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Factors Associated with Disaster Response Self-Efficacy among Nursing Students in Indonesia

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Abstract

Background: Disaster preparedness is a critical competency for nursing students, as they are expected to respond effectively in emergency and disaster situations. However, the level of disaster response self-efficacy (DRSE) and its associated factors among nursing students in Indonesia remain unclear. This study aimed to identify factors associated with DRSE among nursing students.
Design: A cross-sectional design was used.
Methods: This study involved 234 students from a university in North Sulawesi Province, Indonesia, selected through convenience sampling. Data were collected in May 2023 using the Disaster Response Self-Efficacy Scale (DRSES) and analyzed using descriptive statistics, independent t-test, Pearson correlation, and multiple linear regression.
Results: The mean DRSES score was 3.31 (SD=0.66). Age was positively correlated with self-efficacy (r=0.188, p=0.004). Significant differences were also found for academic level (t=-4.974, p<0.001), disaster experience (t=-2.613, p=0.010), disaster organization involvement (t=-2.231, p=0.027), disaster training (t=-2.883, p=0.004), and disaster course participation (t=-3.320, p=0.001). Academic level emerged as the only significant determinant of DRSE (β=0.293, 95% CI [0.166 to 0.626], p<0.001). The overall model was statistically significant (p<0.001), explaining 15.6% of the variance.
Conclusions: DRSE among nursing students was moderate, with academic level as the primary determinant. The findings underscore the need for curriculum enhancement through structured disaster education, simulation-based training, and experiential learning to better prepare nursing students for real-world disaster response.

Keywords: Disaster; Nursing Students; Self-Efficacy

INTRODUCTION

Disasters, including climate-related, geophysical, biological, and technological events, are increasingly complex and compounding, placing significant strain on health systems, disrupting care continuity, and exacerbating existing inequities. Global evidence from the Lancet Countdown highlights that climate change is already affecting health through multiple pathways, intensifying the need for resilience-oriented preparedness (1). Moreover, repeated and cumulative disaster exposures contribute to long-term physical, mental, and community-level burdens, while disproportionately affecting vulnerable populations and worsening health inequities (2,3). These trends emphasize the importance of strengthening health workforce readiness as part of disaster risk reduction and climate-health adaptation.

Within this context, nurses play a central role across all phases of disaster management, including preparedness, response, and recovery. Their contributions extend beyond clinical care to leadership, coordination, and community resilience building (4). However, disaster involvement can also lead to psychological distress, fatigue, and perceived lack of support, despite potential benefits such as professional growth and increased confidence (5). Preparedness is influenced not only by individual competencies but also by access to training, drills, leadership opportunities, and organizational support, which determine the ability to perform effectively in crisis situations (6).

Disaster preparedness is increasingly recognized as a core component of nursing education that requires structured curricula and experiential learning. Evidence shows that disaster training improves self-efficacy, knowledge, and skills, particularly when using simulation-based approaches (7). Experimental studies further support that structured training programs significantly enhance disaster preparedness and disaster response self-efficacy (DRSE) (8). Nevertheless, the evidence base remains heterogeneous, with limited standardized methods and high-quality evaluations, indicating the need for more rigorous research in disaster nursing education (9).

Self-efficacy, based on Bandura's social cognitive theory, refers to an individual's belief in their ability to perform specific tasks and influences motivation, effort, and performance under stress (10). In nursing education, self-efficacy develops through structured learning experiences such as mastery, observation, and feedback (11). In disaster settings, this construct is critical due to high uncertainty and complexity. The Disaster Response Self-Efficacy Scale (DRSES) has been validated as a reliable tool to assess this construct (12), and evidence shows that DRSE is positively associated with disaster preparedness, supporting its relevance as an outcome in nursing education (13).

International studies consistently report that nursing students generally have low-to-moderate levels of DRSE, with variation across contexts. In Bangladesh, DRSE was moderate and associated with demographic and educational factors, though not consistently linked to disaster experience or training (14). Comparative studies in Turkey and Iran also found moderate DRSE, with higher levels among students with greater academic exposure and disaster-related involvement (15). Similar findings were reported in specialized contexts such as radiological disasters, where training and education stage influenced DRSE (16). These findings support examining both demographic and educational predictors of DRSE.

