



# CRITICAL MEDICAL AND SURGICAL NURSING JOURNAL

Vol. 12, no. 1, April 2023

Journal Homepage: <https://e-journal.unair.ac.id/CMSNJ>



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## The Relationship Between The Implementation of Triage and The Incidence of Overcrowded in the Emergency Department of Adi Husada Kapasari Hospital, Surabaya, Indonesia

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### ARTICLE HISTORY

Received: April 2, 2023

Accepted: April 20, 2023

Published: April 30, 2023

### KEYWORDS

Emergency Department,  
Overcrowded, Triage

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### ABSTRACT

**Introduction:** The emergency department (ED) is at the forefront of hospital healthcare and is expected to provide timely and effective care. The imbalance of the need for emergency care and the availability of hospitals to provide health services has an impact on the occurrence of overcrowded situations. This study aims to determine the relationship between the implementation of triage and the incidence of overcrowded in the ED of Adi Husada Kapasari Hospital.

**Methods:** This study uses a correlation study design with a cross sectional approach. The population in the study were all nurses in the ED of Adi Husada Kapasari Hospital, Surabaya, Indonesia, and 14 nurses were involved as respondents through a total sampling technique. The independent variable is the implementation of triage, the dependent variable is the incidence of overcrowded. Data collection using a questionnaire sheet to measure the implementation of triage, and the NEDOCs scale (National Emergency Department Overcrowding Scale) to measure the incidence of overcrowded. Data was analyzed using Spearman rank correlation test with  $\alpha = 0.05$ .

**Results:** The results showed that more than half respondents (64.3%) practice triage in moderate level, and the overcrowded assessment showed all respondents (100%) in the level 1, which means it was in category not busy. Spearman rank correlation test showed that there was no relationship between the implementation of triage and the incidence of overcrowded in the ED of Adi Husada Kapasari Hospital (p-value 0.898 and  $r=0.038$ ).

**Conclusion:** For non-large-scale emergency departments like the ED of Adi Husada Kapasari Hospital, the implementation of triage is not significantly related to the overcrowded incidence, although some studies and theories state otherwise, that the accuracy of emergency room nurses in triaging can help reduce patients overcrowding and treat patients immediately. Further research could explore this gap through a larger sample or by involving or comparing more populations of various type of EDs.

### Cite this as:

Suroso, H., Apriliana, B., Fauziah, F., I., Hartanto, M., W., & Paraswati, M., D. (2023). The Relationship Between The Implementation of Triage and The Incidence of Overcrowded in the Emergency Department of Adi Husada Kapasari Hospital, Surabaya, Indonesia. *Crit. Méd. Surgical. Nurs. J*, 12(1), 19-24.

## 1. INTRODUCTION

The Emergency Department (ED) is at the forefront of hospital health services that are expected to provide timely and effective care (Amin & Haswita, 2023). The role of the ED is to manage emergency and urgent cases that require immediate

attention through rapid diagnosis and provision of medical or surgical treatment in a very short time (Sartini et al., 2022). The number of hospital emergency departments (EDs) used by the public is increasing, and the situation where the demand for emergency services exceeds the department's capacity to provide quality care within an acceptable

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time frame leads to ED overcrowding, with all its consequences, and becomes a national and international crisis problem (Kundiman et al., 2019; Jung et al., 2021). The imbalance between the need for emergency care and the availability of hospitals to provide healthcare services leads to an overcrowded situation (Savioli et al., 2022).

Most emergency departments around the world are hampered by overcrowding and the number of visits to emergency services continues to increase (Darraj et al., 2023). According to the data from the Australian Institute of Health and Welfare (2018), there has been a reported increase of 3.4% in the number of emergency department visits in Australia compared to the previous year. Based on data from hospital emergency department visits in Korea in 2018, there were 10,609,107, an increase of 1.76% compared to the previous year, and the number of patients treated through emergency departments increased by 2.95% compared to the previous year (Jung et al., 2021).

