OptimizingEmergencyResponse:Strategies StudiesforEnhancingHospitalManagementforTraffic Accident Victims

ABSTRACT

Background and Objectives : Traffic accidents are a significant issue in Indonesia that requires immediate attention, particularly in terms of response time and accuracy in emergency care. Given the high number of road accidents occurring each year, hospitals must be well-equipped to provide prompt and high-quality emergency treatment. This study aims to examine hospital management strategies in improving emergency service responses to traffic accident victims using a mixed methods approach..**Methods :**Theresearchwasconductedthroughquantitativeanalysisofresponsetimedata,in-depthinterviewswithhospitalmanagement,directobservationofserviceflow, and focus group discussions with emergency department staff. **Results:** The findings reveal that the averageemergencyresponsetimeis7.3minutes,exceedingtheideal5-minutestandard,withadministrativesystemcomplexity (43%), human resource limitations (27%), and poor inter-unit coordination (30%) as majorcontributingfactors.Thehospitalinformationmanagementsystem'sincompleteintegration,highworkloadespecially during night shifts, and limited trauma-specific facilities pose significant challenges.Whiletriage processes meet standards, bottlenecks in administrationand support unit coordination cause delaysin critical interventions. The emergency department staff shows good competency levels (8.2/10 score),buthighworkloads(1:8nurse-to-patientratio)affectservicequality.Thesurvivalrateformoderate-severetraumacasesreaches89%,withsignificantlybetteroutcomesforpatientstreatedwithinthegoldenperiod.**Conclusion**: Traffic accidents are a serious issue in Indonesia that requires immediate attention, particularly regarding the speed and accuracy of emergency response. Given the high number of traffic accidents occurring each year, hospitals must be properly equipped to deliver fast and high-quality emergency care.

Keywords: Emergency service responsiveness, Hospital management strategy, Traffic accident, Responsetime,Healthcarequalitymanagement

1. INTRODUCTION

Traffic accidents are a significant public health issue that requires serious attention, particularlyregardingthespeedandaccuracyofemergencyservices.Thehighincidenceoftrafficaccidentsoccurringeachyeardemandsthathospitalsbepreparedto provideresponsiveandqualityemergencycare(1). Emergency services play a vital role as the frontline in managing trafficaccidentvictimswithinhospitals.Quickandaccurateresponsetimesarecrucialforthesuccessfultreatment of emergency patients, especially during the golden hour, which can determine a patient's chances ofsurvival(2) The complexity of hospital services, particularly in the emergencydepartment, necessitates an integrated management system to optimize patient care processes. This alignswith the increasing public demand for healthcare services that are swift, accurate, and of high quality,especiallyinthemanagementofemergencycases.(3)

The Hospital Management Information System (HMIS) is a crucial component in enhancing theefficiencyofemergencyservices.ProperimplementationofHMIScanaccelerateadministrativeprocesses,improvecoordinationbetweenunits,andfacilitateclinicaldecision-making,ultimatelyleadingtofasterresponsetimesinservicedelivery.(4)

Theperformanceofhealthcareteamsinmanagingemergencycasesisinfluencedbyvariousfactors,including individual competencies, work systems, infrastructure, and hospital management. Optimizingall these factors is essential to achieve optimal standards of emergency care. Hospitals, as healthcarefacilities,facemultiplecomplexitiesfromsituational,systemic,andmedicalperspectives.Thiscomplexity is further exacerbated by evolving government regulations and the national health insurancesystem,allaimedatprovidingthebestqualityofcareforpatients(5)

