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Empowering future nurses: a comparative study of nursing students' disaster literacy and response self-efficacy in Türkiye and Iran

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Abstract

Background As disasters become more frequent and severe, their impact on global health systems grows, highlighting the critical need for disaster preparedness in nursing education. As future healthcare providers, nursing students must be equipped with the knowledge and skills to anticipate, respond to, and mitigate the effects of disasters. This study evaluates and compares the disaster literacy and disaster response self-efficacy levels of nursing students in Türkiye and Iran, emphasizing the role of nursing education in strengthening global disaster resilience.

Methods Conducted from January to June 2024, this descriptive, correlational, and comparative study involved third and final-year undergraduate nursing students in Samsun and Istanbul provinces of Türkiye and in Kerman and Jiroft provinces of Iran. The study encompassed a population of 811 students, from which a sample of 508 participants was drawn using the convenience sampling method, comprising 288 students from Türkiye and 220 from Iran. Data collection was conducted through a face-to-face questionnaire, incorporating the Descriptive Information Form and validated, reliable scales: the Disaster Literacy Scale and the Disaster Response Self-Efficacy Scale. The data were analyzed using IBM SPSS Statistics 25.0, employing descriptive statistics, t-tests, Pearson correlation, and linear regression, with significance set at $p < 0.05$.

Results Linear regression analysis utilizing dummy variables revealed that students in Türkiye exhibited higher disaster literacy than their counterparts in Iran ($\beta = 6.720$), with the country of study explaining 22.9% of the variance in disaster literacy scores. Similarly, Turkish students demonstrated greater disaster response self-efficacy ($\beta = 3.945$), with 1.9% of its variance attributable to the country of study. A statistically significant, medium, and positive correlation was identified between disaster literacy and disaster response self-efficacy for students in both countries ($r = 0.470$, $p = 0.000$ for Türkiye; $r = 0.491$, $p = 0.000$ for Iran). Furthermore, regression analysis indicated that nursing students' disaster literacy significantly predicted disaster response self-efficacy ($\beta = 1.030$, $p < 0.001$ for Türkiye; $\beta = 1.074$, $p < 0.001$ for Iran).

Conclusion The findings show that disaster literacy and disaster response self-efficacy perceptions among nursing students in both countries are moderate, requiring improvement. Disaster literacy significantly and positively influenced disaster response self-efficacy. This study highlights the importance of disaster literacy in shaping students' confidence and competence in disaster response. Disaster preparedness courses should be integrated into nursing

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programs. Addressing identified gaps and implementing targeted educational strategies can enhance nursing students' disaster preparedness and improve response outcomes. Future research should investigate the factors behind the differences in disaster literacy and self-efficacy across countries. Collaboration between nurse educators and policymakers should be encouraged.

Clinical trial number Not applicable.

Keywords Comparative studies, Disasters, Disaster literacy, Disaster response, Disaster preparedness, Nursing students, Self efficacy, Iran, Turkey

Introduction

The frequency and severity of both natural and human-made disasters have been steadily increasing, placing significant strain on global health systems. These disasters exacerbate social, physical, psychological, and economic vulnerabilities, thereby heightening health risks at local, regional, and global levels. According to the International Emergency Events Database (EM-DAT), disasters resulted in 86,473 fatalities and caused economic losses amounting to 202.7 billion dollars worldwide in 2023 [1]. According to the Center for Research on the Epidemiology of Disasters (CRED), a total of 7,348 disaster events have been recorded over the past two decades. These events have impacted an average of 60,000 individuals annually, resulting in approximately 1.23 million deaths and affecting over 4 billion people. While improvements in data collection and reporting may account for some of the increase in disaster events, the primary driver is the growing frequency of disasters attributable to climate change [2].

Türkiye is highly susceptible to natural disasters due to its geological, geomorphological, and climatic characteristics, which result in significant loss of life and property, as well as economic and environmental damage. The country is particularly prone to earthquakes and floods. On average, approximately 20 medium-sized earthquakes occur annually, with large-scale, destructive earthquakes occurring every few years [3]. On February 6, 2023, Türkiye experienced devastating earthquakes centered in Kahramanmaraş, which resulted in the loss of 50,783 lives and affected over 14 million people-approximately 16% of the country's population-across 10 provinces. Additionally, the risk of natural disasters in Türkiye is exacerbated by heavy rainfall leading to floods in the Black Sea and Marmara regions, as well as frequent forest fires in areas with a Mediterranean climate [4]. Similarly, Iran's geographical location makes it highly vulnerable to natural disasters, and the country has faced significant catastrophic events in recent years. Iran experiences more than 1,000 small to moderate earthquakes annually, and historical records indicate that the country is also prone to destructive seismic events [5, 6]. In addition to earthquakes, Iran's climate and geographical characteristics make it vulnerable to various other types of natural disasters, including floods, droughts, landslides, and sandstorms. Between 2015 and 2020, Iran faced eight major flood disasters [7]. Furthermore, sandstorms in the eastern and southern regions of the country occur on average 10–15 times per year, with significant adverse effects on public health [8]. These disasters have affected more than 60 million people, caused at least 158,350 deaths, and caused an estimated damage of more than US$53 billion [9].

The increasing frequency of natural disasters, such as earthquakes and floods, in Türkiye and Iran has heightened the importance of disaster preparedness within nursing education. While recent initiatives have sought to integrate disaster management modules into nursing curricula, studies indicate that nursing students still report deficiencies in practical knowledge and disaster response skills [10–12]. Disaster nursing remains an emerging field despite Türkiye's ongoing efforts to enhance disaster management preparedness [13]. As frontline health responders, nurses play a critical role in both the immediate aftermath and recovery phases of disasters, managing medical, logistical, and emotional needs under challenging conditions [14]. This central role demands that nurses not only possess foundational knowledge of disaster management but also have the confidence to effectively apply this knowledge in high-stress situations. Consequently, concepts such as disaster literacy and disaster response self-efficacy have become essential competencies for the nursing profession. This is especially relevant considering global health crises, such as the COVID-19 pandemic, which underscore the need for well-prepared and resilient healthcare providers [4, 15, 16].