Despite growing evidence, gaps remain in geographic representation and methodological consistency, limiting generalizability across settings. Associations between DRSE and factors such as training and disaster experience vary across contexts, suggesting that curriculum design, training quality, and engagement opportunities influence self-efficacy development (9,14,15). Therefore, in disaster-prone lower and middle-income settings such as Indonesia, there is a strong need for context-specific evidence to better understand how educational and experiential factors shape DRSE among nursing students.

Building on these gaps, there is a clear need for context-specific evidence examining how demographic characteristics, educational exposures, and experiential factors jointly shape DRSE among nursing students in disaster-prone settings. Understanding these relationships is essential to inform targeted curriculum development, optimize training strategies, and strengthen the preparedness of the future nursing workforce. Therefore, this study aimed to identify the level of DRSE and determine the factors associated with it among nursing students in Indonesia.

METHODS

Study Design

This was a cross-sectional study.

Population and Sample

Participants were recruited using convenience sampling from a nursing school at a university in North Sulawesi in May 2023. Eligible participants included third and fourth year undergraduate nursing students and those enrolled in the professional nursing program who agreed to take part in the study. Students who were ill or absent during the data collection period were excluded. The required sample size was calculated using G*Power software version 3.1.9.7 (17). Based on multiple linear regression analysis with an effect size of 0.15, statistical power of 0.95, an alpha level of 0.05, and 10 predictors, the minimum

sample size was estimated to be 172 participants. In total, 234 students were included in the study.

Research Instrument

Participants' characteristics were collected using a self-constructed questionnaire that included age, gender, academic level, reason for pursuing a nursing degree, living in a disaster-prone area, disaster experience, disaster organization involvement, disaster training, disaster course participation, and scout activities.

The Disaster Response Self-Efficacy Scale (DRSES) was used to assess self-efficacy among nursing students (18). The instrument consists of 22 items rated on a 5-point Likert scale (1=no confidence to 5=complete confidence) and includes four domains: Disaster assessment, emergency rescue, psychological nursing, and role quality and adaptation. Scores for the overall scale and each subscale are calculated as mean values, ranging from 1 to 5, with higher scores reflecting greater self-efficacy in disaster. The Cronbach's alpha of the DRSES in this study was 0.954.

Data Collection and Analysis

Ethical approval for this study was obtained from the university's Institutional Review Board (No: 250/KEPK-FIK/EC/VIII/22). Eligible students were identified with assistance from the nursing program administrator. Those who expressed interest were contacted individually by the researcher. Informed consent was obtained electronically, with participants required to review and agree to the consent form prior to accessing the survey. Participation was voluntary, and all data were collected anonymously and handled with strict confidentiality.

Data were analyzed using descriptive statistics. The independent t-test and Pearson correlation were applied to examine the associations between participant characteristics and DRSE scores. Multiple linear regression analysis was conducted to identify significant predictors of DRSE. Variables with bivariate associations at $p<0.20$ were entered into the regression model (19). All assumptions for multiple linear regression were met. Normality test was assessed using the Kolmogorov–Smirnov test, while linearity, homoscedasticity, independence of errors, and absence of multicollinearity were also confirmed. The Durbin–Watson statistic was 2.053, indicating no significant autocorrelation of residuals. A significance level of $p<0.05$ was used to determine statistical significance.

RESULTS

Description of Participants' DRSE

Table 1 shows that the overall mean score of DRSE among participants was 3.31 (SD=0.66), with scores ranging from 1 to 4.77. Among the domains, the highest mean score was observed in the role quality and adaptation domain at 3.55 (SD=0.75), while the lowest mean score was found in the psychological nursing domain at 3.21 (SD=0.82). At the item level, the highest mean score was reported for item 22 (adhering to professional ethics) at 4.01 (SD=0.80), followed by item 21 (communicating and collaborating) at 3.60 (SD=0.92), and item 10 (performing patient transfer) at 3.52 (SD=0.93). In contrast, the lowest mean score was found for item 12 (providing intensive care) at 2.87 (SD=0.93), followed by item 2 (assessing injury conditions) at 3.09 (SD=0.88), and item 16 (initiating psychological assessment) at 3.09 (SD=0.93).

