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Preparedness training programs improved the emergency response and crucial outcomes among nursing students: a scoping review

Review

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Abstract: **Objective:** The study aims to review and discuss the outcomes of emergency preparedness training programs among nursing students.
Methods: A scoping review was conducted based on the guidelines of Arskey and O'Malley. Databases through PubMed, Science Direct, and Google Scholar were used to obtain the relevant articles within the scoping review.
Results: The researchers found 1175 articles. After manual review, 28 articles were identified and assessed. The review reported that the emergency preparedness training program significantly affects preparedness, knowledge, performance, self-efficacy, learning motivation, self-confidence, satisfaction, critical decision-making, and problem-solving.
Conclusions: Emergency training effectively increases knowledge, skills, confidence, satisfaction, and team performance.

Keywords: *emergency preparedness • first aid • nursing students • training program • emergency response • disaster management • team performance*

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1. Introduction

Emergencies can happen anywhere and anytime. Emergencies can occur in everyday cases and disaster cases. It has become an officer of health workers to deal with this problem.[1] Health workers could face emergencies in areas that are difficult to reach (on highways, schools, universities, and homes) or can be reached by health workers. However, there are more victims than health workers (disasters).[2] Community participation, especially among nursing students, is crucial in helping victims before they are found. Emergencies are often severe and sometimes dangerous situations that occur suddenly and unexpectedly and require immediate action to save life or prevent disability.[3]

Both daily emergencies and disasters will have the same impact on the victims, namely, broken bones, bleeding, multiple traumas, respiratory arrest, and cardiac arrest.[4] World Health Organization (WHO) reported 95,906 accidents in 2019. Around 17.2% died from accident incidents, and approximately 1.3 million

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people experienced physical disabilities. In 2019, WHO noted that traffic accidents claimed the lives of roughly 2.4 million people. The high number of accidents causes high fracture incidents, including the maxilla fracture.[5] Cardiac arrest that occurs outside the hospital, otherwise known as Out of Hospital Cardiac Arrest (OHCA), is one of the emergency cases that is the leading cause of death in America and Europe. Globally, the incidence of OHCA tends to increase from year to year. The incidence of OHCA also increases with increasing age among men aged 50 years. The incidence of OHCA reaches 100 per 100,000 population per year and increases in men aged 80 years, reaching 800 per 100,000 per year.[6] Mulyana et al.[7] suggested that OHCA most often occurs at home, which runs 80% and 20% occurs outside the home. The phenomenon in Indonesia is that the role of bystanders has not been appropriately implemented. Therefore, patients with OHCA often do not get early cardiopulmonary resuscitation (CPR), which is given at the hospital when a patient is.[7] In the last decade, disaster events have almost doubled, showing a trend line of about 450–800 significant emergencies annually. This increase is most pronounced in middle and low-income countries, where emergency preparedness is often insufficient.[8]

In daily emergencies and disasters, one of the efforts to increase the victim's life expectancy and prevent disability is first aid. First aid is a treatment given while waiting for help to arrive or before being taken to a health facility.[9] The health services development problem needs to be more evenly distributed. It only reaches some levels of society. Other factors that influence these problems are the number, distribution, and capacity of human resources, which still need to be improved, as well as the limited range of transportation. The handling of emergency cases encounters various obstacles ranging from failure to recognize risks, delays in diagnosing, delays in referring, and delays in receiving inadequate treatment. Lack of facilities and economic limitations are also the causes of failure in handling emergency cases. In addition, the lack of public knowledge regarding the initial handling of emergency cases often causes victims to experience disability or death. Knowledge and skills in dealing with emergency patients are essential in determining the success of assistance. Many emergency room sufferers experience disability and death due to ignorance in assisting.[5]

In a disaster emergency, apart from first aid, another effort is understanding disaster management at the pre-disaster, disaster, and post-disaster levels. A disaster is an incident that results in damage, ecological disturbance, loss of human life, and deterioration of health status or services on a particular scale that requires a response from the people of the area affected by the disaster.[10]

Therefore, training programs need to be provided to increase the knowledge and skills of nursing students in providing first aid and disaster management. Training is an effort to improve learning, change behavior, and develop skills. European countries have made first aid and disaster management mandatory in senior high schools. They have accustomed high school graduates to mastering first aid and disaster management. Of course, as health students, nursing students should master it.[11]

Many published studies are looking at the effectiveness of emergency and disaster management training programs. Therefore, this study aims to assess the outcomes of Emergency Preparedness Training Programs among Nursing Students through a scoping review.

