



## Research Article

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# DISASTER AWARENESS AND ASSOCIATED FACTORS AMONG 3RD AND 6TH YEAR STUDENTS OF ANKARA UNIVERSITY FACULTY OF MEDICINE

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## Abstract

**Objectives:** This study assessed disaster awareness among 3rd and 6th-year medical students at Ankara University and explored factors influencing their awareness. Understanding this is crucial for preparing future healthcare professionals for emergencies. The study investigates how different stages of medical education and receiving disaster education affect disaster awareness.

**Materials and Methods:** This cross-sectional study at Ankara University Faculty of Medicine from August to October 2023 assessed disaster awareness among third and sixth-year students. Data were collected via Google Forms using a 20-item questionnaire covering demographics, disaster experiences, and medical school education and a 36-item 'Disaster Awareness Scale'.

**Results:** A total of 352 participants, 210 in 3rd grade and 142 in 6th grade were included in the study. The mean disaster awareness score was 148.4. Disaster awareness was found to be higher in sixth-grade students who received disaster education at the medical faculty and those who participated in disaster drills. The scale scores of the participants who had experienced an earthquake and had a disaster experienced in their close circle were also higher.

**Conclusion:** The study revealed that the disaster awareness of the sixth-grade students those who received disaster education at the medical faculty, those who had experienced an earthquake, those whose close circle had experienced a disaster, and those who had participated in a disaster drill were significantly higher. These results emphasize the importance of formal education and drills in disaster preparedness. Therefore, it is recommended that disaster preparedness education should be disseminated and developed in all faculties.

**Keywords:** Disasters, awareness, students, medical.

## Introduction

Disasters are significant events that severely disrupt the normal functioning of a society and exceed its capacity to cope with the situation using its resources. Disasters can arise from natural or human-made hazards, as well as from various factors affecting a community's exposure and vulnerability.<sup>1</sup> In recent years, factors such as rapid population growth worldwide, environmental degradation, and global climate change have increasingly amplified the social, biological, and economic impacts of natural disasters.<sup>2,3</sup> According to a 2023 report by the United Nations Office for Disaster Risk Reduction (UNDRR), climate change-related disasters are threatening global economic and development gains. These disasters disproportionately impact poorer communities. Extreme weather events, such as the 2022 floods in Pakistan and droughts in the Horn of Africa, displaced 12 million children in countries with some of the lowest literacy rates in the world.<sup>4</sup> At the same time, disasters are a serious public health issue that disrupts physical, mental, and social well-being, leading to high morbidity and mortality. They strain health and social care services and impose a heavy burden on socioeconomic and political systems.<sup>5</sup>

Disaster awareness is not limited to taking action during or after a disaster; it also includes taking necessary precautions and making comprehensive preparations before disasters occur. This proactive approach is critical for minimizing disaster risk and making the community resilient to potential catastrophes. The measures taken and effective interventions during a disaster can play a significant role in reducing its impacts and enabling the community to recover more quickly.<sup>6</sup>

Due to its geographical location and geological structure, Turkey is exposed to various natural disasters. It is situated in a region that can be considered 'high risk' globally in terms of earthquakes. On average, large-scale earthquakes causing significant loss of life and property occur every five years. In addition to earthquakes, disasters such as landslides, floods, rockfalls, and avalanches frequently occur in various regions and seasons.<sup>7</sup> The major earthquake centered in Kahramanmaraş on February 6, 2023, which affected eleven provinces, once again highlighted that Turkey is a country with a high earthquake risk. The earthquakes, which turned into disasters as a result of a chain of negligence, remind us of the necessity to increase the measures and preparations that need to be taken in our country. Adopting more comprehensive and effective strategies to minimize the impacts of natural disasters will enhance the community's resilience against them.

It is important for physicians, who play a critical role during disasters, to recognize, understand, and be prepared for natural disasters in an informed manner. Medical schools are the primary places where physicians acquire the knowledge and skills related to disasters. The education provided by medical schools enables students, as future health professionals, to act effectively during disasters and contribute to the mission of protecting public health. During the medical school education process, lectures related to disasters, drills,

practices, emergency patient care, and other studies are included, and it is necessary to determine the impact of these trainings on disaster awareness.

