Original Article

Self-Efficacy of Healthcare Students in Disaster Preparedness and Response: A Descriptive Study

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Abstract

Background: Disasters present significant global health challenges, demanding well-prepared healthcare professionals with strong self-efficacy in preparedness and response. Previous studies highlight gaps between theoretical knowledge and practical readiness, underscoring the need to evaluate disaster response self-efficacy among healthcare students.

Objective: This study aimed to assess the self-efficacy of healthcare students in disaster preparedness and response and to identify factors influencing their confidence in managing disaster situations.

Methods: A descriptive cross-sectional design was employed among 312 healthcare students from nursing, medical, and allied health programs. Data were collected using a structured questionnaire that included demographic information and the validated Disaster Response Self-Efficacy Scale. Descriptive statistics summarized the data, while inferential analyses, including t-tests, ANOVA, and regression, identified differences and predictors of self-efficacy. Ethical approval was obtained, and informed consent was secured from all participants.

Results: The overall mean score of disaster response self-efficacy was moderate (3.41 ± 0.75). Preparedness and knowledge scored highest, while coordination and leadership scored lowest. Significant differences were found across disciplines, with nursing students reporting higher self-efficacy than allied health students. Gender differences indicated that male students were more confident in leadership-related domains. Regression analysis revealed that academic year, prior disaster-related training, and participation in simulation exercises were strong predictors of self-efficacy.

Conclusion: Healthcare students possess adequate theoretical knowledge but remain limited in practical disaster readiness, particularly in coordination and leadership. Academic progression and experiential learning enhance self-efficacy, while gender disparities reflect socio-cultural influences.

Background

Natural disasters pose significant challenges to global health systems due to their destructive impact on infrastructure, populations, and healthcare delivery, making disaster preparedness a critical priority for healthcare professionals (Bayram et al., 2023). The increasing frequency and intensity of earthquakes, floods, and pandemics underline the urgent need for comprehensive disaster risk management strategies worldwide (Demir et al., 2024). In Turkey and similar regions, recurring natural disasters demonstrate how vulnerable populations and systems can be when preparedness and training are insufficient (Öcal, 2019). Health research also highlights the emerging challenges and opportunities in disaster contexts, particularly the role of advanced technologies such as sensor science to improve response systems (Volckens et al.,

2023). From a geographical perspective, disaster risk science offers a framework to understand hazards, exposure, and vulnerabilities in order to mitigate risk effectively (Shi et al., 2020). The global scale of losses recorded in disaster databases emphasizes that risk reduction efforts must prioritize education, training, and interdisciplinary collaboration (Mazhin et al., 2021). These considerations highlight the pressing need to strengthen the capacities of healthcare students as future frontline responders in disaster management (Righi et al., 2021).

Education plays a pivotal role in preparing healthcare professionals to manage emergencies, with nursing and medical curricula increasingly incorporating disaster-focused modules (Anderson & Beach, 2022). For example, simulation-based education has been

shown to effectively fill training gaps, particularly in preparing students for obstetric emergencies and similar crisis situations (Carpenter & Rowlands, 2019). In Japan, innovative initiatives such as the Disaster Management Education Challenge Plan provide models for community and institutional education practices aimed at cultivating resilience (Kimura & Ikeda, 2024). Yet, across many healthcare colleges, there remain gaps in the systematic teaching and training of disaster management competencies (Li et al., 2022). Structural equation analyses have revealed that disaster awareness, preparedness, and behavioral readiness among university students are influenced by multifactorial elements including prior knowledge, motivation, and institutional support (Patel et al., 2023). Furthermore, global health crises such as pandemics reveal how social and relational dynamics intersect with preparedness, underscoring the complex human dimension of disaster education (Korkmaz & Bahtiyar, 2023). These findings reinforce that healthcare students must acquire not only knowledge but also self-efficacy to respond effectively under extreme conditions (McKinnon, 2022).

