

DISASTER RESPONSE SELF-EFFICACY OF MEDICAL STUDENTS AND RELATED FACTORS: A CROSS-SECTIONAL STUDY

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Received: 27.12.2023; **Accepted:** 01.11.2024; **Available Online Date:** 31.01.2025

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Cite this article as: Alçınar R, Şahin MK, Alçınar G. Disaster Response Self-Efficacy of Medical Students and Related Factors: A Cross-Sectional Study. J Basic Clin Health Sci 2025; 9: 40-47.

ABSTRACT

Purpose: The purpose of this study was to assess the self-efficacy of 4th-6th grade medical students in disaster response and to investigate the related factors.

Material and Methods: This is a cross-sectional study. The sample of the study consisted of 209 4th-6th grade medical students studying at a medical faculty in the 2022-2023 academic year. Data were collected by applying a questionnaire to 4th-6th grade medical students between April-June 2023. The questionnaire included sociodemographic characteristics, Disaster Response Self-Efficacy Scale (DRSES).

Results: : A total of 209 medical students participated in this study. The mean age of the participants was 23.4±1.3 years, and 56.4% were women. Of the participants, 84.5% had no previous training in disaster preparedness and 92.8% required training in disaster preparedness. The DRSES scores were higher among senior medical students ($p=0.001$), those who had previously received disaster response training ($p=0.005$), those who had previously participated in a disaster drill ($p=0.017$), those who felt prepared for possible disasters ($p<0.001$), those who had information about the disaster risks of the region where they lived ($p=0.003$), and those who knew the disaster assembly areas of the hospital ($p=0.023$). The DRSES score did not differ according to the sex of the participants.

Conclusion: The majority of participants needed disaster preparedness training. Self-efficacy in disaster response was higher among those who had previously received disaster response training and among final-year medical students.

Keywords: disaster medicine, medical students, self-efficacy

INTRODUCTION

Disasters are events that disrupt the order of a society, causing economic and social losses that either halt or interrupt people's daily lives and activities and deeply affect societies (1). Disasters continue to occur around the world, causing negative social and individual impacts at national and international levels (2, 3). According to the World Disasters Report, 97.6 million people were affected by disasters in 2019, and 24,396 people lost their

lives. Of the people affected by disasters, 97% were affected by climate and weather-related disasters. According to the report, the most common disasters in 2019, in order of frequency, were floods, storms, epidemics, and earthquakes (4).

Human activities are negatively affecting natural climate variations and are rapidly causing global climate change. The Mediterranean region, including Turkey, is expected to be more affected by climate change. The expected effects of global climate

change include an increase in the number and severity of disasters caused by natural hazards such as floods, fires, storms, and earthquakes; erratic precipitation; extreme heat waves; and increased frequency of epidemics. Although climate change is slow, its consequences are devastating (5).

Turkey is located on the active Anatolian plate, where major earthquakes have occurred throughout history. In the last hundred years, 269 earthquakes have occurred in Turkey, 20 of which had a magnitude greater than 7.0 on the Richter scale. The largest earthquakes in terms of loss of life and severe damage were the 2023 Kahramanmaraş, 1939 Erzincan and 1999 Gölcük centered Marmara earthquakes. Due to its location, Turkey is one of the most earthquake-prone countries in the world. On February 6, 2023, two earthquakes occurred in Turkey with epicenters in Pazarcık and Elbistan districts of Kahramanmaraş with magnitudes of 7.7 and 7.6 on the Richter scale. On February 20, 2023, an earthquake with a magnitude of 6.4 on the Richter scale occurred in Turkey with the epicenter in Yayladagi, Hatay. A total of 11 provinces were devastated by these earthquakes. In terms of severity and area affected, these earthquakes are unprecedented in recent history. In fact, more than 48,000 people lost their lives and hundreds of thousands were injured as a result of these earthquakes (6).