"Disaster literacy", a concept that has gained increasing prominence in recent years, is defined as an individual's ability to read, comprehend, and apply essential information to make informed decisions in the context of disaster mitigation, preparedness, response, and recovery [17]. It also involves following instructions to enhance survival chances during disaster situations [18]. Disaster literacy is a multifaceted competency that includes the knowledge, skills, and attitudes necessary to identify risks, prepare for potential threats, and respond effectively to disaster scenarios [19]. This concept serves as a

foundational framework for both individuals and communities to reduce risks and mitigate harm [20]. A disaster-literate individual is expected to possess the essential knowledge, attitudes, and behaviors required to confront disasters, serve as a role model to others, and effectively navigate such situations [19]. Nurses with high levels of disaster literacy are better equipped to make informed decisions during disaster situations, prioritize patient needs, and manage resources effectively [15]. Given its critical role in minimizing both material and psychological losses during disasters, disaster literacy should be a focal point in nursing education. This is particularly important for nursing students since they represent the future healthcare workforce that will inevitably encounter various crises throughout their careers.

A study by Zhang et al. (2021) in China, aimed at assessing the disaster literacy levels of university students, revealed that the overall scores on the disaster literacy scale were low [21]. Similarly, a large-scale study in Türkiye found that over 50% of participants had insufficient or moderate disaster literacy [20]. In another study examining the disaster literacy levels of nursing students in Türkiye, the results indicated a moderate level of disaster literacy [22]. A study conducted in Türkiye found that a significant portion of the population does not possess the desired level of disaster literacy and perceives the disaster services provided as inadequate [23]. In Iran, research identified several factors as predictors of disaster literacy, including household income level (medium and high), trust in Iranian disaster management, fear of natural disasters, perceived frequency of natural disasters, internet usage, employment status, and participation in specialized natural disaster education programs [9]. A review of the literature reveals that disaster literacy across different country samples [9, 24, 25] has generally been found to be insufficient or at a moderate level.

It can be said that nursing students, whose knowledge and awareness of disasters increase through disaster literacy, may also have higher self-efficacy in disaster management. Self-efficacy refers to an individual's belief in their ability to cope with challenging situations [26, 27]. In the context of disasters, it specifically denotes the confidence in one's capacity to respond effectively to disaster situations [28]. Disaster response self-efficacy is crucial for nurses and nursing students, as it enables them to manage negative and stressful circumstances more effectively and plays a significant role in determining their overall ability to respond to disasters [29]. Many studies have demonstrated a positive relationship between self-efficacy and the ability to cope with disaster situations [27, 29]. In disaster contexts, nursing students who are well-prepared with the necessary knowledge, skills, and abilities tend to exhibit higher levels of self-efficacy [28]. The significance of disaster response self-efficacy, along with its positive outcomes, has been widely highlighted in the literature. High self-efficacy has been associated with improved psychological resilience, reduced stress, and enhanced patient care outcomes during disaster situations [30, 31]. Furthermore, disaster literacy and disaster response self-efficacy are critical for improving emergency response outcomes and reducing disaster-related mortality [25, 32].

Nursing students represent a valuable workforce that can mitigate disaster-related losses and improve health outcomes through providing various forms of assistance during crises [27]. However, research has shown that while nursing students are willing to volunteer in disaster situations, they often have limited knowledge of their roles and feel unprepared to respond effectively [33]. Several studies have emphasized that the education, preparation, and awareness of nursing students regarding disasters are generally insufficient [34, 35]. Additionally, research examining the disaster response self-efficacy of nursing students has typically found their self-efficacy to be moderate or low [10, 12, 36]. In a study specifically assessing the disaster response self-efficacy of third- and fourth-year nursing students, the results indicated a moderate level of self-efficacy in disaster response [37]. The effective and efficient utilization of nursing students, who represent a significant portion of the healthcare workforce, is crucial for improving disaster response outcomes. Therefore, it is essential for nursing students to enhance their disaster literacy and disaster response self-efficacy to manage disasters they may encounter both in their current education and future professional practice. In this context, evaluating the disaster literacy and response self-efficacy of nursing students is critical, since it provides valuable insights for planning targeted actions, such as educational interventions, based on the results.

While the literature has examined disaster knowledge and skills [29], the ability to cope with disaster situations [27], disaster preparedness [4], and the relationship with disaster response self-efficacy, there is a lack of studies investigating the relationship between disaster literacy and disaster response self-efficacy. Furthermore, a comprehensive review of the literature reveals that this issue has not been compared across countries. Therefore, this study aims to explore the relationships between disaster literacy and disaster response self-efficacy among nursing students and to compare the results between Türkiye and Iran. Türkiye and Iran, both disaster-prone countries frequently affected by earthquakes and other natural disasters, provide a unique context for a comparative analysis of disaster literacy and disaster response self-efficacy levels among nursing students. While both countries experience frequent natural disasters, their health and education systems differ significantly, shaped by cultural,

social, and political factors. In this context, the aim of this study is to evaluate and compare the disaster literacy and disaster response self-efficacy levels of nursing students in these two countries, with the goal of informing curriculum design and policy development. As a result, this comparative analysis offers valuable insights that can be applied not only to Türkiye and Iran but also to other countries seeking to enhance disaster preparedness.

In this study, answers to the following questions were sought.

1. What are the levels of disaster literacy and disaster response self-efficacy among nursing students in Türkiye and Iran?
2. Do disaster literacy and disaster response self-efficacy levels differ significantly based on the sociodemographic characteristics of nursing students in each country?
3. Is there a significant relationship between disaster literacy and disaster response self-efficacy, and to what extent does disaster literacy influence disaster response self-efficacy among nursing students in Türkiye and Iran?

Method

Design

This descriptive, cross-sectional study aims to evaluate and compare the disaster literacy and disaster response self-efficacy levels of nursing students in Türkiye and Iran. The study adhered to the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) reporting guidelines for cross-sectional studies.

Population and sample

The population of the study consisted of 811 third- and fourth-year undergraduate nursing students studying in Samsun and Istanbul provinces of Türkiye (n:531) and in Kerman and Jiroft provinces of Iran (n:280). Third- and fourth-year nursing students were selected since the Disaster Response Self-Efficacy Scale used in the study was developed specifically for this group, and disaster-related courses are generally offered at the university level in these years. To determine the sample size, the sample calculation formula for finite populations was applied, resulting in a calculated sample size of 230, with a 95% statistical power and an $\alpha = 0.05$ significance level. To minimize the potential impact of factors such as participant withdrawal or missing data on statistical power, it is recommended to increase the sample size by 10–20% of the calculated sample size [38]. Accordingly, the goal was to reach more participants ($230 + 46 = 276$). The study used convenience sampling to collect data from all selected nursing students. A total of 500 questionnaires were distributed in Türkiye and 280 in Iran. A total of 42 questionnaires from both countries were excluded from the data analysis due to missing data. As a result, the final research sample consisted of 508 students, including 288 from Türkiye and 220 from Iran, with a response rate of 70.51%.