Disaster-related lectures, drills, practical applications, and emergency patient care are part of the medical school curriculum. The importance of enhancing education in disaster medicine is widely recognized.<sup>8</sup> Assessing the impact of this training on disaster awareness can help shape future educational programs. Therefore, this study aims to evaluate disaster awareness and influencing factors among third and sixth-year students at Ankara University Faculty of Medicine.

## Materials and Methods

The study was conducted as a cross-sectional research at Ankara University Faculty of Medicine between August and October 2023. At Ankara University Faculty of Medicine, the "Health Services Management in Disasters" lecture is provided in the fifth year. Third-year medical students represent a group in the preclinical period who have not yet taken many practical, clinical lectures, and lectures related to disasters, while sixth-year students represent a group who have taken various clinical and practical lectures, including lectures related to disasters, and have also learned how to approach emergencies. Therefore, these two groups were included in the study, particularly to measure the impact of the education provided. The disaster education received outside the medical faculty is based on the statements of the participants. The source and content of the education were not questioned. The sample size was calculated using the Epi-Info program in a population of 768 individuals consisting of third and sixth-year students. The minimum sample size was determined as 257. A total of 352 individuals, 210 from the third year and 142 from the sixth year consented to participate in the study. Due to incomplete responses from 14 participants to the scale questions, the responses of 338 participants were included in the univariate and multivariate analyses.

Data were collected via Google Forms using a 20-item questionnaire covering demographics, disaster experiences, and medical school education and a 36-item 'Disaster Awareness Scale'. The Disaster Awareness Scale, developed by Dikmenli Y, Yakar H, and Konca AS. (2018), consists of 36 items and is scored on a five-point Likert scale ranging from 1 to 5. The items in the scale are scored as follows: (1) 'strongly disagree', (2) 'disagree', (3) 'neutral', (4) 'agree', and (5) 'strongly agree'. It comprises 27 positive and 9 negative statements, with the lowest possible score being 36 and the highest score being 180. A high score on the scale indicates a high level of disaster awareness among students.

The research received approval from the Ankara University Scientific Research Ethics Committee (protocol no: 2023000442-1). Necessary permissions were obtained from the Ankara University Faculty of Medicine Dean's Office for implementation and from Assoc. Prof. Dr. Yurdal Dikmenli, the developer of the scale.

### *Statistical analysis*

The analysis was performed using SPSS 26.0 for Windows (SPSS, Inc.; Chicago, USA). Descriptive statistics are presented as frequency (n), percentage (%), mean (M), standard deviation (SD), median, minimum (min), and maximum (max) values. Categorical variables were compared using chi-square tests. The normal distribution of continuous variables was examined visually (histograms and probability plots) and analytically (Kolmogorov-Smirnov and Shapiro-Wilk tests). Due to the continuous variables not adhering to a normal distribution, nonparametric tests (Mann-Whitney U and Kruskal-Wallis tests) were utilized for comparison. The relationship between continuous variables was assessed using the Spearman correlation test. The Disaster Awareness Scale was grouped according to the median value (below 150 points, 150 points, and above), and logistic regression analysis was performed with the grouped scale as the dependent variable. Variables with  $p < 0.25$  in univariate analyses were taken as independent variables in the regression analysis. A significance level of  $p < 0.05$  was considered for all analyses.

## **Results**

The sociodemographic and disaster-related characteristics of the total 352 participants, including 210 from the third year and 142 from the sixth year, are presented in Table 1. According to this, 191 of the participants are female and 160 are male. Looking at the educational status of the students' parents, it is observed that 75.56% of mothers and 84.37% of fathers are at least high school graduates. Additionally, 10.22% of students' families reside in one of the 11 provinces affected by the Kahramanmaraş earthquake. 65.05% of students have encountered a disaster at least once, with the majority of these disasters (58.88%) being earthquakes. Moreover, 72.15% of participants reported that their close surroundings have also experienced a disaster. In the study, 21.30% of students stated that they received education on disasters from the medical faculty, and 70.73% participated in disaster drills. The main sources of information for participants were the internet/social media (95.45%) and TV (47.44%), while the proportion of participants receiving education on disasters outside of the medical faculty was 35.79%.

