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Triage Management of Trauma Patients Among Hospitals in The 5th District in Camarines Sur, Philippines

Intervention for Rapid Assessment and Care

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ABSTRACT

This study aimed to assess the triage management of trauma patients among hospitals in the 5th District of Camarines Sur, Philippines, focusing on the interventions practiced by triage management team members and the relationship between their profiles and applied strategies. Employing a quantitative descriptive research design, data were collected through a validated questionnaire checklist administered to selected triage personnel. Statistical tools such as percentage technique, weighted mean, and chi-square test were utilized to analyze and interpret the data systematically. The findings revealed that hospitals have begun integrating strategic plans to equip triage personnel with essential knowledge and skills, thereby reducing the risks of overtriage and undertriage. Results also emphasized the importance of adopting standardized protocols and the need for a more comprehensive and evidence-based definition of trauma patients requiring specialized care. Furthermore, the study highlighted the significance of emergency preparedness—particularly during mass casualty incidents—through effective personnel deployment and structured triage systems. The introduction of an intervention-based triage management guide was found to enhance decision-making processes and patient prioritization. Future research is recommended to explore the long-term effectiveness of standardized triage training programs, as well as the development of region-specific protocols that consider local healthcare capacities, infrastructure, and challenges. Continued efforts in triage innovation and training

evaluation are essential to advance trauma care practices and improve patient outcomes in diverse healthcare settings.

Keywords
Emergency Care
Healthcare Systems
Hospital Preparedness
Standardized Protocols
Trauma Patients

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Introduction

Globally, trauma remains a leading cause of morbidity and mortality, particularly among younger populations and in low- and middle-income countries (LMICs) where healthcare systems often face significant constraints. According to the World Health Organization, injuries resulting from road traffic accidents, falls, interpersonal violence, and other emergencies account for more than five million deaths annually, representing nearly 9% of global mortality [1], [2]. This substantial burden places immense pressure on emergency departments (EDs), necessitating efficient systems for patient prioritization and resource allocation. Evidence indicates that trauma disproportionately affects LMICs due to limited infrastructure, workforce shortages, and fragmented emergency care systems [3]-[5].

In response to these challenges, triage has become a fundamental component of emergency care, enabling healthcare providers to rapidly assess, categorize, and prioritize patients based on the severity of their condition. The concept of triage, derived from the French term *trier* (to sort), has evolved significantly over time, particularly within trauma care systems [6]. In high-income countries, the implementation of structured triage protocols and integrated trauma systems has contributed to improved patient outcomes through timely intervention and optimized clinical decision-making [7],[8]. These systems emphasize rapid assessment, standardized procedures, and continuous monitoring to ensure efficiency and accuracy in emergency response.

However, in many developing countries, including the Philippines, the implementation of standardized and evidence-based triage systems remains inconsistent. Studies have identified variations in triage practices, gaps in clinical competencies, and inefficiencies in patient flow within emergency departments [9],[10]. Furthermore, broader systemic challenges—such as overcrowding, insufficient training, and limited access to emergency medical services—continue to hinder the effectiveness of trauma care delivery in LMIC settings [11]-[13]. These limitations highlight the urgent need for context-specific strategies to strengthen triage systems and improve emergency care outcomes.

In Southeast Asia, the growing demand for emergency healthcare services—driven by urbanization, increasing road traffic incidents, and vulnerability to natural disasters—has further intensified the need for robust triage management frameworks. National efforts, such as policies issued by the Philippine Department of Health, have emphasized the importance of developing organized emergency and trauma care systems; however, translating these policies into consistent practice across healthcare institutions remains a challenge [14],[15]. Consequently, there is a critical need to assess existing triage practices and identify gaps that may affect the timeliness and quality of trauma care.