Hospital management is required to develop effective strategies to address various challenges inemergency services. These strategies should encompass aspects of human resources, infrastructure,informationsystems,andoperationalproceduresthatsupportserviceresponsiveness.Continuousevaluationoftheemergencyserviceimplementationiscrucialtoensureeffectivenessandefficiency.Thisevaluation includes various aspects, from response times and service quality to outcomes for trafficaccident victims. Enhancing the capacity and competencies of healthcare teams through ongoing trainingand professional development is a vital strategy for improving the quality of emergency care. A well-trainedandcompenthealthcareteamwillbebetterequippedtoprovidepromptandaccurateinterventions.(6).Integrating information systems with various related units inhospitals can help accelerate service processes and clinical decision-making. An integrated informationsystem also facilitates the monitoring and evaluation of emergency service performance. Standardizingoperational procedures for handling traffic accident cases is crucial to ensure consistency and quality ofcare.Standardizedproceduresassisthealthcareteamsindeliveringpromptandaccurateservicesthatmeetpatients' needs(7)

Coordinationbetweentheemergencydepartmentandsupportingunits,suchaslaboratories,radiology,andoperating rooms, needs to be optimized to ensure continuity of care. Effective coordination will expeditepatientmanagementprocessesandimproveserviceoutcomes.Theutilizationofinformationtechnologyinreferralsystemsandcoordinationwithotherhealthcarefacilitiesisalsoacrucialaspectofenhancingserviceresponsiveness.Awell-coordinatedreferralsystemwillhelpoptimizepatientmanagementaccordingtotheseverityoftheircondition(8).Theinvolvementofhospitalmanagementinensuringtheavailabilityofadequateresourcesandsupportsystemsisakeyfactorinthesuccessofemergencyservices.

Managementcommitmenttodevelopingsystemsandinfrastructuredirectlyimpactsservicequality(9). The development of a safety and quality culture within the emergencydepartment must be supported by all components of the hospital. An organizational culture focused onpatientsafetyandservicequalitywilldrivecontinuousimprovementsinemergencyserviceperformance.

Based on this background, the objective of this research is to analyze hospital managementstrategiesforenhancingemergencyserviceresponsivenessfortrafficaccidentvictimsbyidenti

fyinghinderingfactorsandprovidingrecommendationsforimprovement,withthethemeofimprovingtheresponsivenessofemergency servicesin hospitals.

2. RESEARCHMETHODS

This study employed a mixed-method design using a sequential explanatory approach. Thisapproachwasselectedtoachieveacomprehensiveunderstandingofhospitalmanagementstrategies aimed at enhancing the responsiveness of emergency services for trafficaccidentvictims. The first stage involved collecting and analyzing quantitative data, followed by thecollection and analysis of qualitative data to enrich the insights gained from the quantitativefindings. (10)The data collection techniques in this study employed threemethods: direct observation of the emergency service workflow and response time, in-depthinterviews with hospital management and the emergency department (ED) healthcare team, anddocumentation to gather data from medical records and standard operating procedures (SOPs).Primarydatasources wereobtainedfromtheresults ofobservations andinterviews,whilesecondary data were collected from relevant hospital documents, such as emergency departmentvisit data, medical records of traffic accident patients, and management documents related to theemergency service system.(11)Data analysis was conducted in stages according tothe sequential explanatory approach. Quantitative data were analyzed using descriptive statisticsto illustrate patterns of response time and service quality, while qualitative data were analyzedusing thematic analysis to identify key themes related to management strategies for enhancingservice responsiveness. The results of both types of analysis were then integrated to gain acomprehensive understanding of hospital management strategies aimed at improving emergencyservice responsivenessfor trafficaccidentvictims.

3. RESULT AND DISCUSION

Traffic accidents are one of the leading causes of fatal injuries and trauma in many countries, including Indonesia. Given the significant impact of these accidents, hospitals play a crucial role in providing prompt and accurate medical care to the victims .(12)Therefore, optimizing emergency response in hospital management is crucial to improving the readiness and effectiveness of handling traffic accident victims. Below are several strategies that can be implemented to enhance hospital management in addressing such emergency situations. (13). Optimizing emergency response in hospital management for traffic accident victims requires an integrated approach, ranging from infrastructure improvements and medical staff training to collaboration with other emergency agencies. This process demands long-term commitment from all parties to create a system that is fast, efficient, and responsive to the needs of accident victims. By implementing the right strategies, hospitals can provide optimal medical care for accident victims, improve safety outcomes, and reduce mortality rates from traffic accidents.(13).

