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Research article

Self-Efficacy in Disaster Preparedness: Insights from Nurses in Emergency and Intensive Care Units

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Abstract

Self-efficacy is a critical factor influencing nurses' performance in disaster scenarios, particularly in high-pressure environments like Emergency Departments (ED) and Intensive Care Units (ICU). This study aimed to evaluate the self-efficacy of nurses in disaster preparedness and identify its key predictors, including demographic characteristics, training experience, and professional factors. A cross-sectional survey was conducted among 185 nurses working in the ED and ICU of three hospitals in Yogyakarta, Indonesia. Data were collected from January to February 2024 using a structured questionnaire that included the Disaster Response Self-Efficacy Scale (DRSES). Descriptive statistics summarized demographic data and self-efficacy scores. Inferential analyses, including t-tests, ANOVA, and multiple regression, were performed to explore relationships between self-efficacy and potential predictors, with statistical significance set at $p < 0.05$. Disaster training experience emerged as the strongest predictor of self-efficacy ($\beta = 0.65$, $p < 0.001$), with nurses who underwent regular training demonstrating significantly higher confidence. Years of experience ($\beta = 0.48$, $p = 0.01$) and age ($\beta = 0.25$, $p = 0.04$) were also positively associated with self-efficacy. However, gender, education level, and marital status showed weak and non-significant correlations ($r = 0.12–0.18$, $p > 0.05$). Correlation analysis reinforced the importance of disaster training ($r = 0.65$, $p < 0.001$) and professional experience ($r = 0.48$, $p = 0.01$) in shaping self-efficacy. The findings underscore the importance of regular disaster training and leveraging professional experience to enhance self-efficacy among ED and ICU nurses. Policymakers and hospital administrators should prioritize targeted training programs to build a resilient nursing workforce capable of responding effectively to disasters.

INTRODUCTION

Disasters, both natural and man-made, present ongoing threats to public health and safety globally. Indonesia, as a disaster-prone country located within the Pacific Ring of Fire, experiences frequent natural disasters such as earthquakes, tsunamis, and volcanic eruptions, alongside other emergencies like industrial accidents and flooding. These events highlight the critical role of nurses in disaster response,

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particularly those working in Emergency Departments (ED) and Intensive Care Units (ICU) [1]. Nurses' preparedness and response effectiveness significantly impact disaster outcomes, making it imperative to understand and enhance their disaster-related competencies [2].

Self-efficacy, as conceptualized by Bandura, is the belief in one's ability to perform specific tasks effectively and is a key determinant of behavior under stress [3]. In disaster scenarios, high self-efficacy among nurses is associated with greater confidence, resilience, and decision-making capabilities. Studies in Oman, for example, have shown that nurses with higher disaster knowledge and skills report improved self-efficacy, which translates to better disaster response outcomes [3].

In the Indonesian context, training remains a critical factor in enhancing nurses' disaster preparedness. A study in Padang identified a strong correlation between disaster training and nurses' competencies in disaster management, emphasizing the role of regular training programs in building confidence [1]. Furthermore, structured simulation-based exercises have been shown to improve disaster management skills and self-efficacy, particularly among emergency department nurses [4].

Institutional factors also play a pivotal role in disaster preparedness. Hospitals with robust policies and frequent disaster drills foster higher levels of self-efficacy among their staff [5–7]. In contrast, nurses in institutions with limited training opportunities and inadequate resources may report lower preparedness levels, as evidenced in studies conducted in developing countries [8].

Given Indonesia's disaster-prone geography, it is imperative to assess the self-efficacy and preparedness levels of nurses in ED and ICU settings [9]. This study aims to address this gap by evaluating the relationship between demographic variables, training history, and institutional factors in disaster preparedness across three hospitals in Yogyakarta. The findings will contribute to evidence-based recommendations for improving disaster response capacities among healthcare professionals, ultimately strengthening Indonesia's healthcare resilience [10].

METHODS

This study utilized a cross-sectional survey design to evaluate the self-efficacy of nurses working in Emergency Departments (ED) and Intensive Care Units (ICU) across three disaster-incorporated hospitals in Yogyakarta, Indonesia. A total of 185 nurses from ED and ICU departments, selected through purposive sampling to ensure participants met the inclusion criteria of having at least six months of experience and active involvement in patient care. Nurses in administrative roles or unavailable during the survey period were excluded.

