

Optimizing Emergency Response: Factors Influencing Medical Team Performance in Surabaya's Islamic Hospital, East Java, Indonesia

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KEYWORDS

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ABSTRACT:

Introduction: The response time of medical teams in the Emergency Department (ED) is crucial for improving patient care outcomes.

Objectives: This research aims to evaluate the impact of various factors, including training, skills, and management, on response times in handling emergency cases.

Methods: This study employs a cross-sectional design, collecting demographic data from nurses and patients, as well as analysing the factors affecting response times. Data were collected through questionnaires, and statistical analysis was conducted using multiple regression.

Results: The findings indicate that training, skills, standard operating procedures (SOPs), management, and psychological factors significantly influence the response time of medical teams ($p < 0.05$). Specifically, training has the strongest influence (Beta Coefficient -0.35; $p < 0.01$). Additionally, patient volume shows a significant positive influence on response times, indicating challenges in resource management as patient volume increases.

Conclusions: The results emphasise the importance of enhancing training and management practices to improve response efficiency in the ED. Although medical equipment and information technology did not demonstrate significant influence, greater attention is needed for optimising their use. These findings recommend the development of continuous training programmes and management evaluations to improve response times in emergency situations.

1. Introduction

The response time of medical teams in handling emergency medical cases is a critical factor that can determine the success of treatment and patient safety. In the Emergency Department (ED), every second is precious, particularly when faced with life-threatening situations. Research indicates that rapid response times can

significantly enhance the survival chances of patients in critical conditions (Kumar et al., 2020). In Indonesia, there has been a significant increase in the number of visits to the ED over recent years, presenting considerable challenges for hospitals, including Islam Hospital Surabaya, in providing swift and effective services. According to data from the Indonesian Ministry of Health, the number of visits to the ED has risen by 30% over the past five years, necessitating improved efficiency in patient management (Kemenkes RI, 2021).

In this context, several factors influence response times, including the training and skills of medical teams, standard operating procedures (SOPs), infrastructure, and information technology. Research conducted by Abdul et al. (2022) demonstrates that adequate training for medical staff is positively correlated with response times in the ED. However, despite the critical importance of response times in the ED, in-depth research on the factors influencing them remains limited, particularly within the context of hospitals in Indonesia.

In emergency situations, both accuracy and speed in patient management can be affected by medical team training, skills, medical equipment, and standard operating procedures (SOPs). Nonetheless, many hospitals, including Islam Hospital Surabaya, face challenges in implementing these elements. A study by Rossy et al. (2023) found that a lack of facilities and high workloads can result in suboptimal response times. With increasing patient loads and limited infrastructure, medical teams are often compelled to operate under pressure, thereby diminishing service effectiveness.

Therefore, it is essential to delineate specific issues related to response times to identify appropriate solutions for enhancing emergency service quality and patient safety. This study aims to analyse the factors influencing medical team response times in handling emergency cases at the Emergency Department (ED) of Islam Hospital Surabaya. The research will systematically explore the roles of medical team training, skills, medical equipment, standard operating procedures (SOPs), patient volume, hospital infrastructure, information technology, management practices, and psychological factors in affecting response time efficiency.

Although various studies have explored medical team response times in the ED, many have not thoroughly examined the complex interactions between different factors that influence emergency service efficiency. Much of the existing literature tends to focus on one or two specific variables without considering the synergistic relationships among training, skills, standard operating procedures (SOPs), and infrastructure. Research by Hidayati et al. (2022) indicates that integrating these various elements can enhance overall medical team performance.

Consequently, there is a lack of holistic understanding regarding the factors contributing to response times in the ED, particularly within the specific context of Islam Hospital Surabaya. This study seeks to fill this gap by providing a comprehensive analysis that considers not only individual variables but also interactions among these factors.

This research holds significant relevance within the healthcare context, especially in improving medical team responses in the ED. In critical situations such as cardiac arrests or other serious emergencies, rapid response times can directly impact prognosis and patient safety. While some previous studies have identified factors influencing response times, there remains a deficiency in comprehensive understanding regarding the interactions between various elements.