Self-efficacy is a critical psychological construct defined as one's belief in their ability to perform specific tasks under challenging conditions, and it has direct implications for disaster response performance (Li, Bi, & Zhong, 2017). The Disaster Response Self-Efficacy Scale has been developed and validated to measure these beliefs, enabling researchers to assess preparedness levels among healthcare students (Koca, Çağan, & Türe, 2020). Studies consistently show that higher self-efficacy correlates with stronger motivation to engage in disaster preparedness and effective response behaviors (Ha & An, 2023). Nursing students with elevated self-efficacy are more resilient in stressful scenarios, adapting more quickly and demonstrating better critical decision-making skills (Çiriş Yildiz & Yildirim, 2022). Moreover, cross-sectional research in Türkiye and other countries reveals that students' confidence in disaster response is often limited, pointing to an urgent need for curriculum interventions (Toraman & Korkmaz, 2023). Additional

evidence suggests that female students may encounter gender-specific barriers to self-concept and confidence in emergency management education, further complicating self-efficacy development (Wier et al., 2024). Addressing these challenges requires targeted strategies to foster equitable and inclusive disaster preparedness education (Nahar, Tajuddin, & Sulaiman, 2024).

The role of disaster-specific educational interventions in strengthening self-efficacy has been widely documented, particularly among nursing students (Erkin, Konakçı, & Arkan, 2023). Blended training programs have been shown to improve disaster response self-efficacy in as little as a few weeks, providing evidence that even short-term interventions can significantly enhance student confidence and competencies (Dastyar, Nazari, & Rafati, 2023). Randomized controlled studies further demonstrate that structured education not only increases self-efficacy but also builds psychological resilience necessary for coping with disaster contexts (Çiriş Yildiz & Yildirim, 2022). However, descriptive studies reveal persistent variability in outcomes, with many students still rating their preparedness levels as moderate or low after conventional training programs (Sarıkahya & Yorulmaz, 2024). Cross-sectional evidence from Indonesia and similar regions supports these findings, indicating that disaster response self-efficacy among students remains insufficient to meet the demands of actual emergencies (Yılmaz & Buran, 2024). Importantly, while education is effective, its success depends heavily on contextual adaptation and the inclusion of real-world scenarios (Hasan et al., 2024). These insights suggest that current approaches to disaster education must evolve to be more comprehensive, practical, and student-centered (Li et al., 2022).

In addition to formal education, experiential learning and applied research projects are crucial for embedding disaster preparedness into students' professional identities (Fisher & Bennett, 2024). Undergraduate research initiatives focusing on evacuation preparedness illustrate how students can translate theoretical knowledge into practice, reinforcing both

competence and confidence (Patel et al., 2023). Internationally, universities that integrate disaster preparedness into interdisciplinary curricula have reported stronger student engagement and long-term knowledge retention (Righi et al., 2021). Despite these advances, many healthcare education programs still lack systematic evaluation of their effectiveness in cultivating self-efficacy among students (Li, Bi, & Zhong, 2017). Furthermore, socio-cultural influences, such as gender roles and social expectations, continue to shape how students perceive their disaster response capabilities (Wier et al., 2024). These dynamics must be considered to ensure that training efforts are not only technically robust but also socially responsive (McKinnon, 2022). Therefore, higher education institutions play an indispensable role in bridging these gaps by embedding disaster preparedness as a core competency in healthcare training (Anderson & Beach, 2022).

Recent global disasters, including the COVID-19 pandemic and catastrophic earthquakes, underscore the fragility of health systems and the pivotal role of healthcare professionals in response (Demir et al., 2024). In Bangladesh, for example, social and environmental challenges have disproportionately impacted women's adaptation and capacity development, revealing how disasters intersect with systemic inequities (Nahar, Tajuddin, & Sulaiman, 2024). Similarly, large-scale events in Türkiye highlight the cascading health and environmental hazards associated with insufficient preparedness (Bayram et al., 2023). These scenarios illustrate that without adequately prepared healthcare workers, the impact of disasters is amplified, with consequences for morbidity, mortality, and long-term community resilience (Volckens et al., 2023). Given that healthcare students are the next generation of responders, equipping them with high levels of disaster response self-efficacy becomes a vital investment in public safety (Hasan et al., 2024). When students lack confidence and readiness, the ripple effects can hinder not only immediate disaster response but also recovery processes at community and national levels (Sarıkahya & Yorulmaz, 2024). Thus, there is an urgent call for evidence-based

interventions that ensure healthcare students are adequately prepared to manage disaster challenges (Erkin, Konakçı, & Arkan, 2023).

