

ORIGINAL ARTICLE

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Approach to disasters by medical students in a disaster-affected region: Education and awareness

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Abstract

This study aims to investigate the awareness of medical students, who are educated in regions that have experienced significant destruction from disasters such as earthquakes, towards disasters, the roles they can assume during disaster situations, and their attitudes towards disaster medicine. This cross-sectional study was conducted between November 2023 and January 2024 at Erzincan Binali Yıldırım University Faculty of Medicine, involving medical students aged 18 years and older. A structured, 20-item questionnaire was administered to collect demographic information, previous disaster experiences, levels of disaster awareness, and attitudes toward disaster medicine. Descriptive statistics were used for data presentation, and the Chi-square test was applied for categorical comparisons. Statistical significance was set at $p < 0.05$. A total of 172 students participated in the study. Among these participants, 80.2% ($n=138$) stated that they lacked sufficient knowledge regarding the appropriate actions to take during a disaster, and 30.2% ($n=52$) reported not having received adequate training in disaster preparedness. Among students with previous natural disaster experience, it was observed that such experiences did not significantly impact their knowledge and attitudes towards disaster management ($p=0.434$). Students who had received training were observed to have greater confidence in providing medical support during disasters ($p=0.006$). In conclusion, medical students remain a highly motivated but underprepared group in terms of disaster readiness. It is therefore imperative to strengthen their knowledge and skills in disaster management and intervention. Increasing the emphasis on disaster preparedness within medical education programs can better equip students for future disasters and ultimately enhance the overall resilience of the community.

Keywords: Disaster medicine, natural disasters, disaster planning, medical education

Introduction

Throughout history, disasters have had significant impacts on societies. These impacts have occurred as a result of natural or man-made events and may lead to serious consequences such as loss of life, economic damages and disruption of social structures [1]. Being prepared for disasters and being able to respond effectively at the time of a disaster are of vital importance in terms of minimising such negative consequences. In particular, continuity and efficiency of health services are at the centre of the disaster management process [2]. In this context, it is essential for healthcare professionals to possess sufficient knowledge and competence in disaster preparedness and response [3].

The competence of healthcare professionals in disaster medicine is undoubtedly crucial. However, equipping students in health sciences with essential knowledge and skills in disaster management and response is equally vital. Such training ensures they are prepared to assume critical roles in effectively addressing the challenges posed by disasters [4]. Medical students, in particular, hold a central position in disaster scenarios due to the critical roles they can undertake. These roles span a wide spectrum, from disaster preparedness and first aid to emergency medical interventions and psychosocial support [5]. Integrating disaster management and response training into medical education plays a pivotal role in preparing future healthcare professionals to effectively address and respond to disasters [6].

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However, there is a lack of sufficient data regarding medical students' preparedness for disasters, the roles they can assume during such events, and their attitudes and knowledge about disaster medicine [7]. This gap poses significant challenges in designing strategies to enhance disaster preparedness and response capacities effectively [7].

The aim of this study is to assess the awareness, potential roles, and attitudes of medical students towards disaster medicine, particularly those studying in a region historically affected by devastating earthquakes. Additionally, the study seeks to identify the educational needs of medical students in disaster management and response and to propose recommendations for the development of educational programs in this field.

Material and Methods

This research was conducted as a cross-sectional design between November 2023 and January 2024, involving students enrolled at the Erzincan Binali Yıldırım University Medical Faculty. Participants were recruited through convenience sampling, ensuring representation from multiple academic years. Recruitment was facilitated by announcements delivered in classrooms within the Faculty of Medicine. According to MacCallum et al.'s recommendation on sample size calculation for factor analysis, the sample size was set to include at least 5-10 participants for each item on the questionnaire [8]. Given that the questionnaire consists of 20 items, the targeted sample size was set at least 100 participants.