Improving hospital infrastructure, both physical and technological, is a key element in supporting the effectiveness of emergency response. Several measures that can be taken include enhancing

emergency department facilities, providing fast medical transportation services, and implementing a Hospital Information Management System (SIMRS). (14)Training and emergency response simulations for human resources are crucial in handling traffic accident victims. Improving the skills of medical staff through regular training and simulations can significantly enhance emergency response effectiveness. Regular training, traffic accident simulations, and coordination among medical teams are essential factors in this process.(15). An efficient triage system is vital in determining the priority of care based on the severity of the victims' injuries. An effective triage system in the emergency department will ensure that the most critical victims receive immediate medical attention.(16)Coordination between hospitals and other agencies involved in traffic accident response, such as the police, fire departments, and ambulance teams, is crucial to expedite treatment.(17)Data management and victim monitoring are essential in emergency hospital management. With integrated and easily accessible data, hospitals can provide more targeted and accurate care.(18)

Base on the mixed-method study conducted on hospital management strategies to improve emergencyserviceresponsivenessfortrafficaccidentvictims,severalkey findingswereobtained asfollows::

Thequantitativeanalysisshowedthattheresponsetimeforemergencyservicesfortrafficaccidentvictims is still suboptimal, with an average response time of 7.3 minutes compared to the idealstandard of 5 minutes. The most influential factors contributing to the delay in response time arethe complexity of the administrative system (43%), limited human resources during peak hours(27%),andinadequateintegrationofcoordinationamongunits(30%).Fromthein-depthinterviewswithhospitalmanagement,severalkeychallengesinemergencyserviceswereidentified: the management information system is not yet fully integrated, the workload of thehealthcareteamishigh,particularlyduringnightshifts,andthereisalackoffacilitiesspecifically.

Cabral, Eric Lucas dos Santos, et al. (2018) state that the average response time recorded in 2015 was 15 minutes. Factors influencing this response time include the readiness of ambulances for trauma incidents at the accident scene. In comparison, Asia has a shorter average response time of 7.3 minutes. (19). According to the WHO, the ideal response time for hospital emergency readiness and for trauma care in handling traffic accident victims is less than 8 minutes. (20)

Emergency Medical Response Time for Road Traffic Accidents in the Kingdom of Saudi Arabia: Based on a National Data Analysis (2016–2020), the parameters related to response time revealed that the duration at the scene (Poor, >15 minutes), time to reach the hospital (Good, 30–60 minutes), and duration at the hospital (Poor, >15 minutes) were suboptimal. The overall average emergency rescue response time was 35.84 minutes.(20). A study in Tehran revealed that the average time between the occurrence of an accident and arrival at the hospital is 170 minutes (21). Emergency Response Time and Pre-Hospital Trauma Survival Rates from the National Ambulance Service in Greater Accra, Africa (A Case Study from January to December 2014) showed that the average response time was 16.9 ± 0.7 minutes, with a range of 1 to 151 minutes. The average time spent at the scene handling patients was 17 minutes, with a range of 1 to 150 minutes. The average patient

transportation time was 82 minutes, with a range of 5 to 552 minutes..(22)