During disasters, the provision of health services may be disrupted and health facilities and personnel may be unable to meet the increased demand (7). In such cases, the level of disaster-related knowledge of healthcare workers becomes critical and once again highlights the importance of disaster medicine training. From the past to the present, medical students have been directly involved in patient care during large-scale events that deeply affect society, such as disasters. Medical students have participated in care and intervention during earthquakes, floods, the Spanish flu of 1918, the September 11 massacre, and many other disasters (8-12). During the 2005 H5N1 pandemic, the Royal Belgian Academy of Medicine (13) suggested that medical students could play an important role in pandemic planning, but the study showed that they were not ready (14). Although volunteers are expected to respond to disasters, we find that there is little or no training in disaster response or disaster medicine in current medical curricula worldwide (15-17). In disaster management, doctors are an important part of the workforce.

Interventions by doctors can be life-saving (17). Physicians acquire their basic professional competencies during their medical education. According to the National Core Curriculum for Pre-Graduate Medical Education, providing health care services in emergencies is one of the basic medical practices, and a general practitioner is expected to perform these practices in an emergency in accordance with the guidelines (18).

Although there are many studies in the literature evaluating the level of knowledge and awareness of healthcare professionals about disasters, the number of studies measuring medical students' self-efficacy toward disasters is quite limited. This study is one of the few studies that measured medical students' disaster self-efficacy and examined the factors that influence it.

The aim of this study was to evaluate the self-efficacy of 4th-6th grade medical students in disaster response and related factors in a medical school in Turkey.

Study questions are listed below:

- What is the disaster self-efficacy of 4th-6th grade medical students?
- What are the variables that affect the disaster self-efficacy of 4th-6th grade medical students?
- What is the self-efficacy of students trained in disaster medicine?

MATERIAL AND METHODS

Study Design and participants

This is a cross-sectional study. The study was conducted in May-June 2023 at Ondokuz Mayıs University Faculty of Medicine. Due to the earthquake, the preclinical period students switched to online education, so the population of the study consisted of 825 4th, 5th, and 6th year students of Ondokuz Mayıs University Faculty of Medicine. The inclusion criteria for this study were 4th, 5th and 6th year medical students and volunteering to participate in the study. There was no age limit for participation in the study. The sample size was calculated as 263 with 95% confidence interval ($\alpha=0.05$), 5% margin of error and 50% unknown prevalence. Taking into account the possibility of missing data, it was planned to reach a total of 289 people. Of these 825 medical students, 291 who volunteered to participate in the study comprised the sample of the study. A method of probability sampling was not used in this study.

Table 1. Characteristics of the participants

Variable	Category	n(%)
Sex	Female	164(56.4)
	Male	127(43.6)
Education year	4	132(45.4)
	5	78(26.8)
	6	81(27.8)
Previous disaster experience	Yes	31(10.7)
	No	260(89.3)
Previous family disaster experience	Yes	86(29.6)
	No	205(70.4)
Previous disaster preparedness training status	Yes	45(15.5)
	No	246(84.5)
Previous participation in a disaster drill	Yes	172(59.1)
	No	119(40.9)
Need for disaster preparedness training	Yes	270(92.8)
	No	21(7.20)
Feeling prepared for possible disasters	Yes	31(10.7)
	No	260(89.3)
Concern about possible disasters in the region where they live	Yes	249(85.6)
	No	42(14.4)
Knowledge of disaster risks in the region where they live	Yes	211(72.5)
	No	80(27.5)
Knowledge of the hospital's disaster assembly areas	Yes	43(14.8)
	No	248(85.2)

Ethical Considerations

This study was conducted according to the tenets of the Declaration of Helsinki. Ethics committee approval was obtained from the Clinical Research Ethics Committee of Ondokuz Mayıs University before the start of the study (Date:10.05.2023, Decision No: OMÜKAEK 2023/137). In addition, verbal permission was obtained from the participants.

Data Collection Tools

The mean score obtained from the DRSES were the dependent variable of the study whereas the participants' characteristics were the independent variables of the study. A questionnaire developed from a literature review was used. A pilot study was carried out with 15 participants. Afterwards, adjustments were made regarding the clarity and fluency of the questionnaire and the final version of the questionnaire was created. The questionnaire consisted of two parts. In the first part, the socio-demographic characteristics of the participants were asked. The Disaster Response Self-Efficacy Scale (DRSES) was used in the second part. The purpose of the study was explained to the participants at the

beginning of the questionnaire. The questionnaire was administered face to face.