Data collection

Data collection was carried out using a face-to-face between January and June 2024. Participants were allowed to complete the questionnaire in person within a 2-hour period at their convenience. To control the sampling, a stratified random sampling method was used, ensuring that it represented the nursing student population in both Türkiye and Iran. Participants were recruited through the universities' official channels, and faculty members at each participating university distributed and collected the questionnaires from third- and fourth-year nursing students. Clear instructions on how to complete the questionnaire were provided to the participants, and informed consent was obtained prior to participation. During the data collection process, all necessary information about the study-including its purpose, scope, the assurance that the data obtained would only be used for this research, the confidentiality of the data, and data storage-was first shared with the nursing students.

Data collection tool

During the data collection process, the following forms were used in both Turkish and Persian versions:

1. ***Introductory Information Form***: This form consisted of 18 questions designed to gather information about students' personal characteristics, such as age, gender, year of study, disaster experience, and opinions on disaster preparedness.
2. ***Disaster Literacy Scale (DLS)***: Developed by Çalışkan and Üner (2023) [17], the DLS is a 61-item scale that evaluates an individual's knowledge and skills related to disaster phases. The scale comprises three subscales as mitigation/prevention, terms of preparedness and response, and recovery/rehabilitation. The scale is rated using a 5-point Likert scale with the following options: "1-Very difficult", "2-Difficult", "3-Neither difficult or easy", "4-Easy", and "5-Very easy". To facilitate ease of calculation, the total score from the scale was standardized to a range between 0 and 50. A higher score indicates better disaster literacy. The Cronbach's alpha internal consistency coefficient of the scale was determined to be 0.95 [17].
3 ***The Disaster Response Self-Efficacy Scale (DRSES)***: The DRSES, originally developed by Li et al. (2017) [39] and adapted to Turkish by Koca et al. (2020) [40], consists of 19 items. It measures three key

areas as "on-site rescue competency," "disaster psychological nursing competency," and "disaster role quality and adaptation competency." The scale is scored using a 5-point Likert type, with the following options: "1-No confidence at all," "2-Basically no confidence," "3 - Little confidence," "4 - Basically confident," and "5 - Complete confidence." As the mean score obtained from the scale increases, the self-efficacy in disaster response also increases. The Cronbach's alpha coefficient for the Turkish version of the scale was found to be 0.96 [40].

In this study, the Persian versions of the DLS, and DRSES were validated through a cultural adaptation, including translation and back-translation. The content validity of the scales was assessed by 10 professors at the nursing school of Kerman University of Medical Sciences. They rated the items in terms of simplicity, clarity (qualitatively), and relevance (quantitatively). The content validity index (CVI) was equal to 0.96 for DLS, and 0.98 for DRSES. The reliability of the scales was evaluated using internal consistency, and the Cronbach's alpha coefficients for Persian version of the DLS, and DRSES were 0.95 and 0.93, respectively.

Data analysis

The data collected in the study were analyzed using the IBM SPSS Statistics for Windows version 25.0. Descriptive statistical methods, including frequency, percentage, mean, and standard deviation, were employed to analyze the data. In assessing the distribution of the data, kurtosis and skewness values were examined to determine the normality of the variables. To ensure the reliability of the tests and results, the reliability of the measurement scales was assessed using Cronbach's alpha. For the analysis of differences between two independent groups with normally distributed data, an independent samples t-test was applied. Additionally, Pearson correlation analysis was conducted to examine the relationships between continuous variables within normally distributed groups. Furthermore, linear regression analysis was conducted to explain the variation in the dependent variable. The statistical results were considered significant at a p-value of less than 0.05, with a 95% confidence interval.

Results

The demographic characteristics of the participants are summarized in Table 1. Most students were aged 22 or younger (68.3%), female (63.2%), and in their third year of study (55.7%). Regarding disaster experience and preparedness, many had not experienced a disaster (65.6%), were not involved in disaster-related civil society organizations (90.0%), and followed disaster news (68.3%). A large proportion lacked a disaster preparedness kit (82.5%), had not made a disaster plan with their families (84.4%), and did not have disaster insurance (66.7%). Additionally, most had not lost a family member in a disaster (88.2%), had not received any disaster-related education (60.6%), and had not participated in disaster response activities (74.4%). Regarding clinical practice, 72.4% had not cared for disaster victims, and 69.7% had not participated in disaster drills. Most were unfamiliar with the Hospital Disaster Plan (73.8%) and their faculty's disaster plan (80.7%). While 51.6% understood disaster literacy, 83.3% were interested in disaster nursing education. In addition, it was found that students studying in Türkiye and Iran exhibited significant differences in many of these characteristics ($p < 0.05$).

Table 2 presents the comparison of scale scores. Significant differences were found between students in Türkiye and Iran in total disaster literacy and all subscale scores ($p < 0.05$), with students in Türkiye scoring higher. Significant differences were also found in the Disaster Response Self-Efficacy Scale, including on-site rescue competency and disaster role quality and adaptation competency, with students in Türkiye scoring higher. However, no significant difference was found in the psychological nursing proficiency in disaster sub-dimension scores ($p > 0.05$). The highest effect size was observed in disaster literacy scores, while the lowest was in on-site rescue competency.

Demographic factors influencing disaster literacy and disaster response self-efficacy were analyzed separately for students in Türkiye and Iran (Table 3). In Türkiye, students aged 23 and older, fourth-year students, and those involved in civil society organizations related to disasters had higher disaster response self-efficacy. Additionally, students following disaster-related news and having a disaster preparedness kit at home also scored higher in self-efficacy. Students with disaster plans or who had lost a family member in a disaster showed higher self-efficacy. In both Iran and Türkiye, participants who had received any disaster-related education in the past five years demonstrated higher levels of disaster literacy and disaster response self-efficacy. In Iran, female students, those who had experienced a disaster, followed disaster-related news, had disaster insurance for their homes, and participated in disaster response processes or drills scored higher. Students who read or are familiar with the Hospital Disaster Plan of the hospitals where they had undertaken clinical practice, who were aware of the disaster plan for their faculty or school buildings, and who understood the concept of disaster literacy, demonstrated higher disaster literacy and disaster response self-efficacy scores in both Türkiye and Iran. Finally, students in both Türkiye and Iran who expressed an interest in studying disaster nursing had higher disaster literacy scores.