The Association between Participants Characteristics and DRSE

Table 2 presents the results of the association between participant characteristics and DRSE. Statistically significant associations were found for several variables. Age was positively correlated with DRSE ($r=0.188$, $p=0.004$), where older participants tended to have higher self-efficacy. Academic level showed a significant difference ($t=-4.974$, $p<0.001$), with participants in the professional nursing program demonstrating higher self-efficacy than those in the 3rd and 4th grade. Disaster experience was also significantly associated with self-efficacy ($t=-2.613$, $p=0.010$), those with prior disaster experience had higher self-efficacy compared to those without experience. Involvement in disaster organizations was significantly associated with higher self-efficacy ($t=-2.231$, $p=0.027$), those engaged in such organizations were more confident in their disaster response abilities. Disaster training was also a significant factor ($t=-2.883$, $p=0.004$), with those who had received training demonstrated higher self-efficacy than those without training. Participation in disaster-related courses showed a significant association ($t=-3.320$, $p=0.001$), with participants who had taken such courses had higher self-efficacy compared to those who had not.

Determinants of DRSE among Participants

A multiple linear regression analysis was conducted to examine the determinants of disaster response self-efficacy (DRSE) among participants (Table 3). Academic level was identified as a significant determinant of DRSE (β=0.293, 95% Confidence Interval [0.166 to 0.626], p<0.001). Other variables were not statistically significant, including age (β=-0.060, 95% CI [-0.068 to 0.032], p=0.471), reason to pursue a nursing degree (β=-0.118, 95% CI [-0.316 to 0.004], p=0.056), disaster experience (β=0.062, 95% CI [-0.142 to 0.364], p=0.387), disaster organization involvement (β=0.110, 95% CI [-0.050 to 0.391], p=0.130), disaster training (β=0.050, 95% CI [-0.120 to 0.265], p=0.457), and disaster course (β=0.123, 95% CI [-0.009 to 0.336], p=0.063). The overall regression model was statistically significant (p<0.001), explaining 15.6% of the variance in DRSE (R^2=0.156; adjusted R^2=0.130).

Table 1. Description of DRSE among Participants (n=234)

No.	Item	Mean	SD	Min-Max
1.	Detecting hazardous conditions	3.18	0.85	1-5
2.	Assessing injury conditions	3.09	0.88	1-5
3.	Assessing epidemic situations	3.12	0.86	1-5
4.	Identifying vulnerable groups	3.51	0.79	1-5
5.	Assessing risk factors	3.41	0.89	1-5
6.	Recognizing rescue procedures	3.29	0.91	1-5
7.	Performing triage	3.35	1.02	1-5
8.	Performing wound care and stabilization	3.37	0.91	1-5
9.	Performing patient lifting	3.49	0.96	1-5
10.	Performing patient transfer	3.52	0.93	1-5
11.	Performing ABC emergency care	3.30	1.03	1-5
12.	Providing intensive care	2.87	0.93	1-5
13.	Preventing and controlling infections	3.18	0.93	1-5
14.	Surveying and reporting epidemics	3.15	0.97	1-5
15.	Conducting initial psychological assessment	3.12	0.94	1-5
16.	Initiating psychological assessment	3.09	0.93	1-5
17.	Recognizing mental health issues	3.33	0.94	1-5
18.	Providing basic psychological care	3.27	0.94	1-5
19.	Referring for psychiatric care	3.09	0.98	1-5
20.	Adapting psychologically	3.48	0.95	1-5
21.	Communicating and collaborating	3.60	0.92	1-5
22.	Adhering to professional ethics	4.01	0.80	1-5
DRSES Score		3.31	0.66	1-4.77
	Assessment	3.26	0.65	1-5
	Emergency Rescue	3.27	0.74	1-5
	Psychological Nursing	3.21	0.82	1-5
	Role Quality and Adaptation	3.55	0.75	1-5

Note: DRSES=Disaster Response Self-Efficacy Scale.

