

EFFECTIVENESS OF DISASTER NURSING INTERVENTION ON NURSES' PREPAREDNESS IN DEALING WITH DISASTERS: LITERATURE REVIEW

Muhamad Hasan Basri¹, Muhamad Zulfatul A"la², Tantut Susanto³

¹ Faculty of Nursing, Universitas Jember, Indonesia

² Faculty of Nursing, Universitas Jember, Indonesia

³ Faculty of Nursing, Universitas Jember, Indonesia

Email: habasri86@gmail.com¹, m.zulfatul@unej.ac.id², tantut_s.psik@unej.ac.id³

ABSTRACT

Preparedness is a series of activities to anticipate disasters through appropriate and effective steps to ensure a quick and effective response when a disaster occurs. Nurses who are good at implementing and standardizing disaster preparedness are needed. This literature review aims to determine the effectiveness of disaster nursing interventions on nurses' preparedness in dealing with disasters. The data for this study were taken from four relevant databases, PubMed, Science Direct, EBSCO, and Google Scholar, using the PIOS (Participant, Intervention, Outcomes, and Study Design) method. Keywords "nurse" or "disaster management," "disaster education" or "disaster simulation," "disaster training" or "disaster preparedness," and "disaster readiness." The data collected came from journals published between 2019 and 2024, both in English and Indonesian (open access and full text), and were original articles. Of the total $n = 2,774$ articles found, only $n = 12$ met the inclusion criteria. The results of this literature review explain that various interventions aimed at improving nurses' disaster preparedness such as educational programs, online training, simulation exercises, and contingency plan-based human resource management each offer unique advantages and face distinct challenges.

Keywords: Preparedness; Disaster; Nurse; Training; Response

ABSTRAK

Kesiapsiagaan merupakan serangkaian kegiatan yang dilakukan untuk mengantisipasi bencana melalui langkah-langkah yang tepat dan berdaya guna untuk menjamin adanya respons yang cepat dan efektif bila terjadi bencana. Perawat yang baik dalam implementasi dan standarisasi kesiapsiagaan bencana sangat diperlukan. Tujuan dari literatur review ini adalah mengetahui efektivitas intervensi keperawatan bencana terhadap kesiapsiagaan perawat dalam menghadapi bencana. Data penelitian ini diambil dari empat database yang relevan seperti PubMed, Science Direct, EBSCO dan Google Scholar dengan menggunakan metode PIOS (Participant, Intervention, Outcomes and Study Design). Kata kunci "nurse" or "disaster management," "disaster education" or "disaster simulation," "disaster training" or "disaster preparedness," and "disaster readiness." Data yang dikumpulkan berasal dari jurnal yang diterbitkan antara tahun 2019-2024, baik dalam bahasa Inggris maupun bahasa Indonesia (akses terbuka dan teks penuh) serta merupakan artikel asli. Dari total $n=2.774$ artikel yang ditemukan, hanya $n=12$ yang memenuhi kriteria inklusi. Hasil dari literatur review ini menjelaskan bahwa berbagai intervensi yang bertujuan untuk meningkatkan kesiapsiagaan perawat terhadap bencana—seperti program pendidikan, pelatihan online,

latihan simulasi, dan manajemen sumber daya manusia berbasis rencana kontinjensi masing-masing menawarkan keuntungan unik dan menghadapi tantangan yang berbeda.

Keywords: Kesiapsiagaan; Bencana; Perawat; Pelatihan; Penanggulangan

INTRODUCTION

A disaster is an event or series of events that have the potential to threaten and disrupt people's lives. According to the World Disaster Report, there has been a 60% increase in disasters, and the number of fatalities due to natural disasters has increased from 600,000 to more than 1.2 million people, or an increase of 17%. Indonesia's location on the equator and consisting of islands causes a high risk of various types of disasters. Based on BNPB data, preparedness is important in dealing with potential disaster threats. Preparedness involves a series of activities to anticipate disasters through organizing and implementing effective and efficient steps (Tiara & Prahmawati, 2021).

Preparedness is the effort to anticipate disasters through an effective and efficient organizational system to ensure quick and appropriate action when faced with a disaster. Preparedness steps include preparing and testing emergency response plans; organizing, installing, and testing early warning systems; providing and preparing necessities; preparing evacuation sites; compiling accurate data; updating information and emergency response procedures; and procuring equipment needed for the recovery of infrastructure and facilities (Ihsan et al., 2022).

Implementing disaster preparedness is the government's responsibility and involves the community, especially health workers. As an important component in disaster response, nurses have a major role in preparing and assisting the community when a disaster occurs. Nurses' Failure to carry out their roles and responsibilities can fail to handle disaster victims. Therefore, besides mastering expertise in their fields, nurses must also understand how to implement disaster preparedness to minimize risks and increase the success of handling disaster victims (Doondori et al., 2021).