Inclusion and Exclusion Criteria

The study included medical students aged 18 years and older. Individuals with permanent disabilities resulting from prior disasters or those diagnosed with severe psychological conditions (e.g., severe anxiety or post-traumatic stress disorder) were excluded from participation.

Ethical Considerations

Both verbal and written informed consent were obtained from all participants, ensuring that their participation was entirely voluntary. The study was approved by the Clinical Research Ethics Committee of Erzincan Binali Yıldırım University (Approval No: 2023-18/5, Date: 19.10.2023).

Data Collection Method

The questionnaire used in this study consisted of 20 questions developed based on a comprehensive literature review. It includes 10 demographic and disaster-related experience questions (e.g., previous disaster experiences, type of disaster experienced, psychological support, sources of disaster information, potential roles in disasters) followed by 10 attitude-related items. The attitude-related items were formatted as a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), evaluating the participants' knowledge, preparedness, educational background, willingness, and attitudes toward disaster medicine. The survey aimed to capture both quantitative and qualitative

insights into medical students' disaster-related awareness and readiness. It was administered through face-to-face interviews.

Data Analysis

Data were analyzed using IBM SPSS 25.0 (SPSS Inc., Chicago, IL, USA). The Kolmogorov-Smirnov test was employed to assess the normality of data distribution, and Levene's test was used to evaluate variance homogeneity. Descriptive statistics for continuous and categorical variables were presented as mean±standard deviation and frequencies (percentages), respectively. Differences between categorical variables were evaluated using the Chi-square test.

For the attitude scale, responses categorized as positive ("Strongly Agree" and "Agree") and negative ("Disagree" and "Strongly Disagree") were combined for analysis. Statistical significance was set at $p < 0.05$.

Results

The study included 172 participants. The mean age of the participants was 20.10 ± 1.88 years. The participants had resided in the province where they were studying for an average of 2.34 years, with durations ranging from 1 to 21 years. Among the participants, 56.4% ($n=97$) were first-year students, 27.9% ($n=48$) were second-year students, and 15.7% ($n=27$) were students from other academic years (third-year and above). Their prior disaster experiences, sources of information on disasters, and potential roles during disaster scenarios are presented in Table 1.

In response to the statement "I have knowledge about what to do in case of disaster", 80.2% of participants ($n=138$) selected "disagree" or "completely disagree", indicating a lack of perceived preparedness. Regarding the statement "I received training on disaster preparedness", 30.2% ($n=52$) expressed disagreement, suggesting that nearly one-third of the students had not received relevant training. Participants' responses to other attitude-related items are summarized in Figure 1.

No significant relationship was found between prior natural disaster experiences and either the level of knowledge about disaster response or the potential to take an active role during disasters ($p=0.395$ and $p=0.434$, respectively).

Participants' responses regarding their disaster preparedness training, perceived competence, and the roles they believed they could undertake during disaster situations are summarized in Table 2. Although the association between prior disaster preparedness training and role preferences did not reach statistical significance ($\chi^2=11.884$, $p=0.065$), students who believed they had gained sufficient knowledge and skills during their medical education were significantly more likely to express willingness to provide medical support in disaster settings ($\chi^2=18.016$, $p=0.006$). Notably, among the students who agreed or strongly agreed that they were competent in disaster management ($n=43$), 74.4% ($n=32$) stated that they could take on medical responsibilities during such situations.

Table 1. Participants' previous disaster experiences, sources of information, and potential roles in disaster scenarios

	n	%
Gender		
Male	61	35.5
Female	111	64.5
Previous natural disaster experience		
Yes	127	73.8
No	45	26.2
What kind of disaster have you experienced?		
Earthquake	109	63.4
Flood	1	0.6
Multiple disasters	17	9.9
Did you receive psychological support after the disaster?		
Yes	22	12.8
No	83	48.3
Partly	22	12.8
Do you have an emergency kit to use in case of disaster?		
Yes	79	45.9
No	93	54.1
What are your sources of information about disasters*		
Book	3	1.7
Magazine	4	2.3
Internet	141	82.0
TV-Radio	79	45.9
Social media	125	72.7
Seminars	13	7.6
Other	1	0.6
What tasks can be assigned to medical students in disaster situations*		
Medical support	124	72.1
Logistic support	5	2.9
Physical labor	27	15.7
Search & rescue	49	28.5
Other	1	0.6