The sociodemographic information form asked about age, gender, class, previous disaster experience, presence of someone in the family who has experienced a disaster, previous disaster preparedness training, previous participation in a disaster drill, presence of disaster preparedness training needs, feeling prepared for possible disasters, concern about possible disasters in the region where they live, knowledge of disaster risks in the region where they live, and knowledge of disaster assembly areas of the hospital where they work.

The original version of the Disaster Response Self-Efficacy Scale (DRSES) was developed by Li et al. (19) The Turkish adaptation, validity and reliability study of the Disaster Response Self-Efficacy Scale (DRSES) was conducted by Toraman et al. (20) The scale is a 5-point Likert-type scale consisting of 19 items. Each item is scored from 1 to 5 (1 = No confidence at all, 2 = Basically no confidence, 3 = Little confidence, 4 = Basically confident, 5 = Complete confidence). Higher scores indicate higher self-efficacy in disaster response. In this study, the

Table 2. Students' responses to the DRSES

Variable	No confidence at all	Basically no confidence	Little confidence	Basically confident	Complete confidence
	n(%)	n(%)	n(%)	n(%)	n(%)
1. Debridement, hemostasis, bandaging and immobilization	36(12.4)	56(19.2)	125(43.0)	59(20.3)	15(5.20)
2. Lifting/Transportation	25(8.60)	48(16.5)	90(30.9)	99(34.0)	29(10.0)
3. Transferring	23(7.90)	57(19.6)	99(34.0)	86(29.6)	26(8.90)
4. Techniques for emergency rescue	35(12.0)	67(23.0)	110(37.8)	66(22.7)	13(4.50)
5. Intensive care of critical patients	91(31.3)	104(35.7)	79(27.1)	11(3.80)	6(2.10)
6. Communicable disease prevention and control in the disaster area	40(13.7)	86(29.6)	106(36.4)	48(16.5)	11(3.80)
7. Initial psychological assessment of disaster victims	39(13.4)	64(22.0)	111(38.1)	67(23.0)	10(3.40)
8. Recognize common post-disaster psychiatric and psychological problems such as post-traumatic stress disorder, depression, and anxiety.	24(8.20)	50(17.2)	97(33.3)	99(34.0)	21(7.20)
9. Provide basic psychological treatment to disaster victims	38(13.1)	70(24.1)	120(41.2)	51(17.5)	12(4.10)
10. Referral of disaster victims in need of psychological and psychiatric treatment in the disaster area	20(6.90)	44(15.1)	88(30.2)	118(40.5)	21(7.20)
11. Identifying the damage caused by the disaster	42(14.4)	72(24.7)	95(32.6)	72(24.7)	10(3.40)
12. Accurately and quickly identify injuries	14(4.80)	54(18.6)	113(38.8)	99(34.0)	11(3.80)
13. Assess post-disaster outbreaks such as infectious diseases or acute poisonings	25(8.60)	69(23.7)	118(40.5)	74(25.4)	5(1.70)
14. Identify vulnerable populations such as the chronically ill or disabled	13(4.50)	48(16.5)	94(32.3)	113(38.8)	23(7.90)
15. Triage techniques	20(6.90)	65(22.3)	106(36.4)	81(27.8)	19(6.50)
16. Regulate own psychological state and adapt quickly to the work environment	17(5.80)	23(7.90)	78(26.8)	115(39.5)	58(19.9)
17. Good communication and cooperation with other team members	13(4.50)	9(3.10)	49(16.8)	143(49.1)	77(26.5)
18. Communicate effectively with victims and their families and establish a good patient-doctor relationship	14(4.80)	11(3.80)	60(20.6)	143(49.1)	63(21.6)
19. Adhere in a humane, fully empathetic and loving manner to professional ethical principles.	12(4.10)	11(3.80)	41(14.1)	141(48.5)	86(29.6)

Cronbach's alpha value of the DRSES scale was 0.91.

