



ORIGINAL ARTICLE

START Triage Video Education Improves Earthquake Disaster Response Knowledge among Anesthesiology Nursing Students: A One-Group Pretest–Posttest Study



Muhammad Zaidan Yudzkar¹, Anita Setyowati², Raden Sugeng Riyadi³

¹ Universitas 'Aisyiyah Yogyakarta, Indonesia

² Universitas 'Aisyiyah Yogyakarta, Indonesia

³ Universitas 'Aisyiyah Yogyakarta, Indonesia

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Corresponding Author:

Muhammad Zaidan
Yudzkar

Universitas 'Aisyiyah Yogyakarta
Email:
zaidanyudzkar@gmail.com

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ABSTRACT

Background: Earthquake disasters may cause mass casualties and require rapid victim prioritization through appropriate triage. START triage is a simple method for disaster response, but students' knowledge of its application may still be limited. Video education may help improve students' understanding of triage procedures.

Objectives: This study aimed to examine the effect of START triage video education on earthquake disaster response knowledge among anesthesiology nursing students.

Methods: Quantitative pre-experimental study used a one-group pretest–posttest design. A total of 70 first-semester anesthesiology nursing students were selected using simple random sampling. Participants received a five-minute START triage educational video. Knowledge was measured before and after the intervention using a 20-item questionnaire. Data were analyzed using descriptive statistics and the Wilcoxon Signed Rank Test.

Results: Before the intervention, 34.4% of students had good knowledge. After the intervention, the proportion increased to 67.2%. The Wilcoxon test showed a significant improvement in knowledge after video education ($p < 0.001$).

Conclusions: START triage video education significantly improved earthquake disaster response knowledge among anesthesiology nursing students and may be used as a practical learning medium in disaster preparedness education.



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Introduction

Earthquakes remain one of the most serious natural disasters because they occur suddenly and may cause mass casualties, physical injury, psychological distress, displacement, infrastructure damage, and disruption of health services (United Nations Office for Disaster Risk Reduction, 2015; World Health Organization, 2024). Indonesia is highly vulnerable to earthquakes because it is located in an active tectonic region and is frequently exposed to seismic hazards (Anshori, 2019; United Nations Office for Disaster Risk Reduction, 2015). The Special Region of Yogyakarta is one of the areas with historical earthquake impacts, making disaster preparedness an important concern for educational institutions and health-related programs in the region (Widyawarman & Fauzi, 2025). Disaster preparedness is not only a community responsibility but also an essential component of health professional education because future health workers are expected to contribute to emergency response and disaster management (International Council of Nurses, 2019; Tussing et al., 2022).

Mass casualty incidents may overwhelm available health resources and require rapid decision-making to determine which victims should receive immediate care. In this situation, triage becomes a fundamental process for prioritizing victims based on urgency, severity, and available resources (World Health Organization, 2024). Effective triage supports patient safety by helping emergency responders allocate limited resources appropriately and reduce delays in the management of critically injured victims (Fekonja et al., 2023). In disaster nursing, the ability to assess victims, classify priorities, communicate clearly, and act safely is considered part of core disaster response competence (International Council of Nurses, 2019). Therefore, students in health-related programs need early exposure to disaster triage concepts before they enter clinical and emergency practice settings (Nikitara et al., 2025; Tussing et al., 2022).

Anesthesiology nursing students are among the future health professionals who require basic disaster response knowledge because their field is closely related to airway, breathing, circulation, emergency assessment,

and patient stabilization (Firdaus et al., 2022). Their understanding of disaster triage is important because correct prioritization can influence the speed and accuracy of victim management during emergency situations (Bazyar et al., 2019; Fekonja et al., 2023). Previous studies have shown that disaster preparedness and triage knowledge among nursing students may vary and often require structured educational reinforcement (Emaliyawati et al., 2021; Pawilliyah et al., 2024). This indicates that disaster triage learning should not only be delivered theoretically but also through learning strategies that are practical, visual, and easy to understand (Morgado et al., 2024; Tussing et al., 2022).