*More than one option could be selected

Table 2. Comparison of participants' answers to questions about education and the tasks they think they can undertake in case of a disaster

	What tasks can be assigned to medical students in disaster situations n (%)				df	χ^2	p
	Medical support	Physical labor- logistics-other	Search & rescue	Multiple tasks			
I received training on disaster preparedness							
Completely agree-agree	38 (73.1)	1 (1.9)	5 (9.6)	8 (15.4)	6	11.884	0.065
I have no idea	17 (42.5)	7 (17.5)	8 (20)	8 (20)			
Disagree - completely disagree	45 (56.3)	9 (11.3)	10 (12.5)	16 (20)			
As a medical student. I can take an active role in disaster situations							
Completely agree-agree	66 (63.5)	5 (4.8)	14 (13.5)	19 (18.3)	6	15.188	0.019
I have no idea	30 (57.7)	7 (13.5)	6 (11.5)	9 (17.3)			
Disagree - completely disagree	4 (25)	5 (31.3)	3 (18.8)	4 (25)			
In my medical education. I gained sufficient knowledge and skills related to disaster management and response							
Completely agree-agree	32 (74.4)	0	8 (18.6)	3 (7)	6	18.016	0.006
I have no idea	30 (46.9)	8 (12.5)	7 (10.9)	19 (29.7)			
Disagree - completely disagree	38 (58.5)	9 (13.8)	8 (12.3)	10 (15.4)			

