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Assessing Healthcare Students' Self-Efficacy in Disaster Response: A Cross-Sectional Analysis

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Abstract

Background: Assessing healthcare students' self-efficacy in disaster response is crucial for preparing them to effectively manage real-world disaster situations. This study aimed to assess the self-efficacy status of healthcare students in disaster response.

Methods: The data for this cross-sectional analysis were gathered from 498 healthcare students between November 18, 2023, and February 14, 2024, using an individual diagnostic form and the disaster-response self-efficacy (DRSE) scale. This scale is used to assess an individual's self-efficacy in responding effectively to disasters, including on-site rescue competency, disaster psychological nursing competency, disaster role quality, and adaptation competency.

Results: The mean age of the students enrolled in the study was 21.7 ± 3.56 years. A statistically significant difference was observed between the total DRSE scale score and the subdimension scores of students who were male, in the fourth grade, studying in the nursing department, exposed to a disaster, and enrolled in a course or training on disaster management ($p < 0.05$).

Conclusions: The results emphasize the importance of education, training, and prior experience in enhancing DRSE among healthcare students. Tailored interventions and comprehensive instructional activities are thus essential to improve preparedness and to ensure that students can effectively handle disaster scenarios.

Keywords: disaster, emergency response, self-efficacy, students

INTRODUCTION

Almost every day, disasters occur in our country and across the world. Throughout history, catastrophes have been an essential component of human existence, which has been supplemented by the rapid expansion of cities and the recent advancements in science, technology, and industry.[1] Disasters are defined as spontaneous events that transpire on Earth, whose magnitude, location, and timing are unpredictable. The geographical location and climate of Turkey render it highly susceptible to a variety of natural disasters, such as droughts, forest fires, landslides, floods, and earthquakes. The environment, society, and human health are all significantly and permanently affected by these disasters.[2,3]

Natural disasters in Turkish history have led to substantial economic losses and human casualties. These events have had a significant impact on the country's economy, resulting in the deaths of over 100,000 individuals over the past century.[3] Turkey's susceptibility to natural disasters are exacerbated by its diversified topography and climate, as well as its location in an active seismic region. The intensity and distribution of disaster impacts are significantly influenced by the geographical environment.[2] Moreover, the effects of disasters can be amplified by the interconnectedness of various hazards, such as earthquakes that induce landslides.[2] For example, the earthquakes that occurred on February 6, 2023, were centered in the Kahramanmaraş province and affected a large area, including 11 provinces in Turkey and some parts of Syria. The seismic events caused led to severe damage to buildings and infrastructure, with reportedly over 50,000 fatalities.[4,5]

The events are also characterized as "generally frightening events" that can cause substantial material and moral losses for societies.[2,3] In the event of a calamity, it is crucial to increase public awareness and encourage healthcare students, who are future professionals, to work in a coordinated, efficient, and timely manner. As the future frontline responders during disasters, healthcare students must be ready for quick and efficient interventions. Raised awareness would equip them with the right knowledge, tools, and confidence required to effectively manage crises, ensure patient safety, and support group attempts at coordinated disaster response.[6]

Nevertheless, the capacity to respond depends upon an individual's self-assurance or self-sufficiency in his or her capacity to manage disaster events, in addition to their technical knowledge and skills.[7–9] Evaluating disaster-response self-efficacy (DRSE) among healthcare students

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is essential for assessing and improving their readiness and efficacy in actual disaster situations, as engagement in educational interventions and disaster-related training markedly influences self-efficacy in disaster response. Past research has indicated that nursing students have moderate DRSE, which improves significantly with disaster management courses and training.[10,11] As reported previously, students in the field of healthcare who completed a disaster nursing course exhibited enhancements in their disaster awareness, readiness, and response self-efficacy perceptions, with statistically significant variations observed between the pretest and posttest scores.[11] Another research indicated that age, prior experience with disaster nursing education, and disaster awareness are the primary factors that influence the self-efficacy of students in the field of healthcare in disaster response.[12] The research also revealed that the self-efficacy of students was contingent upon their grade level, region of residence, and whether they had received disaster-related training previously.[12] Disaster preparation programs should therefore be incorporated into the standard curriculum and tailored to the individual requirements and characteristics of students, based on their geographic location and prior exposure to catastrophes.[12,13] For instance, Japan integrates disaster education into its school curricula to ensure that students understand the science behind natural disasters and emergency procedures. This initiative is a part of the Disaster Management Education Challenge Plan that is aimed at strengthening fundamental disaster management skills.[14]