When comparing third-year and sixth-year students (Table 2), the proportion of third-year students whose families reside in earthquake-affected provinces ( $p = 0.024$ ), those who have encountered a disaster at least once ( $p < 0.001$ ), those who have encountered earthquakes specifically among disaster types ( $p = 0.001$ ), and those who express knowledge about earthquakes ( $p = 0.036$ ) is significantly higher. On the other hand, the rate of receiving disaster education at the medical faculty was found to be higher among sixth-year students compared to third-year students (35.91% versus 11.42%;  $p < 0.001$ ). No significant difference was observed between the two groups in terms of participation in drills and receiving education on disasters outside of the medical faculty ( $p > 0.05$ ).

**Table 1.** Socio-demographic Characteristics and Disaster Status of the Students

Variable	Categories	n	%
<b>Gender</b>	Female	191	54.26
	Male	161	45.73
<b>Mother's Education Level</b>	Primary school or below	59	16.76
	Middle school	27	7.67
	High school	94	26.70
	University or above	172	48.86
<b>Father's Education Level</b>	Primary school or below	26	7.38
	Middle school	29	8.23
	High school	62	17.61
	University or above	235	66.76
<b>Location of Family Residence</b>	Earthquake-prone areas*	36	10.22
	Other areas	316	89.77
<b>Encounter with Disasters (earthquake, flood, fire, etc.)</b>	Never experienced	123	34.94
	Experienced at least once	229	65.05
<b>Type of Disaster Encountered**</b>	Earthquake	207	58.88
	Flood	37	10.51
	Fire	36	10.22
	Other (landslide, storm, etc.)	8	2.27
<b>Disaster Experience in the Close Circle</b>	Yes	254	72.15
	No	98	27.84
<b>Receiving Disaster Education in Medical School</b>	Yes	75	21.30
	No	277	78.69
<b>Participation in Disaster Drill</b>	Yes	249	70.73
	No	103	29.26
<b>Sources Used for Information**</b>	Internet/Social Media	336	95.45
	TV	167	47.44
	Seminars and Training	81	23.01
	Books	50	14.20
	Radio	11	3.12
<b>Receiving Education on Disasters Outside of Medical Faculty</b>	Yes	126	35.79
	No	226	64.20

n: frequency, %: column percentage \*: Cities affected by the February 6 Kahramanmaraş earthquake (Adana, Adıyaman, Diyarbakır, Gaziantep, Hatay, Kahramanmaraş, Kilis, Malatya, Osmaniye, Şanlıurfa, Elâzığ)

\*\* : Questions that can be marked with more than one option.

The comparison of responses provided by participants who completed the questionnaire items without missing responses, based on the scores obtained from the scale is presented in Table 3. The total mean score obtained from the disaster awareness perception scale for all participants was  $148.4 \pm 15.3$ , with a median of 150 and a distribution ranging from 71 to 180. When looking at the distribution of the disaster awareness perception scale, scores based on certain characteristics, the median scale score of sixth-year students (153.0) is significantly higher than that of third-year students (148.0) ( $p=0.001$ ); the scores of those who express knowledge about any disaster ( $p=0.025$ ), those who received education on disasters at the medical faculty ( $p=0.048$ ), and those who participated in disaster drills are statistically significantly higher ( $p=0.002$ ). No

significant difference was observed in the scale scores based on gender, parents' educational status, family's place of residence, type of encountered disaster, personal and close surroundings' encounter with disasters, and receiving education on disasters outside of the medical faculty.

