

# FACTORS RELATED TO DISASTER PREPAREDNESS AMONG NURSES: A SYTEMATIC REVIEW

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## ABSTRACT

**Introduction:** One-decade disasters that occur globally are the phenomena that will not stop but increase. This results in a high rate of injury, death, large numbers of infrastructure damages, and also enormous economic and personal loss to society. Nurses are in the frontline and have a very important role in all phases of disaster management. The purpose of writing this article is to review the factors of preparedness of nurses in disaster management. **Methods:** This is a literature review of scientific articles conducted from 2009 to 2019 on nurses' preparedness for disasters. The review was proceeded through several stages; making questions, identification, eligibility, article inclusion selection, screening, and appraisal. The selection process was listed in the review systematic framework and 8 article articles were obtained. The articles were then summarized and assessed by JBI in each article. **Results:** The review shows that nurse preparedness is related to several factors, namely; education level, years of work, previous disaster response experience, attendance in disaster simulation training, family preparedness, and self-regulation. **Conclusion:** Providing a sustainable education and training on disaster simulation that involves nurses in disaster mapping will increase nurses' confidence and preparedness in facing future disasters.

**Keyword:** *Disaster, Preparedness, Nurses*

## INTRODUCTION

Disasters that occur globally are the phenomena that will not stop and increase, this will result in high rates of deaths and injuries, large numbers damages to infrastructure and enormous economic and personal losses for the community (Kayano *et al.*, 2019). The number of deaths and injuries varies and depend on factors related to the nature of the disasters and the regional infrastructure where the disaster has occurred (Guha-Sapir *et al.*, 2016).

Nurses are the largest sector of the workforce in health care and will be at the forefront. They are the first health professional to visit the victims for every disaster emergency response (Veenerma, 2015). Nurses have a very important role in disaster preparedness, especially nurses who work in emergency units or installations (Grochtdreis *et al.*, 2016). Nurses have played an important part in disasters in all phases, including preparedness, mitigation, response and recovery/

rehabilitation (Miller & Farra, 2012). Among those phases, disaster nursing requires a special attention on its planning and preparation (International Council of Nurse, 2009). The important role of nurses in disaster management must be considered to minimize the increasing global threats. In case of disaster it is very important for nurses to improve their competence in disaster preparedness (Achora & Kamanyire, 2016).

Within the Sendai Framework it was found that there are four priorities in disaster risk management, namely 1). Understand disaster risk; 2). Strengthening disaster risk management to manage disaster risk; 3). Invest in disaster risk reduction for resilience and 4). Improve disaster preparedness for effective response and to rebuild better in terms of recovery, rehabilitation and reconstruction (Suriyanto *et al.*, 2019). A recent study found that nurses' preparedness in disaster management is still at the moderate to lower level (Labrague *et al.*, 2018). Nurses also do not understand their exact role in disaster management (Duong, 2009).

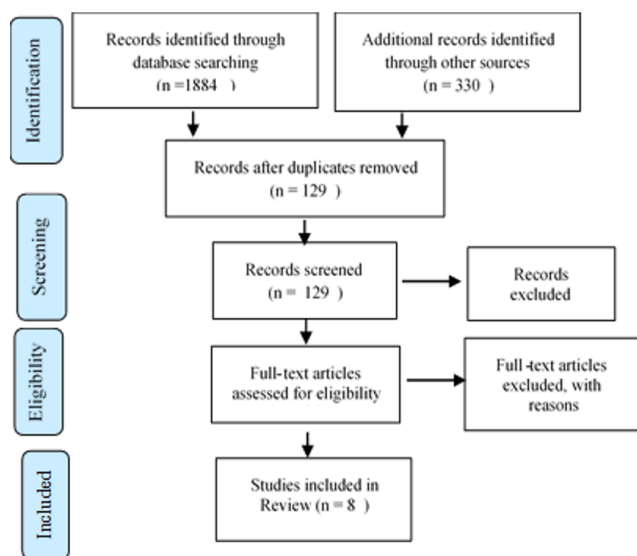


Figure 1: Flow chart of the selection process

**METHODOLOGY**

This study is a systematic review on factors that contribute to nurses' preparedness for disasters, through several electronic medical databases namely, ProQuest, Science Direct, and NCBI. The search keywords included: Nurses Role, Disaster Preparedness, and Disaster

Response. Those keywords are applied in a combination using conjunction "AND", i.e., 'Nurses Role and Disaster Preparedness and Disaster Response'. The author identifies the article by selecting settings on each database search page, namely: articles published between 2009-2019. Besides, the criteria for the articles included in this review are original research articles with a quantitative approach written in English. While theses, systematic reviews, qualitative studies, and articles that are not written in English are excluded.