2. Methods

2.1. Aim

The study aims to review and discuss the outcomes of emergency preparedness training programs among nursing students.

2.2. Design

A scoping review was conducted based on the guidelines of Arskey and O'Malley. Five stages of scoping review include (1) the outlining of research questions, (2) identifying the study based on the inclusion criteria, (3) defining the final study, (4) synthesizing the data, and (5) results summarizing and reporting.

2.3. Databases

Databases through PubMed, Science Direct, and Google Scholar were used to obtain the relevant articles within the scope of this scoping review. Those articles were initially included based on the inclusion criteria and followed by the preferred reporting items for systematic review and meta-analysis (PRISMA) framework to appraise each relevant article. Table 1 shows database search results.

2.4. Search strategies

The terms used to obtain the relevant articles in this review include "Emergency Nursing Preparedness Training Program," "Emergency Nursing Training," "Emergency Training," "Emergency Preparedness,"

Database (2012–2022)	Retrieved article number
PubMed	400
Science Direct	457
Google Scholar	318
Total	1175

Table 1. Database searching result.

PICO	Mesh
Population	"Nursing Student"
Intervention	"Emergency Nursing Preparedness Training Program" OR "Emergency Nursing Training" OR "Emergency Training" OR "Emergency Preparedness" OR "First Aid Training Program"
Comparison	Control group
Outcomes	Any outcomes

Note: PICO, Population, Intervention, Comparison, Outcomes.

Table 2. Search strategies.

"First Aid Training Program," and "Nursing Student". Available titles and abstracts regarding the outcomes of emergency nursing training programs for nursing students were reviewed and analyzed systematically to find the most relevant articles. Table 2 shows the search strategies used in this study.

2.5. Eligibility criteria of the study

The eligibility of articles was limited to those published between 2012 and 2022 to ensure they were up-to-date and relevant to the current situation. Articles that discussed emergency training programs or first aid training programs for nursing students were mainly focused on reviewing. Description of an appropriate program that does not include emergency/first aid training programs as part of intervention and nursing students as part of the target population would be listed as a reason to exclude from the study. Types of study designs, including a single design, descriptive, review, and unpublished dissertation, were also excluded from this study.

2.6. Synthesis of results

All authors did the screening of relevant articles. The findings of this study are explained narratively, including (1) Authors, year, and country; (2) Design; (3) Sample size; (4) Strategy of emergency/first aid training programs as an intervention; (5) Outcomes of the programs; (6) Instruments used for measuring the outcomes.

3. Result

3.1. Search result

Using the initial keywords, we extracted 1175 articles from 3 databases based on the PRISMA flowchart from 2012 to 2022. Among 1175 articles, 1075 articles were removed because of duplicate; finally, 109 articles were included. The researchers screened and selected relevant articles related to emergency training programs or first aid training programs for nursing students based on the titles and abstracts of the selected articles. From there, 70 articles were excluded due to inappropriate inclusion criteria. Accurately, 30 published studies were in review format, including concept analysis, literature review, systematic review, and meta-analysis. Another reason to exclude 40 published studies was that they were not in full text. After screening relevant articles based on research titles, abstracts, and full text, the researchers extracted 39 eligible, complete text studies. Only 28 relevant articles fulfilled the inclusion criteria. On the other hand, >11 articles were excluded due to the focus on different populations: medical students and ordinary people. Figure 1 shows summary of searching process.

3.2. Research origin

A scoping review is taken from research in various countries. Countries that contributed to compiling this scoping review were Indonesia, Poland, South Korea, China, Spain, Japan, Georgia, Germany, Iran, Brazil, Australia, Sweden, and France.

3.3. Research design

The Randomized Controlled Trial (RCT) and quasi-experiment study dominated in this review. Eight studies were RCTs to examine the program's effectiveness on health outcomes.[2,6,12–17] Other 15 studies also were conducted using quasi-experiment.[3,5,8,12,18–29] Two studies used the cross-sectional study as a research design.[30,31] Other studies applied a mixed-methods study,[32] a qualitative study, and a report study.[33]

3.4. Training programs & duration of programs

3.4.1. Emergency training programs

CPR

Twelve studies provided CPR training to nursing students.[3,6,13–16,19–21,26–28] The training duration varies from