Pre-hospital and emergency services in Indonesia are still developing, according Brice et al (2022) A total of 1,964 (62%) traffic accident patients were surveyed. The average age of the patients was 44 years, with an interquartile range (IQR) of 26 to 58 years. Life-threatening conditions such as trauma and cardiovascular diseases were found in 8.6% and 6.6% of the patients, respectively. The majority of trauma patients traveled to the hospital by motorcycle or car (59.8%). Ambulances were used by only 9.3% of all patients, and 38% of patients reported that they were unaware of the availability of ambulances. The ambulance response time was longer compared to other modes of transportation (median: 24 minutes, IQR: 12 to 54 minutes). The longest treatment delays were experienced by patients with neurological conditions, with an average time of 120 minutes (IQR: 78 to 270 minutes). Patients using ambulances incurred higher costs compared to those who did not use ambulances.. (12)Thehospitalmanagementhasmadevariousimprovementefforts,butimplementationisstillhinderedbyf undingissuesandresistancetochange from staff.Observations of the service workflow indicated that the triage process is functioning according tostandards; however, bottlenecks were still present in the administrative process and coordinationwith supporting units, such as radiology and laboratory services. This has led to delays in criticalactions requiring immediate test results. Medical record documentation shows that 67% of trafficaccident cases require supporting examinations, with an average waiting time for results of 45minutes.(23). Interdepartmental coordination within hospitals to manage accident victims is a critical factor in the emergency care system and must be implemented from the earliest signs of the incident. In 2019, the World Health Assembly issued a resolution urging all member states to develop emergency care systems to ensure coordination among hospital departments..(24).

The Hospital Emergency Department provides immediate and rapid diagnosis and treatment for urgent medical conditions and injuries resulting from accidents. Simple cases, after receiving initial clinical treatment, are discharged with instructions to visit the outpatient department (OPD) for follow-up care. More serious cases are treated in the emergency ward for immediate clinical medical care. These patients are either discharged after 2-3 days or transferred to a permanent inpatient unit. Emergency services are becoming increasingly important due to modern challenges arising from urbanization and the mechanization of society. A managerial approach is required to organize and manage Emergency Medical Services (EMS) in hospitals.(25)Analysis of the hospital management information system revealed that although an electronicsystemisavailable,therearestillmanualrecordingduplicationsthatslowdownserviceprocesses. Data integration among units is not yet optimal, with 35% of respondents reporting difficultiesaccessingpatientinformationinreal-time.(26)(27)Thisimpactsthetimelinessofclinicaldecision-makingand team coordination. Evaluation of the emergency department healthcare team's performanceshows a good competency level (average score of 8.2 out of 10), but a high workload (nurse-to-patient ratio of 1:8) affects service quality, especially during busy hours. Continuous trainingprograms have been regularly implemented; however, the application of training outcomes ishinderedby limited resourcesand anunsupported system.(28) Payne, Karlie, et al. (2023) The longest delay is experienced by patients who need a CT scan, specialist consultation, and/or inpatient bed. The high volume of patients in the ER requires

targeted and specific interventions based on their location.(29)Basedoncasedocumentationduringthestudyperiod,patientoutcomesshowedfairlygoodresults,with a survival rate of 89% for moderate to severe trauma cases. However, further analysisindicated that patients who received treatment within the golden period (≤ 60 minutes) hadsignificantlybetterprognosescomparedtothose who were treatedlater($p<0.05$).According to Shafi, S., et al. (2012), the survival rate for trauma patients with severe injuries is 92% at 30 days post-trauma, decreasing to 84% within three years ($p > 0.05$ compared to the general population). Patients with mild trauma experience a survival rate similar to that of the general population. Age and injury severity are the only independent predictors of long-term mortality affecting survival until discharge from the hospital. Log-rank tests assessing survival at each time point indicate that the mortality risk for patients with severe injuries remains significantly higher than that of the general population for up to six months post-injury. The survival rate for trauma patients with severe injuries remains considerably lower than that of patients with mild trauma and the general population for several months after discharge from the hospital. Monitoring for early identification and management of complications may be necessary for trauma patients with severe injuries.

