

ENHANCING NURSES' CAPACITY IN MANAGING MASS-CASUALTY VICTIMS THROUGH TRIAGE TRAINING AT A DISASTER REFERRAL HOSPITAL

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ABSTRACT

A mass-casualty incident (MCI) is an event in which the number and severity of victims exceed the available resources, thereby demanding rapid and accurate decision-making. Triage is central in such situations because it determines the priority of treatment so that limited resources can deliver the greatest benefit to the greatest number of victims. Nurses at disaster referral hospitals play a strategic role as triage performers, so that their capacity and knowledge need to be continuously strengthened. This community service activity aimed to enhance nurses' capacity in managing mass-casualty victims through triage training. The activity was conducted in 2024 with 20 nurses at a disaster referral Siti Rahmah Islamic Hospital in Padang as the target participants.

The implementation methods comprised lectures, demonstrations, and triage simulations, accompanied by knowledge evaluation through a pre-test and a post-test. The results showed a marked improvement in knowledge: the good-knowledge category rose from 30% to 85%, the fair category fell from 45% to 15%, and the poor category fell from 25% to 0%. The activity concludes that triage training is effective in improving nurses' knowledge in managing mass-casualty victims.

Keywords: triage; mass-casualty incident; nurse capacity; disaster referral hospital; training

INTRODUCTION

Indonesia is one of the most disaster-prone countries in the world owing to its position at the meeting point of tectonic plates and along the Pacific Ring of Fire. Large-scale disasters such as earthquakes, tsunamis, and mass accidents can produce large numbers of casualties simultaneously—known as mass-casualty incidents (MCIs). In such situations, health-care facilities particularly disaster referral hospitals face a surge of victims that exceeds their normal capacity.

Disaster referral hospitals play a crucial role as the final node of victim management. When the number of victims exceeds the availability of staff, space, and equipment, the success of life-saving efforts depends heavily on the team's ability to perform triage rapidly and accurately. Triage allows limited resources to be directed to the victims who need them most and are most likely to be saved, in accordance with the principle of "the greatest good for the greatest number."

Siti Rahmah Islamic Hospital (RSI Siti Rahmah) Padang is one of the private hospitals in Padang City that provides comprehensive healthcare services, including emergency care, outpatient services, inpatient care, surgical procedures, and supporting medical services. RSI Siti Rahmah is located in the Aie Pacah area of Padang City and is equipped with various medical facilities. Data from the Padang City Health Office also lists RSI Siti Rahmah as one of the private general hospitals in Padang City classified as a Class C hospital.

Hospital preparedness for disasters is particularly important because RSI Siti Rahmah has previously been included in the Contingency Plan for Tsunami Disaster Management in Padang City as one of the hospitals to be activated within the referral system in the event of a tsunami. This highlights the importance of hospital

preparedness to receive and provide healthcare services to a large number of disaster casualties.

Nurses are the health workers at the front line of the Emergency Department (ED) and are among the principal performers of triage when an MCI occurs. Their knowledge and competence in triage are therefore decisive for the quality of victim management. However, nurses' triage knowledge and skills often vary, particularly because not all nurses receive periodic specialised training in mass-casualty management. This condition underlies the delivery of this community service activity in the form of triage training.

The Concept of Mass-Casualty Incidents (MCI)

A mass-casualty incident (MCI) is defined as an event that produces a number and/or severity of victims exceeding the capacity of local health resources to provide standard care within the available time. The main characteristic of an MCI is the imbalance between needs (the number and severity of victims) and availability (staff, equipment, space, and time). This differs from everyday emergency conditions, whose management focuses on a single patient to the maximum extent; in an MCI, the focus shifts to managing many victims efficiently in order to save as many lives as possible.

Triage in Mass-Casualty Conditions

Triage is the process of sorting and setting priorities for victim management based on the level of severity and the likelihood of survival. In mass-casualty conditions, triage is carried out rapidly to sort victims into priority categories commonly indicated by a colour system: red (first priority/immediate), yellow (second priority/delayed), green (third priority/minor or ambulatory), and black (deceased or non-salvageable). One widely used method for field triage of adult victims is the START (Simple Triage and Rapid Treatment) method, which sequentially and

rapidly assesses the ability to walk, respiration, perfusion, and mental status.