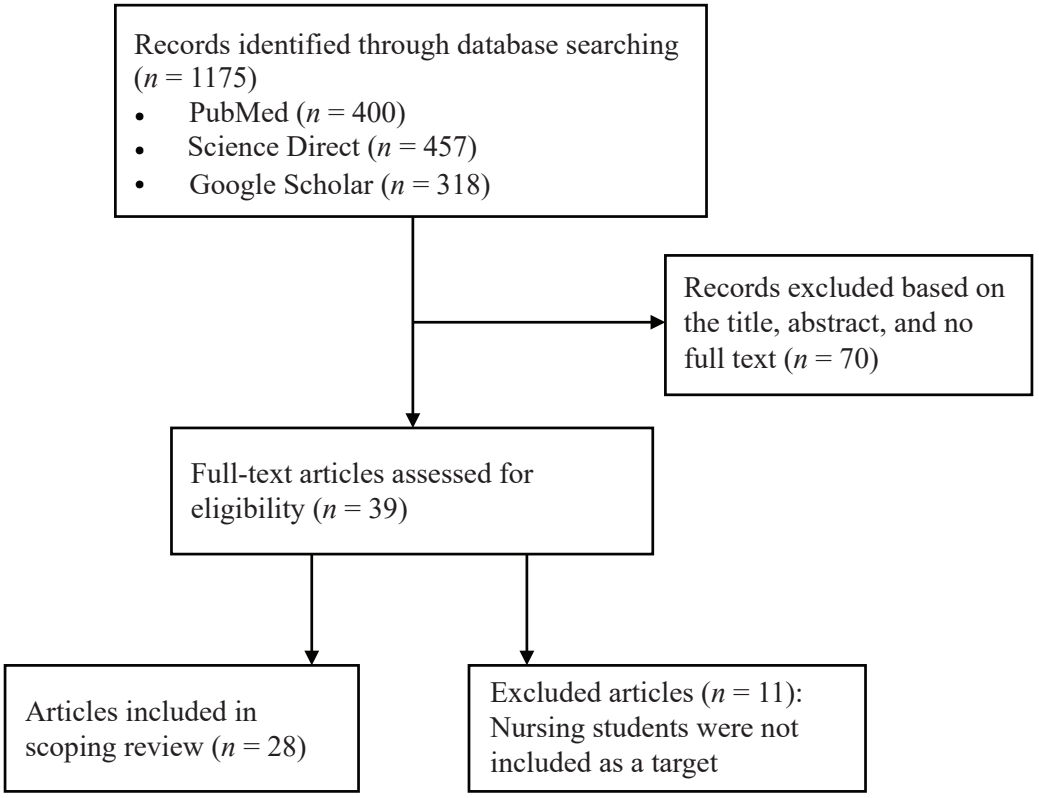


Figure 1. Summary of searching process.

1 d to 1 month. CPR training implementation strategies also vary. Online virtual features or virtual reality were used to demonstrate CPR.[21,26] The training courses were held offline within 1–2 d and then evaluated directly or 1 month later using the help of modules and videos.[3,15,19,20,27] One study used the device to aid accuracy in performing CPR,[13] 1 of the 12 studies used a team of professionals to perform CPR.[14] Then, 3 of the 12 training courses used a training method repeated every 2, 4, and 6 months.[6,16,28]

Pre-hospital emergency care

Four studies conducted first-aid training for nursing students.[5,8,29,31] The duration of the training ranges from 1 d to 2 d. The form of training also varies since courses were provided using the fracture management method.[5,8] One training offers comprehensive training for everyday emergencies such as broken bones, hemorrhages, bruises, nosebleeds, sprains, leg cramps, and animal stings.[29] Furthermore, 1 of 4 training courses provides training on traffic accident trauma cases.[31]

Intra-hospital emergency care

Five studies provided nursing students with training at the intra-hospital level.[22,25,30,32,34] One of 5 trainings providing training on newborn emergency care with a combination method of 1 3-h lecture, 3 h of clinical training, and a 2-h simulation program.[22] One of 5 training courses provided a simulation-based, interprofessional course module training program on clinical emergency medicine. This program forms a team between nursing and medical students in understanding and emergency skills.[25] One of 5 trainings providing emergency chest pain, hypovolemic, and respiratory distress training through scenario simulation.[32] One of 5 studies recorded when students were taking emergency exams at the hospital for nursing students to view again.[34] One training provides regular and repeated training in the emergency room.[30]

3.4.2. Disaster preparedness training programs

Seven of 28 studies provided disaster preparedness training programs to nursing students.[2,12,17,18,23,24,33] The average training duration is 1 month. Forms and topics of disaster training also vary. Other studies implement training in natural disaster management with the help of modules. The training includes assessment, airway assistance, triage, injuries, transportation, evacuation, and installation of tents, as well as a flash flood emergency simulation.[2,12,18,33] One of 7 trainings

provided comprehensive disaster training (disaster response, emergency care, and intensive care) using a high-technology and simulation-based emergency curriculum.[17,23,24]