One commonly used approach in mass casualty triage is the Simple Triage and Rapid Treatment method, known as START. START triage allows responders to classify victims rapidly based on walking ability, respiration, perfusion, and mental status. The method uses color-coded categories, including green for minor injuries, yellow for delayed care, red for immediate care, and black for deceased or expectant victims (Radiation Emergency Medical Management, 2024). START triage is considered simple and practical for field conditions because it can be applied quickly when time, personnel, and equipment are limited (Bazyar et al., 2019). However, systematic reviews have also shown that the accuracy of triage systems may vary, indicating that adequate training and repeated educational exposure are needed to improve understanding and reduce decision-making errors (Bazyar et al., 2022; Montagner et al., 2022).

Knowledge of START triage is particularly relevant in earthquake disaster response because earthquakes may produce many victims with different levels of injury severity at the same time (United Nations Office for Disaster Risk Reduction, 2015; World Health Organization, 2023). Students who understand START triage are expected to recognize basic victim priority categories and understand how assessment should be performed in a mass casualty context (Bazyar et al., 2019; Radiation Emergency Medical Management, 2024). In contrast, limited knowledge of triage may create uncertainty when students are required to identify victim

priorities, interpret clinical signs, and make rapid decisions in simulated or real disaster situations (Fekonja et al., 2023; Nikitara et al., 2025). Therefore, structured education on START triage is needed to strengthen students' disaster response knowledge and support their preparedness as future healthcare professionals (International Council of Nurses, 2019; Tussing et al., 2022).

Video-based education is one learning strategy that may improve students' understanding of disaster triage because it combines visual and auditory information in a structured format (Morgado et al., 2024). Video can present procedures, scenarios, and decision-making steps more clearly than verbal explanation alone, especially for procedural topics such as triage (Morgado et al., 2024; Niekrenz & Spreckelsen, 2024). In health education, video-based approaches have been reported to support knowledge acquisition, skill development, and learner engagement (Morgado et al., 2024). Audiovisual learning may also help students focus on important information and remember material more effectively because it uses both visual and auditory channels (Aisah et al., 2021; Amandus et al., 2021).

Previous studies support the use of video education in disaster and triage learning. A study on earthquake disaster preparedness showed that animated video education improved students' knowledge of disaster safety (Maghriza et al., 2023). Another study found that video-based triage education increased nursing students' knowledge of emergency triage (Pawilliyah et al., 2024). Research on simulation video also showed improvement in triage knowledge among healthcare workers after video-based learning (Amandus et al., 2021). These findings suggest that video education may be a relevant method for teaching START triage because it can present victim assessment, color classification, and emergency decision-making in a more concrete and understandable way (Morgado et al., 2024; Radiation Emergency Medical Management, 2024).

At Universitas 'Aisyiyah Yogyakarta, preliminary observations among first-semester anesthesiology nursing students indicated that many students had not yet received specific learning material on START

triage. Initial assessment also suggested that students' knowledge of earthquake disaster response and disaster triage was still limited. This condition may reduce students' readiness to understand victim prioritization in disaster situations, especially because START triage requires rapid recognition of victim categories and basic clinical assessment. Therefore, video-based START triage education may provide a simple, accessible, and practical learning strategy to improve students' understanding of earthquake disaster response.

Although several studies have examined disaster preparedness education, video-based learning, and triage knowledge, limited evidence has specifically addressed START triage video education for earthquake disaster response knowledge among anesthesiology nursing students (Amandus et al., 2021; Maghriza et al., 2023; Pawilliyah et al., 2024). This gap is important because anesthesiology nursing students need learning experiences that are relevant to emergency assessment, patient prioritization, and disaster response (Firdaus et al., 2022; International Council of Nurses, 2019). Therefore, this study aimed to examine the effect of START triage video education on earthquake disaster response knowledge among anesthesiology nursing students at Universitas 'Aisyiyah Yogyakarta. It was hypothesized that START triage video education would significantly improve students' knowledge after the intervention.