The search was done by combining the three keywords with the combination "AND" resulted in 894 articles in Science Direct, 330 articles in NCBI and 990 articles in ProQuest. This number was reduced to 129 after the title and abstract review. It was found that 2085 articles are not relevant to the purpose of the review. The full text reading of the remaining articles produced 8 articles that were deemed suitable for review. The process followed to identify articles that are relevant for re-view is shown in the attached figure. After the authors determine the articles to be reviewed, all articles are summarized and assessed using the Joanna Briggs Institute check list (Joanna Briggs Institute, 2019). The summary of the results of each article is explained in the attached table below:

Table 1: Summary of Results of Each Article

Author	Location	Sample	Sampling Method	Study Purposes	Study Design	Instrument	Main Findings
Ahayalimudin & Osman, (2016)	Malaysia	196 (emergency room nurses, doctors and medical assistants)	Simple Random Sampling	This study explores the knowledge, attitudes and practices of emergency medical staff towards disaster management.	cross-sectional	The author makes a questionnaire through deepening the literature review.	Sociodemographic factors studied, gender and education level were significantly associated with improved knowledge and practice scores. Work experience, involvement in disaster response and attending disaster training have a significant association with higher practice scores

Husna, Hatthakit dan Chaowalit, (2011)	Aceh, Indonesia	78 Nurses	Purposive Sampling	<p>Identifying the level of clinical skills felt for tsunami care among nurses in Banda Aceh, Indonesia,</p> <p>To determine the relationship between clinical skills perceived for tsunami care and knowledge, and clinical experience among nurses in Banda Aceh, Indonesia</p>	Descriptive correlational study	(Demographic Data Questionnaire [DDQ], Nurses' Clinical Experience Questionnaire [NCEQ], Nurses' Knowledge Tsunami Care Questionnaire [NKTCQ], and Tsunami Care Questionnaire [TCQ])	Clinical knowledge and experience have a significant low positive correlation with nurses' clinical skills perceptions in caring for post-tsunami patients.
Jonson, Pettersson, Rybing, Nilsson, & Prytz, (2017)	Swedia	13 Chief of Emergency Care Nurse	Total Sampling	Measuring whether a brief, small-scale computer-based simulation exercise can improve general and specific Self Efficacy of emergency nurses and disaster management skills	Experimental method with pretest-posttest design in groups	Self Efficacy Disaster Management Questionnaire	This study shows that short computer-based simulation exercises provide opportunities for head nurses to improve management skills and improve general self-efficacy
Rizqillah & Suna, (2018)	Central Java, Indonesia	120 Nurses	Convenience Sample	Explore the disaster preparedness of Indonesian nurses to identify the education and training needs of Indonesian nurses	Descriptive, cross-sectional Study	Disaster Preparedness Evaluation Tool ((Tichy <i>et al.</i> , 2009)	<p>Indonesian emergency nurses have a moderate level of disaster preparedness.</p> <p>Previous disaster experience and disaster training or education are positively related to disaster preparedness</p>

Park & Kim, (2017)	South Korea	231 Emergency Care Nurses	Convenience Sampling	To identify factors affect the core competencies of emergency nurse disaster	Descriptive, cross-sectional	Nurses' Experiences of Disaster scale, Attitudes toward Disaster Management scale, Nurses' Knowledge about Disaster scale, Disaster Nursing Core Competencies scale	These findings indicate that the main competencies of nurses in emergency nurses can be improved through education and training programs that increase their disaster preparedness.
Nofal, Alfayyad, Khan, Al Aseri, & Abu-Shaheen, (2018)	Mecca, Saudi Arabia	189 doctors and emergency room nurses	Convenience Sampling	To assess knowledge, practices, and attitudes about disasters and emergency preparedness among Emergency Department (ED) staff.	Cross-sectional Survey	Emergency Preparedness Information Questionnaire (EPIQ)	Participants with more than 5 years experience had statistically significant knowledge scale scores ( $p = 0.009$ ) for disaster and emergency preparedness. Overall, 186 (98.4%) respondents believed that training was needed for all health workers.
Lim, Lim, & Vasu, (2013)	Singapore	1534 Health workers (doctors, nurses and other officers)	Convenience Sampling	To know perception Health workers to their individual and institutional readiness for disaster	cross-sectional survey	The author makes a questionnaire through deepening the literature review	Experience in previous disaster response, attendance at disaster training, the support of family and peers are factors in individual preparedness in facing disasters.
Baack S & Alfred D	Texas	620 Nurses	Purposive Sampling	This research study was conducted to illustrate the current status of nurses' preparedness to deal with illnesses to help communities and the health care system strengthen their emergency response programs. their preparedness in facing disaster and how nurses get this perception.	Descriptive and correlational design	Emergency Preparedness Information Questionnaire (EPIQ), Self-Regulation Scale, Angket Kepuasan Kerja (Wieck <i>et al.</i> , 2009)	A confident nurse is more likely to have previous experience in a disaster. Self-regulation behavior (motivation) is a significant predictor of nurses' competency perceptions for managing disasters. Work environment (job satisfaction) is not a determinant of disaster preparedness.