The fundamental principle of mass-casualty triage is to provide the greatest good for the greatest number. This principle demands objective and consistent decision-making, so that periodic training and refreshers become important for nurses to be able to apply triage accurately under the pressure of a disaster situation.

The Role of Nurses at Disaster Referral Hospitals

Disaster referral hospitals are required to have a hospital disaster plan that regulates the activation mechanism, victim flow, triage area, and management of victim surges. Nurses serve as triage performers, providers of emergency care, and members of the team that maintains continuity of service. Adequate nurse capacity in triage will streamline the flow of care, reduce delays, and ultimately improve victims' chances of survival.

Partner's Problems

Based on the situation analysis, the problems faced by the partner can be identified as follows:

1. Uneven knowledge among nurses regarding the principles and methods of triage in mass-casualty conditions
2. Limited opportunities for nurses to attend periodic triage refresher training
3. The need to strengthen the team's readiness to handle victim surges (surge capacity) at the disaster referral hospital.

Objectives

The general objective of this activity was to enhance nurses' capacity in managing mass-casualty victims through triage training. Specifically, the activity aimed to:

1. Improve nurses' knowledge of the concept of mass-casualty incidents and the principles of triage
2. Improve nurses' ability to prioritise victims based on the triage method
3. Strengthen nurses' readiness as part of the hospital disaster management system.

Benefits

1. For nurses: improved triage knowledge and skills that can be directly applied to victim management
2. For the hospital: strengthened human-resource readiness in facing mass-casualty incidents
3. For the educational institution: fulfilment of the Tri Dharma of Higher Education, particularly community service in the field of emergency and disaster nursing.

METHOD IMPLEMENTATION AND EVALUATION

The activity was conducted in July 2024 at the disaster referral hospital that served as the partner. The detailed time and place of implementation were arranged by mutual agreement with the partner.

Target Participants

The target participants were 20 nurses working at the disaster referral hospital, particularly those who could potentially be involved in victim management under emergency and disaster conditions.

Implementation Stages

The activity was carried out through three stages, as follows:

1. Preparation stage: coordination with the hospital, preparation of materials and evaluation instruments, and administration of the pre-test to measure participants' baseline knowledge

- Implementation stage: delivery of material on the concept of MCI and triage, demonstration of the use of triage tags, and group simulation of mass-casualty triage
- Evaluation stage: administration of the post-test to measure participants' knowledge after the training, followed by analysis and report writing.

Results And Discussion

The triage training was carried out as planned and was attended by 20 nurses. Participants completed the entire series of activities, from the pre-test and material presentation to the demonstration and simulation of mass-casualty triage. Their enthusiasm was evident from their active engagement in the question-and-answer session and in the practice of prioritising victims using triage tags.

Respondent Characteristics

Table 1. Characteristics of Respondents
(n = 20)

Characteristic	Category	f	%
Age	20–29 years	6	30
	30–39 years	8	40
	40–49 years	5	25
	≥50 years	1	5
Sex	Male	6	30
	Female	14	70
Education	D-III Nursing	9	45
	Bachelor of Nursing / Registered Nurse (Ners)	11	55
Length of Service	<5 years	6	30
	5–10 years	8	40
	>10 years	6	30
Work Unit	Emergency Department (ED)	8	40
	Inpatient Ward	7	35

Characteristic	Category	f	%
	ICU	3	15
	Other units	2	10
Total		20	100

Table 1. Respondent characteristics

Overview of Nurses' Knowledge Before and After the Training

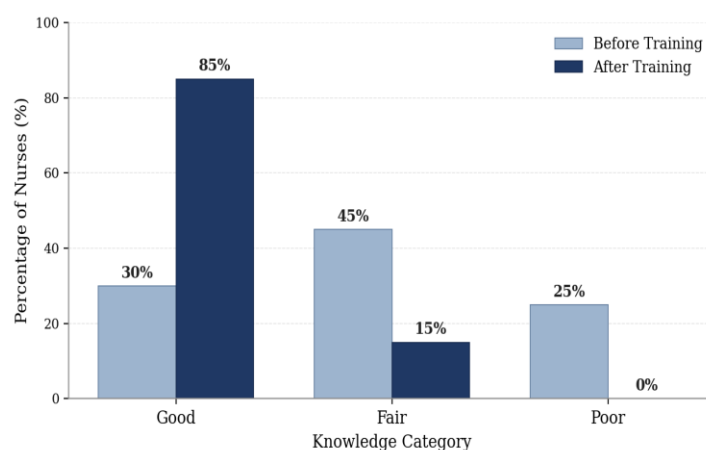


Figure 1. Comparison of the distribution of nurses' knowledge categories before and after the training