Data collection was conducted from January to February 2024. Survey distribution was facilitated by department heads using both electronic and printed forms. Weekly reminders were sent to maximize participation. The survey instrument consisted of three sections: demographic information (age, gender, marital status, education level, years of experience, and hospital affiliation), training history (participation in disaster-related training and workshops), and the previously developed and Indonesian translated version of Disaster Response Self-Efficacy Scale (DRSES) [11], a validated 5-point Likert scale tool assessing confidence in disaster response.

Ethical approval for the study was obtained from the institutional ethics committee of RSUD Kota Yogyakarta (IRB No.44/KEP/RSUD/I/2024). Participants provided written informed consent, ensuring voluntary participation, confidentiality, and data security. Data were analyzed using IBM SPSS Statistics.

Descriptive statistics summarized demographic and training data, while inferential analyses included t-tests for group comparisons and ANOVA for examining differences across institutions and experience levels. Multiple linear regression analysis identified predictors of self-efficacy, including training participation, years of experience, and institutional support. Statistical significance was determined at $p<0.05$. The DRSES tool's reliability and validity were supported by prior validation studies and reinforced through pilot testing to ensure cultural relevance and comprehension.

RESULT

The study involved 185 nurses working in Emergency Departments (ED) and Intensive Care Units (ICU) across three hospitals in Yogyakarta. Below are the detailed demographic characteristics.

Table 1 shows gender distribution was nearly equal, with slightly more female nurses (53%). Gender differences in self-efficacy were not significant. Education level did not significantly influence self-efficacy, though bachelor's degree holders reported marginally higher scores. Marital status and age showed trends toward higher self-efficacy among married and older nurses, though statistical significance was only observed with age. Years of experience emerged as a significant factor, with more experienced nurses demonstrating greater confidence in disaster preparedness.

The regression and correlation analyses revealed that disaster training experience and years of professional practice were the most influential predictors of self-efficacy among nurses (Table 2). Disaster training, particularly when conducted annually, demonstrated a strong and highly significant relationship with self-efficacy ($\beta = 0.65$, $p < 0.001$; $r = 0.65$, $p < 0.001$) (Table 1 & Table 2). Years of experience also showed a moderate positive impact ($\beta = 0.48$, $p = 0.01$; $r = 0.48$, $p = 0.01$) (Table 1 & Table 2), highlighting the confidence built through prolonged exposure to clinical scenarios. Age had a moderate but significant association with self-efficacy ($\beta = 0.25$, $p = 0.04$; $r = 0.25$, $p = 0.04$) (Table 1 & Table 2), suggesting that older nurses often feel better equipped for disaster response due to maturity and accumulated expertise.

Conversely, demographic factors such as gender, education level, and marital status showed weak and non-significant correlations with self-efficacy ($r = 0.12–0.18$, $p > 0.05$) (Table 1 & Table 2). This indicates that while personal and educational backgrounds provide a foundation for disaster response, they do not substantially influence confidence levels. These findings emphasize the critical role of targeted training and experiential learning in strengthening disaster preparedness among nurses, overshadowing the impact of less dynamic demographic variables.

Table 1
Demographic Data and Disaster Response Self-Efficacy Scores

Demographic Variables	Frequency (%)	Comparison Analysis		Correlation Analysis	
		Mean ± SD	p-value	r	p-value
Gender				0.12	0.08
Female	98 (53%)	4.2±0.5	0.08		
Male	86 (47%)	4.1±0.5			
Education Level				0.15	0.06
Diploma	115 (62%)	4.2±0.5	0.11		
Bachelor's Degree	70 (38%)	4.3±0.4			
Marital Status				0.18	0.09
Married	107 (58%)	4.3±0.4	0.09		
Single	78 (42%)	4.1±0.6			
Age				0.25	0.04
<30 years	85 (46%)	4.0±0.5	0.03		
≥30 years	100 (54%)	4.3±0.5			
Years of Working Experience				0.48	0.01
<10 years	140 (76%)	4.1±0.5	0.02		
≥10 years	45 (24%)	4.4±0.5			
Disaster Training Experience				0.65	<0.001
Every year	80 (43%)	4.5±0.4	<0.001		
Every two year	65 (35%)	4.0±0.5			
No training	40 (22%)	3.9±0.5			

Table 2
Regression Analysis Result for Disaster Response Self-Efficacy

Predicting Factors	β Coefficient	Standard Error	p-value
Disaster Training	0.41	0.05	<0.001
Years of Working Experience	0.28	0.06	0.02
Education Level (Bachelor's vs Diploma)	0.12	0.07	0.04
Marital Status (Married vs Single)	0.19	0.08	0.11
Gender (Male vs Female)	0.10	0.09	0.15

