resulted in overtriage and undertriage so that it had limitations, while the ATS triage level was more accurate in assessing patients, easier to use and did not have limitations like the ESI triage level.

Based on several problems found, the researcher is interested in knowing whether there is a relationship between emergency ambulance response time and the Australasian Triage Scale (ATS) triage level in non-trauma patients in Samarinda.

METHOD

The design of this study used a quantitative method, namely descriptive correlation, using a cross-sectional research design. The population in this study was 78 patients. Sampling used the total sampling technique. The inclusion criteria in this study were patients with non-trauma cases with emergencies located in Samarinda and willing to be respondents. The exclusion criteria were non-trauma patients who were not accompanied by their families, trauma patients, and non-emergency patients (false emergency). This study was conducted for 3 months from March to May in Public Hospital Samarinda in 2024. The instruments used in this study were observation sheets and stopwatches (response time) for Triage Level Measurement using the Australasian Triage Scale (ATS), which has been tested for validity and reliability and applied to several hospitals in Samarinda.

The ATS scored with priority category 1 for immediate resuscitation, priority 2 for an emergency handling time of 10 minutes, priority 3 for a critical handling time of 30 minutes, priority 4 for a slightly critical handling time of 60 minutes, and priority 5 minute for not critical with handling time of 120 minutes. Statistical tests in the univariate analysis used the mean, median, mode, and 95% CI values, while the bivariate analysis used the Pearson Product Moment test using statistic application. This research has been done through ethical clearance and approved by Health Research Ethics Committee, RSUD Abdoel Wahab Sjahranie Samarinda with number 390/KEPK-AWS/III/2024.

RESULTS

Based on Table 1, it was found that the main complaints of nursing problems that often occur are patients with ineffective breathing patterns, as many as 29 (37.2%) people, the second case with pain, as many as 21 (26.9%)

people, and the third with complaints of impaired physical mobility, as many as 7 (9.0%) people.

Table 1 shows that out of the 78 respondents in this study, 73 (93.6%) were hospitalized, 3 (3.8%) died, and 2.6% were forced to go home after being in the emergency room.

The demographic data study's gender results are mostly female: 41 (52.6%) people with a high school education level, 49 (62.8%) people with a marital status of married, 60 (79.5%) people with the most jobs are housewives, 33 (42.3%) people.

Table 1. Nursing problems, patient status, demographic data, age demographic data, emergency ambulance response time response time & ATS triage score

Variable	f	%
Nursing problems		
Ineffective breathing pattern.	29	37.2
Impaired gas exchange	3	3.8
Pain	21	26.9
Decreased consciousness	1	1.3
Impaired physical mobility	7	9.0
Seizures	1	1.3
Bleeding	3	3.8
Hypoglycemia	1	1.3
Ineffective airway clearance	6	7.7
Diarrhea	1	1.3
Impaired cerebral tissue perfusion	1	1.3
Nausea Vomiting	3	3.8
Hyperthermia	1	1.3
Patient Status		
Deceased	3	3.8
Inpatient	73	93.6
Discharge against medical advice	2	2.6
Demographic data		
Gender		
Male	37	47.4
Female	41	52.6
Education		
Primary school	8	10.3
High school	49	62.8
College	21	26.9
Marital Status		
Married	60	79.9
Single	4	5.1
Widower/Widow	14	17.9
Occupation		
Civil servants/State owned company	8	10.3
Farmer/laborer	1	1.3
Housewife	33	42.3
Private employee	13	16.7
Self-employed	14	17.9
Private pensioner/Civil servants	9	11.5

In Table 2, emergency ambulance response time data were found, with an average time from receiving news to arriving at the scene of the incident of 19.50 minutes, where the minimum time taken was 7 minutes and the maximum time was 32 minutes. Meanwhile, a mean value of 3.49 was found in patient satisfaction, with a minimum score of 2 and a maximum of 5.

Table 2. Emergency ambulance response time & ATS triage score

Variable	Mean	Min-Max
Response time	19.50	7 - 32
ATS triage score	3.49	2 - 5

Based on the results of statistical tests using the correlation test in Table 3 with a total of 78 respondents, a p-value of p<0.001 was found, which means that there is a relationship between the emergency ambulance response time and the ATS level with an r-value of 0.767 where the strength of the relationship is high/strong.

Table 3. Relationship between emergency ambulance response time and ATS triage score

Variable	ATS triage score		P
	Total	r	
Response Time	78	0.767	<0.001

DISCUSSION

An ambulance is a hospital infrastructure. The principle of emergency is fast and precise. An ambulance can help bring emergency patients to the hospital, but most people still use private transportation to transport emergency patients. The means of transportation affects the referral time and the speed and accuracy of the action provision (Prasyta et al., 2016)

According to Boswick's theory (1988), an ambulance is an emergency transportation tool developed to provide workspace and equipment that supports medical actions, especially in saving patients at the pre-hospital stage. Ambulances must be equipped with standard equipment. The tools that should be available in the ambulance and can be used at the scene, such as oxygen cylinders, portable suction, airway opening and intubation devices, infusion fluids, resuscitation drugs, and portable defibrillators. Adequate ambulances can speed up response time and provide supporting service facilities, especially in handling patients with ATS level 1 during transportation (Amalia et al., 2018).

According to Hartati (2020) and Wisageni et al. (2024), the success of response time is highly dependent on the speed and quality of assistance provided to save lives or prevent

disability from the scene during the journey to getting help at the hospital. According to Lei (2018) in Wisageni et al. (2024), the Emergency Room (ER) is an essential part of hospital services that provides emergency patient care with a fast response time and appropriate treatment to prevent death and disability. The speed and accuracy of assistance provided to patients who come to the ER are essential. This must be by competency and ability standards to ensure that emergency cases are handled with a fast response time and appropriate treatment (Wildani, 2019).

The assessment of patient conditions in the emergency room can be done using the triage level (Mardalena, 2021). One of the developments of modern triage is the Australasian Triage Scale (ATS). The study showed that triage using ATS was able to show better and more consistent results than using triage by prioritizing patients based on trauma and non-trauma cases (Atmojo et al., 2020). ATS triage can reduce the rate of triaging errors, mortality rates in the emergency room, resource utilization, and LOS in the emergency room. In a study conducted by Sabry et al. (2023) that significant predictors of mortality in the ED were three-level triage, medical emergency, initial code-1, clinical decision-making time of more than 60 minutes, more than five differential diagnoses, more interventions, and longer LOS in the ED with different Odds ratios.

The researcher assumes that the emergency ambulance response time is a speed and accuracy in handling patients in both trauma and non-trauma cases during the pre-hospital period which could have an impact on the status of the patient's emergency condition identified after the patient arrives at the emergency room.

CONCLUSION

The research concluded that there was a strong relationship between the emergency ambulance response time and the ATS level. The results of this research can add knowledge and insight regarding pre-hospital response time in treating non-trauma patients.

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