Methods

This study used a quantitative pre-experimental design with a one-group pretest-posttest approach to examine the effect of START triage video education on earthquake disaster response knowledge among anesthesiology nursing students. The study was conducted at Universitas 'Aisyiyah Yogyakarta, Indonesia, in 2026.

The population consisted of 234 first-semester anesthesiology nursing students from the 2025 cohort. The sample size was determined using the Slovin formula, resulting in 70 participants. Participants were selected using simple random sampling. Eligible participants were first-semester anesthesiology nursing students who were willing to participate in the study. Students were excluded if they were absent during data

collection, did not complete the education session, were on academic leave, or had health conditions that prevented full participation.

The intervention was START triage video education delivered once in a classroom setting using audiovisual media. The video lasted approximately five minutes and contained material on the definition of triage, triage principles, types of triage, triage categories and classifications, and the purpose of triage. The education focused on the application of START triage in earthquake disaster response.

Knowledge of earthquake disaster response and START triage was measured using a 20-item multiple-choice questionnaire adapted from a previous study. The questionnaire covered five indicators: triage definition, triage principles, types of triage, triage categories and classifications, and the purpose of triage. Each correct answer was scored 1, while each incorrect answer was scored 0. The total score was categorized into three levels: poor knowledge (<56%; score 0–11), sufficient knowledge (56%–75%; score 12–15), and good knowledge (76%–100%; score 16–20).

Data collection was conducted in three stages. First, participants completed a pretest questionnaire to assess their baseline knowledge of START triage and earthquake disaster response. Second, participants received START triage video education in the classroom. Third, participants completed a posttest questionnaire after the education session to measure changes in knowledge. All questionnaires were checked for completeness before data analysis.

Data were analyzed using IBM SPSS Statistics version 24. Descriptive statistics, including frequency and percentage, were used to describe participant characteristics and knowledge levels before and after the intervention. Because the data were ordinal and obtained from paired measurements in the same group, the Wilcoxon Signed Rank Test was used to analyze differences between pretest and posttest knowledge scores. Statistical significance was set at $p < 0.05$.

This study received ethical approval from the Ethics Committee of Universitas 'Aisyiyah Yogyakarta with approval number No. 5226/KEP-UNISA/II/2026. All participants received information about the study

objectives, procedures, voluntary participation, confidentiality, and their right to withdraw from the study. Informed consent was obtained before data collection.

Results

A total of 70 anesthesiology nursing students participated in this study. Based on sex, most participants were female, with 61 students (87.1%), while 9 students (12.9%) were male.

Table 1. Characteristics of Participants

Characteristics	n	%
Sex		
Male	9	12.9
Female	61	87.1
Total	70	100.0

Before receiving START triage video education, participants' knowledge of earthquake disaster response was distributed across three categories. A total of 23 participants (32.8%) had poor knowledge, 23 participants (32.8%) had sufficient knowledge, and 24 participants (34.4%) had good knowledge. After the intervention, the number of participants with good knowledge increased to 47 students (67.2%), while those with sufficient knowledge decreased to 15 students (21.4%) and those with poor knowledge decreased to 8 students (11.4%).

Table 2. Knowledge level before and after START triage video education

Knowledge level	Pretest		Posttest	
	n	%	n	%
Poor	23	32.8	8	11.4
Sufficient	23	32.8	15	21.4
Good	24	34.4	47	67.2
Total	70	100	70	100

The mean knowledge category score increased from 2.01 before the intervention to 2.56 after the intervention. The standard deviation decreased from 0.825 to 0.694, indicating that knowledge scores became more consistent after the educational video was delivered.

Table 3. Effect of START triage video education on earthquake disaster response knowledge

Measurement	n	Mean	Standard deviation	p-value
Pretest	70	2.01	0.825	<0.001
Posttest	70	2.56	0.694	

The Wilcoxon Signed Rank Test showed a statistically significant difference in knowledge

before and after START triage video education ($p < 0.001$). This result indicates that START triage video education significantly improved earthquake disaster response knowledge among anesthesiology nursing students.