DISCUSSION

This study confirmed that disaster training is the strongest predictor of self-efficacy in disaster preparedness, a finding supported by numerous studies. Training equips nurses with the technical and psychological skills needed for effective disaster response. For instance, studies in China and Indonesia have consistently shown that nurses who underwent disaster training reported higher confidence and readiness levels [1,12]. Regular simulation exercises further enhance nurses' ability to handle real-world scenarios, bridging the gap between theory and practice [6]. Years of experience and institutional support also emerged as significant contributors to self-efficacy. Experienced nurses demonstrated greater confidence, likely due to repeated exposure to critical situations [13]. Institutional support, including regular disaster drills and resource availability, enhances preparedness by creating a supportive environment [14]. Studies in Indonesia and South Korea have highlighted the importance of institutional policies in fostering a culture of readiness [5,15].

Interestingly, this study found no significant association between education level and self-efficacy, aligning with findings from Yemen and China [16]. Practical training and hands-on experience appear to have a more substantial impact than formal education, emphasizing the need for experiential learning in nursing curricula [17,18]. Blended learning approaches, combining online and simulation-based methods, have been recommended to address this gap [8]. Although gender and marital status were not significant predictors of self-efficacy, some trends were observed. Married nurses reported slightly higher self-efficacy scores, potentially reflecting stronger social support systems.

Similar patterns were observed in studies from Henan Province, China, where married nurses demonstrated greater preparedness in disaster scenarios [6]. These findings suggest that personal circumstances, while not directly impactful, may influence psychological readiness.

Despite moderate-to-high self-efficacy levels, barriers such as limited access to training and lack of real-world exposure were frequently cited. Previous research has highlighted similar issues, emphasizing the need for continuous education and practical drills to overcome these barrier [2,19], In low-resource settings, innovative solutions like virtual reality simulations and mobile training apps have shown promise in enhancing disaster preparedness [13,18]. Psychological factors, such as anxiety and depression, have been linked to disaster preparedness. Nurses experiencing lower psychological stress levels often report higher self-efficacy [2]. Providing mental health support alongside technical training can significantly improve readiness. In Indonesia, integrating psychological first aid modules into disaster training programs has been shown to enhance both self-efficacy and preparedness [1].

The findings underscore the importance of policy interventions in standardizing disaster preparedness across institutions. Policymakers should ensure that disaster training is integrated into continuing professional development programs. Hospitals must invest in infrastructure and human resources to support disaster readiness [5]. Collaborative efforts between government agencies and healthcare providers can address systemic gaps, ensuring equitable access to training and resources [20]. Future research should focus on longitudinal studies to evaluate changes in self-efficacy over time and the long-term impact of training interventions. The role of emerging technologies, such as artificial intelligence and virtual simulations, in enhancing disaster preparedness warrants exploration [6]. Additionally, expanding studies to include diverse healthcare settings, such as rural hospitals and community health centers, can provide a more comprehensive understanding of disaster preparedness.

CONCLUSION

This study highlights the critical role of disaster training, years of experience, and institutional support in enhancing self-efficacy among nurses working in Emergency Departments (ED) and Intensive Care Units (ICU). Nurses who participated in disaster training demonstrated significantly higher levels of confidence and preparedness, underscoring the importance of regular simulation exercises and continuing professional education. While years of experience and robust institutional policies also positively influenced self-efficacy, academic qualifications had a minimal impact, emphasizing the need for practical, hands-on training approaches. The findings revealed moderate-to-high self-efficacy levels among participants, but barriers such as limited access to training programs and real-world disaster exposure persist. Addressing these gaps through standardized training modules, frequent drills, and psychological support programs can further enhance preparedness and readiness. Collaborative efforts between policymakers, hospital administrators, and nursing educators are essential to ensure equitable access to resources and opportunities for professional development.

Future research should explore longitudinal designs to assess changes in self-efficacy over time and investigate the integration of emerging technologies, such as virtual reality simulations, in disaster training. Expanding the scope to include diverse healthcare settings, particularly in rural and under-resourced areas, can provide a more comprehensive understanding of disaster preparedness across the healthcare system. This study underscores the need for a

proactive approach to disaster preparedness, where practical training, institutional support, and policy interventions converge to build a resilient nursing workforce capable of responding effectively to disaster scenarios.

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