Table 2. The Association between Participants Characteristics and DRSE (n=234)

Variables	n	%	DRSES		t/r	p
			Mean	SD		
Age [M=21.66 years, SD=2.15, Min-Max=19-33]					0.188	**0.004****
Gender					-0.714	0.476
Female	199	85.0	3.29	0.65		
Male	35	15.0	3.38	0.69		
Academic Level					-4.974	**<0.001*****
3rd & 4th Grade	146	62.4	3.15	0.64		
Professional Nursing Program	88	37.6	3.57	0.59		
Reason to Pursue Nursing Degree					1.838	0.067
Self-Motivated	133	56.8	3.38	0.67		
External Direction	101	43.2	3.22	0.64		
Disaster Prone Area					-0.809	0.419
No	181	77.4	3.29	0.67		
Yes	53	22.6	3.38	0.62		
Disaster Experience					-2.613	**0.010***
No	197	84.2	3.26	0.65		
Yes	37	15.8	3.57	0.63		
Disaster Organization					-2.231	**0.027***
No	180	76.9	3.26	0.65		
Yes	54	23.1	3.48	0.66		
Disaster Training					-2.883	**0.004****
No	169	72.2	3.24	0.64		
Yes	65	27.8	3.51	0.65		
Disaster Course					-3.320	**0.001****
No	97	41.5	3.15	0.69		
Yes	137	58.5	3.43	0.61		
Scout Activities					-0.835	0.404
No	77	32.9	3.26	0.68		
Yes	157	67.1	3.34	0.64		

*Note: *p<0,05; **p<0,01; ***p<0,001; DRSES=Disaster Response Self-Efficacy Scale.*

Table 3. Determinants of DRSE among Participants (n=234)

Variables	B	ß	p	95% CI		VIF
				Lower Bound	Upper Bound	
Age	-0.018	-0.060	0.471	-0.068	0.032	1.860
Academic Level	0.396	0.293	**<0.001*****	0.166	0.626	1.995
Reason to Pursue Nursing Degree	-0.156	-0.118	0.056	-0.316	0.004	1.013
Disaster Experience	0.111	0.062	0.387	-0.142	0.364	1.370
Disaster Organization	0.170	0.110	0.130	-0.050	0.391	1.389
Disaster Training	0.073	0.050	0.457	-0.120	0.265	1.197
Disaster Course	0.164	0.123	0.063	-0.009	0.336	1.162
F	5.953					
p	**<0.001*****					
R^2	0.156					
Adjusted R^2	0.130					

*Note: *p<0,05; **p<0,01; ***p<0,001; CI=Confidence Interval, VIF=Variance Inflation Factors.*

DISCUSSION

The present study of nursing students identified an overall moderate DRSE. At the domain level, the highest score was observed in role quality and adaptation, while the lowest was psychological nursing. Bivariate analyses indicated that DRSE was positively associated with age, and differed significantly by academic level, disaster experience, experience in disaster organizations, disaster training, and participation in disaster-related courses. In multivariable regression, academic level emerged as the only statistically significant determinant.

These patterns align with a growing body of international evidence showing that nursing students commonly report moderate levels of DRSE, including a large multi-site study in Bangladesh (14) and comparative work spanning Turkey and Iran (15). Studies conducted in post-earthquake educational contexts have similarly documented moderate DRSE scores among nursing students (13), supporting the interpretation that moderate DRSE is a recurrent baseline across diverse nursing education systems and hazard exposures. A moderate DRSE profile can be interpreted as partial readiness, in which students perceive some capacity to act, especially on professional-role and adaptation tasks, while remaining uncertain about specialized competencies that require repeated practice, high-fidelity simulation, or authentic field exposure. Systematic synthesis of disaster training research in nursing indicates that structured preparedness education generally increases self-efficacy, with simulation- and scenario-driven approaches producing the most consistent gains (7). Likewise, randomized and quasi-experimental trials repeatedly show that targeted training improves DRSE (8,20).

The domain profile observed highest scores in role quality/adaptation and lowest in psychological nursing also has plausible educational and competency-based explanations. Professional role adaptation (ethics, teamwork, communication, and maintaining functioning under stress) is embedded across curricula and clinical placements, which can contribute to stronger perceived capability in that domain. Supporting this, a radiological-disaster-focused study of final-year students and interns in Saudi Arabia found the highest subscale scores in role quality and adaptation, suggesting that professional role confidence may generalize even when technical disaster content is specialized (16).