## RESULTS

From the results of the review conducted by the author it can be concluded that there are six factors that contribute to the preparedness of nurses in disaster management.

### Level of Education

Nurses who have a degree of undergraduate education have a positive correlation with the high level of nurses' knowledge and skills in disaster management (Ahayalimudin & Osman, 2016).

### Year of Work

Length of work shows a significant and positive correlation on increasing nurse preparedness in management and responding to disasters (Ahayalimudin & Osman, 2016). In other studies it was also found that nurses who worked more than 5 years in health institutions will have more knowledge and skills in disaster management (Nofal *et al.*, 2018). The work period is also stated to have a strong and positive relationship to the perception of emergency nurse preparedness in Indonesia in preparing themselves for future disasters (Rizqillah & Suna, 2018). The clinical experience (years of work) of nurses was also conveyed to be an important factor that had a positive correlation in increasing knowledge and skills in providing nurse care to patients in Post-Tsunami Aceh (Husna, Hatthakit & Chaowalit, 2011).

### Experience in Previous Disaster Response

The selected articles in this review also expose the relationship between nurses' experience in disaster response and their preparedness. Nurses involved in responding to disasters have a positive and significant correlation with the improvement of their knowledge and skills in future disaster management (Ahayalimudin & Osman, 2016), while those who have never been exposed to disasters in their area have less knowledge about the dangers of other disasters (Rizqillah & Suna, 2018). Besides, nurses' experience in responding to major disasters give a positive impact on the perception of competency they have (Baack & Alfred, 2013). Other study also found that previous disaster-related experiences were important findings and had the strongest influence on the main competencies of emergency room nurses in South Korea in terms of future disaster management (Park & Kim, 2017).

Conclusively, previously reported studies found that disaster experiences will be able to positively enhance nurses' knowledge and competency in disaster preparedness.

### Disaster Simulation Training

A study revealed that nurses who attended previous disaster simulation training had a positive correlation with their knowledge and skills in caring for patients after the Aceh Tsunami. The findings of this study could serve as evidence for stakeholders in the hospital to prepare nursing staff for nurses' knowledge and skills for tsunami care by providing regular disaster and emergency training to respond to future disasters (Husna, Hatthakit & Chaowalit, 2011). It was also found in another study that nurses who worked in emergency departments, and those who previously attended disaster management training had high self-confidence when facing an impending disaster (Rizqillah & Suna, 2018). The provision of disaster simulations and ongoing training by hospitals provides a positive contribution to improving the main competencies of emergency room nurses in responding when a disaster occurs (Park & Kim, 2017). Giving a short simulation through computer media also has a positive correlation to the increase the confidence of the head nurse in responding to disaster occurrences (Jonson *et al.*, 2017). The presence of officers in every training and disaster simulation is very important in improving their knowledge and skills in dealing with future disasters (Lim, Lim & Vasu, 2013).

### Family Readiness and Support

Nurses whose families that have adequate readiness and could plan for disaster, are given a support to be able to give a good response when a disaster occurs. Sharing information about the scope of work of health workers with their family members will be beneficial. This will enable family members to understand and support their work, especially in the event of a disaster (Lim, Lim & Vasu, 2013).

### Self-Regulation

Self-regulation in this case is an effort made by nurses to regulate themselves. So that, they are able to survive and can provide the best response when a disaster occurs. Self-Regulation, which relates to motivation, has a positive and strong correlation to the increase in nurse preparedness for disaster management (Baack & Alfred, 2013).