Effective triage management is essential not only for improving patient outcomes but also for optimizing healthcare resource utilization. Research has demonstrated that well implemented triage systems can reduce waiting times, enhance patient flow, and improve overall emergency department efficiency [16],[17]. Additionally, the competence of triage personnel, including their educational background, clinical experience, and specialized training, plays a crucial role in ensuring accurate patient prioritization and appropriate intervention [18],[19]. These factors underscore the importance of strengthening both system level frameworks and individual competencies in emergency care settings. Furthermore, continuous monitoring and evaluation of triage practices are necessary to sustain quality improvement and adapt to evolving healthcare demands.

This study assessed the triage management of trauma patients among hospitals in the 5th District of Camarines Sur as a basis for developing a tailored Intervention for Rapid Assessment and Care. Specifically, the study aimed to: (1) determine the profile of triage management team members in terms of educational background, years of experience, and specialized training; (2) identify the intervention strategies employed in managing trauma patients, including clinical decision-making processes and response times; and (3) examine the relationship between team member profiles and the interventions they implement. Through this multi-dimensional analysis, the study seeks to identify strengths and gaps in current triage practices.

Ultimately, the findings of this research are expected to inform the development of a context-sensitive intervention model that enhances the speed, accuracy, and effectiveness of trauma response in the region. By addressing existing challenges and leveraging best practices in triage management, the proposed intervention aims to contribute to improved patient outcomes, more efficient use of healthcare resources, and the establishment of a more resilient emergency care system in Camarines Sur and similar LMIC settings. Furthermore, this study also provides evidence-based insights that can support policy formulation and capacity-building initiatives for emergency care providers at both local and national levels.

Material and Methods

A. Research Design

This study employed a quantitative descriptive research design, a method that aims to systematically describe and summarize numerical data to gain a comprehensive understanding of phenomena. The research focused on assessing the triage management of trauma patients in hospitals within the 5th District of Camarines Sur, Philippines. Specifically, the study sought to address the following research questions:

1. What is the profile of the Triage Management Team Members?
2. What are the interventions practiced by the triage management team members in managing trauma patients?
3. Is there a significant relationship between the profile and the interventions practiced by the triage management team?
4. What interventions may be proposed to enhance the management of trauma patients?

This design enabled the researchers to analyze trauma triage practices through structured responses to survey questions. It facilitated a detailed evaluation of current methods and laid the groundwork for developing more effective rapid assessment and care strategies.

B. Data Gathering Procedure

The primary data collection tool used in this study was a pre-validated questionnaire checklist. The instrument was designed by the researcher after a thorough review of relevant literature, including books, journals, and previous studies. It was structured in two parts: (1) the demographic profile of the respondents and (2) the interventions practiced by the triage management teams.

The questionnaire underwent validation by the research adviser, oral examination committee, and a statistician. A pilot test was conducted with 10 respondents to assess the clarity and relevance of the questions. Based on the feedback, revisions were made before reproducing the final version of the questionnaire.

Before data collection, the researcher obtained formal approval to conduct the study. The questionnaires were personally distributed and retrieved by the researcher on the same day to ensure a 100% response rate and to provide assistance in completing the forms when necessary. Structured interviews and observations were also used to complement the responses from the questionnaire.

C. Data Analysis

Upon retrieval, the responses were tallied, grouped, and systematically tabulated based on the variables outlined in the study. To analyze the data effectively, several statistical tools were employed. The percentage technique was used to determine the proportion of responses for each item. The weighted mean was utilized to quantify the respondents' assessments of the

interventions practiced by triage management team members and interpreted through a Likert-type scale. Additionally, the chi-square test was applied to examine the presence of significant relationships between categorical variables—specifically, the respondents' profiles and the interventions they practiced. These statistical tools allowed for a comprehensive and accurate analysis of the data, offering meaningful insights into the current approaches and challenges in managing trauma patients across hospitals in the 5th District of Camarines Sur.

Results

A. The demographic data of the respondents

Fig. 1 presents the demographic characteristics of the respondents, specifically their age distribution and sex composition, providing an overview of the sample profile used in the study.