The number of emergency room patient visits in Indonesia in 2017 reached 4,402,205 patients, based on data from the Indonesian Ministry of Health (2019). The number of patient visits to emergency departments during the pandemic in Indonesia increased to 15,786,974 patients (Dinas Kesehatan Provinsi Jawa Timur, 2020). Based on the results of a preliminary study, data on patient visits in the last 10 months from February to November 2022, namely 6770 patients, were obtained by researchers at the Emergency Department of Adi Husada Kapasari Hospital.

Nurses working in the emergency department must be able to assess, stabilize and, if necessary, provide the appropriate care to patients quickly and appropriately (Darraj et al., 2023). Speed of response is, of course, greatly influenced by human resources (e.g. doctors/nurses), work processes, testing facilities to support diagnosis, drugs used and supportive transport flows (Putri et al., 2023). Fast and accurate service is required in the ED, but service in the ED can be hindered when the ED is full (overcrowded) with patients (Hamel, 2018). Overcrowding in the ED is one of the main challenges to effective hospital management. Overcrowding in the hospital context is described as "a condition in which the identified need for emergency care exceeds the available resources in the ED" (Colella et al., 2022).

Overcrowding in the ED is caused by several factors, including an increase in the number of incoming ED patients (input factors), a shortage of ED resources (throughput factors), and the number of inpatients waiting to be transferred from the ED to hospital wards (output factors) (Jung et al., 2021). Overcrowding in the ED directly reduces the quality of medical care, for example by delaying treatment and increasing inpatient mortality. It also causes a range of indirect problems, such as longer waiting times, lower patient satisfaction, and loss of healthcare benefits (McKenna et al., 2019). This

problem will often occur in EDs due to the large number of patients presenting and attending on a daily basis. In fact, one of the most common causes of ED overcrowding is the delay in sending patients to the hospital's surgical unit after they have been registered and assessed, resulting in patients waiting in the ED (Colella et al., 2022). Other factors that can lead to ED overcrowding include an increase in the number of difficult cases and patients with comorbidities (King et al., 2021).

The provision of emergency services aims to reduce morbidity and mortality rates, so it requires the ability of nurses to classify or sort patients who need help first, known as triage (Febrina & Sholehah, 2018). Triage is one of the nursing skills that emergency department nurses must have, and this is what distinguishes emergency department nurses from nurses in other specialised units (Zahroh et al., 2020). Triage, as a process of sorting patients according to their acuity, is one way of providing rapid and appropriate treatment in the emergency department (Purwacaraka et al., 2022). Hospital triage methods that are currently being developed and extensively researched for their reliability, validity and effectiveness include the Australian Triage System (ATS), the Canadian Triage Acuity System (CTAS), the Emergency Severity Index (ESI) and the Manchester Triage Scale (MTS). The most widely used triage method worldwide is the Emergency Severity Index (ESI) (Kasenda et al., 2020). Based on this, this study aims to determine the relationship between triage implementation and overcrowding in the emergency department (ED) of Kapasari Hospital.

## 2. METHODS

### Study Design

This research uses a correlation study to determine the correlation between one variable and another. This is done by identifying existing variables in an object using a cross-sectional approach.

### Population, Samples, and Sampling

The study population was all the emergency nurses of Adi Husada Kapasari Hospital. The research sample was the ED nurses of Adi Husada Kapasari Hospital as many as 14 respondents. The sampling technique in the study was non-probability sampling in the form of total sampling. Sampling was based on inclusion criteria (nurses who were on duty in the emergency room at the time of data collection, nurses who were willing to be respondents) and exclusion criteria (nurses who were sick at the time of the study and are not the implementing nurses were not involved). The research variables consist of independent variables, namely the implementation of triage, and the dependent variable is overcrowding incidence.

### Instruments

The instrument used in this study was a questionnaire sheet. The questionnaire used was the implementation of triage measured using a questionnaire totalling 10 questions. The assessment was carried out based on the number of items correctly answered by the subject, the answer "Yes" was given a value of 1 while the answer "No" was given a value of 0. The incidence of overcrowded was measured using the NEDOCS scale (National Emergency Department Overcrowding Scale) with the results of level 1: score 0-20 means not busy; level 2: score 21-60 means busy; level 3: score 61-100 means extremely busy but not overcrowded; level 4: score 101-140 means overcrowded; level 5: 141-180 means severely overcrowded; level 6: >180 means dangerously overcrowded.