Table 1 Demographic characteristics of participants

Variables		Countries				Total		Test value	p
		Students from Türkiye		Students from Iran					
		n	%	n	%	n	%		
Age Mean (SD): 22.12 (1.85) Min-max:19–36	22 years and below	208	72.2	139	63.2	347	68.3	**4.709**	**0.030***
	23 years and above	80	27.8	81	36.8	161	31.7		
Gender	Female	227	78.8	94	42.7	321	63.2	**69.849**	**0.000***
	Male	61	21.2	126	57.3	187	36.8		
Grade	3rd grade	160	55.6	123	55.9	283	55.7	0.006	0.937
	4th grade	128	44.4	97	44.1	225	44.3		
Disaster survival	Yes	121	42.0	54	24.5	175	34.4	**16.854**	**0.000***
	No	167	58.0	166	75.5	333	65.6		
Disaster-related civil society membership	Yes	31	10.8	20	9.1	51	10.0	0.387	0.534
	No	257	89.2	200	90.9	457	90.0		
Following news about disaster	Yes	254	88.2	93	42.3	347	68.3	**12.495**	**0.000***
	No	34	11.8	127	57.7	161	31.7		
Keeping a disaster kit at home	Yes	56	19.4	33	15.0	89	17.5	1.705	0.192
	No	232	80.6	187	85.0	419	82.5		
Having a disaster plan prepared with family members	Yes	69	24.0	10	4.5	79	15.6	**35.191**	**0.000***
	No	219	76.0	210	95.5	429	84.4		
Insuring your home against disasters	Yes	107	37.2	62	28.2	169	33.3	**4.521**	**0.033***
	No	181	62.8	158	71.8	339	66.7		
Loss of a family member or relative in a disaster	Yes	24	8.3	36	16.4	60	11.8	**7.722**	**0.005***
	No	264	91.7	184	83.6	448	88.2		
Receiving any disaster-related training in the last five years	Yes	182	63.2	126	57.3	308	60.6	1.832	0.176
	No	106	36.8	94	42.7	200	39.4		
Taking part in any pre-during-post-disaster process throughout life	Yes	49	17.0	81	36.8	130	25.6	**25.690**	**0.000***
	No	239	83.0	139	63.2	378	74.4		
Caring for disaster survivors in clinical practice	Yes	48	16.7	92	41.8	140	27.6	**39.521**	**0.000***
	No	240	83.3	128	58.2	368	72.4		
Participating in any disaster drill	Yes	236	81.9	118	53.6	354	69.7	**47.321**	**0.000***
	No	52	18.1	102	46.4	154	30.3		
Reading/knowing the hospital disaster plan of the hospitals where clinical practice is performed	Yes	62	21.5	71	32.3	133	26.2	**7.451**	**0.000***
	No	226	78.5	149	67.7	375	73.8		
Reading/knowing the disaster plan of the faculty/school building	Yes	58	20.1	40	18.2	98	19.3	0.307	0.580
	No	230	79.9	180	81.8	410	80.7		
Knowing the meaning of the concept of disaster literacy	Yes	158	54.9	104	47.3	262	51.6	2.876	0.090
	No	130	45.1	116	52.7	246	48.4		
Wishing to receive disaster nursing training	Yes	256	88.9	167	75.9	423	83.3	**15.082**	**0.000***
	No	32	11.1	53	24.1	85	16.7		

*Bold *p*-values are significant at level of ≤ 0.05;SD: standard deviation; chi-square analysis was used

When the relationship between students' disaster literacy levels and disaster response self-efficacy levels was examined (Table 4), a statistically significant, positive, and medium correlation was found between disaster literacy and disaster response self-efficacy for students in Türkiye ($r = 0.470$; $p = 0.000$). Similarly, a statistically significant, positive, and medium correlation was observed for students in Iran ($r = 0.491$; $p = 0.000$).

In the linear regression analysis, both models were statistically significant (disaster literacy: F = 151.279; $p = 0.000$, disaster response self-efficacy: F = 10.883; $p = 0.001$). Students in Türkiye had higher disaster literacy (beta = 6.720) and disaster response self-efficacy (beta = 3.945) scores compared to those in Iran. The models explained 22.9% of the variance in disaster literacy and 1.9% of the variance in disaster response self-efficacy scores based on students' educational background. No autocorrelation issue was found (1.5 < Durbin-Watson < 2.5, Table 5).

A linear regression analysis was conducted to examine the effect of disaster literacy scores on disaster response self-efficacy scores by country (Table 6). No

Table 2 Comparison of the scale scores

Scales	Students from Türkiye				Students from Iran				t test	*p* value	Effect size
	Mean (SD)	Min-max	Median	Cronbach Alpha	Mean (SD)	Min-max	Median	Cronbach Alpha			
Disaster literacy scale	34.67(6.25)	4.10–50.00	34.73	0.968	27.95 (5.90)	4.10–49.80	26.33	0.954	12.300	**0.000***	1.101
Mitigation/Prevention	35.28(6.63)	12.50–50.00	35.29	0.909	28.37 (6.58)	11.76-50.00	26.47	0.873	11.691	**0.000***	1.05
Preparedness	34.29(6.94)	0.00–50.00	34.38	0.906	28.31 (6.53)	0.00–50.00	25.78	0.872	9.865	**0.000***	0.88
Response	35.62(6.93)	0.00–50.00	36.54	0.893	28.55 (6.84)	0.96-50.00	26.92	0.844	11.458	**0.000***	1.03
Recovery/Rehabilitation	33.57(7.72)	0.00–50.00	34.17	0.922	26.59 (6.90)	2.50–50.00	25.42	0.867	10.570	**0.000***	0.95
Disaster response self-efficacy scale	64.77(13.69)	19.00–95.00	65.00	0.958	60.82 (12.90)	19.00–95.00	59.50	0.937	3.299	**0.001***	0.30
On-site rescue competency	36.61(8.18)	11.00–55.00	37.00	0.936	34.45 (7.74)	11.00–55.00	34.00	0.896	3.021	**0.003***	0.27
Disaster psychological nursing competency	13.13(3.60)	4.00–20.00	12.00	0.929	12.71 (3.22)	4.00–20.00	12.00	0.832	1.382	0.168	0.12 (pointless)
Disaster role quality and adaptation competency	15.03(3.27)	4.00–21.00	16.00	0.908	13.67 (3.10)	4.00–20.00	13.00	0.827	4.758	**0.000***	0.43

*Bold *p*-values are significant at level of ≤ 0.05; SD: standard deviation

autocorrelation issue was found (1.5 < Durbin-Watson < 2.5). For students in Türkiye, the model was statistically significant (F = 81.274; $p = 0.000$), with a one-point increase in disaster literacy resulting in a 1.030-point increase in disaster response self-efficacy (beta = 1.030), explaining 21.9% of the variance. In the analysis of disaster literacy subscales, the model was also significant (F = 21.691; $p = 0.000$), with a one-point increase in recovery/rehabilitation scores leading to a 0.437-point increase in disaster response self-efficacy (beta = 0.437), explaining 22.4% of the variance. Furthermore, the linear regression analysis for students in Iran showed that the model was statistically significant (F = 69.235; $p = 0.000$), with a one-point increase in disaster literacy leading to a 1.074-point increase in disaster response self-efficacy (beta = 1.074), explaining 23.8% of the variance. Additionally, the analysis of disaster literacy subscales showed that the model was significant (F = 17.826; $p = 0.000$) and revealed that a one-point increase in disaster response scores resulted in a 0.483-point increase in disaster response self-efficacy (beta = 0.483), explaining 23.5% of the variance.