**Table 2.** Comparison of Disaster-Related Experiences and Education of 3rd and 6th-Year Students

		Class				p*
		3rd Year		6th Year		
		n	%	n	%	
<b>Location of Family Residence</b>	Earthquake-prone areas**	28	12.85	8	5.63	<b>0.024</b>
	Other areas	182	86.66	134	94.36	
<b>Encounter with Disasters (earthquake. flood. fire. etc.)</b>	Never	58	27.61	65	45.77	<b>&lt;0.001</b>
	At least once	152	72.38	77	54.22	
<b>Type of encountered disasters***</b>	Earthquake	138	65.71	69	48.59	<b>0.001</b>
	Flood	27	12.85	10	6.71	0.117
	Fire	22	10.47	14	9.85	0.993
<b>Type of Disaster Students Have Knowledge About***</b>	Earthquake	204	97.14	131	92.25	<b>0.036</b>
	Flood	78	37.14	59	41.54	0.406
	Fire	121	57.61	84	59.15	0.774
	Landslide	46	21.90	38	26.76	0.294
<b>Receiving disaster-related Education at the medical faculty</b>	Yes	24	11.42	51	35.91	<b>&lt;0.001</b>
	No	186	88.57	91	64.08	
<b>Participation in Disaster Drill</b>	Yes	149	70.95	100	70.42	0.915
	No	61	29.04	42	29.57	
<b>Received Disaster-related Education Outside of Medical School</b>	Yes	82	39.04	44	30.98	0.101
	No	128	60.95	98	69.01	

\*Pearson chi-square test. \*\* Cities affected by the February 6 Kahramanmaraş earthquake (Adana, Adıyaman, Diyarbakır, Gaziantep, Hatay, Kahramanmaraş, Kilis, Malatya, Osmaniye, Şanlıurfa, Elâzığ) \*\*\* Questions that can be marked with more than one option.

Logistic regression analysis was conducted to evaluate the impact of certain characteristics of students who participated in the study and provided complete responses on the disaster awareness scale score (Table 4). The scale score was 1.88 times higher in sixth-year students compared to third-year students (95% CI 1.19-2.97, p=0.007); 1.79 times higher in those who had previously encountered earthquakes compared to those who had not (95% CI 1.07-2.99, p=0.027); and 2.25 times higher in those whose close circle had encountered disasters compared to those whose close circle had not (95% CI 1.29-3.93, p=0.005). There was no significant difference in other variables (p>0.05). It was observed that knowing disasters did not have a significant effect compared to those without knowledge.

**Table 3.** Distribution of Disaster Awareness Scores According to Some Characteristics of Students

		<b>n</b>	<b>Mean±SD</b>	<b>Median</b>	<b>Min-Max</b>	<b>p</b>
<b>Disaster Awareness Scores</b>	<b>Total</b>	338	148.4±15.3	150	71-180	-
<b>Characteristics</b>						
<b>Class</b>	3rd Year	199	146.0±16.0	148.0	71-180	<b>0.001</b>
	6th Year	139	151.1±14.0	153.0	97-177	
<b>Gender</b>	Female	185	149.6±12.4	150	108-180	0.433
	Male	152	146.3±18.3	149	71-174	
<b>Mother's Education Level</b>	Primary school or below	59	149.2±17.0	149	71-177	0.563
	Middle school	27	146.0±17.0	150	97-171	
	High school	93	149.3±15.0	151	71-180	
	University or above	159	147.4±14.9	149	87-178	
<b>Father's Education Level</b>	Primary school or below	26	153.0±11.4	150	131-172	0.525
	Middle school	28	151.0±13.2	150	119-177	
	High school	62	149.3±14.0	150	71-173	
	University or above	222	147.0±16.4	149	71-180	
<b>Location of Family Residence</b>	Earthquake-prone areas*	33	144.0±20.4	147	71-174	0.185
	Other areas	303	149.0±14.3	150	71-180	
<b>Encounter with Disasters (earthquake, flood, fire, etc.)</b>	Never	117	149.7±13.7	151	97-180	0.218
	At least once	221	147.3±16.2	149	71-178	
<b>Encounter with Earthquake</b>	Yes	199	146.8±16.7	148.0	71-178	0.109
	No	139	149.9±13.1	151.0	97-180	
<b>Encounter with Flood</b>	Yes	35	147.9±20.9	152.0	71-174	0.479
	No	303	148.1±14.7	149.0	71-180	
<b>Encounter with Fire</b>	Yes	34	148.0±20.9	150.5	71-172	0.422
	No	304	148.1±14.7	149.5	71-180	
<b>Disaster Experience in the Close Circle</b>	Yes	244	149.0±15.1	150	71-180	0.099
	No	94	146.0±16.0	147	87-173	
<b>Knowledge about disasters</b>	Yes	325	148.4±15.3	150	71-180	<b>0.025</b>
	No	13	139.9±16.8	141	97-167	
<b>Receiving Disaster Education in Medical School</b>	Yes	72	151.1±13.7	152	107-178	<b>0.048</b>
	No	266	147.2±15.7	149	71-180	
<b>Education on disaster other than medical faculty</b>	Yes	119	149.8±14.0	152	90-178	0.201
	No	218	147.2±16.1	148.5	71-180	
<b>Participation in a disaster drill</b>	Yes	238	149.7±15.3	150	71-180	<b>0.002</b>
	No	100	144.3±15.4	147	87-174	