### Procedure

Data collection was carried out by researchers after obtaining a letter of permission from the Head of the STIKES Adi Husada, Nursing Undergraduate Programme, Surabaya, Indonesia. Data collection began since the research permit was granted by the Director and the Head of the ED of Adi Husada Kapasari Hospital, Surabaya, Indonesia. The researchers ensured that all respondents signed an informed consent (after being given a comprehensive explanation about the research being conducted). After obtaining informed consent, the researcher asked respondents to fill out a questionnaires. All procedures are carried out at the ED of Adi Husada Kapasari Hospital while maintaining the confidentiality of the respondent's data.

### Data Analysis

Data processing in this study consists of editing, coding, entering, cleaning and tabulating research data, namely related to the relationship between the implementation of triage and the incidence of overcrowding in the ED of Adi Husada Kapasari Hospital. The data collected through the stages of data processing are then analysed using univariate and bivariate analysis. The distribution of the characteristics of the respondents and the distribution of the characteristics of each independent and dependent variable in this study were analysed using univariate analysis. Bivariate analysis was used in this study to determine the relationship between the implementation of triage and the incidence of overcrowding in the ED of Adi Husada Kapasari Hospital. Researchers used the Spearman rho test to determine the relationship with value of  $\alpha = 0.05$ .

### Ethical Clearance

This research has been carefully reviewed and has been declared ethically feasible by research ethics board of STIKES Adi Husada Surabaya with a certificate number 779/PPM/SPPT/STIKES-AH/XII/2022.

### 3. RESULTS

Table 1. Data distribution of the triage implementation and the overcrowded incidence in the ED of Adi Husada Kapasari Hospital

Variables	f	%
<b>Triage Implementation</b>		
Good	5	35.5
Moderate	9	64.3
Poor	0	0.0
Subtotal	14	100
<b>Overcrowded Incidence</b>		
Level 1 : Not busy	14	100
Level 2 : Busy	0	0
Level 3 : Extremely busy but not overcrowded	0	0
Level 4 : Overcrowded	0	0
Level 5 : Severely overcrowded	0	0
Level 6 : Dangerously overcrowded	0	0
Subtotal	14	100

Table 1 shows the implementation of triage in the ED of Adi Husada Kapasari Hospital showing that no one was in the poor category with more than half of the respondents (64.3%) indicating a moderate level of triage implementation. Furthermore, overcrowded events at Adi Husada Kapasari Hospital shows that all respondents (100%) stated that the ED of Adi Husada Kapasari Hospital in level 1 category (not busy).

Table 2. The cross tabulation and statistical result of research variables

Triage Implemen- tation	Overcrowded Incidence						N
	Lvl 1	Lvl 2	Lvl 3	Lvl 4	Lvl 5	Lvl 6	
Good	5	0	0	0	0	0	5
%	0.355	0	0	0	0	0	0.355
Moderate	9	0	0	0	0	0	9
%	0.643	0	0	0	0	0	0.643
Poor	0	0	0	0	0	0	0
%	0	0	0	0	0	0	0
Total	14	0	0	0	0	0	14
Spearman rho test result: p value = 0.898 ; r = 0.038							

Table 2 shows that 9 out of 14 respondents (64.3%), who did triage in the category moderate, experiencing ER level 1, which means the ER was not busy. The results of statistical tests using the Spearman Rank test show a p value of 0.898, then  $H_0$  is accepted so it can be concluded that there is no relationship between overcrowded conditions and the triage implementation in the ED at Adi Husada Kapasari Hospital.

#### 4. DISCUSSION

##### Accuracy of triage implementation in the EDs

Based on the results of research on the implementation of triage in the ED, most respondents (64.3%) had moderate triage implementation. Dadashzadeh et al. (2014), states that in his qualitative research states that the factors that influence the implementation of triage are divided into 3 categories, namely personnel factors (skills and knowledge of nurses), patient factors and non-personnel factors, one of which is workload. According to Ainiyah et al. (2015), the availability of resources is one of the supports used by nurses in providing nursing services to patients optimally.