3.5. Outcomes and instrument

3.5.1. Preparedness

Four out of the 28 studies measured readiness in dealing with emergencies. These studies reiterate that emergency training was indeed effective in increasing emergency preparedness. They used the same instrument, a 20-item questionnaire. Questions 1-5 measured knowledge, 6-10 measured warning systems, 11-15 measured emergency response plans, and 16-20 measured resource mobilization.[3,18,20,31]

3.5.2. Knowledge

A total of 11 studies measured the knowledge in dealing with emergencies. The study's results explained that emergency training increases knowledge of dealing with emergencies. The instruments used vary depending on the training topic (CPR, fracture, disaster, and bioterrorism) provided. However, all studies use devices in the form of questionnaires, either essays or multiple choices.[2,5,15,17,19,21,22,27,29,31,33]

3.5.3. Skills/performance/team performance

Among the 28 studies, a notable 15 measured the skills of both individuals and teams as outcomes. What's fascinating is the vast array of instruments used in these studies, each tailored to the specific training topics. They included observation sheets and questionnaires to measure skills such as dressing and splinting.[8,29] Observation sheets using Standard Operational Procedures (SOP) were employed for disaster management.[2] Raters assessed student-simulated resuscitation performance,[23] while an Objective Structured Clinical Examination (OSCE) checklist (six-station bioterrorism performance) was used to measure bioterrorism performance.[17] OSCE ratings and the Team Emergency Assessment Measure (TEAM) scale were utilized to measure teamwork performance in managing chest pain, hypovolemic shock, and respiratory distress.[14,32] Furthermore, a 20-multiple choice American Heart Association (AHA) 2011 version, observation sheets, SOP for five quality CPR, manikin feedback, and a case-based scenario were used to measure five quality CPR.[6,13–16,26]

3.5.4. Self-efficacy

Three of 28 studies measure self-efficacy in dealing with emergencies. The results of the study show that emergency training is effective in increasing self-efficacy. The instruments used were the questionnaire and the general self-efficacy scale.[12,28,31]

3.5.5. Learning motivation

Three of 28 studies measure learning motivation in understanding emergencies. All studies show that emergency training improves nursing students' motivation to understand emergencies. The instruments used were the learning motivation test paper,[21] a 10-item motivation questionnaire, and a 26-item questionnaire.[30]

3.5.6. Self-confident level

Three of 28 studies measured self-confidence levels when carrying out practice and emergency simulations. All studies show that emergency training increases self-confidence levels. The measurement instruments used were a 15-item self-confidence in a functional questionnaire[21,22] and a 10-item self-confidence questionnaire.[24]

3.5.7. Learning satisfaction

Three of 28 studies measured student satisfaction with the training programs provided. All studies gave satisfying responses to the training programs offered. The instruments used were a questionnaire,[22,25] and a 11-item questionnaire.[24]

3.5.8. Critical thinking in decision-making and problem-solving

Three of 28 studies measure critical thinking in decision-making and problem-solving as secondary outcomes. Training, in addition to increasing knowledge and skills, also increases critical thinking. The instruments used were a 30-item problem-solving questionnaire, a 15-item clinical reasoning ability questionnaire,[21] a 14-item decision-making and technical questionnaire,[24] and a critical thinking skill questionnaire.[28]

3.6. Other outcomes

Other outcomes also measured simultaneously are the degree of anxiety using the State-Trait Anxiety Inventory (STAI) instrument,[21] self-evaluation after first aid training using the core self-evaluation instrument,[31] clinical

experience using the 7-item questionnaire,[24] and quality of teaching using the quality of teaching questionnaire.[25]

3.7. Barriers to training programs

All experienced researchers faced barriers to retaining skills and knowledge over time. Several studies were conducted, and expertise and skills are reduced when the trainer evaluates it after 4–6 months.