Effective nurse preparedness and education can significantly improve response and recovery capabilities to natural disasters. Nurses' knowledge, skills, and preparedness for disasters are key factors in ensuring an appropriate response to the increasing frequency of disasters. According to the International Council of Nurses (ICN) in 2019, in the preparedness phase, nurses must be ready to plan procedures to save lives and minimize damage during an emergency. Disaster planning, training, and simulation are essential elements of preparedness. Although research on nurses' disaster preparedness has grown, evidence suggests that many nurses are underprepared to respond to natural disasters (Tri Wulandari et al., 2023).

Low preparedness can lead to high vulnerability, one of the disaster's triggering factors. Disasters occur due to the interaction between hazard, vulnerability, capacity, and risk. Risk is the result of the interaction of these three factors. Systematically, risk is directly proportional to the level of danger and vulnerability while inversely proportional to capacity. High vulnerability will increase risk, and high risk will increase a disaster's impact (Husen et al., 2020).

One strategic step in improving nurses' preparedness is through disaster management training or simulation. Disaster education and training in schools is an effective, dynamic, and sustainable strategy for disseminating knowledge about disasters so that all possible risks and their impacts on health can be anticipated and resolved properly.

METHODS

This study is a literature review that assesses and analyzes articles on a specific topic, specifically related to the effectiveness of disaster nursing interventions on nurses' disaster preparedness. Inclusion criteria include articles in English and Indonesian published between 2019 and 2024, original research, and articles that discuss the effectiveness of disaster nursing interventions on nurses' disaster preparedness. Exclusion criteria include articles that do not explain the purpose of the writing, are only abstracts or meta-analyses, or discuss preparedness in general.

The data sources used in this literature review were obtained from electronic databases, such as PubMed, Ebsco, ScienceDirect, and Google Scholar, with searches conducted between August and September. The search was conducted using the keywords "nurse" or "disaster management," "disaster education" or "disaster simulation," "disaster training" or "disaster preparedness," and "disaster readiness." of the 2,774 articles found, 2,000 were eliminated because they were irrelevant, and finally, 12 articles were obtained that met the criteria for further review.

The article selection process used the PRISMA flowchart. Of the 2,774 articles found, the articles were screened through several stages, from excluding articles that did not match the review objectives to selecting abstracts and full texts. In the end, only 12 articles met the criteria and were analyzed in depth to review the effectiveness of disaster nursing interventions on nurses' disaster preparedness.