Evaluations of these programs highlight the need for a more comprehensive scientific understanding of disasters and improved logistical support for enhanced program implementation.[14] Despite the educational interventions enhancing DRSE in healthcare students, a gap remains in attaining the requisite levels of competence. This gap signifies the need for supplementary techniques, including practical exercises and community involvement activities, to enhance students' preparation and confidence in disaster-response scenarios. In addition, the objective of assessing the DRSE of healthcare students is to enhance the comprehension of their perceived readiness and to understand the areas for enhancement in the current educational programs. The present research attempted to assess the self-efficacy level of healthcare students in a disaster response.

This study aims to explore various aspects of disaster exposure and self-efficacy among healthcare students. Specifically, it investigates the distribution of disaster exposure among participants, examining variations based on the type of disaster experienced, such as earthquakes, storms, landslides, droughts, floods, fires, and avalanches. Furthermore, the research assesses whether students' self-efficacy scale scores differ according to their level of disaster exposure. Additionally, this study examines the influence of sociodemographic factors, including age, sex, and education level, on healthcare students' self-efficacy scores in disaster response.

METHODS

To conduct the study, approval from the ethical committee (E-26428519-050.99-105514-2023/38), institutional authorization from the university where the research would be executed, and signed consent from the participants were secured. The research adhered to the Helsinki Principles. This study is a cross-sectional study. The research was conducted at the faculty of health sciences of a university situated in the western region of Turkey during the 2023–2024 academic year. The study encompassed a total of 1026 students, with 370 students enrolled in the physiotherapy and rehabilitation department of a state university, 394 students in the nursing department, and 262 students in the health management department. The CDC's Epiinfo program was used to compute the sample size, which was determined to be at least 279 students when $p = 0.50$ was accepted with a 5% margin of error and a 95% confidence interval. The study concluded with 498 students as a result of factors such as incomplete survey completion and the reluctance to participate.

Between November 18, 2023, and February 14, 2024, the research data were collected on the online platform using a Google Form. The surveys were completed by the participants voluntarily. The study universe is composed of 10 queries that serve as individual introductions to the students who are participating in the study. The participants' sex, age, departments of study, grade level, geographical region of hometown, disaster exposure, types of disasters, education received regarding disaster and disaster management, adequacy of the education received in coping with disasters, and desire to receive disaster-related education are all addressed in this survey. This survey form is a critical source of information for comprehending the students' characteristics, as well as their beliefs and DRSE. The queries were designed to furnish the participants with information consistent with the study's objectives and to identify prospective factors that could potentially influence the study's outcomes. This approach enables a more comprehensive examination of the impact of individual characteristics on DRSE by using the study's data.

In 2017, Hong-Yan Li *et al*. devised the Disaster-response Self-efficacy Scale.[15] In 2020, Koca *et al*. investigated the reliability and validity of the Turkish language.[16] The scale comprised 19 items and 3 subdimensions (on-site rescue competency, disaster psychological nursing competency, disaster role quality, and adaptation competency) and was scored on a 5-point Likert scale. The items are rated on a five-point Likert scale ranging from 1 to 5, where 1 = "No confidence at all," 2 = "Basically no confidence," 3 =

"Little confidence," 4 = "Basically confident," and 5 = "Complete confidence." Questions 1–11 are represented by the on-site rescue competency subdimension in the scale, while questions 12–15 are represented by the disaster psychological nursing competency subdimension. Questions 16–19 are represented by the nature of the role undertaken in the disaster and the adaptation competency subdimension. The scale was scored as follows: no self-confidence (1 point), basically no self-confidence (2 points), somewhat self-confident (3 points), basically confident (4 points), and wholly confident (5 points). The scale score is determined by adding the responses. A high score on the scale indicates high disaster intervention self-efficacy. The Cronbach alpha coefficient of the entire scale was 0.96 in the Turkish validity and reliability study of the scale. The subdimensions, which included on-site rescue competence, psychological nursing competence in disaster, and the quality of the role undertaken in a disaster, were each determined to be 0.93.