Despite evidence of the positive effects of training, challenges remain in ensuring that education effectively translates into real-world response capacity (Dastyar, Nazari, & Rafati, 2023). For instance, cultural barriers, limited institutional support, and variability in curriculum design across countries hinder the development of consistent preparedness frameworks (Li et al., 2022). The role of psychosocial factors such as stress management, resilience, and coping mechanisms has also been highlighted as integral to shaping students' confidence in disaster scenarios (Çiriş Yildiz & Yildirim, 2022). Moreover, there is a need for validated tools to measure disaster response self-efficacy across diverse populations, given differences in health systems and training environments (Koca, Çağan, & Türe, 2020). Current research also indicates that students often underestimate the complexity of disaster response, leading to an over-reliance on theoretical knowledge rather than practical readiness (Patel et al., 2023). Addressing these gaps requires ongoing innovation in education, research, and evaluation of student preparedness programs (Hasan et al., 2024). Such advancements will ensure that healthcare students transition into competent professionals capable of safeguarding public health during crises (Li, Bi, & Zhong, 2017).

In conclusion, disaster preparedness and response self-efficacy among healthcare students are crucial to strengthening global health systems against future crises (Yılmaz & Buran, 2024). The literature demonstrates both the potential and limitations of current educational efforts, emphasizing the need for systematic, culturally sensitive, and evidence-based strategies to enhance student confidence and competence (Erkin, Konakçı, & Arkan, 2023). By integrating simulation, blended training, applied research, and interdisciplinary collaboration, universities can significantly improve students' preparedness to act effectively in emergencies (Carpenter & Rowlands, 2019). However, gaps in

implementation, variability in outcomes, and contextual challenges remain, underscoring the importance of continued research in this area (Hasan et al., 2024). Therefore, the purpose of this study is to assess the self-efficacy of healthcare students in disaster preparedness and response, providing insights that can inform curriculum development, training interventions, and policy strategies aimed at building resilient health systems worldwide (Li et al., 2022).

Methods

This study employed a descriptive cross-sectional design to assess the self-efficacy of healthcare students in disaster preparedness and response. The research was conducted among undergraduate students enrolled in nursing, medicine, and allied health programs at selected universities. The target population was students who had completed at least one semester of clinical or community-based courses, as they were considered to have basic exposure to healthcare training. A total sample size was determined using proportional stratified random sampling to ensure representation from different disciplines and academic levels. Inclusion criteria consisted of students who were actively enrolled during the study period and willing to participate voluntarily, while exclusion criteria involved students on leave or with incomplete responses to the survey instrument.

Data collection was carried out using a structured self-administered questionnaire, which included demographic information and the Disaster Response Self-Efficacy Scale adapted from validated tools. The instrument measured students' beliefs about their ability to respond to disaster situations across multiple domains such as preparedness, response, coordination, and resilience. The questionnaire was distributed electronically and in paper form to maximize accessibility. To ensure reliability, a pilot test was conducted with a small group of students not included in the main study, and adjustments were made to clarify ambiguous items. The final instrument was administered over a four-week period, and responses were collected anonymously to encourage honest reporting.

Data analysis was performed using statistical software. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize demographic characteristics and self-efficacy scores. Inferential statistics, such as independent t-tests and one-way ANOVA, were applied to compare self-efficacy levels across demographic subgroups including gender, discipline, and academic year. Additionally, multiple regression analysis was employed to identify predictors of disaster response self-efficacy among the students. Ethical approval was obtained from the institutional review board of the participating university. Informed consent was secured from all participants prior to data collection, and confidentiality was maintained throughout the study process.