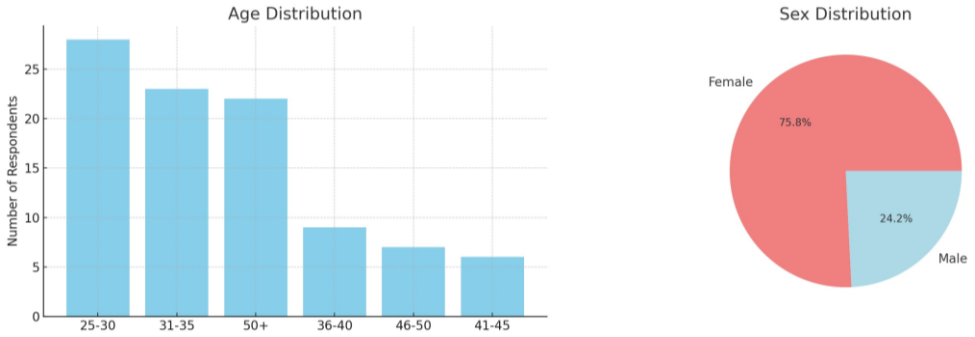


Fig. 1. The demographic data of the respondents (Age and Sex)

In terms of age, out of 95 respondents, 28 or 29.47 percent were 25-30 years old, 23 or 24.21 were 31-35 years old. 50 years old and above with 22 or 23.16 percent, 36-40 years old with nine or 9.47 percent, 46-50 years old with seven or 7.37 percent, and 41-45 years old with six or 6.32 percent. As to sex, the majority of the respondents were females with 72 or 75.79 percent and 23 or 24.21 percent were males.

Fig. 2 illustrates the demographic characteristics of the respondents in terms of civil status and length of service, offering insight into their personal background and professional experience.

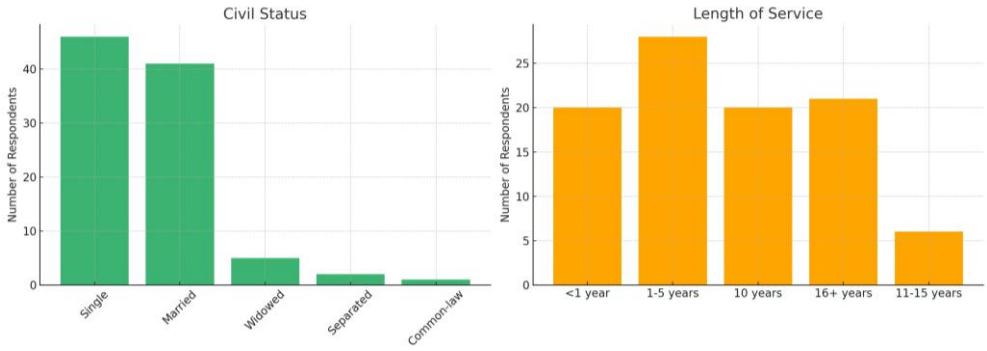


Fig. 2. The demographic data of the respondents (Civil Status and Length of Service)

With the civil status, a good number of the respondents were single with 46 or 48.42 percent, followed by married with 41 or 43.16 percent. Five or 5.26 were widowed, two, or 2.11 were separated and one, or 1.05 percent with common-law husband. As to length of service, 28 or 29.47 percent of the respondents served 1-5 years, followed by 16 years and above with 21 or 22.11 percent. There were 20 or 21.05 percent of respondents with less than 1 year and 10 years of service. The remaining six or 6.32 percent had 11-15 years of service.

Fig. 3 presents the demographic characteristics of the respondents in terms of educational attainment and current position, highlighting their academic background and roles within the organization.