RESULTS

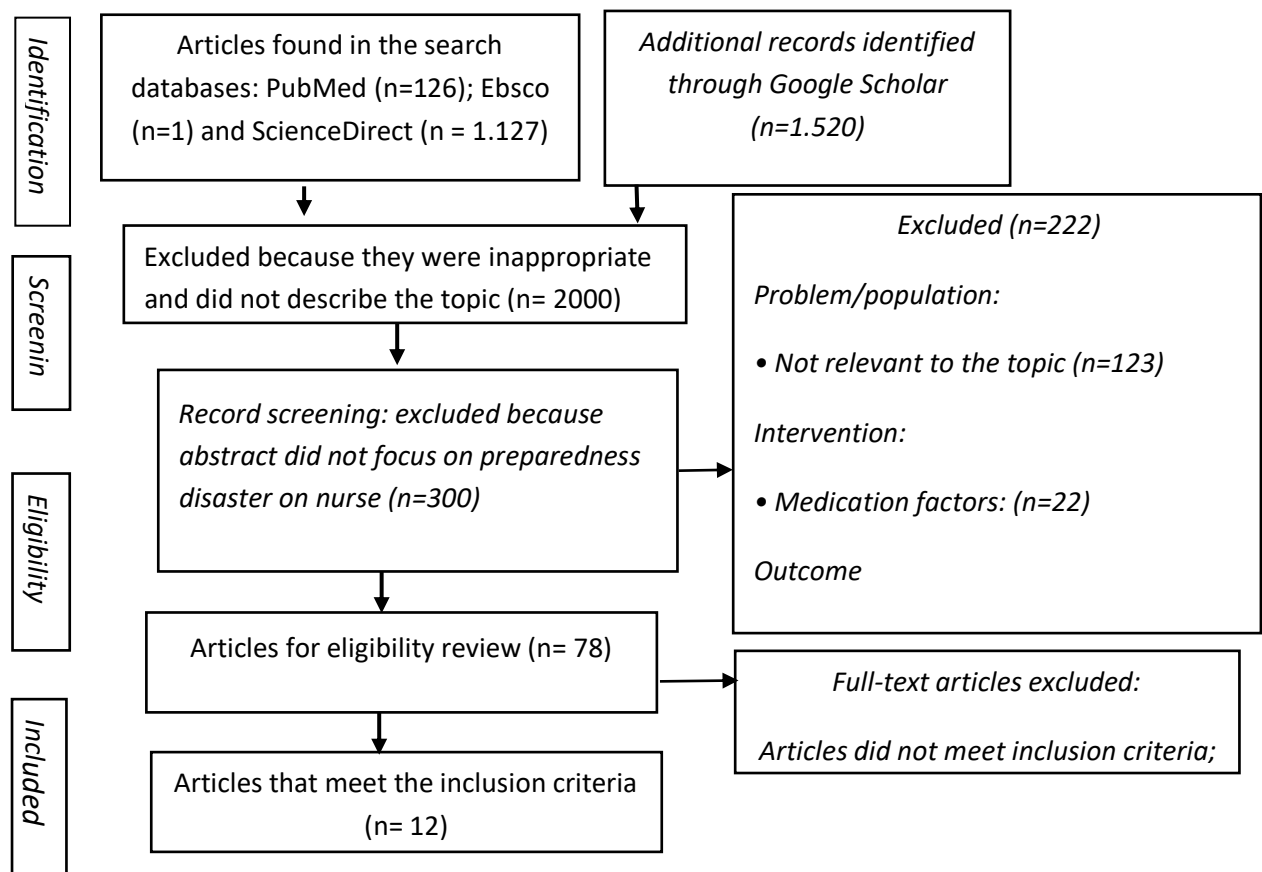


Figure 1: PRISMA flow framework

The findings of the research results are described in Table 1 below:

Table 1. review jurnal tahun 2019-2024

No.	Author and Journal Identity	Journal Titles	objective	Populati on and Sample	method	Summary of Results
1	Manuju : Malahayati Nursing Journal.	Effectiveness of Modified Miniature Of Vulcano Disaster Managem	To identify the effective ness of the use of modifcat ion of	The sample in this study were 25 nurses who were in the Mount Kelud Eruption	This study uses a Quasi-Experimen tal Pretest- Posttest design	The results showed that there was an increase in nurses' understanding of preparedness in dealing with volcanic eruptions as indicated by a change in the mean score at pretest from 57 to 86 after posttest. Wilcoxon test results showed a value of 0.000 (<0.05). The use of Miniature of Vulcano Disaster Management media is

No.	Author and Journal Identity	Journal Titles	objective	Populati on and Sample	method	Summary of Results
	(Mulya di et al., 2023)	ent On Nurses' Readiness In Disaster Managem ent Of Volcanic Eruption	Miniatur e of Vulcano Disaster Manage ment on nurse prepared ness in disaster managem ent of volcanic eruptions	Disaster- Prone Area, Blitar Regency, which were carried out by means of quota sampling.		effective in increasing nurse preparedness in dealing with volcanic eruption disasters.
2	Manuju : Malahayati Nursing Journal (Khoiril Anam et al., 2023)	Effectiveness of Human Resource Managem ent of the Profit-Net Scheme on Nurse Preparedn ess in Disaster Managem ent Based on Contingen cy Plan	Identifyi ng the effective ness of human resourcemanagem ent using a spider web scheme on nurses' prepared ness in disaster managem ent based on a contingen cy plan.	The sample in this study was nurses in the Volcanic Eruption Disaster Prone Area of Blitar Regency, totaling 25 people who were taken using quota sampling.	This study used a Quasi-Experimen tal Pretest-Posttest design. Data were analyzed using the Wilcoxon test.	The results showed that there were differences in preparedness before and after being exposed to HARI management education in the spider web scheme in increasing nurse preparedness in contingency plan-based disaster management as evidenced by the Wilcoxon test showing a value of 0.002 (<0.05). Human resource management based on a contingency plan-based spider web scheme is effective in increasing the preparedness of nurses in dealing with volcanic eruption
3	Risk Manage	Enhancing Nurses'	This study	The number of samples	A quasi-experiment	A significant proportion of nurses (78.4%) reported ongoing training in

No.	Author and Journal Identity	Journal Titles	objective	Population and Sample	method	Summary of Results
	ment and Healthcare Policy (Alotai bi et al., 2024)	Disaster Management and Preparedness: Evaluating the Effectiveness of an Online Educational Program Through a Quasi-Experimental Study.	was conducted to determine the effectiveness of a newly developed educational program on improving nurses' disaster management and preparedness.	in this study was 88 nurses working in a general hospital in the Riyadh region, Saudi Arabia.	al study was conducted on 88 nurses working at a public hospital. The educational program included six modules covering various aspects of disaster management. Pre-and post-tests were administered to evaluate changes in perceptions of disaster management competencies. Independent sample t-test, Pearson coefficient	disaster management, while a smaller percentage (21.6%) expressed a contrary opinion. Nurses also had a moderate level of agreement with the disaster preparedness program (Pretest: 2.26 ± 0.34 ; post-test: 2.29 ± 0.31). Further, the results showed small improvements in nursing perceptions of the operational plan after the educational program (Pretest: $M=2.76$, $SD=0.63$; Post-test: $M=2.89$, $SD=0.44$), although the differences between pre-and-post assessments were not significant ($P > 0.05$). The mean values for overall familiarity in the pre-test were 3.16 ± 1.39 , while in the post-test, they slightly increased to 3.26 ± 1.18 . The findings also showed no statistically significant differences reported in nurses' attitudes and familiarity towards disaster preparedness based on the gender, marital status, nationality, working shifts, and working hours variables ($P > 0.05$).