The study included volunteers who were active students at the university's faculty of health sciences during the study period. International students who were in the preparatory class and who experienced difficulty with Turkish language comprehension and writing, as well as those who had not completed the data collection forms, were excluded from the study.

The SPSS version 27 utility program was employed to conduct data analysis after the data were entered into the computer environment. The data from the study conducted on the students of the Faculty of Health Sciences was initially organized using Microsoft Office Excel software. The quantitative data were summarized in percentages and figures, while the quantitative data were summarized using the mean, standard deviation, median, minimum, and maximum statistics. The Kolmogorov–Smirnov test was conducted to determine whether the data met the assumption of normality. For normally distributed data with equal variances, ANOVA was applied, whereas the Welch t-test was employed when the variances were unequal. Pairwise comparisons were conducted with the Tukey HSD post-hoc test in cases where the variance homogeneity was achieved, and the Games–Howell Posttest was applied when the variance homogeneity was not achieved. The same letter was used for index groups that did not exhibit any statistically significant difference as a result of the post-hoc test. Furthermore, Cohen's d and Eta-squared statistics were employed to report the effect sizes observed in two independent and more than two-sample groups, respectively. The minimum acceptable statistical significance level was $p < 0.05$.

RESULTS

The results of the study indicate significant differences in disaster response self-efficacy based on various socio-demographic factors, academic background, and prior disaster exposure. The mean age of the participants was 21.7 ± 3.56 years, with 63.9% being female and 36.1% male. Table 1 presents demographic information on the participants.

As shown in Table 2, over half of the research participants (61%) reported prior exposure to a catastrophe, and over half of them (68.4%) specifically identified earthquakes as the most common disaster type encountered. Moreover, 58.4% (N = 291) of the participants reported having completed courses or training in disaster and disaster management. The percentage of participants who believed that the received training was sufficient to cope with disaster situations was only 19.2% (N = 56). Furthermore, 62.8% (N = 130) of the participants expressed a desire to pursue courses or training in catastrophe and disaster management in the future.

Table 3 illustrates the correlation among the sociodemographic characteristics of the students, their disaster exposure status, and their scale scores. A statistically significant difference was observed between the total DRSE scale score and the subdimension scores of students who were male (the effect size was in a low-to-medium effect size [0.20–0.50]), in the fourth grade (the effect size was very high [>0.20]), and those studying in the nursing department (the effect size was in a low-to-medium [0.01–0.06]), exposed to a disaster (the effect size was approximately low [0.20]), and those enrolled in a course or training in disaster management (the effect size was approximately medium [0.50]) ($p < 0.05$). The nursing department average was statistically significantly higher than that of the other two department averages when the source of the difference was examined in the scores, showing a significant difference. However, the difference between the FTR and health management departments was not statistically significant. In addition, the effect magnitude (eta-squared) was observed to be between low and medium (0.01–0.06). These results underscore the impact of various health disciplines on disaster preparedness and response competencies (Table 3).

A noteworthy finding was that students who had prior exposure to disasters scored significantly higher on-site rescue competency and overall self-efficacy compared to those who had never experienced a disaster. However, no significant differences were found in the psychological nursing competency or disaster role quality sub-dimensions. This suggests that while direct disaster exposure may enhance confidence in immediate response abilities, it does not necessarily translate to greater perceived competence in psychological support and role adaptation (Table 3). Another critical factor influencing self-efficacy was prior training in disaster response and management. Students who had completed coursework or training in disaster preparedness scored significantly higher across all sub-dimensions of the self-efficacy scale

($p < 0.05$) (Table 3). This underscores the importance of integrating structured disaster management education into healthcare curricula to enhance students' confidence and preparedness for real-world disaster scenarios. Overall, these findings reinforce the necessity for tailored educational interventions that cater to the specific needs of students in different healthcare disciplines. Given the observed disparities in self-efficacy based on gender, academic program, and prior experience, institutions should consider adopting targeted training approaches to bridge these gaps and improve disaster preparedness among future healthcare professionals.