n: frequency. SD: standard deviation. \*Provinces affected by the February 6 Kahramanmaraş earthquake (Adana, Adıyaman, Diyarbakır, Gaziantep, Hatay, Kahramanmaraş, Kilis, Malatya, Osmaniye, Şanlıurfa, Elâzığ)



**Table 4.** Logistic Regression Analysis Results to Evaluate the Impact of Some Characteristics of Students Participating in the Study on Disaster Awareness Score

	OR	%95 CI		p
		Lower Limit	Upper Limit	
<b>Class</b> 6th Year (ref.: 3rd Year)	1.88	1.19	2.97	<b>0.007</b>
<b>Encounter with Earthquake</b> Yes (ref.: No)	1.79	1.07	2.99	<b>0.027</b>
<b>Disaster Experience in the Close Circle</b> Yes (ref.: No)	2.25	1.29	3.93	<b>0.005</b>
<b>Knowledge about disasters</b> Yes (ref.: No)	3.42	1.00	11.70	0.051

\* The regression analysis was conducted using the backward LR method. The final model was reached in 4 steps. Ref.: reference. OR: odds ratio. CI: confidence interval. p: significance level

## Discussion

A total of 352 students, including 210 third-year and 142 sixth-year students, participated in this study conducted to assess the disaster awareness of medical students and the factors influencing this awareness at Ankara Faculty of Medicine.

The median score obtained by students from the scale was determined to be 150.0, with a mean score of 148.4. In the study conducted by Yakar and Dikmenli with teacher candidates, the average score of students' disaster awareness level was found to be 121.69.<sup>6</sup> In a study conducted by Tozun et al. with medical faculty students, disaster awareness levels of students were found to be high.<sup>7</sup> This situation may be attributed to medical students generally receiving comprehensive education in the field of health, as well as specific competencies gained through medical education to cope with emergencies and effectively respond to crises.

In this study, it was observed that 10.22% of the students' families resided in the regions affected by the Kahramanmaraş earthquake. It has been determined that 65.05% of the students have encountered a disaster at least once. The most common disaster encountered by the students was an earthquake (58.88%). The rate of encountering a disaster in the close circle of the students is 72.15%. In a similar study conducted by Şekerçi et al., 89% of university students had experienced an earthquake.<sup>9</sup> According to the Turkey Disaster Awareness and Preparedness Study conducted by the Disaster and Emergency Management Authority in 2014, 56.5% of participants reported having experienced an earthquake. The high percentage is a predictable outcome given Turkey's location in an earthquake zone and the frequent occurrence of earthquakes in the region.<sup>10</sup> The fact

that Turkey is located in a seismic belt and experiences frequent earthquakes indicates that these high percentages are an expected outcome.

In this study, only 21.30% of medical students reported receiving disaster education at the medical faculty, whereas participation in drills was notably high at 70.73%. However, the proportion of students who reported receiving disaster education outside of the medical faculty was 35.79%. In a study conducted with nursing students, it was reported that 20.5% participated in drills related to disasters and/or emergencies.<sup>11</sup> Additionally, Şen and Ersoy's (2017) study found that 27.1% of hospital disaster team members participated in drills.<sup>12</sup> These findings suggest that education received by the medical faculty enhances awareness and participation in practical applications. They also highlight the need to increase disaster education and drills in other healthcare disciplines.

In our study, the internet/social media and television were the most frequently used sources of information, with percentages of 95.45% and 47.44%, respectively. In a study by Avcı et al. (2020) with nursing students, it was found that 66.4% of participants preferred using the Internet as their primary source for disaster-related information, while 64.9% relied on television as a source of information.<sup>11</sup> Similarly, a study conducted with middle school students found that social media was the most commonly used source of information for disaster preparedness, with 78.8% of students relying on it.<sup>13</sup> These results indicate that students and young people frequently use accessible media such as social media and TV as information sources. The findings emphasize the need to strengthen disaster information strategies through both digital and traditional media channels.