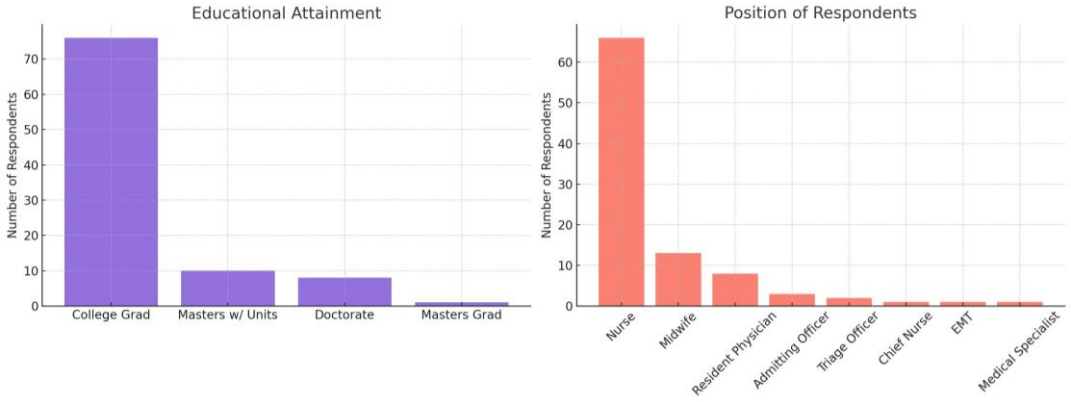


Fig. 3. The demographic data of the respondents (Education and Position)

With educational attainment, the majority of the respondents were college graduates with 76 or 80.00 percent. 10 or 10.53 of the respondents had in master's degree with units, eight or 8.42 were doctorate holders and the remaining one or 1.05 percent were Master's degree holders. As to position, more than half of the respondents were nurses with 66 or 69.47 percent. 13 or 13.68 were midwives, resident physicians with eight or 8.42 percent, admitting officers with three or 3.16 percent, and two or 2.11 percent triage officers. There are one or 1.05 percent Chief Nurse, EMT, and medical specialists. Of the 95 respondents, some attended a multiple trainings and seminars attended which resulted to a total of 124 responses. Most of them had no pieces of training and seminars attended with 48 or 38.71 percent. 42 or 22.87 responses with Basic Life Support, Advance Cardiac Life Support with 26 or 20.97 percent, Trauma Training with two or 1.61 percent. One or 0.81 each with NCII - Caregiving, Home Care, Emergency Medical Technician- Basic Course, PALS/NALS, Fire Safety, and First Aid.

The respondents were predominantly young professionals, with a significant portion aged between 25 and 35. They were mainly female and either single or married, suggesting a relatively youthful and predominantly female workforce in the studied population. A considerable number of respondents had substantial work experience, with many having more than five years of service. The majority were well-educated, with a significant portion holding a college degree and an additional portion pursuing or completing postgraduate studies.

Despite the attendance of majority of respondents in various trainings and seminars, a significant portion had not participated in any training.

B. The interventions practiced by the triage management team members in managing trauma patients

The interventions practiced by the triage management team members in managing trauma patients among the hospitals in the 5th District of Camarines Sur along with assessment, the average weighted mean 3.90 interpreted as often. The average weighted mean of managing trauma patients along with diagnosis was 3.86 which is interpreted as often. The average weighted mean of managing trauma patients along with planning was 3.87 which is interpreted as often. The average weighted mean of managing trauma patients along with intervention was 3.83, interpreted as often. The average weighted mean of managing trauma patients along with evaluation was 3.74, interpreted as often. Table 1 shows the average weighted mean for each component of trauma patient management, along with their interpretations. This table would be helpful to clearly visualize and compare how frequently each component is practiced by the triage management team.

Table 1. Average Weighted Mean and Interpretation of Interventions Practiced

Components of Trauma Management	Average Weighted Mean	Interpretation
Assessment	3.90	Often
Diagnosis	3.86	Often
Planning	3.87	Often
Intervention	3.83	Often
Evaluation	3.74	Often

The triage management team members often practiced the interventions in managing trauma patients among the hospitals in the 5th District of Camarines Sur, along with assessment, diagnosis, planning, intervention, and evaluation.