Discussion

Characteristics of Respondents

This study involved 70 anesthesiology nursing students, most of whom were female. This distribution reflects the general profile of nursing students, where female students are often more dominant than male students. Although sex was not the main variable in this study, participant characteristics remain important because individual differences may influence learning attention, motivation, and the way students receive information. In disaster nursing education, students' readiness is not only shaped by formal learning but also by personal characteristics, previous exposure to disaster information, and learning experience ([International Council of Nurses, 2019](#); [Tussing et al., 2022](#)). Therefore, understanding the characteristics of respondents helps provide context for interpreting changes in knowledge after the educational intervention.

The dominance of female respondents in this study should not be interpreted as the main cause of knowledge improvement. The increase in knowledge after the intervention was more likely related to the structured video education provided to all participants. Video-based education delivers the same information to learners in a standardized format, allowing students with different backgrounds and learning experiences to receive similar material. This is useful in classroom-based disaster education because students may have different levels of prior knowledge before receiving structured learning ([Morgado et al., 2024](#); [Niekrenz & Spreckelsen, 2024](#)).

Knowledge Before START Triage Video Education

Before receiving START triage video education, students' knowledge of earthquake disaster response was still varied. The proportion of students in the poor, sufficient, and good knowledge categories was relatively balanced, indicating that students had not yet developed a strong and consistent understanding of START triage. This finding is

reasonable because preliminary observations showed that many first-semester anesthesiology nursing students had not received specific learning material on START triage.

Limited baseline knowledge may occur because START triage is a procedural topic that requires more than simple theoretical explanation. Students need to understand the meaning of triage, the purpose of victim prioritization, the color classification system, and the assessment sequence used in mass casualty situations. START triage requires rapid assessment based on walking ability, respiration, perfusion, and mental status, so learners need clear guidance to understand how each step is applied in disaster response ([Radiation Emergency Medical Management, 2024](#)). Without structured learning, students may know general disaster concepts but still have difficulty applying triage principles in practical situations.

This finding is consistent with previous studies showing that disaster preparedness and triage knowledge among nursing students may vary before educational intervention. Emaliyawati et al. (2021) reported that disaster preparedness among nursing students still required strengthening ([Emaliyawati et al., 2021](#)). Firdaus et al (2022) also highlighted the importance of improving disaster triage knowledge among anesthesiology nursing students ([Firdaus et al., 2022](#)). These findings indicate that disaster triage education should be introduced early and delivered using learning methods that are simple, practical, and easy to understand.

Knowledge After START Triage Video Education

After receiving START triage video education, students' knowledge improved, as shown by the increased proportion of students in the good knowledge category. This improvement suggests that video education helped students understand the concept and steps of START triage more clearly. The decrease in the number of students with poor knowledge also indicates that the intervention was useful in reducing knowledge gaps among participants.

The improvement in knowledge can be explained by the characteristics of audiovisual learning. Video combines visual and auditory

information, allowing students to see, hear, and follow the material in a structured sequence. This format is particularly useful for procedural topics because students can observe the flow of assessment and decision-making more clearly than through written or verbal explanation alone (Morgado et al., 2024; Niekrenz & Spreckelsen, 2024). In START triage education, video can present victim assessment, color classification, and emergency prioritization in a more concrete way, making the material easier to understand and remember.

The findings of this study are in line with previous research on video-based disaster and triage education. Maghriza et al. (2023) found that animated video education improved knowledge of earthquake disaster preparedness (Maghriza et al., 2023). Pawilliyah et al. (2024) reported that video-based education increased nursing students' knowledge of emergency triage (Pawilliyah et al., 2024). Amandus et al. (2021) also showed that simulation video improved triage knowledge among healthcare workers (Amandus et al., 2021). These studies support the current finding that video education can be an effective medium for improving knowledge in disaster and emergency learning.

Effect of START Triage Video Education on Earthquake Disaster Response Knowledge

The Wilcoxon Signed Rank Test showed a significant difference in students' knowledge before and after START triage video education. This result indicates that the intervention had a significant effect on improving earthquake disaster response knowledge among anesthesiology nursing students. The increase in the mean score after the intervention also supports the finding that students' understanding improved after receiving video-based education.