## DISCUSSION

From the articles reviewed, it was found that there are six predominant factors that contribute to the nurses' preparedness in disaster management, namely; the level of education, years of work, experience in previous disaster response, disaster simulation training, family readiness and support, Self-Regulation. In terms of nurses level of education, effective disaster response is influenced by a high level of education, a long duration of education, good learning, and an abundance of disaster knowledge and skills from nurses (Xu & Zeng, 2016). As the frontline of health services during disasters, nurses must be equipped with knowledge and readiness in responding to disasters in all phases (Hutton, Veenema & Gebbie, 2016).

The availability of knowledge resources in the form of difficult to find appropriate libraries and internet networks were also obstacle for nurses to increase their capacity to obtain the latest knowledge in disaster preparedness (Sangkala & Gerdtz, 2018). The availability of information and literature is a key factor in supporting clinical staff to keep their knowledge updated and follow current practices. Limited access to published literature will reduce nurses' abilities in clinical practice (Melnik & Ellen, 2014). As a result, nurses who lack knowledge and readiness will have difficulty in providing adequate care and support for disaster victims and their families (Arbon *et al.*, 2013).

Nurses' knowledge and skills in nurse preparedness are reported to have a significant relationship with experience of dealing with previous disasters and the frequency of their attendance in disaster simulation training (Labrague *et al.*, 2018). The involvement of nurses in mapping potential disasters that will occur, providing education through disaster simulations to nurses will be able to increase their confidence in dealing with future disasters (Al Khalailah, Bond & Alasad, 2012). Another study reported a significant and positive correlation between the frequency of training for nurses and their confidence (Duong, 2009). In other words, with more training on disaster management they have higher confidence in their abilities with disaster management (Naser & Saleem, 2018).

Disaster management training must be provided for all nurses, especially those who work in non-government hospitals, who have not received training on disaster management, to increase their knowledge in responding to any possible disasters. The more nurses

attending disaster simulation exercises will increase nurses' confidence in dealing with actual disasters in the future (Vincent, Berg & Ikegami, 2009; Morrison & Catanzaro, 2010; Alim, Kawabata & Nakazawa, 2015; Jonson *et al.*, 2017). However, it is still found in some countries a lack of nurse awareness and awareness to attend training related to increasing the capacity of nurses in disaster preparedness (Usher *et al.*, 2015). Disaster-related training must be included in nursing education programs and continuing education courses to help hospital nurses recognize and improve their own preparedness for disaster response (Tzeng *et al.*, 2016).

The preparedness of health workers, especially nurses, is not only related to how they receive training and continue education, but family support in the form of family preparedness also has an important role for nurses to be able to provide their best response in disaster management (Lim, Lim & Vasu, 2013). Nurses who are involved in family planning and preparedness in facing disasters are eight times more willing to attend their workplaces in disasters (Arbon *et al.*, 2013). Other research also shows nurses who have higher personal preparedness, such as disaster plans at their homes, have a higher level of willingness to attend their workplaces in disasters (Goodhue *et al.*, 2012).

Besides that nurses in responding to disasters require motivation and strength to organize themselves so that they are truly prepared to face the conditions they experience (Baack & Alfred, 2013). The first phase when they are confronted with an actual disaster is a feeling of being unprepared because they are taken aback by seeing the catastrophic disaster and the impact of the damage resulting from the disaster that occurred (Li *et al.*, 2017). After being hit by reality, the process of adapting to these circumstances requires extensive professional experience (Li *et al.*, 2015).

## CONCLUSION

This literature review aims to identify the factors that contribute to the nurses' preparedness in disaster management. The studies reviewed has elucidated that there are six main factors which are proven to promote nurses' preparedness, namely; the level of education, year of work, experience in previous disaster response, disaster simulation training, family readiness and support, Self-Regulation. Those six factors are concluded to be beneficial for the nurses' competency both in the aspects of knowledge and skill. Therefore, this article would suggest the importance of continuous

professional development for nurses, especially in disaster management. Thus, providing training and education may not only be about knowledge that increases their skills in helping victims but must also include how they should be encouraged to have a strong self-regulation of a risk-filled challenge that would enforce their readiness when an actual disaster occurs.

### Conflict of Interests

The authors declare that they have no conflict of interest.

### ACKNOWLEDGEMENT

The authors are thankful to the institutional authority for completion of the work.

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