No.	Author and Journal Identity	Journal Titles	objective	Population and Sample	method	Summary of Results
4	BMC Nursing . (Farokh zadian et al., 2023)	Effectiveness of an online training program for improving nurses' competencies in disaster risk management	This study was conducted with the aim of investigating the effectiveness of an online training program to improve competencies in disaster risk management.	Eighty-one nurses were randomly assigned into two intervention and control groups (n = 42 = 39).	The intervention group received an online training program in four sessions, and both groups electronically completed the demographic questionnaire and the nurses' perceptions of disaster core competencies scale (NPDCC) before and one month after the correlation, and One-way ANOVA tests were all run using SPSS	The study results showed no significant difference in disaster competency scores between the two groups before the intervention ($p < 0.51$), but the NPDCC score in the intervention group was statistically significant after the intervention compared to before the intervention ($p < 0.02$) and no statistically significant difference was observed between the two groups after the intervention ($p < 0.16$)

No.	Author and Journal Identity	Journal Titles	objective	Populati on and Sample	method	Summary of Results
5	INQUIRY: The Journal of Health Care Organization, Provision, and Financing (Al-qbelat et al., 2022)	Effect of Educational Program Knowledge, Skills, and Personal Preparedness for Disasters Among Emergency Nurses: A Quasi-Experimental Study	This study evaluated the effect of an educational program on knowledge, skills, and personal preparedness for disasters among emergency nurses.	A convenience sample was adopted to recruit registered nurses who are working in emergency rooms in the private and government health sectors in Jordan (N = 50).	intervention A quasi-experimental study and one-group pretest-posttest design was used. This study was conducted between May and June 2021	There were significant differences between the pre-post educational intervention for knowledge ($t = 4.79$, $P \leq .001$), skills ($t = 6.66$, $P \leq .001$), and personal preparedness ($t = 9.56$, $P \leq .001$) for disasters. These findings suggested the importance of implementing continuous education and training programs for emergency nurses about disasters due to increasing frequency of disasters worldwide.
6	BMC Nursing (Sofyana et al., 2024)	The implementation of disaster Open Access preparedness training integration model based on Public Health Nursing	This study aimed to implement the Disaster Preparedness Training Integration Model based on Public Health Nursing	The sample size was calculated using the sample size calculation formula for the experimental research design without controls. The samples of the study	The research design, at the implementation stage, used the one-sample pre-post test without control group design. The respondent	The intervention had a significant effect on increasing the independent preparedness of the people in Kendeng Community, Sugih Mukti Village ($p 0.000 \leq 0.005$) in terms of four preparedness parameters, namely knowledge and attitudes about disasters (KA), disaster preparedness plans (PE), disaster warnings (WS), and resource mobilization community (RMC).

No.	Author and Journal Identity	Journal Titles	objective	Population and Sample	method	Summary of Results
		(ILATGANA-PHN) to increase community capacity in natural disaster-prone areas	(ILATGANA-PHN) to increase the Capacity of community in natural disaster-prone areas by assessing the preparedness level of families and communities in disaster-prone areas	were 78 people.	s were assessed before and after the ILATGAN A-PHN training intervention.	
7	American Journal of Disaster Medicine. (Cicero et al., 2019)	A tabletop school bus rollover: Connecticut-wide drills to build pediatric disaster preparedness and	To assess emergency medical services (EMS) and hospital disaster plans and communication and promote an	Five school bus rollover tabletop exercises were conducted, one in each of Connecticut's five EMS regions. Action figures and playsets	Using hospital-specific and national guidelines, a disaster preparedness plan consisting of pediatric guidelines	Exercises occurred at five hospitals, with inpatient capacity ranging 77-1,592 beds, and between 0 and 221 pediatric beds. There were 27 participants in the tabletop exercises, and 20 complete survey responses for analysis (74 percent). After the exercises, pediatric disaster preparedness aligned with coalition guidelines. However, methods of expanding surge capacity and methods

No.	Author and Journal Identity	Journal Titles	objective	Population and Sample	method	Summary of Results
		promote a novel hospital disaster readiness checklist	integrated pediatric disaster response in the state of Connecticut, using tabletop exercises to promote education, collaboration, and planning among healthcare entities.	were used to depict patients, healthcare workers, vehicles, the school, and the hospital	and a hospital checklist was created by The Connecticut Coalition for Pediatric Disaster Preparedness	of generating surge capacity and capability varied ($p < 0.031$)
8	African Journal of Emergency Medicine (Firissa et al., 2023)	Disaster response readiness assessment of public hospitals in Addis Ababa City, Addis Ababa, Ethiopia	This study aims to evaluate disaster readiness in public hospitals in Addis Ababa using WHO standards, focusing on hospital characteristics, disaster	Ten hospitals out of the 12 public referral hospitals in Addis Ababa were included in the study. Two hospitals were excluded because they did not respond to participation requests,	A cross-sectional study design was utilized using quantitative and qualitative methods to assess disaster response readiness among public hospitals in Addis Ababa, the	Public referral hospitals in Addis Ababa have significant gaps in disaster management preparedness and response. A comprehensive disaster response plan, including staff training, regular restocking of medication and equipment, and functional communication networks, should be implemented in every public referral hospital.