In contrast, psychological nursing tasks in disasters such as psychological assessment, recognizing stress disorders, providing brief psychosocial support, and referral are often less practiced in skill-based formats and may be perceived as high-stakes and complex. Evidence indicates that senior nursing students' psychological first aid (PFA) application self-efficacy warrants strengthening (21). Complementary intervention research also demonstrates that structured PFA training can produce measurable gains in students' DRSE and preparedness perceptions (22). Together, these findings support interpreting psychological nursing as a confidence bottleneck domain, particularly where curricula emphasize general professionalism more than practiced psychosocial disaster competencies.

The study's positive association between age and DRSE suggests that even within a relatively narrow student age band, incremental maturity and cumulative exposure may translate into slightly higher perceived capability. Similar age-related patterns have been reported in other nursing student samples. Hasan et al. (14) identified age as a significant factor associated with DRSE, and another study found higher DRSE among older students in the Turkish subgroup (15). Conceptually, age may operate through proximal learning mechanisms (more clinical encounters, more role socialization, and more time to accumulate mastery experiences), which can elevate self-efficacy judgments. However, when academic level is modeled simultaneously, age-related variance may be absorbed by education-stage differences, consistent with the present study's finding that age did not remain significant in the multivariable model.

Academic level demonstrated the strongest and most consistent association with DRSE in this study. This pattern is supported by international findings where more advanced or higher exposure educational pathways are linked to greater DRSE. In a study, being enrolled in a higher level of study was significantly associated with higher DRSE, indicating that additional formal training/clinical experience may translate into higher confidence in disaster response capacities (14). In a comparative study, fourth-year students in Turkey reported significantly higher DRSE than third-year students, reinforcing the education-stage gradient (15).

Evidence from specialized emergency contexts further suggests that more immersive practice roles can elevate self-efficacy for certain competencies. Another study found that interns had higher overall radiological-DRSE than final-year students, and training exposure was associated with higher scores (16). Collectively, this supports interpreting academic level as a proxy for cumulative clinical immersion and exposure to disaster-related learning opportunities.

Disaster experience was significantly associated with DRSE in the present study, suggesting that direct exposure can strengthen perceived disaster response capability. Comparable evidence appears in a comparative study, where disaster survival was associated with higher DRSE in the Iranian subgroup, indicating that lived disaster exposure can shape confidence judgments (15). At the same time, findings across the literature are not uniform. Hasan et al. (14) did not observe a significant association between disaster experience and DRSE, suggesting that experience may differ in intensity, role clarity, supervision, and learning structure across contexts. Qualitative evidence can help interpret this heterogeneity. Nursing students engaged in support activities in disaster-affected provinces described intense emotions, ethical dilemmas, and perceived deficiencies in organization and education (23). Such experiences may both increase realism and awareness of gaps, potentially leading to variable impacts on self-efficacy depending on whether exposure is accompanied by training, mentoring, and defined responsibilities.

Experience in disaster-related organizations was also associated with higher DRSE in the present study. This aligns with cross-national evidence that civil society involvement can relate to higher DRSE particularly in contexts where such organizations provide structured preparedness activities. A study found that disaster-related civil society membership was associated with higher DRSE (in the Turkish subgroup), supporting the idea that organized engagement can increase exposure to drills, role expectations, and practical response norms (15). However, another study indicates that student involvement in disaster support settings may also expose gaps in coordination and education (23), underscoring that organizational experience likely enhances DRSE most when participation includes structured training, supervision, and clear scope of practice rather than ad hoc deployment.

The present study found significantly higher DRSE among students who reported disaster training exposure. This finding is strongly reinforced by intervention studies demonstrating causal gains in DRSE following disaster-focused education. A RCT using a structured, model-based, learning-management-system-assisted training program showed significant increases in nursing students' response self-efficacy after training (8). Similarly, a single-blind RCT found that a multi-module disaster nursing and management education program increased DRSE relative to controls (24). Quasi-experimental simulation research further indicates that repeated standardized patient simulations can significantly improve DRSE (20), and mixed-method evidence suggests that intensive search-and-rescue-focused training can raise DRSE scores substantially across total and sub-dimensions (25). Blended training programs have also been evaluated as effective for improving DRSE (26). Overall, the convergence of randomized and quasi-experimental evidence supports disaster training as a robust lever for strengthening DRSE.