TABLE 1. Demographic data on the study participants (N = 498)

Variables	N	%
Sex		
Male	180	36.1
Female	318	63.9
Participants' geographical areas		
Mediterranean Region	57	11.4
Eastern Anatolia Region	30	6.0
Aegean Region	54	10.8
Southeast Anatolia Region	31	6.2
The Black Sea Region	94	18.9
Marmara Region	128	25.7
Central Anatolia Region	104	20.9
Department		
Physiotherapy and Rehabilitation	165	33.1
Nursing	179	35.9
Health Management	154	30.9
Students' year		
1st year	138	27.7
2nd year	108	21.7
3rd year	110	22.1
4th year	142	28.5
Status of the Disaster Exposure		
Yes	304	61.0
No	194	39.0
Type of Disaster Exposed*		
Earthquake	208	68.4
Storm	37	12.2
Landslide	46	15.1
Drought	9	3.0
Flood and Inundation	60	19.7
Fire	42	13.8
Avalanche	15	4.9
Knowledge about disasters and disaster management education		
Taking courses or training in disasters and disaster management	291	58.4
How well is the education given helped deal with a disaster	56	19.2
Request disaster and disaster management training	130	62.8

*Multiple options were selected

DISCUSSION

Assessing healthcare students' self-efficacy in disaster response is essential for comprehending their preparedness so as to engage them during emergencies successfully. Self-efficacy, which is characterized as an individual's conviction in their capacity to do activities necessary to navigate certain special circumstances, is particularly relevant in disaster response, as swift and certain decision-making is crucial in such situations.[17,18] The main objective of assessing self-efficacy in this context was to discern the strengths and areas for enhancement in students' training. The study entitled "Evaluation of Healthcare Students' Self-Efficacy in Disaster Response" presumably offers significant insights into the preparedness and confidence of prospective healthcare workers in disaster management.[19] The present research highlights the critical necessity for disaster preparedness, especially within the healthcare sector, where prompt and efficient responses can preserve lives. Evaluating self-efficacy can facilitate the identification of deficiencies and areas that require focused training. This approach would guarantee that any detected deficiencies can be remedied through education and training before labor entry. The results obtained can inform about the development and incorporation of disaster-response training into healthcare curricula, thereby improving the overall preparedness of healthcare systems for catastrophes.[12,20] With this background, the present research was conducted to evaluate healthcare students' self-efficacy in disaster response.

The present results underscore sex as a significant determinant influencing the catastrophe response self-efficacy among the participating students. Particularly, the discovery that male students typically possess higher DRSE than female students is noteworthy. Despite the statistical significance of sex differences in all subdimensions and total scores, these findings can be interpreted as male students possessing higher DRSE than female students. Women often face sociocultural constraints that limit their mobility and access to resources during disasters. In Bangladesh, for example, patriarchal norms restrict women's ability to adapt and respond effectively to flood disasters.[21] Similarly, in Turkey, sex inequality exacerbates women's vulnerability during disasters.[22] Initiatives, such as the EmTASK course, highlight the importance of interdisciplinary education toward reducing disaster risk. These programs facilitate the integration of knowledge and experiences from past emergencies to enhance the preparedness capacity across different scales and levels.[23]

TABLE 3. Comparison of participants' features concerning sociodemographic factors and exposure to disasters, together with the scale scores (N = 498)