C. Statistical Calculation

The result of statistical data showed that age, sex, civil status, length of service, educational attainment, position, and pieces of training and seminars with computed values of 10.07, 4.51, 8.35, 14.66, 9.93, 9.78, and 11.47 were higher than the tabular value of 9.49, 3.84, 7.82, 11.07, 5.99, 7.82 and 9.49 at 0.05 level of significance, therefore the null hypothesis is rejected. This implies that age, sex, civil status, length of service, educational attainment, position, and pieces of training and seminars are related to the interventions practiced by the triage management team members in managing trauma patients among the hospitals in the 5th District in Camarines Sur. Moreover, these findings suggest that both demographic and professional factors play a significant role in shaping the effectiveness of triage practices in trauma care settings.

Table 2. The computed and tabular values for each variable

Variable	Computed Value	Tabular Value	Significance Level (0.05)
Age	10.07	9.49	Rejected Null Hypothesis
Sex	4.51	3.84	Rejected Null Hypothesis
Civil Status	8.35	7.82	Rejected Null Hypothesis
Length of Service	14.66	11.07	Rejected Null Hypothesis
Educational Attainment	9.93	5.99	Rejected Null Hypothesis
Position	9.78	7.82	Rejected Null Hypothesis
Training and Seminars	11.47	9.49	Rejected Null Hypothesis

Table 2 presents the computed and tabular values for each variable at the 0.05 significance level, where the null hypothesis is rejected, indicating that these factors are related to the interventions practiced by the triage management team in trauma patient management. The demographic factors (age, sex, civil status, length of service, educational attainment, position, and training significantly influenced the interventions practiced by the triage management team.

The findings of the study on the triage management manual emphasize the need for clear and comprehensive guidelines to assess the severity of trauma patients. These guidelines should include the evaluation of physiological parameters, anatomical injuries, and the mechanism of injury to ensure accurate triage decisions. A well-organized and efficient triage system is crucial in minimizing morbidity and mortality by facilitating prompt and appropriate medical interventions. Moreover, the implementation of targeted interventions can significantly improve hospital response times during emergency situations. This is particularly important in the post-pandemic era, or in scenarios where COVID-19 may resurge, ensuring that healthcare facilities are prepared to handle both trauma cases and infectious disease outbreaks effectively.

Discussion

A. Enhancing Triage Personnel Competency and In-Hospital Protocols

The findings of the study emphasize the importance of equipping triage personnel with the appropriate knowledge and skills to accurately assess and prioritize trauma patients. As part of strategic hospital planning, continuous training and capacity-building for triage staff are vital in minimizing both overtriage and undertriage, which can significantly affect patient outcomes. Overtriage may overwhelm trauma centers with minor cases, while undertriage risks the lives of critically injured patients by delaying appropriate care. Evidence shows that triage accuracy is strongly associated with personnel competence, clinical experience, and structured training programs [18], [19].

To address this, hospitals are increasingly adopting criteria-directed protocols for in-hospital triage. These protocols guide triage decisions using standardized criteria based on trauma severity, physiological indicators, and injury mechanisms. Implementing such systems

ensures consistency in triage practices and helps streamline decision-making processes, ultimately leading to faster and more accurate identification of patients needing urgent intervention. Studies on structured triage systems demonstrate their effectiveness in improving emergency department efficiency and patient outcomes [7], [8]. Standardized triage protocols not only increase the efficiency of emergency departments but also serve as a foundation for developing long-term trauma care strategies that improve overall patient care quality [16], [17].

B. Standardizing Trauma Definitions and Triage Education

Another key insight from the study is the need to redefine what constitutes a trauma patient requiring specialized trauma center care. The current definitions often fall short in capturing the full spectrum of trauma cases, particularly those involving complex care, multi-system injuries, or patients with limited access to specialized resources. A more comprehensive, evidence-based definition should take into account not only the severity of physical injuries but also the context of care, including the availability of medical resources and the degree of specialization required. This perspective aligns with global recommendations emphasizing context-sensitive trauma systems, particularly in LMIC settings [5], [20].