4. Discussion

An emergency is a patient's clinical condition that requires immediate medical action to save lives and prevent disability. To achieve this goal, it is necessary to provide emergency services. Health workers must provide emergency services. However, in practice, not all emergency conditions occur around health workers. Emergency conditions can happen anywhere and anytime without health workers' awareness. The public, especially nursing students, must understand and be skilled in providing emergency services before health workers arrive. Saving the victim's life and preventing disability is determined by 3 factors: (1) the speed at which the victim is found, (2) the speed of asking for help, and (3) the speed and accuracy of assisting. These 3 factors can be achieved by understanding and being skilled in handling emergencies. Training is one method of increasing emergency knowledge and skills.[35]

Training is a short-term educational process using systematic and organized procedures to teach students technical knowledge and skills for a specific purpose. The success of the training is inseparable from the chosen methods, namely, lectures, videotapes, demonstrations, role-plays, simulations, and case discussions. The effectiveness of the training is the result of increasing knowledge, skills, and abilities so that they can handle emergencies.[36]

The lower a person's knowledge about emergencies, the less readiness for handling emergencies will also not be appropriate. Readiness is a person's ability to apply knowledge to action. A person's readiness is influenced by education and training. Readiness in an emergency is influenced by knowledge of particular objects and is stored in memory. Knowledge can develop over time, and the learning process is essential in development. Learning is an activity of adding and gathering a certain amount of knowledge. By learning, new behavior will be obtained, from not understanding to knowing so that a new understanding arises, followed by the development of social and emotional traits. To improve the quality of learning, indicators of training effectiveness can be seen from several indicators, namely, (1) Additional participant knowledge or abilities or insights; (2) The participants' ability to remember the contents of the training or abilities; (3) The ability of participants to practice training material or skilled.[37,38]

European countries have made first aid and disaster management mandatory in senior high schools. They have accustomed high school graduates to mastering first aid and disaster management. Of course, as health students, nursing students should master it.[11] The Bachelor of Science in Nursing curriculum is shifting from a content-based to a competency-based approach, emphasizing practical learning for prelicensure nursing students to strengthen nursing competency.[21]

Meanwhile, according to the American Heart Association (2015), anyone can do first aid, not necessarily health workers. First aid skills are essential because they teach basic techniques to save victims from various accidents or everyday disasters that are commonly encountered. One of the first aid skills that must be appropriately mastered is CPR. The ability to perform high-quality chest compressions is essential for nursing students, who frequently are first responders in in-hospital and out-hospital settings. International CPR guidelines emphasize the importance of high-quality chest compressions, including correct chest compression depth, rate, and complete chest recoil. These guidelines suggest that the "high quality" resuscitation parameters should be 5–6 cm of chest compression depth, 100–120/min rate, and full chest recoil with minimal interruptions in chest compressions. High-quality chest compression is an essential factor enabling vital organ perfusion maintenance and influencing cardiac arrest patients' outcomes. Maintaining high quality throughout prolonged CPR is difficult, even for medical personnel.

For this reason, the current guidelines recommend changing the rescuer every 2–3 min, especially during prolonged resuscitation. One of the significant CPR problems is not letting the chest recoil, which can lower the effectiveness of the resuscitation by reducing the venous return and decreasing the overall cardiac output. Any interruptions in chest compressions, including hands-off time, diminish the quality of chest compressions. Using high technology in simulation-based training for nursing students was associated with decreased response time in a resuscitation simulation. Some publications suggest that the quality of visual assessment of hand placement, compression depth, chest decompression, and rate during CPR is suboptimal. This observation implies that feedback devices should be incorporated into Basic Life Support (BLS) training.[13]

Another outcome of this training is increased self-confidence during the simulation, increased motivation to learn, and satisfaction. Confidence comes from the

advanced knowledge and skills of the participants so that, when given a scenario, the participants understand and are confident. Satisfaction with the training program increases because the participants benefit from knowledge and skills. Apart from that, because satisfaction with the training program is obtained, participants have high learning motivation to master this knowledge and skills.

5. Conclusions

In conclusion, the evidence strongly supports the assertion that emergency training profoundly and positively impacts nursing students. The acquisition of knowledge, development of skills, increased confidence, heightened satisfaction, and enhanced team performance collectively highlight the effectiveness of emergency training programs for nursing students. These outcomes contribute to the professional growth of individual students and signify the broader benefits for the healthcare sector. As emergency preparedness continues to be a critical aspect of nursing education, these findings underscore the importance of ongoing investment in such training initiatives to ensure that nursing students are well-equipped to navigate and excel in emergencies.

Limitations

(1) This study only focused on nursing students, where nursing students have had basic knowledge regarding first aid;
(2) This research did not include the general public as respondents, so the impact of the training on these respondents was not known;
(3) Since this research design is a scoping review, various research designs are included in this research and could not be known the magnitude of the impact of the preparedness training program could not be known.

Ethical approval

Ethical issues are not involved in this paper.

Conflicts of interest

All contributing authors declare no conflicts of interest.

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