Discussion

The characteristics of the 20 participants showed variations in age, gender, educational level, work experience, and work unit. Regarding age, most participants were aged 30–39 years (40%), followed by those aged 20–29 years (30%). This indicates that the majority of participants were within the productive working-age group and actively involved in nursing care. Productive age may support the development of knowledge and skills; however, triage competence is not determined by age alone but is also influenced by education, clinical experience, and training.

Regarding gender, the majority of participants were female (70%). This distribution reflects the general characteristics of the nursing workforce. Gender is not a primary determinant of triage

competence, as triage performance is more closely related to rapid assessment, clinical reasoning, prioritization, communication, and decision-making skills.

In terms of educational level, 55% of participants held a Bachelor of Nursing/Professional Nurse (Ners) qualification, while 45% held a Diploma in Nursing (D3) qualification. Educational background provides a foundation for understanding emergency care and disaster management concepts. However, triage during a Mass Casualty Incident (MCI) requires nurses to apply their knowledge rapidly and systematically under conditions of limited time and resources. Therefore, competency development through structured training and simulation remains necessary.

Regarding work experience, the largest proportion of participants had 5–10 years of experience (40%), while those with less than 5 years and more than 10 years of experience each accounted for 30%. Clinical experience may support nurses' assessment and clinical decision-making abilities. Nevertheless, MCI management differs from routine clinical care because nurses must prioritize multiple casualties simultaneously while considering limited available resources.

In terms of work unit, most participants worked in the Emergency Department (ED) (40%), followed by inpatient units (35%) and the Intensive Care Unit (ICU) (15%). The involvement of nurses from different clinical units is important because MCI management requires cross-unit coordination. Emergency nurses play a key role in the initial assessment and triage of casualties, while nurses from other units can support resource mobilization and patient care when the number of casualties exceeds normal service capacity.

Overall, the characteristics of the participants demonstrated diversity in educational

background, clinical experience, and work unit. These characteristics provide an important basis for implementing MCI triage training to improve nurses' ability to conduct rapid assessments, prioritize casualties, and make accurate and systematic decisions during disaster situations.

Table Figure 1 show a clear improvement in nurses' knowledge after attending the triage training. Before the training, most nurses were in the fair category (45%) and a quarter of the participants were still in the poor category (25%), while only 30% had good knowledge. After the training, the proportion of nurses with good knowledge rose sharply to 85%, the fair category fell to 15%, and no nurses remained in the poor category (0%).

The increase in the good category by 55 percentage points (from 30% to 85%) and the elimination of the poor category indicate that the training successfully closed the participants' initial knowledge gap. This change suggests that the training method, which combined material presentation, demonstration, and simulation, was effective in facilitating nurses' understanding of the MCI concept and the application of triage.

This finding is consistent with the principle that triage skills are competencies that can be improved through structured training and repeated practice. Learning experiences involving simulation give participants the opportunity to apply their knowledge in a context that resembles real situations, thereby strengthening retention and readiness to act. Accordingly, periodic triage training is recommended as part of efforts to maintain nurses' readiness at disaster referral hospitals.

Although these results are encouraging, the evaluation conducted was still limited to the knowledge aspect. Assessment of triage skills and behaviour in real situations, as well as knowledge retention over the long term, should be a

focus of future activities so that the impact of the training can be assessed more comprehensively.

Conclusion

The community service activity in the form of triage training was shown to enhance nurses' capacity in managing mass-casualty victims. Nurses' knowledge in the good category rose from 30% to 85%, the fair category fell from 45% to 15%, and the poor category fell from 25% to 0%. This indicates that the training was effective in improving nurses' knowledge of the MCI concept and the application of triage.

Recommendations

1. Disaster referral hospitals are advised to organise periodic triage training and refreshers for all nurses
2. Similar activities can be developed by adding skills evaluation and full-scale drills
3. Follow-up in the form of measuring knowledge retention and triage application in real situations is needed to assess the long-term impact of the training.

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