Discussion

As a result of this study, it was found that the disaster literacy and disaster response self-efficacy levels of students studying in Türkiye were higher than those studying in Iran. One possible explanation for this difference may be related to the sociodemographic and historical characteristics of the students. In addition, both institutions in Türkiye where data were collected are accredited by HEPDAK (Association for Evaluation and Accreditation of Nursing Education Programs), which ensures a higher standard of nursing education. This accreditation may contribute to the higher quality of education and training in disaster preparedness and response. Additionally, some of the students in Türkiye participated voluntarily in fieldwork during the 2023 Kahramanmaraş earthquake. This earthquake, which had widespread and devastating effects, significantly heightened disaster awareness across the country. Given that the event was described as the "largest earthquake of the century," it is likely that the experience had a profound impact on the students' disaster literacy and self-efficacy. Finally, this difference may also be attributed to the curriculum differences between the two countries. In Türkiye, the nursing curriculum spans four years, with disaster-related courses primarily provided in the final year. In contrast, previous studies have suggested that the Iranian nursing curriculum may be insufficient in fostering the critical thinking and skills necessary for clinical practice, particularly in disaster response scenarios [41]. According to the results of a study that examined and compared the curricula of nursing faculties at Tehran University (Iran), Western University (Canada), and Hacettepe University (Türkiye) using the SPICES model, it was found that the curriculum at Western University aligns with the innovative spectrum of the SPICES model, while the curricula at universities in Iran and Türkiye largely remain traditional. The study concluded by recommending the implementation of necessary curricular changes in Iran, tailored to the country's social conditions and opportunities [42]. Educational institutions must regularly review

Table 3 Comparison of disaster literacy and disaster response self-efficacy scale scores according to demographic characteristics

Variables		DLS		DRSES	
		Students from Türkiye	Students from Iran	Students from Türkiye	Students from Iran
		Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Age	22 years and below	34.74 ± 5.72	28.09 ± 5.78	63.37 ± 13.93	61.66 ± 13.02
	23 years and above	34.5 ± 7.50	27.72 ± 6.11	68.41 ± 12.39	59.38 ± 12.64
Test		0.296	0.440	**-2.836**	1.266
Significance		0.767	0.660	**0.005***	0.207
Gender	Female	34.73 ± 6.28	28.42 ± 6.07	64.02 ± 14.07	64.26 ± 13.43
	Male	34.44 ± 6.20	27.6 ± 5.76	67.54 ± 11.87	58.26 ± 11.91
Test		0.321	1.028	-1.789	**3.495**
Significance		0.748	0.305	0.075	**0.001***
Grade	3rd grade	33.45 ± 5.36	28.09 ± 5.30	60.65 ± 13.00	60.44 ± 12.43
	4th grade	36.2 ± 6.94	27.78 ± 6.60	69.91 ± 12.81	61.31 ± 13.52
Test		**-3.686**	0.392	**-6.050**	-0.496
Significance		**0.000***	0.695	**0.000***	0.620
Disaster survival	Yes	35.12 ± 5.94	28.57 ± 5.63	65.9 ± 13.15	64.26 ± 13.18
	No	34.35 ± 6.47	27.75 ± 5.98	63.95 ± 14.05	59.7 ± 12.65
Test		-1.025	-0.893	-1.197	**-2.275**
Significance		0.306	0.373	0.232	**0.024***
Disaster-related civil society membership	Yes	36.81 ± 6.53	28.84 ± 5.42	73 ± 12.25	65.15 ± 12.15
	No	34.41 ± 6.18	27.86 ± 5.95	63.77 ± 13.54	60.39 ± 12.92
Test		**2.028**	0.708	**3.618**	1.579
Significance		**0.043***	0.480	**0.000***	0.116
Following news about disaster	Yes	34.95 ± 6.18	29.94 ± 6.04	65.13 ± 13.33	64.4 ± 12.84
	No	32.57 ± 6.48	26.5 ± 5.36	62.09 ± 16.10	58.2 ± 12.35
Test		**2.099**	**4.379**	1.216	**3.613**
Significance		**0.037***	**0.000***	0.225	**0.000***
Keeping a disaster kit at home	Yes	35.97 ± 6.46	30.61 ± 7.83	71.25 ± 13.02	64.24 ± 12.65
	No	34.36 ± 6.18	27.48 ± 5.38	63.2 ± 13.41	60.22 ± 12.88
Test		1.742	**2.207**	**4.053**	1.658
Significance		0.083	**0.033***	**0.000***	0.099
Having a disaster plan prepared with family members	Yes	36.64 ± 6.80	31.15 ± 6.59	71.52 ± 13.56	69 ± 12.37
	No	34.05 ± 5.96	27.8 ± 5.83	62.64 ± 13.05	60.43 ± 12.82
Test		**3.039**	1.763	**4.883**	**2.067**
Significance		**0.003***	0.079	**0.000***	**0.040***
Insuring your home against disasters	Yes	34.54 ± 6.49	29.33 ± 6.53	66.39 ± 12.96	61.87 ± 14.50
	No	34.75 ± 6.13	27.41 ± 5.56	63.81 ± 14.05	60.41 ± 12.24
Test		-0.268	**2.047**	1.553	0.754
Significance		0.789	**0.043***	0.122	0.451
Loss of a family member or relative in a disaster	Yes	35.5 ± 7.46	27.07 ± 5.47	71.38 ± 14.70	59.39 ± 10.85
	No	34.6 ± 6.14	28.12 ± 5.97	64.17 ± 13.46	61.1 ± 13.27
Test		0.679	-0.985	**2.492**	-0.728
Significance		0.498	0.326	**0.013***	0.467
Receiving any disaster-related training in the last five years	Yes	35.84 ± 6.44	28.98 ± 5.68	67.81 ± 12.95	63.27 ± 12.36
	No	32.67 ± 5.38	26.58 ± 5.93	59.55 ± 13.41	57.54 ± 12.95
Test		**4.266**	**3.040**	**5.154**	**3.332**
Significance		**0.000***	**0.003***	**0.000***	**0.001***
Taking part in any pre-during-post-disaster process throughout life	Yes	35.7 ± 7.09	29.52 ± 5.39	72.31 ± 12.26	64.41 ± 12.74
	No	34.46 ± 6.06	27.04 ± 6.00	63.22 ± 13.48	58.73 ± 12.57
Test		1.142	**3.066**	**4.362**	**3.213**
Significance		0.258	**0.002***	**0.000***	**0.002***
Caring for disaster survivors in clinical practice	Yes	35.08 ± 6.00	28.08 ± 6.21	67.96 ± 13.26	62.62 ± 13.54
	No	34.59 ± 6.31	27.86 ± 5.68	64.13 ± 13.71	59.53 ± 12.31