Variables	N	Subdimensions (Mean ± SD)			Total of DRSES (Mean ± SD)
		On-Site Rescue	Disaster Psychological Nursing Competency	Disaster Role Quality and Adaptation Competency	
Sex					
Male	180	36.13 ± 9.99	14.22 ± 3.75	16.73 ± 3.53	67.08 ± 15.51
Female	318	33.18 ± 9.85	12.89 ± 4.17	15.6 ± 3.82	61.68 ± 16.10
*p**		0.002	<0.001	0.001	<0.001
Department					
Physiotherapy and Rehabilitation	165	32.14 ± 9.3[a]	12.58 ± 3.84[a]	15.78 ± 3.84	60.50 ± 15.10[a]
Nursing	179	36.79 ± 9.46[b]	14.40 ± 3.74[b]	16.32 ± 3.58	67.51 ± 15.10[b]
Health Management	154	33.55 ± 10.70[a]	13.03 ± 4.43[a]	15.90 ± 3.85	62.47 ± 17.44[a]
*p***		<0.001	<0.001	0.376	<0.001
Students' year					
1st year	138	28.52 ± 8.06[a]	11.57 ± 3.96[a]	14.38 ± 3.86[a]	54.46 ± 13.78[a]
2nd year	108	30.23 ± 8.03[a]	11.84 ± 3.62[a]	15.42 ± 3.65[a,b]	57.49 ± 13.26[a]
3rd year	110	35.69 ± 9.14[b]	14.07 ± 3.81[b]	16.28 ± 3.46[b]	66.05 ± 14.87[b]
4th year	142	41.75 ± 8.51[c]	15.75 ± 3.30[c]	17.84 ± 3.08[c]	75.34 ± 12.99[c]
*p***		<0.001	<0.001	<0.001	<0.001
Whether students are exposed to disasters or not					
Yes	304	35.2 ± 10.40	13.50 ± 4.20	16.10 ± 3.70	64.90 ± 16.60
No	194	32.7 ± 9.00	13.00 ± 3.70	15.80 ± 3.70	61.60 ± 14.80
*p**		0.005	0.207	0.328	0.023
Students who either received or did not receive training on disaster and disaster management					
Yes	291	35.80 ± 8.89	14.18 ± 3.57	16.79 ± 3.24	66.77 ± 13.93
No	207	32.06 ± 11.02	12.24 ± 4.45	14.91 ± 4.14	59.22 ± 17.81
*p**		<0.001	<0.001	<0.001	<0.001

SD: Standard deviation; * Independent two-sample t-test; **One-way analysis of variance (ANOVA)

Women frequently face distinct problems stemming from societal norms and obligations, which may hinder their capacity to respond effectively to catastrophes; conversely, males experience constraints related to the conventional standards about masculinity that might affect their self-efficacy in disaster response. Hegemonic male norms frequently compel men to exhibit daring and strength, which may restrict their access to support systems.[24] The preeminence of male voices in catastrophe narratives and emergency management can eclipse women's contributions and experiences, thereby affecting the overall efficacy of disaster-response tactics.[24] In the research of Sarıkahya and Yorulmaz, which focused on nursing students, the overall score of male students regarding the sex variable was substantially greater than that of female students.[15] The fact that male students generally report higher self-efficacy in disaster-response tasks may be attributed to their increased exposure to roles or activities that emphasize rapid, decisive, and leadership abilities, which are conventionally valued in disaster and emergency response contexts.[25] Furthermore, the reasons for the diverse outcomes of the effect of sex on DRSE have been identified as education and disaster-response strategies, which contribute to sex disparities along with factors such as sex roles, social expectations, and personal experiences.

The study also identified substantial disparities between the students' DRSE levels and their educational departments. The nursing department students' DRSE average was statistically higher compared to that of the other two departments: Physical Therapy and Rehabilitation and Health Management. Nursing students, as prospective first responders, frequently receive specialized disaster management training, which augments their self-efficacy in disaster response. Nursing students who have completed disaster nursing courses exhibited enhanced DRSE, as these courses improved their overall awareness and preparedness.[11] Past research also indicates that disaster management knowledge and skills are essential, as there is a positive correlation between these factors and self-efficacy levels.[10] While nursing students frequently receive more thorough disaster-response training, other departments may not prioritize disaster preparedness to the same

extent, which may explain the discrepancies in their respective students' self-efficacy levels.