Furthermore, the study underscores the importance of an evidence-based approach to triage training and education. Hospitals should invest in standardized and regularly updated training modules that incorporate clinical guidelines, simulation-based learning, and performance evaluations. These programs should be tailored to reflect regional healthcare challenges and resources. Evidence from Southeast Asia and LMICs highlights persistent gaps in triage knowledge and variability in practice, reinforcing the need for structured education systems [9], [12], [13]. By doing so, healthcare institutions can ensure that their triage personnel are well-prepared to make high-stakes decisions quickly and accurately, even in high-pressure scenarios.

C. Mass Casualty Preparedness and Strategic Personnel Deployment

The increasing frequency of mass casualty incidents (MCIs), whether from natural disasters, accidents, or other emergencies, highlights the need for hospitals to have robust and adaptable emergency preparedness plans. Globally, trauma and injury remain major contributors to mortality, particularly in disaster-prone and resource-limited regions [1], [2]. One of the primary considerations in such scenarios is the rapid distribution and categorization of patients to avoid overwhelming any single facility.

As the study suggests, hospitals must develop comprehensive systems for secondary and tertiary triage, patient flow control, and inter-hospital collaboration to maximize available resources. Literature on emergency care systems in LMICs emphasizes the importance of coordinated response mechanisms and integrated trauma systems in improving survival

outcomes [3], [5], [11]. Additionally, the profile of hospital personnel—including their experience, training, and area of expertise—should be considered when assigning roles during emergencies. Personnel with advanced triage training may be assigned to more critical areas, while those with logistical or administrative strengths could support coordination efforts.

This level of preparedness not only improves patient survival rates during MCIs but also strengthens the overall resilience of the healthcare system. Developing and practicing these protocols through drills and simulations can further enhance readiness and response capabilities, as recommended in global emergency preparedness frameworks [6], [21].

D. Implementing an Intervention-Based Triage Management Guide

Finally, the introduction of a well-structured intervention triage management guide can significantly improve how trauma cases are prioritized and managed. Such a system mirrors the principles of medical triage, focusing on the severity of cases and the immediacy of care required. By integrating intervention-based steps such as recording incidents, categorizing cases by criticality, and deploying rapid responses, hospitals can establish a scalable and responsive triage system. Evidence suggests that structured triage frameworks improve workflow efficiency, reduce delays, and enhance patient prioritization in emergency settings [17], [22].

This framework becomes particularly crucial during periods of operational strain—such as post-disaster scenarios or system overload—where rapid decision-making and prioritization are essential. Moreover, by implementing a release triage plan, hospitals can efficiently manage unexpected surges or complications, ensuring that resources are directed where they are most needed. Studies in LMIC contexts, including the Philippines, highlight that improving triage systems requires not only protocols but also adaptive, context-sensitive interventions tailored to institutional capacity [10], [14], [15].

This proactive approach not only boosts the confidence and cohesion of triage teams but also reinforces the trust of patients and the public in the healthcare delivery system. The guide acts as both a practical tool and a training reference, embedding resilience and consistency in trauma care delivery.

Conclusion

This study highlighted the critical role of effective triage management in enhancing trauma care outcomes across hospitals in the 5th District of Camarines Sur. The findings underscore the necessity of equipping triage personnel with the appropriate skills and standardized protocols to ensure accurate and timely patient assessment. By minimizing the risks of overtriage and undertriage, hospitals can optimize their emergency response and allocate resources more efficiently.

Furthermore, the study revealed the need to refine the definition of trauma patients requiring specialized care. A more comprehensive and evidence-based framework—one that considers injury complexity, resource availability, and care regionalization—will significantly improve triage accuracy and healthcare delivery. This calls for the development of consistent and validated training programs for triage staff, ensuring their preparedness in both routine and high-pressure scenarios.

The results also emphasized the importance of emergency preparedness, especially in the context of mass casualty incidents. Strategic personnel deployment and multi-tiered triage systems are vital components of a resilient hospital response plan. Lastly, the implementation of an intervention-based triage management guide presents a practical and systematic approach to prioritizing care, managing large-scale emergencies, and fostering confidence among healthcare teams and patients alike.

Conflict of Interest

The authors declare that there is no conflict of interest.

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