No.	Author and Journal Identity	Journal Titles	objective	Population and Sample	method	Summary of Results
			plans, infrastructure, and human resources availability	and another was exclusively for maternal and child care	capital city of Ethiopia	
9	BMC Health Services Research (Horn et al., 2024)	Exploring disaster preparedness in an obstetric unit in a district hospital in the Western Cape Province	The study aimed to make recommendations to improve disaster preparedness in an obstetric ward based on the nurses' knowledge and attitudes.	The study employed purposive sampling with a sample size of 17 nurses (N = 32, n = 17) and a response rate of 53%	This study utilised an explorator, descriptive qualitative design within a contextual approach. The data were acquired through individual interviews that were done using a semi-structured interview schedule	The results indicate that the participants demonstrate an awareness of disaster terminology but need more assertiveness in executing the institutional disaster policy. The results illustrate that more frequent training, disaster rehearsals, and simulations should be implemented to improve disaster readiness. Strategies are recommended to enhance preparedness for a disaster in the obstetric unit
10	International Nursing Review (Said et al., 2022)	Psychological first aid training in disaster preparedness for nurses working	This study aimed at evaluating the effects of a modified psycholo	Nurses working in the trauma units from five hospitals in Palestine were allocated	A non equivalent controlled group trial was conducted between July 2019	PFA training may help to build nurses' capacity in being better prepared to respond to psychological issues during and after emergencies and disasters.

No.	Author and Journal Identity	Journal Titles	objective	Populati on and Sample	method	Summary of Results
		with emergencies and traumas	gical first aid (PFA) training program on nurses' psychological preparedness for emergencies and disasters.	into two arms: control arm and an intervention arm incorporating a 9-hour modified PFA training program. Both groups were assessed at the start (pretest) and upon completion of the program (posttest) using a number of validated self-reports	and August 2019.	
11	Scientific World Journal (Abu Hasheeh, 2023)	Jordanian Nurses' Perceived Disaster Preparedness: Factors Influencing Successful Planning	This study aimed to explore the Jordanian staff nurses' perception regarding their familiarity	A convenience sample of 240 currently working nurses was recruited to participate in the study.	This is a cross-sectional, quantitative, descriptive study. The study was conducted on nurses working at governmental and	The nurses were somewhat familiar with their role in DP ($2.9 \pm .84$). The nurses' overall attitude towards DP was 2.2 ± 0.38 , indicating that respondents had medium attitude levels. A low practice level for DP (1.59 ± 0.45) was also observed. Among the studied demographic variables, there was a significant relationship between experience and prior training with improved familiarity and practices. This indicates a need for strengthening nurses' practical skills as well as their

No.	Author and Journal Identity	Journal Titles	objective	Populati on and Sample	method	Summary of Results
			y, attitudes, and practices for disaster preparedness (DP) to reduce the negative impacts of disasters.		private hospitals in Jordan	theoretical knowledge. However, there is only a significant difference between attitude scale scores and disaster preparedness training ($f = 10.120$; $p=0.002$).
12	Clinical Simulation in Nursing (Hsiao et al., 2024)	Development and Evaluation of an Immersive Cinematic Escape Room for Disaster Preparedness and Self-Efficacy Among Nurses	This study aimed to develop and evaluate the effectiveness of an immersive cinematic escape room (ICER) instructional approach in disaster preparedness and self-efficacy in nurses	This quasi-experimental research design used a convenience sample of 115 nurses.	The course contents covered establishment of medical stations, incident command system (ICS), personal preparedness and protection in disasters, and mass casualty triage (START). Evaluation of disaster preparedness and self-efficacy occurred before, one week after	The experimental group, lacking prior disaster preparedness education experiences, demonstrated a statistically significant improvement ($p < .01$) compared to the control group with more such experiences. At week four, both groups showed improvement in the self-efficacy scores, but the improvement did not achieve statistical significance ($p > .05$).

No.	Author and Journal Identity	Journal Titles	objective	Populati on and Sample	method	Summary of Results
					and four weeks after the course.	

DISCUSSION

The studies summarized in Table 1 consistently use quasi-experimental research designs to evaluate various interventions aimed at improving nurses' preparedness and competencies in disaster management. Key factors influencing disaster preparedness, as identified across the reviewed studies, include the implementation of educational programs, online training, simulation exercises, and human resource management strategies based on contingency plans.