Table 3 (continued)

Variables		DLS		DRSES	
		Students from Türkiye	Students from Iran	Students from Türkiye	Students from Iran
		Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Test		0.499	0.264	1.776	1.760
Significance		0.618	0.792	0.077	0.080
Participating in any disaster drill	Yes	35.39 ± 5.77	28.89 ± 6.46	66.01 ± 13.44	61.72 ± 11.78
	No	31.43 ± 7.31	26.87 ± 4.98	59.13 ± 13.53	59.78 ± 14.07
Test		**4.248**	**2.609**	**3.335**	1.111
Significance		**0.000***	**0.010***	**0.001***	0.268
Reading/knowing the hospital disaster plan of the hospitals where clinical practice is performed	Yes	36.28 ± 4.57	29.55 ± 7.32	69.65 ± 12.49	65.63 ± 12.78
	No	34.23 ± 6.58	27.19 ± 4.93	63.43 ± 13.73	58.53 ± 12.35
Test		**2.827**	**2.465**	**3.218**	**3.944**
Significance		**0.005***	**0.015***	**0.001***	**0.000***
Reading/knowing the disaster plan of the faculty/school building	Yes	36.46 ± 5.37	31.08 ± 6.95	71.74 ± 11.08	68.02 ± 11.93
	No	34.22 ± 6.39	27.26 ± 5.42	63.01 ± 13.75	59.22 ± 12.59
Test		**2.455**	**3.266**	**4.483**	**4.038**
Significance		**0.015***	**0.002***	**0.000***	**0.000***
Knowing the meaning of the concept of disaster literacy	Yes	35.52 ± 5.57	29.11 ± 6.94	66.66 ± 12.84	64.11 ± 12.25
	No	33.64 ± 6.88	26.91 ± 4.55	62.47 ± 14.37	57.88 ± 12.81
Test		**2.569**	**2.737**	**2.610**	**3.675**
Significance		**0.011***	**0.007***	**0.010***	**0.000***
Wishing to receive disaster nursing training	Yes	35.06 ± 5.88	28.78 ± 5.83	64.96 ± 13.39	61.71 ± 12.97
	No	31.56 ± 8.16	25.35 ± 5.36	63.19 ± 16.06	58.04 ± 12.37
Test		**3.030**	**3.967**	0.692	1.813
Significance		**0.003***	**0.000***	0.490	0.071

*Bold *p*-values are significant at level of ≤ 0.05; SD: standard deviation; DLS: Disaster Literacy Scale; DRSES: The Disaster Response Self-Efficacy Scale; Independent samples *t*-test was used

Table 4 Correlation analysis

	DRSES			
	Students from Türkiye		Students from Iran	
	r	*P*	*R*	*p*
DLS	0.470	**0.000***	0.491	**0.000***

*Bold *p*-values are significant at level of ≤ 0.05, r: Pearson correlation coefficient; DLS: Disaster Literacy Scale; DRSES: The Disaster Response Self-Efficacy Scale

and adapt various aspects of their programs to provide a comprehensive and effective curriculum. Based on the results of this research, it is recommended that Iran take action to update its nursing curriculum and incorporate disaster competencies for nursing students. In summary, the observed differences in disaster literacy and disaster response self-efficacy may be attributed to variations in educational approaches, the accreditation status of nursing programs, curriculum content, and the frequency of applied or practical disaster training.

When the relationship between students' disaster literacy levels and disaster response self-efficacy levels was examined, a statistically significant, positive, and moderate-level correlation was found between these variables in both countries. This relationship underscores the importance of equipping students with the knowledge and skills that enhance their confidence in

Table 5 Regression analysis with dummy variables

Dependent Variables		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Durbin Watson	Adj. R^2	Model F	Model p
		Beta	Std. Error	Beta						
DLS	Constant	27.952	0.411		67.946	**0.000***	1.952	0.229	151.279	**0.000**
	Country = Türkiye	6.720	0.546	0.480	12.300	**0.000***				
DRSES	Constant	60.823	0.900		67.557	**0.000***	1.818	0.019	10.883	**0.001**
	Country = Türkiye	3.945	1.196	0.145	3.299	**0.001***				

*Bold *p*-values are significant at level of ≤0.05, DLS: Disaster Literacy Scale; DRSES: The Disaster Response Self-Efficacy Scale; Durbin Watson: autocorrelation coefficient; R^2: coefficient of determination; Adj. R^2: adjusted coefficient of determination; B: non-standardized beta value; β: standardized beta value; t: significance of variable; F: significance of variable

Note: Country variable is used as a dummy variable in the model. In the related model, the reference category for the country variable is students studying in Iran

Table 6 The effect of students' disaster literacy scores on their disaster response self-efficacy scores

Students from Türkiye								
Model		**B**	**SD**	**B**	**T**	***P***	**Durbin Watson**	**VIF**
1	(Constant)	29.066	4.024		7.223	**0.000***	1.717	
	Disaster Literacy Scale	1.030	0.114	0.470	9.015	**0.000**		1.000
	$R^2 = 0.221$; Adjusted $R^2 = 0.219$; $F = 81.274$; $p =$ **0.000***							
2	(Constant)	30.518	4.133		7.384	**0.000***	1.740	
	Mitigation/Prevention	-0.001	0.171	0.000	-0.005	0.996		2.527
	Preparedness	0.212	0.189	0.107	1.119	0.264		3.396
	Response	0.347	0.182	0.176	1.900	0.058		3.159
	Recovery/Rehabilitation	0.437	0.149	0.247	2.938	**0.004***		2.607
	$R^2 = 0.235$; Adjusted $R^2 = 0.224$; $F = 21.691$; $p =$ **0.000***							
Students from Iran								
1	(Constant)	30.798	3.687		8.352	**0.000***	2.002	
	Disaster Literacy Scale	1.074	0.129	0.491	8.321	**0.000**		1.000
	$R^2 = 0.241$; Adjusted $R^2 = 0.238$; $F = 69.235$; $p =$ **0.000***							
2	(Constant)	30.819	3.704		8.321	**0.000***	2.020	
	Mitigation/Prevention	0.241	0.188	0.123	1.279	0.202		2.638
	Preparedness	0.264	0.202	0.134	1.306	0.193		3.001
	Response	0.483	0.200	0.256	2.413	**0.017**		3.225
	Recovery/Rehabilitation	0.072	0.161	0.039	0.448	0.655		2.123
	$R^2 = 0.249$; Adjusted $R^2 = 0.235$; $F = 17.826$; $p =$ **0.000***							