When comparing third and sixth-semester students, although third-semester students indicated that their families had lived in areas affected by earthquakes more frequently, they had encountered disasters, especially earthquakes, more often, and had more knowledge about earthquakes, the rate of receiving disaster education in medical school was higher among sixth-semester students. The proportion of students receiving disaster education at the medical faculty is, as expected, higher among sixth-year students. There was no significant difference between the two groups in terms of participation in drills and receiving education outside of medical school.

The median scale score of sixth-semester students (153.0) is significantly higher than that of third-semester students (148.0) in both univariate and multivariate analyses. The higher level of awareness among sixth-semester students may be attributed to their completion of disaster-related lectures, as well as their opportunities to translate theoretical knowledge into practice and develop skills in emergency management. Similarly, in a study conducted by Tozun et al. among medical faculty students, it was found that the preparedness levels for disasters were higher in upper-class students compared to first-year students.<sup>7</sup>

In our study, there was no significant difference in disaster awareness between male and female students ( $p=0.433$ ). Similarly, in a study conducted by Nofal et al., the average scores of disaster and emergency preparedness knowledge did not vary according to gender.<sup>14</sup> On the other hand, Tozun et al.'s study found that disaster awareness levels were higher among women. These differing results suggest that individual knowledge and experience may be more influential than gender in determining disaster awareness.<sup>7</sup>

Students who reported receiving disaster education at the medical faculty had significantly higher disaster awareness scale scores in univariate analysis. Similarly, Ayvazoğlu et al.'s study with university students, using the 'Disaster Risk Perception and Preparedness Scale,' highlighted a significant difference between disaster risk perception levels and receiving disaster education.<sup>15</sup> Another study with university students found a significant difference between disaster awareness knowledge scores and receiving disaster education.<sup>16</sup> However, in our study, participants who took part in disaster drills had significantly higher scale scores in univariate analysis. Similarly, Şen and Ersoy's study (2017) also found that those who had previously participated in drills had significantly higher disaster awareness.<sup>12</sup> Additionally, Kapucu and Khosa's research (2013) also indicated a positive relationship between education and drills and disaster resilience and preparedness.<sup>17</sup> These findings demonstrate that disaster education and drills have a significant positive impact on individuals' disaster awareness and preparedness levels. They emphasize the critical importance of education and drills in enhancing disaster awareness and improving preparedness.

In multivariate analysis, individuals who had experienced earthquakes and those whose close circles had encountered disasters had significantly higher scale scores compared to those who had not. This may be attributed to the more devastating and traumatic effects of earthquakes compared to other types of disasters in our country. Additionally, sharing experiences of disasters within one's close circle may increase sensitivity to the issue. Research also indicates that disaster experiences serve as a primary driver for disaster awareness and preparedness.<sup>18</sup>

Our study indicates that disaster awareness among medical students, particularly among sixth-year students who received disaster education is high. Multivariate analysis revealed that disaster education, personal experience with earthquakes, and having close relatives affected by disasters were significant factors influencing awareness. These findings highlight the need for comprehensive disaster education programs that begin in the preclinical years, equipping students with the knowledge and skills to effectively prepare for and respond to disasters.

Further research should explore the long-term impact of disaster education on students' preparedness and response in real-life situations. Additionally, investigating the effectiveness of various educational methods, such as simulations or hands-on drills, can provide valuable insights for improving disaster preparedness

programs in medical education. Expanding these programs to include more diverse disaster scenarios and incorporating feedback from students can further enhance their effectiveness.

#### *Limitations*

Since the study was conducted only among students from Ankara University Faculty of Medicine in the 3rd and 6th terms, it represents only this specific group and can not be generalized to all medical faculties or other faculties. Additionally, limitations of online surveys can also impact the results.

**Ethical Considerations:** The research received approval from the Ankara University Scientific Research Ethics Committee (protocol no: 2023000442-1). Necessary permissions were obtained from the Ankara University Faculty of Medicine Dean's Office for implementation and from Assoc. Prof. Dr. Yurdal Dikmenli, the developer of the scale.

**Conflict of Interest:** The authors declare no conflict of interest.

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