Mulyadi et al. (2023), in their study published in the *Malahayati Nursing Journal*, highlighted the effectiveness of the Miniature of Volcano Disaster Management model in enhancing nurses' preparedness for volcanic eruption disasters. This intervention significantly increased preparedness levels among 25 nurses in the Mount Kelud disaster-prone area, as demonstrated by a marked improvement in their pre-test and post-test scores. Similarly, Khoirul Anam et al. (2023) focused on the application of human resource management using a spider web scheme, finding that it effectively improved nurse preparedness in contingency plan-based disaster management.

Alotaibi et al. (2024) and Farokhzadian et al. (2023) both explored the role of online training programs in improving disaster management competencies. Alotaibi et al. (2024) assessed an online educational program for 88 nurses in Saudi Arabia and found moderate improvements in nurses' familiarity with disaster management, though the differences were not statistically significant. Farokhzadian et al. (2023), in contrast, demonstrated a statistically significant improvement in disaster competency scores following an online training intervention.

In addition, Al-qbelat et al. (2022) emphasized the importance of education in enhancing nurses' knowledge, skills, and personal preparedness for disasters. Their study, which involved 50 emergency room nurses in Jordan, found significant improvements in all these areas following an educational intervention. Meanwhile, Sofyana et al. (2024) applied a

community-based training model, which significantly improved disaster preparedness in natural disaster-prone areas, further supporting the value of educational interventions.

Said et al. (2022) explored the psychological aspect of disaster preparedness, specifically evaluating the effects of psychological first-aid (PFA) training. This study found that PFA training contributed to improving nurses' psychological readiness to handle emergencies, highlighting the importance of addressing psychological factors in disaster preparedness.

Across all the studies, sample sizes varied, with the smallest being 25 nurses and the largest 240. Despite this variation, the outcomes consistently showed that both face-to-face and online interventions led to improvements in nurses' preparedness and competencies in disaster management, reaffirming the effectiveness of targeted educational and training programs.

The reviewed studies provide valuable insights into how educational programs, online training, simulation exercises, and human resource management strategies based on contingency plans contribute to improving nurses' disaster preparedness, specifically in terms of knowledge, attitudes, skills, and motivation. Each of these approaches presents distinct benefits and challenges, as revealed through various studies.

Educational Programs:

Education has consistently shown to be a critical factor in enhancing nurses' disaster preparedness by improving their knowledge, skills, and personal readiness. The study by Al-qbelat et al. (2022) demonstrated the significant impact of an educational program on nurses' knowledge, skills, and personal preparedness for disasters. The intervention resulted in a notable improvement in these areas, evidenced by statistical significance in pre- and post-test comparisons. The strength of educational programs lies in their ability to deliver targeted, theoretical knowledge and practical skills, fostering confidence and motivation among participants. However, a common challenge is ensuring long-term retention of knowledge and skills, as highlighted in Farokhzadian et al. (2023), where although initial competency improvements were observed, maintaining these gains over time remains difficult without continuous learning opportunities.

Online Training:

Online training programs have emerged as a flexible and accessible method for enhancing disaster preparedness competencies. Alotaibi et al. (2024) and Farokhzadian et al. (2023) both assessed the effectiveness of online training in improving nurses' disaster management skills. While the studies showed some improvements in knowledge and familiarity with disaster management concepts, they also identified limitations. For instance,

Alotaibi et al. (2024) found that although there was a slight improvement in nurses' disaster management competencies, the differences between pre- and post-test results were not statistically significant. This suggests that while online training is convenient and can reach a large audience, it may not always provide the depth of learning needed to significantly alter practices without supplementary hands-on experiences. Additionally, technological barriers, such as access to reliable internet and the ability to engage fully with online materials, can also hinder the effectiveness of such programs.

Simulation Exercises:

Simulation-based training is a dynamic approach to disaster preparedness, offering nurses a practical, hands-on experience that closely mimics real-world disaster scenarios. Mulyadi et al. (2023) showed that using the Miniature of Volcano Disaster Management simulation significantly increased nurses' preparedness for volcanic eruptions. Simulation exercises enhance not only theoretical knowledge but also practical skills by allowing nurses to practice disaster response in a controlled environment. The primary advantage of simulation is its ability to simulate stress and uncertainty, helping participants develop the quick decision-making and problem-solving skills necessary in actual disaster situations. However, simulations can be resource-intensive, requiring substantial investment in materials, time, and personnel, as well as repeated exercises to maintain proficiency over time.

Human Resource Management Strategies Based on Contingency Plans:

Contingency plan-based human resource management strategies focus on organizing and preparing the healthcare workforce to respond effectively in disaster scenarios. Khoirul Anam et al. (2023) demonstrated that applying human resource management using a spider web scheme was effective in increasing nurses' preparedness. This approach emphasizes systematic planning and coordination, ensuring that resources are available and that roles are clearly defined during a disaster. The advantage of this strategy lies in its structured approach to disaster management, which ensures that all personnel are aware of their responsibilities and that resources are efficiently allocated. However, the implementation of such plans can be complex, requiring ongoing training and commitment from management to ensure that contingency plans are up-to-date and relevant to evolving disaster scenarios.