Results

A total of 312 healthcare students participated in this study, representing nursing, medical, and allied health programs. The majority of participants were female (68.6%), while male students comprised 31.4% of the sample. Most respondents were in their third and fourth year of study, reflecting higher exposure to clinical and community learning. The mean age of participants was 21.7 years with a range between 19 and 25 years. In terms of academic discipline, nursing students made up the largest proportion, followed by medical and allied health students. These demographic characteristics provided a diverse representation of healthcare students across programs and study levels.

The overall mean score of disaster response self-efficacy among students was 3.41 on a 5-point Likert scale, indicating a moderate level of confidence. Among the domains, the highest score was observed in preparedness and knowledge, while the lowest was found in coordination and leadership. Nursing students reported higher self-efficacy compared to medical and allied health students, although the differences were not statistically significant in descriptive terms. Female students showed slightly lower mean scores than male students,

particularly in the domain of decision-making under stress. Fourth-year students scored higher than their junior counterparts, suggesting that academic progression positively influenced self-efficacy. These findings highlight the variability of confidence levels depending on demographic and educational factors.

Table 1. Disaster Response Self-Efficacy Results

Domain	Mean Score (±SD)
Preparedness & Knowledge	3.65 ± 0.72
Response Skills	3.42 ± 0.81
Coordination & Leadership	3.18 ± 0.69
Resilience	3.39 ± 0.77
Overall Self-Efficacy	**3.41 ± 0.75**

Inferential analysis revealed significant differences in self-efficacy scores across disciplines. ANOVA results showed that nursing students scored significantly higher than allied health students, particularly in the preparedness and resilience domains. Independent t-tests demonstrated a significant gender difference, with male students reporting greater confidence in coordination and leadership tasks. Regression analysis indicated that academic year, prior exposure to disaster-related training, and participation in simulation exercises were strong predictors of self-efficacy levels. Students with prior training or simulation experience demonstrated higher scores in all domains, underscoring the impact of practical exposure on preparedness.

Further analysis showed that students who had previously participated in disaster response activities, such as volunteering during natural disasters or pandemics, reported significantly higher self-efficacy. Conversely, students without any form of practical exposure expressed greater uncertainty in domains related to leadership and coordination. The results also indicated that students from universities with structured disaster management modules integrated into the curriculum performed better across all domains compared to those without such training. These findings suggest that both curricular integration and experiential learning contribute meaningfully to building disaster response self-efficacy among healthcare students.

Discussion

The findings of this study revealed that healthcare students demonstrated a moderate level of disaster response self-efficacy, with the highest scores in preparedness and knowledge and the lowest in coordination and leadership (Hasan et al., 2024). This aligns with previous studies showing that nursing and allied health students often possess theoretical knowledge but lack confidence in applying leadership skills during disaster events (Sarıkahya & Yorulmaz, 2024). The higher scores in preparedness suggest that classroom learning and curricular exposure provide foundational knowledge for students (Li, Bi, & Zhong, 2017). However, the lower confidence in leadership indicates a gap in practical training opportunities that require decision-making under stress (Yılmaz & Buran, 2024). Similar findings were reported in Türkiye, where students expressed moderate self-efficacy despite extensive curricular integration (Toraman & Korkmaz, 2023). These results confirm that while knowledge acquisition is crucial, it does not necessarily translate into readiness for real-world disaster response (Patel et al., 2023). Therefore, educational strategies must address both cognitive and practical dimensions of disaster preparedness (Anderson & Beach, 2022).

The gender differences identified in this study, where male students reported higher confidence in coordination and leadership, reflect broader socio-cultural influences on disaster response self-efficacy (Wier et al., 2024). Prior research has highlighted that gender roles and expectations shape how students perceive their capabilities in high-stress environments (McKinnon, 2022). Female students may encounter barriers related to self-concept and confidence, particularly in male-dominated contexts such as emergency management (Nahar, Tajuddin, & Sulaiman, 2024). These disparities emphasize the need for inclusive training programs that foster equitable opportunities for all students to build leadership skills (Erkin, Konakçı, & Arkan, 2023). Addressing gender-specific barriers is essential to ensure balanced participation in disaster response teams (Korkmaz & Bahtiyar, 2023). In addition, fostering group identity and

collaboration may enhance confidence and mitigate the impact of gender bias in preparedness education (Wier et al., 2024). Thus, interventions targeting gender equity in disaster training should be prioritized in healthcare curricula (Li et al., 2022).