2. Objectives

The primary objective of this study is to analyse the factors influencing the response time of medical teams in handling emergency cases at the Emergency Department (ED) of Islam Hospital Surabaya. Specifically, this research aims to identify and evaluate the impact of medical team training, skill levels, the condition of medical equipment, the presence of standard operating procedures (SOPs), patient volume, hospital infrastructure, the

use of information technology, management practices, and psychological factors on response times. With these objectives, this study is expected to provide a clear overview of the key elements contributing to response time efficiency. Furthermore, the results of this research are anticipated to assist hospital authorities in formulating more effective strategies and policies to enhance the quality of emergency services and optimise clinical outcomes for patients.

3. Methods

This study adopts a quantitative approach with a cross-sectional design to analyse the factors influencing medical team response times in handling emergency cases at the Emergency Department (ED) of Islam Hospital Surabaya. The study population consists of nurses and patients in the ED at Islam Hospital Surabaya. The inclusion criteria for nurses are those who are actively working in the ED during the study period and have undergone basic training in emergency case management. Meanwhile, the exclusion criteria include nurses who are not directly involved in patient care in the ED or those on leave. A total sampling technique was employed for selecting nurse samples, resulting in a final count of 35 nurses. For patients, inclusion criteria encompass those arriving at the ED in emergency conditions and who are willing to participate in the survey, while exclusion criteria include patients unable to provide necessary information. The sampling technique applied was accidental sampling, yielding a final count of 69 patients. This research identifies several important variables. The independent variables analysed include medical team training, skills, medical equipment, standard operating procedures (SOPs), patient volume, hospital infrastructure, information technology, management practices, and psychological factors. The dependent variable is the medical team response time, measured from the moment a patient arrives at the ED until medical treatment begins. Control variables, including time of day, severity of cases, and work shifts, are controlled to minimise bias. Data were collected using a questionnaire designed to measure the perceptions of medical teams and patients regarding factors influencing response times. This questionnaire underwent validation and reliability testing, with assessments by experts and a pilot test to ensure its effectiveness and consistency. Response time measurements were conducted using data from the hospital's medical records system as well as direct observation. Data collection occurred through distributing questionnaires to nurses and patients in the ED during June to July 2024. The data collection steps included direct observation and questionnaire completion during peak hours to ensure a good representation of situations in the ED. The collected data were analysed using descriptive statistical methods to provide an overview of factors influencing response times. Regression analysis and multivariate analysis were applied to evaluate relationships between independent variables and response times in depth, utilising Jamovi statistical software. This study was conducted adhering to ethical research principles. Ethical approval was obtained from the Research Ethics Committee at Nahdlatul Ulama University Surabaya before data collection commenced. Participant data confidentiality was strictly maintained; identities were protected, and data were stored securely to prevent unauthorised access. The validity of this research is ensured through content validation of the questionnaire by experts as well as construct validity testing to confirm that the instrument measures what it intends to measure. The reliability of the instrument was assessed through pilot testing and internal consistency analysis, such as Cronbach's alpha, to ensure that the questionnaire yields consistent and reliable results.

4. Results

a. Characteristics of Patient and Nurse

The demographic data of nurses and patients in the Emergency Department (ED) of Islam Hospital Surabaya provide important insights into characteristics that may influence response times in handling emergency cases. Table 1 presents information regarding age, gender, education, work experience,

socioeconomic status, and types of emergency cases among patients.

Table 1. Demographic Description of Nurses and Patients in the ED of Islam Hospital Surabaya

Characteristic	Frequency	Percentage
Nurse Demographics		
Age		
20-30 years	14	40%
31-40 years	12	34%
41-50 years	6	17%
>50 years	3	9%
Gender		
Male	12	34%
Female	23	66%
Education		
Diploma in Nursing	20	57%
Bachelor in Nursing	15	43%
Work Experience		
<5 years	18	51%
5-10 years	12	34%
>10 years	5	15%
Training		
Completed	28	80%
Not Completed	7	20%

Characteristic	Frequency	Percentage
Patient Demographics		
Age		
0-10 years	8	12%
11-20 years	15	22%
21-30 years	18	26%
31-40 years	12	17%
41-50 years	9	13%
>50 years	7	10%
Gender		
Male	35	51%
Female	34	49%
Socioeconomic Status		
Low	25	36%
Middle	29	42%
High	15	22%
Type of Emergency Case		
Trauma	20	29%
Myocardial Infarction	15	22%
Stroke	12	17%
Respiratory Failure	10	14%