Educational programs offer the advantage of significantly improving theoretical knowledge, enhancing skills, and boosting motivation among nurses, as demonstrated in the study by Al-qbelat et al. (2022). However, a notable barrier is the challenge of ensuring long-term retention of this knowledge and skills, which may decrease without continuous education. In the case of online training, its flexibility, scalability, and ability to allow self-paced learning

make it an appealing option, as seen in studies by Alotaibi et al. (2024) and Farokhzadian et al. (2023). Nonetheless, online training may be limited in providing deep learning experiences, and reliance on technology can pose additional challenges. Simulation exercises, highlighted by Mulyadi et al. (2023), provide practical, hands-on experiences that improve decision-making under pressure. While effective, these exercises are resource-intensive, requiring substantial investments and regular practice to maintain proficiency. Lastly, human resource management based on contingency plans, as explored by Khoirul Anam et al. (2023), is a structured and systematic approach that ensures efficient resource allocation and clear role definition during disasters. However, the complexity of its implementation and the need for ongoing training and updating pose significant barriers.

In summary, these interventions collectively improve nurses' knowledge, skills, attitudes, and motivation regarding disaster preparedness. However, each has its own set of advantages and challenges, which need to be carefully considered and addressed to ensure the sustainability and effectiveness of disaster preparedness programs.

CONCLUSION

In conclusion, various interventions aimed at improving nurses' disaster preparedness—such as educational programs, online training, simulation exercises, and contingency plan-based human resource management—each offer unique advantages and face distinct challenges. Educational programs enhance knowledge, skills, and motivation but require continuous reinforcement to maintain their effectiveness. Online training is flexible and scalable but may lack depth and is dependent on technology. Simulation exercises provide invaluable hands-on experience and improve decision-making under stress, though they are resource-intensive and need regular practice. Human resource management strategies based on contingency plans ensure organized and efficient responses, but their complexity and the need for ongoing updates can hinder their implementation. Overall, these approaches are crucial for improving disaster preparedness, but sustaining their long-term impact requires addressing their respective barriers.

ACKNOWLEDGEMENT

We would like to extend our deepest gratitude to all the individuals and institutions that contributed to the successful completion of this literature review on the effectiveness of disaster nursing interventions on nurses' preparedness in dealing with disasters. First, we are grateful to the authors and researchers whose work laid the foundation for this review and to the

academic institutions that provided access to their valuable resources. We also acknowledge the guidance and support of our academic mentors, whose expertise and encouragement were instrumental throughout this research process.

ETHICS OF STUDY

-

CONFLICT OF INTEREST

There is no conflict of interest in this article.

FUNDS

-

AUTHOR'S CONTRIBUTION

All authors significantly contributed to the conceptualization, development, and completion of this literature review on the effectiveness of disaster nursing interventions on nurses' preparedness in dealing with disasters

CORRESPONDENCE

-

REFERENCE

- Abu Hasheesh, M. O. (2023). Jordanian Nurses' Perceived Disaster Preparedness: Factors Influencing Successful Planning. *The scientific world journal*, 2023. <https://doi.org/10.1155/2023/5473777>
- Al-Qbelat, R. M., Subih, M. M., & Malak, M. Z. (2022). Effect Of Educational Program On Knowledge, Skills, And Personal Preparedness For Disasters Among Emergency Nurses: A Quasi-Experimental Study. *Inquiry: A Journal Of Medical Care Organization, Provision And Financing*, 59, 1–7. <https://doi.org/10.1177/00469580221130881>
- Alotaibi, S. S., Almutairi, H. A., Alotaibi, M. K., Alharbi, K., & Bahari, G. (2024). Enhancing Nurses' Disaster Management And Preparedness: Evaluating The Effectiveness Of An Online Educational Program Through A Quasi-Experimental Study. *Risk Management And Healthcare Policy*, 17, 101–111. <https://doi.org/10.2147/Rmhp.S446704>
- Cicero, M. X., Gollosi, K., Gawel, M., Parker, J., Auerbach, M., & Violano, P. (2019). A Tabletop School Bus Rollover: Connecticut-Wide Drills To Build Pediatric Disaster Preparedness And Promote A Novel Hospital Disaster Readiness Checklist. *American Journal*

Of Disaster Medicine, 14(2), 75–87. <https://doi.org/10.5055/Ajdm.2019.0318>

Doondori, A. K., Paschalia, Y. P. M., Studi, P., Ende, K., & Kupang, K. (2021). Peran Perawat Dalam Penanggulangan Bencana. *Jkp (Jurnal Kesehatan Primer)*, 6(1), 63–70. <https://doi.org/10.31965/Jkp.V6i1.533>