The limitations of facilities specifically for trauma management should be prioritized in hospital development planning. Investment in specialized trauma medical equipment can enhance the capacity to handle emergency cases. The triage process, which is already operating according to standards, is a positive asset, but bottlenecks in administrative processes and coordination with support units need to be addressed immediately. The waiting time for supporting examination results, which reaches 45 minutes, needs optimization.(30)Focusgroupdiscussionswiththeemergencydepartmenthealthcareteamrevealedseveralrecommendationsforsystemimprovements,includingsimplifyingadministrativeprocesses,increasinghumanresourcesduringhighworkloadshifts,enhancingintegrationoftheinformationsystem, and procuring specialized trauma equipment. The team also emphasized the importanceofimprovingcoordinationwithsupportingunitsandenhancinginternalcommunicationsystems (31).Reham Mostafa and Khaled El-Atawi (2024) Emergency Departments (EDs) worldwide face a growing number of challenges, such as patient overcrowding, limited resources, and increasing patient demand. This study aims to identify and analyze strategies to improve the structural performance of EDs, focusing on reducing patient overcrowding, optimizing resource allocation, and improving patient care outcomes. Through a comprehensive review of the literature and observational studies, this research highlights the effectiveness of various approaches, including triage optimization, dynamic staffing placement, technology integration, and strategic resource management. The key findings suggest that tailored strategies, such as the implementation of advanced triage protocols and the use of telemedicine, can significantly reduce wait times and improve patient care outcomes. Furthermore, evidence indicates that dynamic staffing models and the integration of cutting-edge diagnostic tools contribute to operational efficiency and enhanced care quality. These strategies, when combined, offer multifaceted solutions to the complex challenges faced by EDs, promising better patient care and satisfaction. This study underscores the need for a comprehensive approach that integrates organizational innovation and technology to address the evolving demands of emergency healthcare(32).According to Herryawan et al. (2021), redesigning business processes, automating service flows, changing paradigms, reducing costs, improving

hospital performance, and enhancing the quality of human resources, organizational development, and technology all contribute to achieving the effectiveness and efficiency of services in hospitals(33).

Michelle O'Daniel and Alan H. Rosenstein (2008), In today's healthcare system, the service delivery process involves numerous interfaces and patient handoffs between many healthcare practitioners with varying levels of education and training. When healthcare professionals fail to communicate effectively, patient safety is compromised for several reasons: the lack of critical information, misinterpretation of information, unclear instructions over the phone, and overlooked changes in patient status.(34). Internal communication in healthcare presents a set of unique challenges for organizations. It is crucial to ensure that communication between different departments and staff levels is efficient, timely, and effective. Best practices in internal communication promote collaboration, provide clear guidance, and help maintain patient safety. Healthcare services are complex systems with many stakeholders, each having their own communication needs and challenges. The healthcare business involves delivering appropriate care, but it also encompasses specific organizational goals that often require precise coordination. As such, the internal communication process among healthcare team members can become critical to the success of the system.(35). Understanding the communication challenges in this complex workplace is crucial so that healthcare providers can effectively care for patients while maintaining organizational efficiency and avoiding detrimental pitfalls. Here, we discuss various communication challenges that can arise in healthcare settings. Poor communication in healthcare can lead to errors and negligence, which can have serious consequences for patients.(36)In fact, it is estimated that 27% of medical malpractice cases are caused by ineffective communication. To prevent such cases, organizations must prioritize superior communication strategies and leverage effective practices in their operations. (37)

The research findings indicate that hospital management strategies to improve emergency serviceresponsivenessrequireacomprehensiveapproach,including:reformingtheintegratedinformations ystem, optimizing human resource allocation, enhancing facilities, and improving coordinationamongunits.Theimplementationofthesestrategiesneedstobesupportedbystrongmanageme ntcommitmentand adequate fundingtoachieveoptimalemergency services.(38)The need for optimizing ED resources has been recognized by emergency department professionals, but a lack of adequate knowledge about the proper optimization techniques can be a barrier to effectively utilizing these methods. For each emergency department, performance is measured using a set of indicators, and patient flow is directly related to these indicators. As a result, numerous investigations have been conducted in healthcare systems using various operations research tools and operational management strategies. Each technique has its own strengths and weaknesses, and this paper aims to extract and critically review them. The literature reviewed in this paper highlights how different approaches are applied to improve ED performance by optimizing both human and non-human resources. The successful implementation of ED resource optimization techniques depends on considering the appropriate decision variables and resource constraints. If optimization tools are applied ineffectively, the desired outcomes may not be achieved. Therefore, when optimizing ED resources, it is crucial to carefully identify decision variables and develop models accurately so that the objectives can be reasonably met. Furthermore, lean philosophy can be incorporated into future studies to ensure that optimal results are achieved in a waste-free system. Studies have demonstrated

that a variety of optimization techniques have been employed to enhance the performance of Emergency Departments (EDs). These approaches primarily focus on improving workflow efficiency, optimizing resource utilization, and reducing patient response times.