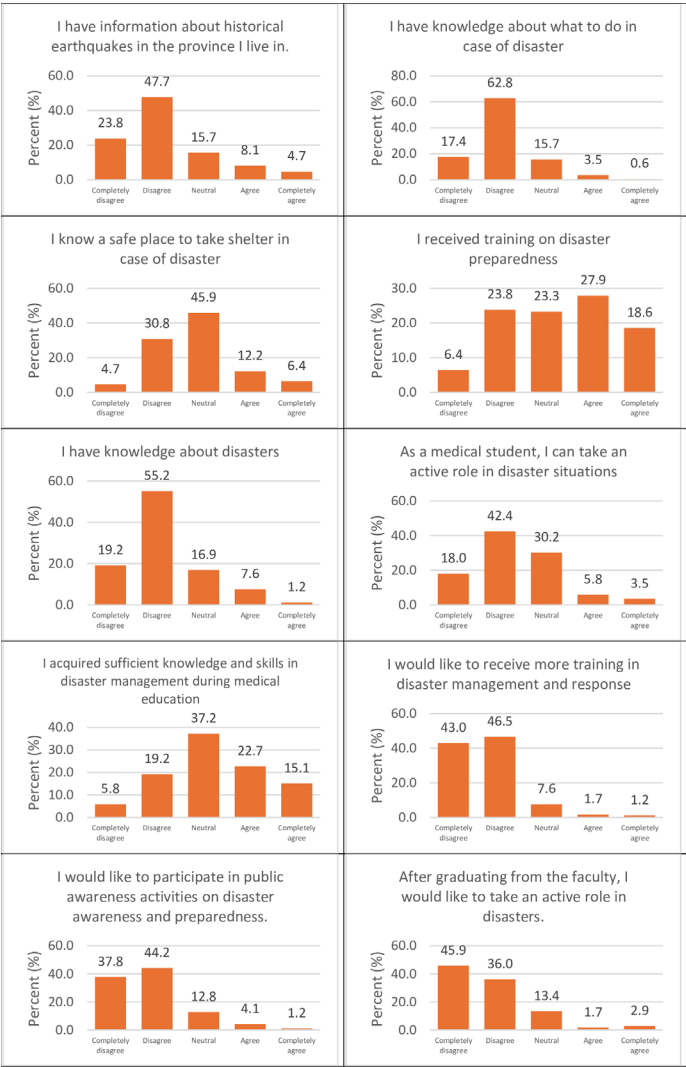


Figure 1. Responses of medical students to attitude questions

Discussion

This study focuses on the roles that medical students studying in a province prone to earthquake disasters can assume during such events, as well as their attitudes toward disaster medicine and their educational needs. According to the findings, 80.2% of participants lacked sufficient knowledge about the appropriate actions to take during a disaster, and 30.2% had not received any formal training in disaster preparedness. These results underscore the urgent need to develop robust disaster management and response programs and integrate them into medical curricula. Providing comprehensive disaster education would likely enhance students’ preparedness and confidence, thereby strengthening overall community resilience. This study focuses on the roles medical students studying in a province that has experienced earthquake disasters can assume during such events, their attitudes toward disaster medicine, and their educational needs. The findings reveal that while a significant proportion of students are knowledgeable about what to do during a disaster, many have not received adequate training in

disaster preparedness. These results underscore the necessity of developing disaster management and response training programs and integrating them into medical curricula.

Education of medical students in disaster medicine and preparedness has gained increasing importance in recent years. Existing studies highlight that students generally possess a moderate level of knowledge in this field, emphasizing the need for efforts to enhance the effectiveness of educational programs [6,9,10]. In our study, students who had received training in disaster preparedness and response were observed to have greater confidence in their ability to provide medical support during disaster situations. This finding suggests that disaster medicine training not only enhances students' knowledge and skills but also fosters the motivation and confidence necessary for them to take on active roles in disaster scenarios.

The study shows that when students were asked if they know what to do in case of a disaster, 62.8% disagreed, and only 3.5% agreed. This reflects a significant lack of disaster response knowledge among the majority of students. Similarly, when asked whether they have information about historical earthquakes in their province, again, 47.7% disagreed. This suggests a lack of understanding of local disaster history, a critical element of community-specific preparedness [11]. Understanding past disaster events in one's locality is essential for developing risk perception, fostering preparedness behaviors, and guiding region-specific mitigation strategies [12]. Moreover, low levels of historical awareness may hinder students' ability to assess vulnerability and respond effectively in high-risk settings [13]. Integrating local hazard education into medical curricula has been shown to improve not only factual knowledge but also students' perceived self-efficacy in crisis situations [14].

Beyond general disaster knowledge, the results also indicate that a large proportion of students lack awareness of practical preparedness measures. For instance, only 18.6% of participants agreed or strongly agreed that they knew a safe place to take shelter during a disaster. This operational gap highlights the need for integrating both theoretical and practical elements into disaster education. Furthermore, students’ confidence in their ability to take an active role during disasters was limited, with less than 9.3% expressing strong agreement. This low level of self-efficacy may stem from the fact that only 15.1% believed they had acquired sufficient knowledge and skills during their medical training. Nevertheless, the demand for further education in disaster management was evident, with over 89% expressing a desire for additional training. Interestingly, willingness to engage in community-based awareness efforts and to take on active roles post-graduation was also limited, suggesting that disaster preparedness remains an under-prioritized domain among future healthcare professionals. These findings emphasize the importance of both curricular reform and motivational strategies to foster greater engagement with disaster medicine.