Statistical analysis

The data were analyzed using IBM SPSS Statistics, version 21.0. Categorical data were expressed as

numbers and percentages. Continuous variables were expressed as mean±standard deviation. The chi-squared test was used to compare categorical data. Data distribution was evaluated by tests and graphs. Independent samples t-test and ANOVA were used to compare continuous variables with

Table 3. The relationship between participant characteristics and DRSES score

Variable	Category	DRSES score	
		Mean±SD	p*
Sex	Female	59.49±11.83	0.591
	Male	58.72±12.74	
Education year	4	56.77±11.61 ^a	0.001
	5	59.13±12.45 ^{ab}	
	6	63.06±12.11 ^b	
Previous disaster experience	Yes	62.68±13.66	0.090
	No	58.73±12.00	
Previous family disaster experience	Yes	60.33±12.84	0.290
	No	58.66±11.95	
Previous disaster preparedness training status	Yes	63.89±12.60	0.005
	No	58.29±11.97	
Previous participation in a disaster drill	Yes	60.58±11.94	0.017
	No	57.10±12.38	
Need for disaster preparedness training	Yes	58.92±12.22	0.245
	No	62.14±12.16	
Feeling prepared for possible disasters	Yes	66.87±12.43	<0.001
	No	58.23±11.89	
Concern about possible disasters in the region where they live	Yes	59.23±12.44	0.791
	No	58.69±10.93	
Knowledge of disaster risks in the region where they live	Yes	60.46±11.93	0.003
	No	55.70±12.37	
Knowledge of the hospital's disaster assembly areas	Yes	63.07±11.22	0.023
	No	58.48±12.28	

a-b: No significant difference between similar letters in categories in the same column.

* Independent samples t-test for two groups and ANOVA for groups of three or more.

normal distribution. $p < 0.05$ was considered statistically significant.

RESULTS

A total of 291 medical students were participants in this study. The mean age of the participants was 23.4 ± 1.3 years. Of the participants, 56.4% were female and 45.4% were 4th year students. Of the participants, 89.3% had never experienced a disaster, 84.5% had never received disaster preparedness training, 40.9% had never participated in a disaster drill, 92.8% needed disaster preparedness training, and 89.3% did not feel prepared for possible disasters (Table 1).

The least confident items on the disaster response self-efficacy scale were "providing intensive care to critically ill patients" with 67.0%, "preventing and controlling infectious diseases in the disaster area" with 43.3%, and "assessing the damage caused by the disaster" with 39.1%. The most confident items on the disaster response self-efficacy scale were "adhere to professional ethical principles in a

humane, fully empathetic and loving manner" at 78.1%, "establish good communication and cooperation with other team members" at 75.6%, and "communicate effectively with victims and their families and establish a good patient-doctor relationship" at 70.7% (Table 2).

The mean DRSES score of the participants was 59.15 ± 12.21 . When the DRSES scores of the students were compared, the DRSES scores of the senior students were higher ($p = 0.001$). The DRSES scores of students who had previously received any disaster preparedness training were higher ($p = 0.005$). The DRSES scores of students who had previously participated in a disaster drill were higher ($p = 0.017$). The DRSES scores of participants who felt prepared for possible disasters were higher ($p < 0.001$). The DRSES scores of the participants who had information about the disaster risks of the region where they lived were higher ($p = 0.003$). The DRSES scores of the participants who knew the disaster assembly areas of the hospital where they worked were higher ($p = 0.023$). The DRSES scores of the

participants did not differ according to gender, previous disaster experience, previous disaster experience in the family, need for disaster preparedness training, and concern about possible disasters in the region where they lived (Table 3).

DISCUSSION

As the global climate crisis worsens by the day, the occurrence of disasters caused by natural hazards is inevitable (5). Since the place and time of disasters caused by natural hazards cannot be predicted in advance, physicians in the disaster area should take the lead in providing medical services until official help arrives. In mass casualty disasters, help is expected from all organizations not affected by the disaster. Therefore, physicians are expected to participate in disaster health care regardless of their specialty (21). Unfortunately, physicians who are not trained in disaster medicine may not be able to work efficiently.