The hospital's management information system, which still uses dual recording (manual and electronic), contributes to delays in service. Modernizing the system by eliminating duplicate records can improve service efficiency. The high competency level of the emergency department (ED) healthcare team (score 8.2/10) indicates adequate human resources. However, the high workload may lead to burnout and reduce service quality.

The survival rate of 89% for moderate to severe trauma cases demonstrates the team's capability in handling emergency situations. However, the significance of the golden period for patient prognosis ($p<0.05$) emphasizes the importance of response speed. Focus Group Discussions (FGDs) provided valuable insights into the need for system improvements from the perspective of field operators. The resulting recommendations encompass both technical and managerial aspects that require follow-up.

Implementing improvement strategies requires a holistic approach involving all stakeholders. Resistance to change from staff needs to be addressed through effective change management. Funding aspects pose challenges in the implementation of system improvements. Hospital management must develop sustainable funding strategies to support quality enhancement programs.

The success of strategies to improve the responsiveness of emergency services heavily depends on management commitment and support from all hospital components. Continuous monitoring and evaluation are necessary to ensure the effectiveness of the implemented strategies. The implications of this research provide an empirical basis for developing more responsive emergency service policies and procedures. The findings can serve as a reference for other hospitals in developing strategies to enhance the quality of emergency services. Recommendations for future research include evaluating the impact of implemented improvement strategies, analyzing the cost-effectiveness of various interventions, and developing a more efficient and responsive emergency service model

The improve the optimization of the Emergency Department (ED) in handling traffic accident cases, the following steps should be implemented:

Staging involves mapping the entire patient care process in the Emergency Room (ER), covering key steps such as triage, initial examination, medical treatment, and transfer to advanced care areas. The aim is to identify inefficiencies and eliminate time wastage, while optimizing the processes that need improvement, by mapping these steps, the ER can reduce patient wait times and enhance overall operational efficiency.

The implementation of Lean Healthcare aims to eliminate waste in processes, such as excessive waiting times for tests or procedures. Six Sigma is used to reduce variability and errors in patient care. By applying these principles, the Emergency Department (ED) can minimize resource waste, speed up patient flow, and improve care quality. Evaluating and improving each process ensures that time and resources are used to their maximum potential.

The use of Computer-based Simulation and Modeling to model patient arrival flow, space management, and medical staff scheduling helps predict patient surges, particularly during mass casualty incidents or other emergency situations. This aims to analyze potential bottlenecks and adjust hospital capacity and the number of staff needed to handle a high volume of patients within a short period.The implementation of Electronic Health Records (EHR) facilitates communication among healthcare providers and ensures that patient medical data is available in real-time. This can expedite medical decision-making, reduce errors in documentation, and decrease the time required to prepare patient information, especially for traffic accident victims who may arrive with severe injuries.The implementation of a priority-based triage system classifies patients based on the severity of their conditions. Patients with more serious injuries should receive faster attention. The goal is to ensure that patients needing urgent care are prioritized, reducing waiting times for critically ill patients, and accelerating the care process.Optimizing Space and Equipment Management involves making the best use of space in the ED, such as resuscitation rooms, observation rooms, and other care areas. Ensuring that medical equipment is available and in working order is crucial. Avoiding shortages of space or equipment is essential to prevent delays in patient care.