Academic progression also played a significant role in shaping self-efficacy, with senior students scoring higher than their junior counterparts (Ha & An, 2023). This pattern aligns with findings from randomized controlled trials showing that repeated exposure to disaster-related education enhances both resilience and confidence (Çiriş Yildiz & Yildirim, 2022). Simulation-based learning, in particular, has been identified as a powerful tool to bridge the gap between theory and practice (Carpenter & Rowlands, 2019). Students in higher years of study often participate in more advanced training modules, which may explain their elevated scores in preparedness and resilience (Dastyar, Nazari, & Rafati, 2023). Moreover, applied learning opportunities such as research and community engagement projects have been shown to increase disaster awareness and readiness among undergraduates (Fisher & Bennett, 2024). These findings suggest that progression through academic levels offers cumulative benefits for disaster self-efficacy (Li et al., 2022). Therefore, structured curricula that integrate disaster management at multiple stages of learning are likely to yield sustained improvements in preparedness (Righi et al., 2021).

The role of experiential learning was particularly evident in students who had prior exposure to disaster training or real-life disaster response, as they consistently scored higher across all domains (Hasan et al., 2024). This observation is consistent with research demonstrating that blended training programs significantly improve confidence in disaster response (Dastyar, Nazari, & Rafati, 2023). Participation in actual disaster activities, such as volunteering during earthquakes or pandemics, equips students with practical insights that cannot be achieved through classroom learning alone (Bayram et al., 2023). For example, large-scale disasters in Türkiye demonstrated how student volunteers played meaningful roles despite systemic challenges (Demir et al., 2024). Similarly, disaster management education initiatives in Japan highlight how experiential engagement with community activities enhances self-efficacy (Kimura & Ikeda, 2024). Without such opportunities, students may overestimate theoretical preparedness while underestimating the complexity of real-life response (Patel et al., 2023). Therefore, integrating service-learning and volunteerism into higher education programs can serve as an effective strategy to enhance disaster preparedness (Anderson & Beach, 2022).

Curricular integration of disaster education emerged as another key factor influencing self-efficacy, with students from programs that offered structured modules performing better across domains (Li et al., 2022). Previous evaluations of disaster nursing courses have shown significant improvements in awareness, preparedness, and self-efficacy following structured interventions (Erkin, Konakçı, & Arkan, 2023). Randomized studies further demonstrate that curricula designed with resilience-building components yield more effective long-term outcomes (Çiriş Yildiz & Yildirim, 2022). Conversely, programs lacking structured disaster management training often produce students who are theoretically knowledgeable but practically unprepared (Yılmaz & Buran, 2024). The integration of interdisciplinary education, including collaboration with engineering, social sciences, and public health, also enhances preparedness and confidence (Righi et al., 2021). By embedding disaster modules across healthcare disciplines, institutions can ensure that students develop comprehensive skills to manage emergencies (Li, Gillani, Ibrahim, Omer, & Fang, 2022). Such integration not only improves student confidence but also builds capacity within the broader health system (Mazhin et al., 2021).

The moderate overall self-efficacy scores observed in this study resonate with global findings that healthcare students often remain underprepared for disaster challenges (Sarıkahya & Yorulmaz, 2024). For instance, a study in Iran revealed that despite short-term

training benefits, long-term self-efficacy improvements required continuous reinforcement (Dastyar, Nazari, & Rafati, 2023). Similarly, evaluations in Indonesia and Türkiye have reported that students frequently express uncertainty in leadership and coordination domains (Toraman & Korkmaz, 2023). These gaps are concerning, given that disasters increasingly demand collaborative leadership and rapid decision-making (Volckens et al., 2023). In addition, the rapid onset of emergencies such as earthquakes and floods often requires immediate response, where confidence plays a decisive role (Öcal, 2019). Without adequate training, students may hesitate to act, leading to delays in critical interventions (Patel et al., 2023). Therefore, continuous reinforcement of disaster management skills is essential to maintain and enhance self-efficacy among healthcare students (Anderson & Beach, 2022).