In this study, 10.7% of the participants reported having experienced a disaster situation, while 42.9% of the participants reported having experienced a disaster situation in the study conducted by Demiray et al. (22) with 6th grade medical students. In the studies conducted by Yiğit et al. (23), Şekerci et al. (24), these rates were 52.8% and 53.4%, respectively. In these studies, which were conducted in different parts of Turkey at different times and in different regions, the difference in disaster experience may be related to the diversity and frequency of disasters occurring in different geographical areas of the country.

In this study, 15.5% of 4th-6th grade medical students reported receiving disaster medicine training. In a study by Demiray et al. (22) of 6th grade medical students, 59.2% of the participants reported receiving disaster training. The reason for the low rate in this study may be the presence of 4th and 5th grade students in the sample group.

In this study, 40.9% of participants reported that they had not participated in a disaster drill. In studies conducted among health professionals, more than half of the participants reported that they had not participated in any disaster drills or courses (25-27). The reason why this rate was lower in this study may be that disaster medicine education in medical school is higher than other health personnel education.

In this study, 89.3% of the participants reported that they did not feel prepared for possible disasters. In the studies of Yiğit et al., Arslan et al., and Demiray

et al., 78.8%, 88.2%, and 89.2% of the students, respectively, did not feel prepared for possible disasters (22, 23, 28). The rate of students who did not feel prepared for disasters was found to be consistent with the literature.

In this study, the majority of medical students reported that they had not received any training in disaster preparedness and that they needed training in disaster preparedness. Similar to this study, Ragazzoni et al. found that most students did not attend any academic or non-academic courses on disaster medicine and that they wanted a course on disaster medicine to be added to their curriculum (29). In this study, the mean DRSES scores of the participants were similar to the study of nursing students by Yıldız et al. (30). Yıldız et al. (30) and Demiray et al. (22) found a significant increase in the mean DRSES score after disaster medicine training. In the study of Demiray et al. (22), the mean DRSES scores of final year medical students before receiving disaster medicine training were similar to this study. There are previous studies indicating that disaster medicine is inadequately covered in medical school curricula (21, 29, 31). Therefore, there is a need for more research on medical student self-efficacy in disaster response.

In this study, final year medical students were found to be more confident in disaster response than the other two years. This may be due to their increased experience in medicine with more patient care in clinical settings in the final year.

This study found that participants who had previously received disaster preparedness training or participated in disaster drills were more confident in responding to disasters. A systematic review by Ashcroft et al. found that implementing disaster education programs for medical students improves medical students' preparedness, knowledge, and skills in disaster situations (32). This study showed that medical students who felt prepared for disasters were more confident in responding to disasters. We believe that student-centered, interactive practical and theoretical disaster medicine training will significantly contribute to students' self-efficacy. Thus, medical students who feel prepared for disasters can play a greater role in disaster health care.

Limitations

The most important limitation of this study is that it was conducted only with 4th, 5th and 6th year

students of a medical faculty because the preclinical period students switched to online education due to the earthquake that occurred during the study period. Therefore, it may not be representative of all medical students in Turkey. Another limitation of this study is that one of the probability sampling methods was not the choice.

CONCLUSION

Most of the students who participated in this study did not receive disaster preparedness training during their medical school programs and did not feel prepared for disasters. However, the participants needed training in disaster response and wanted to increase their knowledge in this area. Students would welcome more applicable courses on disaster medicine in the standard medical curriculum in Turkey. Further studies are needed to investigate how prepared medical students, the future physicians, are to respond to disasters.

Acknowledgements: We are grateful to the medical students who participated in this study.

Author contribution: Concept – RA, MKŞ, GA; Design – RA; Supervision – RA, MKŞ; Fundings – RA, GA; Materials – RA, GA; Data Collection and/or Processing – RA, MKŞ, GA; Analysis and/or Interpretation – RA, MKŞ; Literature Review – RA, MKŞ, GA; Writing – RA, MKŞ, GA; Critical Review – RA, MKŞ, GA.

Conflict of interests: No conflict of interest was declared by the authors.

Ethical approval: Our study was approved by the Clinical Research Ethics Committee of Ondokuz Mayıs University before the start of the study (Date:10.05.2023, Decision No: OMÜKAEEK 2023/137). In addition, verbal permission was obtained from the participants.

Funding: The authors declare that this study received no financial support.**Peer-review:** Externally peer-reviewed.

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