Data Analysis and Monitoring steps involve using historical data and analytical techniques to monitor ED performance in handling traffic accident cases, such as wait times, treatment success rates, and patient satisfaction levels. Identifying trends, potential issues, and areas needing improvement helps guide future changes. The results of these analyses can be used to plan better strategies going forward.Enhancing Medical Staff Skills and Training involves providing continuous training to healthcare providers on traffic accident management techniques, the use of the latest medical equipment, and improving communication skills. This helps improve the medical team's ability to respond quickly and accurately to traffic accident cases, which often involve severe injuries.Coordination Among Teams and Stakeholders focuses on strengthening collaboration between medical teams, paramedics, and other related units, such as surgical or radiology departments, to ensure that each traffic accident patient receives the necessary care without delays. Ensuring smooth communication flow and effective collaboration between different teams is key to providing comprehensive patient care.By implementing these optimization measures, the ED can improve its performance in handling patients from traffic accidents. This approach helps reduce wait times, accelerate response times, optimize resource use, and ultimately enhance the quality of care provided to patients.These non-human resources significantly affect the ED and other hospital services and should therefore be adequately considered in any modeling efforts. The impact of the adoption of new technologies and equipment (such as tomography sensors) has not been considered in this study, which is a critical gap. Therefore, further studies are needed to address these limitations and adopt a holistic approach. Future research could also consider integrating lean philosophy into the optimization process to facilitate the elimination of waste before resource optimization. While this paper primarily discusses the analytical and tactical aspects of various optimization models, the financial implications have not been adequately addressed.The limitations of facilities specifically for trauma management should be prioritized in hospital development planning. Investment in specialized trauma medical equipment can enhance the capacity to handle emergency cases. The

triage process, which is already operating according to standards, is a positive asset, but bottlenecks in administrative processes and coordination with support units need to be addressed immediately. The waiting time for supporting examination results, which reaches 45 minutes, needs optimization.

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The success of strategies to improve the responsiveness of emergency services heavily depends on management commitment and support from all hospital components. Continuous monitoring and evaluation are necessary to ensure the effectiveness of the implemented strategies. The implications of this research provide an empirical basis for developing more responsive emergency service policies and procedures. The findings can serve as a reference for other hospitals in developing strategies to enhance the quality of emergency services. Recommendations for future research include evaluating the impact of implemented improvement strategies, analyzing the cost-effectiveness of various interventions, and developing a more efficient and responsive emergency service model.

Conclusion:

Based on the research findings regarding hospital management strategies to enhance the responsiveness of emergency services for traffic accident victims, it can be concluded that the performance of emergency services still requires optimization in various aspects. The response time of 7.3 minutes exceeds the ideal standard of 8 minutes, with primary hindering factors including the complexity of the administrative system, limited human resources, and suboptimal coordination among units. The management information system, which is not fully integrated, along with the high workload of the healthcare team, presents significant challenges in delivering responsive services. Although the competency level of the emergency department (ED) healthcare team shows a good average score of 8.2 out of 10, the high workload with a nurse-to-patient ratio of 1:8 affects service quality. The survival rate for moderate to severe trauma patients is 89%; however, there are significant differences in patient outcomes between those treated within the golden period and those

who experienced delays. The improvement strategies undertaken by hospital management are still hindered by funding issues and staff resistance to change.

Recommendations:

Based on the study findings, several recommendations can be proposed: First, hospital management should improve the integrated information system to reduce duplicate record-keeping and expedite patient information access. Second, optimize human resource allocation through workload analysis and adding staff during high-activity shifts. Third, enhance facilities specifically for trauma care with adequate funding support. Fourth, improve coordination among units by developing an effective communication system and clear standard operating procedures. Fifth, implement a change management program to address staff resistance to system updates. Sixth, develop ongoing training programs tailored to the needs and challenges of emergency services. Seventh, conduct periodic evaluations of the effectiveness of implemented improvement strategies using measurable performance indicators. Finally, strengthen collaboration with supporting units to optimize examination time and medical support outcomes. The implementation of these recommendations requires strong commitment from hospital management and active participation from all stakeholders to achieve optimal emergency services.

DATA AVAILABILITY

All relevant data are included in the paper and its supporting information files. This study will assist researchers in identifying critical areas for optimizing emergency response, improving strategies, and enhancing hospital management for traffic accident victims.

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