The present results also showed that being in the fourth grade was an influential factor in students' self-efficacy regarding disaster response. By the fourth year of university education, students have typically completed foundational coursework and acquired practical experiences that enhance their self-efficacy and preparedness in responding to emergencies.[26,27] In addition, fourth-year students frequently assume leadership roles in academic and extracurricular environments, which enhances their ability to take charge during emergencies. Ha and An reported that the self-efficacy of nursing students in disaster response was significantly correlated with their grade level, with fourth-year students demonstrating a particularly strong correlation between their educational exposure and self-efficacy.[12] Thus, higher DRSE scores in advanced grades may correlate with students' enhanced experience and knowledge levels. This study established that the correlation between students' prior experience of catastrophes and their self-efficacy in disaster response varied.

When comparing groups exposed to disasters with those unexposed, it was determined that the averages for the disaster-exposed group were significantly higher in both the on-site rescue competency subdimension and the overall score. This study indicated that students previously exposed to catastrophes possessed a greater level of DRSE, suggesting that their experiences were beneficial in this context. Nonetheless, no substantial difference was noted in the other subdimensions, specifically psychological nursing competency in disasters, the nature of the role assumed during disasters, and adaptation competency. Korkmaz *et al*. discovered that students with prior disaster exposure exhibited elevated DRSE ratings; however, no statistically significant correlation was noted.[28] Sarıkahya and Yorulmaz assessed the DRSE of nursing students and revealed a statistically significant difference based on disaster exposure.[13] They noted that the mean scores of students who experienced a disaster were higher than those who had not, indicating a directly proportional increase in the DRSE levels of exposed students.[13] According to a study conducted by Erkin *et al*., students' perceptions of disaster awareness, preparedness, and response self-efficacy were enhanced by undertaking a disaster nursing course.[11] Similarly, a blended training program in Iran demonstrated substantial enhancements in self-efficacy scores after the intervention.[29] Despite the potential impact of disaster exposure on the self-efficacy of health students, organized educational interventions and training programs may be more effective in enhancing their disaster-response skills.

Our research revealed that students exhibited variations in their disaster-response self-efficacy based on the variable of receiving instruction in disaster and disaster management. The DRSE of those who received education on catastrophe and disaster management was statistically significant across all subdimensions, and the overall scores were greater than those of students who did not participate in the course. These findings indicated that education on catastrophe enhanced individuals' disaster-response abilities. Toraman and Konal discovered a substantial disparity between the total scale and all subdimension scores of the DRSE levels of individuals who underwent disaster-related training. This disparity was determined to be greater among students who participated in the course than among those who did not.[8] In an additional investigation that assessed the DRSE of nursing students, the mean scores of those who undertook the course of a disaster were higher than those of those who did not.[6] Self-efficacy in disaster response is thus essential for healthcare students, considering that it affects their capacity to manage emergencies efficiently.

The limitations of the study were that the data were exclusively collected from students who voluntarily participated between November 18, 2023, and February 14, 2024. Moreover, the study sample consisted only of students from the designated institutions and departments.

CONCLUSIONS

The study findings suggested that male students had significantly higher DRSE than females and that nursing students scored higher than other students. Self-efficacy was found to increase with the grade level, being notably higher in students with prior disaster exposure or training in disaster management. These findings highlight the need for tailored disaster preparedness training across departments to address specific needs and reduce disparities. The assessment of healthcare students' self-efficacy in disaster response revealed a multifaceted interplay of factors that affected their confidence and preparedness. Self-efficacy in disaster response is essential for healthcare students, as it affects their capacity to efficiently manage emergencies. Practical training through simulations and exercises enhances familiarity with emergency protocols and boosts confidence and decision-making under pressure. In the future, research across diverse regions and demographics would be necessary to further understand the factors influencing DRSE.

CONFLICT OF INTEREST

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