This improvement is important because START triage is a practical method used in mass casualty incidents. In earthquake disaster situations, responders must be able to classify victims quickly and accurately so that those requiring immediate care can be prioritized. Effective triage supports patient safety and helps optimize limited resources during emergency response (Bazyar et al., 2019; Fekonja et al., 2023). For anesthesiology nursing students, this knowledge is relevant

because their future professional role is closely related to airway, breathing, circulation, patient stabilization, and emergency care.

The significant improvement found in this study also suggests that video education may be a suitable learning strategy for early disaster education. As first-semester students, participants may still have limited clinical exposure and practical experience. Therefore, video can serve as an accessible introductory medium before students proceed to simulation, skills training, or clinical emergency practice. This approach is consistent with disaster nursing education recommendations, which emphasize the importance of structured training to improve knowledge, preparedness, and response competence among nursing students and healthcare workers (International Council of Nurses, 2019; Tussing et al., 2022).

Although the results showed a significant improvement, they should be interpreted carefully. This study used a one-group pretest-posttest design without a control group, so the increase in knowledge cannot be attributed entirely to the video intervention with full certainty. Other factors, such as repeated testing, motivation, classroom conditions, or previous exposure to disaster-related information, may also have influenced the results. Nevertheless, the clear improvement after the intervention suggests that START triage video education is a promising, simple, and practical method to strengthen earthquake disaster response knowledge among anesthesiology nursing students.

Implication and limitation

The findings of this study indicate that START triage video education may represent a simple, accessible, and practical learning strategy to improve earthquake disaster response knowledge among anesthesiology nursing students. By presenting triage concepts, victim assessment steps, and color-coded priority classification in an audiovisual format, video education may help students understand START triage more clearly before they engage in simulation or clinical emergency practice. These findings support the integration of video-based disaster triage education into anesthesiology nursing curricula, particularly as an introductory learning medium for early-stage students.

Nevertheless, several limitations should be considered. The use of a one-group pretest-posttest design without a control group limits causal interpretation, while the single-center setting and relatively small sample size may reduce the generalizability of the findings. In addition, this study measured knowledge only and did not assess students' practical triage skills, decision-making accuracy, long-term knowledge retention, or disaster preparedness behavior. Future studies using controlled or randomized designs, larger multicenter samples, follow-up measurements, and simulation-based skill assessments are recommended to further evaluate the effectiveness of START triage video education in disaster nursing education.

Relevance for Practice

The present findings support the integration of START triage video education into disaster preparedness learning for anesthesiology nursing students. Video-based education may help students understand victim assessment, triage color classification, and priority decision-making in earthquake disaster response more clearly before entering simulation or clinical emergency practice. As a simple, low-cost, and easily repeated learning medium, START triage video education can be used by nursing educators to strengthen students' basic disaster response knowledge and prepare them for more advanced practical training in emergency and disaster care.

Conclusion

START triage video education significantly improved earthquake disaster response knowledge among anesthesiology nursing students at Universitas 'Aisyiyah Yogyakarta. After receiving the video education, more students achieved a good level of knowledge, indicating that audiovisual learning can help students understand triage concepts, victim assessment steps, and color-coded priority classification more clearly. These findings suggest that START triage video education may be used as a simple and practical learning medium to strengthen basic disaster response knowledge before students proceed to

simulation-based or clinical emergency training.

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Author Contribution

Muhammad Zaidan Yudzkar contributed to conceptualization, study design, instrument preparation, data collection, data analysis, manuscript drafting, and preparation of the original manuscript. Raden Sugeng Riyadi contributed to study supervision, methodology refinement, data interpretation, and critical review of the manuscript. Anita Setyowati contributed to study supervision, content validation, manuscript review, and final editing. All authors read and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

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Declaration of Conflicting Interest

The authors declare no conflict of interest.

Declaration of Use of AI in Scientific Writing

The authors declare that generative AI and AI-assisted technologies were used to support language editing and grammatical refinement of the manuscript.

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