Characteristic	Frequency	Percentage
Others	12	17%
Time of Arrival		
Peak Hours	40	58%
Quiet Hours	29	42%

From the table above, it can be observed that the majority of nurses in the ED are female (66%) and hold a Diploma in Nursing (57%). Most nurses have less than five years of work experience (51%) and have undergone training (80%). Meanwhile, patient demographics indicate that the majority of patients are male (51%) with an age range of between twenty-one to thirty years (26%). The most common type of emergency case is trauma (29%), and the majority of patient arrivals occur during peak hours (58%).

b. Factors Influencing Response Time in the Hospital ED

Table 2 presents an analysis of the factors influencing medical team response times in the ED. This study identifies various factors, including training, skills, medical equipment, SOPs, patient volume, infrastructure, information technology, management practices, and psychological factors that affect response speed in handling emergency cases.

Table 2. Factors Influencing Response Time in the ED of Islam Hospital Surabaya

Factor	Beta Coefficient	P-value	Significance
Training	-0.35	0.01	Significant
Skills	-0.28	0.03	Significant
Medical Equipment	-0.22	0.08	Not Significant
SOP	-0.30	0.02	Significant
Patient Volume	0.40	0.01	Significant
Infrastructure	-0.25	0.06	Marginal
Information Technology	-0.18	0.12	Not Significant
Management	-0.33	0.04	Significant
Psychological Factors	-0.29	0.05	Significant

The analysis results indicate that training, skills, SOPs, management practices, and psychological factors significantly influence medical team response times ($p < 0.05$). The patient volume factor also

has a significant positive influence, indicating that as patient volume increases, response times tend to lengthen. Meanwhile, medical equipment and information technology did not show a significant impact on response times. This underscores the importance of enhancing the quality of training and management practices to improve response efficiency in the ED.

5. Discussion

In the context of healthcare, the response time of medical teams in the Emergency Department (ED) is a key indicator in determining patient care outcomes. Previous research has shown that faster response times correlate with reduced morbidity and mortality among emergency patients (Abo et al., 2019). Therefore, this study focuses on identifying the factors that influence the response time of medical teams in the ED of Islam Hospital Surabaya.

The findings reveal that training, skills, standard operating procedures (SOPs), management, and psychological factors significantly affect the response time of medical teams. Specifically, training has been shown to be the most influential factor (Beta Coefficient -0.35; $p < 0.01$), indicating that nurses who have undergone training exhibit quicker response times. This finding is important as effective training can enhance nurses' preparedness to handle emergency situations, in line with recommendations from the American Heart Association emphasising the importance of continuous education (Weisfeld et al., 2020).

However, it is surprising to note that the volume of patients has a positive correlation with response time (Beta Coefficient 0.40; $p < 0.01$). This suggests that as the number of patients increases, response times also increase, presenting a challenge for hospital management in resource allocation. This finding aligns with the study by Kuo et al. (2021), which found that surges in patient volume significantly delay response times in the ED. Conversely, results indicating that medical equipment and information technology do not exert a significant influence contradict previous studies that regarded both as vital elements in healthcare service efficiency (Mikhael et al., 2018). The explanation for this outcome may lie in the suboptimal implementation of existing infrastructure within the ED, which affects the effective use of medical equipment and information technology. Therefore, while this study presents several robust findings, interpretations should be made cautiously. Other variables, such as nurse workload and the psychological condition of medical teams, may also contribute to response times but were not measured in this study. These results suggest several general hypotheses, such as the need for developing continuous training programmes for nurses in the ED and evaluating existing management systems to enhance response time efficiency. The implications of these findings indicate that hospitals should prioritise investment in training and management to improve service quality.

Overall, this research highlights the importance of training and management factors in determining response times in the ED. Additionally, there is a critical need for further investigation to explore relationships between other variables that may potentially influence these outcomes. Future research should include longitudinal analyses to monitor changes in response times following the implementation of new training programmes and variations in patient volume. This will provide deeper insights into the dynamics of response times in the ED and how these factors can be optimised to enhance overall healthcare service delivery.

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