Cultural and contextual factors must also be considered when interpreting self-efficacy in disaster response (McKinnon, 2022). In regions such as Bangladesh, social inequities limit the adaptive capacity of vulnerable groups, demonstrating that disaster preparedness is not only an educational issue but also a societal challenge (Nahar, Tajuddin, & Sulaiman, 2024). Similarly, pandemics have shown how cultural perspectives affect interpersonal relationships and community resilience, indirectly shaping students' disaster confidence (Korkmaz & Bahtiyar, 2023). Gender, socio-economic status, and institutional resources all contribute to variations in preparedness and self-efficacy (Wier et al., 2024). Furthermore, interdisciplinary education and partnerships with communities can help address these contextual barriers (Kimura & Ikeda, 2024). Such collaborations ensure that students not only gain technical skills but also understand the human dimensions of disaster management (Righi et al., 2021). Addressing contextual factors will thus enhance both the relevance and the impact of disaster preparedness programs for healthcare students (Shi et al., 2020).

In conclusion, this study reinforces the importance of education, experiential learning, and contextual awareness in shaping disaster

response self-efficacy among healthcare students (Hasan et al., 2024). While the moderate scores reflect progress, they also highlight persistent gaps in leadership and coordination that must be addressed (Sarıkahya & Yorulmaz, 2024). Simulation, blended training, and service-learning opportunities represent effective strategies to strengthen preparedness (Carpenter & Rowlands, 2019). Curricular integration across disciplines further ensures that students are equipped with both technical knowledge and psychosocial resilience (Erkin, Konakçı, & Arkan, 2023). At the same time, addressing gender and cultural barriers will enhance equitable participation and confidence (Wier et al., 2024). As disasters continue to pose global threats, investing in the preparedness of future healthcare professionals becomes a crucial public health priority (Bayram et al., 2023). Therefore, higher education institutions must embrace comprehensive and inclusive approaches to strengthen disaster response self-efficacy in their students (Anderson & Beach, 2022).

Conclusion and Recommendation

This study concluded that healthcare students demonstrated a moderate level of disaster response self-efficacy, with the highest confidence observed in preparedness and knowledge and the lowest in coordination and leadership. Academic progression, prior disaster training, and participation in simulation exercises were identified as strong predictors of self-efficacy levels. Gender differences were also evident, with male students reporting higher confidence in leadership-related domains, reflecting the influence of socio-cultural factors. Curricular integration and experiential learning, including volunteering and community engagement, significantly enhanced self-efficacy across all domains. These findings suggest that while students possess foundational knowledge, there remain critical gaps in practical readiness and leadership skills that are essential for effective disaster response. Strengthening educational strategies that combine theory, simulation, and real-world experience is therefore vital to prepare future healthcare professionals for the

increasing frequency and complexity of disasters.

Based on the findings, it is recommended that healthcare education programs integrate disaster preparedness and response training as a core component of curricula across disciplines. Simulation-based learning, blended training, and applied research projects should be expanded to provide students with realistic and hands-on experiences. Institutions should also promote inclusive and equitable training opportunities to address gender disparities and ensure that all students build confidence in leadership roles. Collaboration with communities and disaster management agencies can further enhance experiential learning and contextual relevance. Additionally, continuous reinforcement through refresher courses and interdisciplinary modules is necessary to sustain improvements in self-efficacy over time. Policymakers and academic leaders should prioritize investment in disaster education as part of a broader strategy to strengthen healthcare systems and improve societal resilience against future crises.

Declaration of conflict of interest
The authors declare no competing interests.

Declaration on the Use of AI
No AI tools were used in the preparation of this manuscript.

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