*Bold *p*-values are significant at level of ≤ 0.05, Dependent variable: The Disaster Response Self-Efficacy Scale

VIF: Variance Inflation Factor; Durbin Watson: autocorrelation coefficient; R^2: coefficient of determination; Adj. R^2: adjusted coefficient of determination; B: non-standardized beta value; β: standardized beta value; t: significance of variable; F: significance of variable

disaster response. It also demonstrates that improving disaster literacy can foster greater self-efficacy in disaster response, a crucial competency for nursing students who may encounter emergencies in real-life situations. In fact, this relationship highlights the critical role of disaster literacy education in preparing nursing students to effectively manage disasters and contribute to emergency care. Disaster literacy education is crucial for enhancing individuals' knowledge and understanding of disasters, as well as improving their ability to prepare for and respond effectively [22]. Through increasing disaster literacy, the potential damages caused by disasters can be minimized or even prevented, thereby strengthening social resilience (Kesumaningtyas et al., 2022). Disaster literacy can be further developed with community-based disaster education programs and awareness training, which equip individuals with the necessary skills to act confidently and competently during emergencies. Studies indicate that higher disaster literacy is associated with better behavioral responses during disasters. For instance, Indonesian students who received education about disaster risks were significantly more prepared when disaster events occurred [43]. Similarly, research has shown that increased disaster knowledge is associated with enhanced self-efficacy. A recent study found a significant positive correlation between disaster knowledge and disaster response self-efficacy among nursing students in Bangladesh [11]. Therefore, regular disaster education and training play a crucial role in significantly enhancing both disaster literacy and self-efficacy [44]. Lin et al. (2024) reported that a structured disaster management training program notably improved nurses' perceptions of their disaster response preparedness [45]. Similarly, Zhang et al. (2024) emphasized the critical need for increased disaster literacy among nurses and suggested that this improvement could be closely linked to enhanced disaster response self-efficacy [46]. Similarly, considering that self-efficacy is a key factor in resilience, Torpus et al. (2024) found that as individuals' disaster literacy increases, their individual disaster resilience also improves [22]. Logayah et al. (2024) further confirmed that higher disaster literacy can strengthen personal disaster resilience [47]. It can be inferred that individuals with a high level of disaster literacy are better equipped to understand and implement the necessary measures before, during, and after a disaster. As supported by previous studies, disaster literacy enhances individuals' knowledge and awareness of disasters, positively influencing key personal resources, such as self-efficacy and resilience, which are crucial during disaster response.

When examining the effect of disaster literacy on disaster response self-efficacy among nursing students, it was found that the disaster literacy scores of students significantly impacted their disaster response self-efficacy scores. Specifically, 21.9% of the variation in disaster response self-efficacy scores among students in Türkiye can be explained by their disaster literacy levels. On the other hand, 23.8% of the variation in disaster response

self-efficacy scores among students in Iran is explained by their disaster literacy levels. Higher disaster literacy is closely associated with increased self-efficacy in disaster response, as students with a stronger knowledge base feel more confident and capable of taking appropriate actions in emergency situations. Integrating disaster literacy into nursing education can significantly enhance students' preparedness and response abilities. As a matter of fact, Bülbül (2021) found that students who received disaster management education exhibited higher self-efficacy in disaster response [10]. Similarly, Bayageldi and Kaloğlu Binici (2024) concluded that nursing students should undergo systematic and regular psychological first aid training to effectively intervene in disaster situations [48]. Loke et al. (2021) conducted a comprehensive assessment of the development of disaster nursing education and training programs over the past two decades, reporting a significant increase in the number of these programs [49]. Moreover, they noted that approximately half of these programs had led to substantial improvements in knowledge and skills among nursing professionals. In another study, a simulation-based disaster nursing training program was developed for nursing students using standardized patients, and it was demonstrated that the program significantly improved performance in key areas such as disaster nursing competency, triage skills, disaster preparedness, critical thinking, and confidence in disaster nursing [50]. While simulation-based training shows considerable promise, some studies emphasize the need for ongoing education and training programs to sustain and enhance nurses' disaster response capabilities [51]. Regular disaster training and simulation exercises are essential for fostering a proactive approach to disaster management, as they enhance both theoretical knowledge and practical skills.

Comparative studies reveal that while some countries have made significant progress in integrating disaster response self-efficacy development activities into nursing education, others have lagged behind due to limitations in the curriculum or a lack of practical educational resources [52]. In both Türkiye and Iran, nursing students encounter significant challenges in disaster preparedness despite the presence of disaster training programs. Research indicates that while nursing students in Türkiye participate in workshops designed to enhance their disaster response skills, many still lack confidence in applying these principles during actual crises [53, 54]. Similarly, in Iran, limited practical educational opportunities contribute to nursing students' lower levels of self-efficacy in disaster response contexts [55]. Both Türkiye and Iran highlight the lack of hands-on, practical education, which is essential for developing confidence and competency in disaster management [53, 55]. To address these challenges, there is a need to integrate comprehensive disaster management content into the nursing curriculum, ensuring that students are better equipped to cope with disaster situations effectively [54, 56].

As a result, this study found that the disaster literacy and disaster response self-efficacy perceptions of nursing students in both Türkiye and Iran are at a moderate level and should be improved. This finding aligns with the results of many studies in the literature [9, 12, 20, 36, 57]. Previous research indicates that disaster-related training programs promote disaster literacy by enhancing knowledge and awareness, while also improving self-efficacy in disaster response [10, 44, 49, 50]. Nurses with high disaster literacy and self- efficacy can make quick and effective decisions during crises, ensuring timely and appropriate interventions for patients. This is particularly crucial during the golden hour, a critical period that significantly impacts patient outcomes. Confident nurses can take initiative in uncertain environments, contributing to a more organized and efficient healthcare team. High levels of disaster literacy and self-efficacy enhance nurses' ability to cope with stress and reduce the risk of post-disaster burnout. Moreover, disaster-literate nurses play a key role in educating and informing the public, thereby strengthening community resilience against disasters. By improving the disaster literacy and self-efficacy levels of nursing students, the effectiveness of healthcare services in real disaster scenarios can be enhanced. Therefore, global actions and initiatives should be implemented to enhance the disaster literacy and self-efficacy of nursing students. These educational initiatives are crucial for promoting individual and community preparedness, ultimately leading to more effective and coordinated disaster responses.