Participation in disaster-related coursework was significantly associated with DRSE in the present study, suggesting that curricular exposure matters. Controlled and evaluative studies likewise indicate that disaster courses improve disaster-related competence perceptions and perceived ability. A course-effect study reported improvements in nursing students' disaster awareness, preparedness, and response self-efficacy following a disaster nursing course (27). A mixed-method evaluation study in Hong Kong found that disaster education improved nursing students' disaster knowledge, willingness, and perceived ability to respond (28). The multi-national comparative study concluded that disaster preparedness courses should be integrated into nursing curricula given the observed moderate DRSE and the positive linkage between disaster literacy and response self-efficacy (15). Taken together, available evidence supports the interpretation that disaster coursework can strengthen DRSE directly, and also indirectly by increasing disaster literacy, knowledge, and perceived role clarity.

The finding that academic level was the sole statistically significant determinant of DRSE, suggests that education stage may function as an upstream integrator of other apparent correlates. International evidence supports this interpretation. In Hasan et al. (14) study, being in

a post-basic BSc pathway was independently associated with higher DRSE, implying that educational progression and extended professional preparation can materially shape disaster response confidence. A study revealed that academic year was related to DRSE, indicating education-stage gradients (15). In more intensive practice roles, students occupying internship-like positions may also exhibit higher DRSE (16), consistent with the proposition that increased clinical responsibility and exposure experiences strengthen confidence judgments.

The findings of this study have important implications for nursing education and disaster preparedness strategies. Given that DRSE among nursing students remains at a moderate level, there is a clear need to strengthen educational approaches that emphasize experiential and competency-based learning. Integrating structured disaster education into the nursing curriculum, particularly through simulation-based training, scenario-based exercises, and interprofessional collaboration, may enhance students' confidence and readiness. Special attention should be directed toward improving competencies in psychological nursing, as this domain demonstrated the lowest level of self-efficacy. Additionally, providing students with opportunities for real-world exposure, such as participation in disaster drills, community-based disaster programs, and collaboration with disaster response organizations, may further reinforce their practical skills and self-efficacy. Strengthening these educational components is essential to ensure that future nurses are adequately prepared to respond effectively in disaster situations.

This study has several strengths that contribute to its relevance and scientific value. The relatively large sample size enhances the robustness of the findings, while the use of a validated and reliable instrument provides confidence in the measurement of DRSE. Furthermore, the application of both bivariate and multivariate analyses allows for a comprehensive understanding of associated factors and key determinants. However, several limitations should be acknowledged. The cross-sectional design limits the ability to establish causal relationships between variables. The study was conducted in a single institution, which may restrict the generalizability of the findings to other settings or populations. Additionally, the use of self-reported data may introduce response bias, as participants might overestimate or underestimate their actual abilities.

CONCLUSION

This study found that DRSE among nursing students was at a moderate level, indicating that students possess basic confidence but are not yet fully prepared for disaster response. Higher confidence was observed in role quality and adaptation, while psychological nursing emerged as the weakest domain. Several factors were associated with self-efficacy, including age, academic level, disaster experience, involvement in disaster organizations, disaster training, and participation in disaster-related courses. Academic level was the only significant determinant, emphasizing the critical role of educational progression and clinical exposure in shaping disaster response confidence.

These findings highlight the need to strengthen disaster nursing education through structured and experiential learning approaches. Integrating simulation-based training, disaster-focused coursework, and opportunities for real-world engagement such as drills and organizational involvement may enhance students' self-efficacy, particularly in psychological care during disasters. Future research is recommended to adopt longitudinal and interventional designs and to include additional variables such as disaster knowledge, resilience, and institutional support to further explore and improve DRSE among nursing students.

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Author Contributions

F.L. conceptualized and designed the study, conducted data collection, performed statistical analysis, and drafted the manuscript. P.M.S. contributed to data interpretation, critically revised the manuscript, and provided important

intellectual content. Both authors have read and approved the final version of the manuscript.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request. Due to ethical considerations and to protect participant confidentiality, the data are not publicly available.

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