The accuracy and precision of decision-making is influenced by the use of triage scale instruments or algorithms, and nurses who have up-to-date knowledge of triage developments will make decisions about triage more accurate (Khairina et al., 2018). Factors that influence a person's actions include length of service and training. Nurses in solving a problem based on observation and previous experience, and this is the most important and useful approach, the longer a person works, the experience also increases (Zahroh et al., 2020). One of the most important factors affecting decision making in triage is the number of patients in the emergency department, and the level of accuracy of emergency nurses in making decisions (Cetin et al., 2020).

The level of accuracy of emergency nurses will increase as the emergency nurse's triage experience increases in dealing with a large number of patients (Aloyce et al., 2014). Based on the theory above, researchers agree that every emergency room nurse must have the ability to select triage and be supported by attending BTCLS (Basic Trauma Cardiac Life Support) training to be able to add skills that are useful in determining triage in patients in the emergency room.

##### Incidence of overcrowding in the EDs

Based on the results of the study, all respondents (100%) did not experience busyness in ED characterised by the number of emergency room visits not reaching 25 during 1 shift. Conditions in the emergency room that are full (overcrowded) with patients are caused by not matching the number of patients who come to visit with the number of nurses, resulting in services in the emergency room being hampered and even decreasing in quality (Kundiman et al., 2019). Therefore, the provision of emergency services has the aim of reducing morbidity and mortality rates so that it requires the ability of nurses to classify or sort patients who need help first, called triage (Febrina & Sholehah, 2018).

The results of this study contradict research conducted by Nonutu et al. (2015), which showed a significant relationship between the number of patient visits and the accuracy of triage

implementation. This is supported by research by Ainiyah et al. (2015), entitled factor analysis of the implementation of triage in the emergency room, which says that the factors that influence the implementation of triage in the emergency room include patient factors related to optimal triage implementation, good staffing factors that show optimal triage implementation and equipment factors related to optimal triage implementation. Based on the theory above, researchers agree that the occurrence of overcrowded is caused by not matching the number of patients who come to visit with the number of nurses, resulting in services in the emergency room being hampered and even decreasing in quality. In addition, factors that influence the implementation of triage in the IGD include patient factors related to the implementation of optimal triage to prevent overcrowded.

##### The relationship of the triage implementation with overcrowded incidence in the EDs

Based on the research we conducted, it shows that the results of statistical showed that there is no relationship between the triage implementation with overcrowded conditions in the ED of Adi Husada Kapasari Hospital. The results of the study contradict research conducted by Nonutu et al. (2015), which shows a significant relationship between the number of patient visits and the accuracy of triage implementation. This is supported by Sartini et al. (2022), that nurses trained to perform triage systems can reduce the number of accesses and crowding of patients in the ED.

Research by Ainiyah et al. (2015), entitled "Factor Analysis of The Implementation of Triage in The Emergency Room" said that factors influencing the implementation of triage in the emergency room include patient factors related to optimal triage implementation, good staffing factors indicating optimal triage implementation and equipment factors related to optimal triage implementation. Jung et al. (2021), ideally medical decisions, such as triage decisions and admission decisions, should be based on the urgency of treatment and the level of care required by the patient, and these decisions should not be influenced by the level of crowding in the ED.

Based on existing research, researchers agree that the implementation of triage includes influencing the incidence of overcrowded. Therefore, emergency room nurses are required to have the ability to choose triage correctly and quickly to avoid unexpected overcrowded events.

#### CONCLUSION

For non-large-scale emergency departments like the ED of Adi Husada Kapasari Hospital, the implementation of triage is not significantly related to the overcrowded incidence, although some studies and theories state otherwise, that the accuracy of emergency room nurses in triaging can

help reduce patients overcrowding and treat patients immediately. Further research could explore this gap through a larger sample or by involving or comparing more populations of various type of EDs.

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