Farokhzadian, J., Farahmandnia, H., Tavan, A., Taskiran Eskici, G., & Soltani Goki, F. (2023). Effectiveness Of An Online Training Program For Improving Nurses' Competencies In Disaster Risk Management. *Bmc Nursing*, 22(1), 1–9. <https://doi.org/10.1186/S12912-023-01497-1/Tables/4>

Firissa, Y. B., Sultan, M., Abdelwahab, M., & Kifle Belachew, F. (2023). Disaster Response Readiness Assessment Of Public Hospitals In Addis Ababa City, Addis Ababa, Ethiopia. *African Journal Of Emergency Medicine*, 13(3), 210–216. <https://doi.org/10.1016/J.Afjem.2023.06.004>

Horn, C., Bam, N. E., & Matsipane, M. J. (2024). Exploring Disaster Preparedness In An Obstetric Unit In A District Hospital In The Western Cape Province. *Bmc Health Services Research*, 24(1). <https://doi.org/10.1186/S12913-024-11104-X>

Hsiao, C. C., Huang, C. Y., Lai, F. C., Chen, T. L., & Cheng, S. F. (2024). Development And Evaluation Of An Immersive Cinematic Escape Room For Disaster Preparedness And Self-Efficacy Among Nurses. *Clinical Simulation In Nursing*, 91, 101541. <https://doi.org/10.1016/J.Ecns.2024.101541>

Husen, A. H., Kaelan, C., Nurdin, A., & Hadi, A. J. (2020). Faktor Determinan Kesiapsiagaan Perawat Terhadap Bencana Gunung Meletus (Gamalama) Di Puskesmas Wilayah Kerja Dinas Kesehatan Kota Ternate. *Window Of Health: Jurnal Kesehatan*, 159–167. <https://doi.org/10.33096/Woh.V3i2.626>

Ihsan, F., Eli Kosasih, C., Emaliyawati, E., Kunci, K., & Bencana, M. (2022). Kesiapsiagaan Perawat Dalam Menghadapi Bencana: Literature Review. *Faletahan Health Journal*, 9(01), 66–79. <https://doi.org/10.33746/Fhj.V9i01.319>

Khoirul Anam, A., Hayyun Abiddin, A., Mulyadi, A., Khodijahturohma, A., & Kemenkes Malang, P. (2023). Efektifitas Manajemen Sdm Skema Jaring Laba Laba Terhadap Kesiapsiagaan Perawat Dalam Penanggulangan Bencana Berbasis Contingency Plan. *Malahayati Nursing Journal*, 5(5), 1402–1411. <https://doi.org/10.33024/Mnj.V5i5.8516>

Mulyadi, A., Hayyun Abiddin, A., Khoirul Anam, A., Khodijahturrohman, A., & Kemenkes Malang, P. (2023). Efektifitas Penggunaan Modifikasi Miniature Of Vulcano Disaster Management Terhadap Kesiapsiagaan Perawat Dalam Penanggulangan Bencana Erupsi Gunung. *Malahayati Nursing Journal*, 5(4), 1000–1010. <https://doi.org/10.33024/Mnj.V5i4.8247>

Said, N. B., Molassiotis, A., & Chiang, V. C. L. (2022). Psychological First Aid Training In Disaster Preparedness For Nurses Working With Emergencies And Traumas. *International Nursing Review*, 69(4), 548–558. <https://doi.org/10.1111/Inr.12749>

Sofyana, H., Ibrahim, K., Afriandi, I., & Herawati, E. (2024). The Implementation Of Disaster Preparedness Training Integration Model Based On Public Health Nursing (Ilatgana-Phn) To Increase Community Capacity In Natural Disaster-Prone Areas. *Bmc Nursing*, 23(1), 1–18. <https://doi.org/10.1186/S12912-024-01755-W/Tables/8>

Tiara, T., & Prahmawati, P. (2021). Pengaruh Simulasi Bencana Terhadap Peningkatan Kesiapsiagaan Mahasiswa Perawat Dalam Penanggulangan Bencana Diuniversitas Muhammadiyah Pringsewu. *Jurnal Ilmiah Kesehatan*, 10(2), 127–132. <https://doi.org/10.52657/Jik.V10i2.1480>

Tri Wulandari, E., Noviana, U., Warsini, S., Keperawatan, D., Tinggi Ilmu Kesehatan Makassar, S., Maccini Raya No, J., Selatan, S., Keperawatan Anestesiologi Sarjana Terapan, P., Yogyakarta, A., Siliwangi Jl Ringroad Barat No, J., Sawah, A., Keperawatan Jiwa Dan Komunitas, D., Kedokteran, F., Masyarakat, K., & Keperawatan, Dan. (2023). Peran Perawat Pada Fase Preparedness Dalam Penanggulangan Bencana: Systematic Review. *Jurnal Keperawatan*, 15(4), 1825–1834. <https://doi.org/10.32583/Keperawatan.V15i4.1220>