Despite a portion of participants having experienced a natural disaster in the past, no significant relationship was found between this experience and their knowledge of what to do during a disaster or their perception of their ability to take an active role in disaster scenarios. While some studies suggest that prior disaster experience can contribute to improved preparedness, the findings in the literature are mixed, indicating that prior experience alone may not be a consistent predictor of adequate disaster response readiness [15-17]. This underscores the critical importance of formal education in disaster preparedness and response. Existing studies suggest that mandatory disaster education programs can enhance students' knowledge about disaster situations and, when integrated into the curriculum, can be implemented in alignment with existing educational objectives [14]. The integration of disaster medicine education into the medical curriculum can enhance students' knowledge and skills to address the challenges they may encounter during disaster situations, thereby contributing to the community's overall resilience to disasters [4]. Therefore, it would be beneficial for medical faculties to review their curricula related to disaster medicine education and explore opportunities for improvements in this area.

The evaluation of roles that medical students can undertake during disaster situations reveals that students predominantly perceive themselves as capable of taking active roles in tasks such as medical support and search-and-rescue operations. This finding highlights that, under the supervision of a professional healthcare team, medical students represent a valuable resource for disaster management processes. However, it is evident that without adequate training and preparation, they may not be able to fulfill these roles effectively. In this context, it is imperative to emphasize the need for medical education programs to place greater focus on disaster preparedness and response [18,19]. Although the association was not statistically significant, students who reported having received disaster preparedness training demonstrated a tendency to express greater willingness to take on medical roles during disasters ($\chi^2=11.884$, $p=0.065$), which is consistent with findings from previous studies highlighting the positive impact of training on students' role perception and confidence in disaster settings [20]. This may indicate a potential relationship between prior training and role perception, warranting further investigation in future studies.

The primary limitations of this study include its cross-sectional design, which restricts the ability to observe longitudinal changes in students' knowledge and attitudes toward disaster medicine. Additionally, the findings' generalizability is limited since data were collected from a single medical faculty. The predominance of preclinical-year students due to insufficient participation from clinical-year students (fourth to sixth years) may have also influenced the results. Lastly, the self-developed questionnaire used, although based on the literature, may impact the objectivity and comparability of the findings. These limitations should be considered when interpreting the results and conducting future research. The limitations of this study primarily include the restricted generalizability of the findings due to data being

collected from a single medical faculty. Additionally, the cross-sectional design prevents the observation of changes in students' knowledge and attitudes toward disaster medicine over time. Furthermore, the inherent limitations of the survey methodology may affect the objectivity of the results. These limitations should be taken into account when interpreting the findings and planning future research.

Conclusion

This study evaluated medical students' awareness, attitudes, and educational needs regarding disaster management and response. The findings reveal that the majority of students lack adequate knowledge about disaster preparedness and response, with a particularly low level of awareness regarding local disaster risks and practical actions to take during emergencies. While many students expressed willingness to engage in disaster-related roles, only a small proportion reported having received formal training, which significantly influenced their confidence in providing medical support during such events. Conversely, prior natural disaster experience did not significantly impact students' disaster knowledge or self-efficacy, emphasizing the critical role of structured education over experiential exposure.

In conclusion, medical students remain a highly motivated but underprepared group in terms of disaster readiness. Comprehensive, competency-based educational programs are essential to equip them with both the theoretical knowledge and practical skills required for disaster response. Integrating simulation-based training, local risk awareness, and community engagement into medical curricula could significantly enhance their readiness and confidence. Greater emphasis on disaster management in medical education can better prepare students for future disasters and contribute to enhancing the overall disaster resilience of society. The findings reveal that while most students are knowledgeable about what actions to take during a disaster, many lack adequate training in disaster preparedness. Students who received disaster training tended to exhibit greater confidence in their ability to provide medical support during such events. Conversely, prior natural disaster experiences among students did not have a significant impact on their knowledge or attitudes toward disaster management.

In conclusion, comprehensive educational programs are essential to enable medical students to take an active role in disaster management and response. Greater emphasis on disaster management in medical education can better prepare students for future disasters and contribute to enhancing the overall disaster resilience of society.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical Approval

The study was approved by the Clinical Research Ethics Committee of Erzincan Binali Yıldırım University (Approval No: 2023-18/5, Date: 19.10.2023).

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