Limitations and strengths

This study has some limitations. The data were collected using a self- reported questionnaire, which may introduce potential bias in participants' responses. Additionally, the likelihood of participants interpreting the scale items according to their own perceptions could lead to social desirability bias. Furthermore, the high frequency of disasters in both countries, as well as recent large-scale disasters, may have influenced the participants' perceptions and responses. Our research is limited to nursing students from Turkey and Iran, which may affect the generalizability of the findings. Expanding studies to diverse geographical regions can provide a broader perspective. Despite these limitations, the study has several strengths. It is one of the first to explore and compare the relationship between disaster literacy and disaster response self-efficacy among nursing students in two different countries, Türkiye and Iran. The findings of this study can inform the development of policies and initiatives aimed at integrating disaster preparedness into nursing

curricula in both countries. Furthermore, the results may serve as a foundation for creating new programs that enhance disaster literacy and response self-efficacy in nursing education, ultimately contributing to improved disaster response capacity.

Future research

Future studies could explore comparisons between countries with varying disaster experiences to assess how these differences affect disaster literacy and self-efficacy. Future studies should explore the underlying factors that contribute to the observed differences in disaster literacy and self-efficacy between students in different countries. Examining the impact of socio-cultural, educational, and governmental factors could provide valuable insights into improving disaster preparedness across diverse populations. Future studies should also evaluate the effectiveness of high-fidelity simulations, virtual reality (VR)-based disaster drills, and interprofessional simulation exercises in improving disaster response competencies. Research assessing skill retention over time and the transition of disaster training knowledge into actual clinical practice is needed. Future research should explore the development and implementation of internationally standardized curricula integrating simulation-based disaster response training into nursing education.

Practical implications

Integrating evidence-based disaster nursing frameworks into national policies can enhance the preparedness and responsiveness of healthcare systems. Governments and healthcare institutions should invest in regular disaster simulation training, interprofessional collaboration, and emergency drills to improve healthcare workforce preparedness. Strengthening psychosocial support mechanisms for healthcare providers can mitigate burnout and improve long-term workforce sustainability in disaster-prone regions. Establishing international partnerships with disaster nursing institutions and emergency medical teams can provide students with exposure to diverse disaster scenarios and enhance their competencies. Interdisciplinary collaboration with emergency medicine specialists, policymakers, and international organizations can help bridge gaps in disaster preparedness education.

Nurse educators are encouraged to collaborate with emergency response organizations to deliver practical training in authentic disaster settings, and to require clinical rotations in emergency departments, disaster response units, and humanitarian aid organizations to further develop hands-on skills. Mandatory disaster nursing courses covering emergency preparedness, response protocols, and crisis communication should be developed within the nursing curriculum. Nursing curricula should be updated to incorporate global best practices, such as WHO's and ICN's Disaster Nursing Competencies framework. Standardized disaster literacy programs can ensure that nursing students receive training consistent with international guidelines, enhancing their ability to respond effectively in cross-border and large-scale emergencies. Furthermore, the practical policy-making experience of health ministries should be combined with the research and training capabilities of academic institutions. And these partners jointly should design and implement preparedness initiatives that are informed by the latest scientific findings and global best practices.

Conclusion

This study is the first to compare the concepts of disaster literacy and disaster response self-efficacy across countries, and its findings highlight the need for further research in this area. Based on the joint evaluation of the present data and existing literature, it can be concluded that disaster literacy is crucial for the future professional competency of nurses. However, it is generally found to be at a moderate or low level and improving disaster literacy is directly associated with increased self-efficacy in disaster response. Therefore, plans should be implemented to enhance disaster literacy among nursing students, particularly in countries like Iran. This is crucial for enhancing students' disaster resilience and response self-efficacy. Accordingly, multidisciplinary programs are needed at the national level to improve the disaster literacy and disaster response self-efficacy of nursing students. An integrated disaster curriculum should be developed and implemented across health-related disciplines, including nursing and medicine, at universities. Both countries should consider modeling their nursing education systems after those of leading countries to overcome existing challenges and improve the quality of nursing education. This approach is crucial for enhancing the overall effectiveness of health services. In Türkiye, nursing programs are subject to rigorous accreditation processes, which have contributed to improving the quality of education. Accreditation contributes to raising standards in nursing education. Policymakers in Iran may have the opportunity to develop their own systems by examining the strengths of Türkiye's nursing education system. Drawing on Türkiye's experience could also help enhance the quality of nursing education in Iran.

Abbreviations

CVI	Content validity index
DLS	Disaster Literacy Scale
DRSES	The Disaster Response Self-Efficacy Scale
CRED	Center for Research on the Epidemiology of Disasters
EM-DAT,	International Emergency Events Database
HEPDAK	Association for Evaluation and Accreditation of Nursing Education Programs

SPICES Student-based, problem-based, integrated, community-based, elective, and systematic
STROBE Strengthening the Reporting of Observational Studies in Epidemiology
VR Virtual reality

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Author contributions
GTE, FSG and JF contributed to conceiving and designing the research. The data were collected, analyzed, and interpreted by GTE, FSG, and JF. GTE, FSG, and JF contributed equally to writing and revising the manuscript and approved the final manuscript.

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Data availability
The data are available upon request to the corresponding author after signing appropriate documents in line with ethical application and the decision of the Ethics Committee.

Declarations

Ethics approval and consent to participate
Ethical approval was obtained from the Social and Humanities Research Ethics Committee (Date:29.12.2023; No:2023/1130) of a state university in Türkiye and Ethics Committee of Kerman University of Medical Sciences in Iran (Ethics No: IR.KMU.REC.1403.568.) for the implementation of the study and data collection. After receiving ethical approval, permission was obtained from the faculties. Permission to use the scales was obtained from the authors of the scales. The participants were fully informed about the purpose of the study and the procedures involved. Verbal consent was obtained from the students who voluntarily agreed to participate, in accordance with ethical principles. Anonymity and confidentiality were ensured, and participation was entirely voluntary. All steps and procedures were performed in accordance with the Declaration of Helsinki and the Committee on Publication Ethics (COPE).

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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