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Factors Affecting the Self-efficacy, Self Competency, and Willingness of Medical Students in Disasters

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Abstract

Aim: During times of disasters, healthcare professionals often face pressure and need additional support in care areas. This study assesses the potential role of medical students in disaster response and the influencing factors, including their involvement in the TEAMS project.

Materials and Methods: An observational survey-based study was conducted at a university to assess the motivation and competency of undergraduate students toward disaster response. To collect data, the questionnaire was distributed using Google Forms. The homogeneity of items in the subscales of the questionnaire was evaluated using Cronbach's alpha, and the questionnaire results were compared with the categorical variables using the t-test.

Results: TEAMS participants demonstrated a higher level of competence in trauma care and drug/injection administration ($p<0.05$). Individuals who received disaster training exhibited increased competency in triage, trauma care, drug/injection administration, patient follow-up, and psychological support ($p<0.05$). Sixth-year students feel more proficient in trauma care, psychological support, community health services, and public relation work.

Conclusion: Students are willing to contribute to disaster relief efforts, but their motivation is enhanced when they feel psychologically and medically prepared. Active involvement in disaster training programs plays a significant role in increasing students' competence.

Keywords: Disaster medicine, disaster preparedness, volunteering, disaster management

Introduction

Healthcare workers play a crucial role in disaster management, and their decisions can have a significant impact during emergencies. However, in countries where disaster management education is inadequate, medical professionals may lack the necessary expertize knowledge, and preparedness to manage disasters effectively, potentially leading to further escalation (1). During disasters, qualified healthcare workers, including doctors, registered nurses, health technicians, and emergency medical technicians, may be under immense pressure, necessitating assistance in areas beyond direct patient care. Hence, the demand for volunteer workers during disasters is becoming increasingly pertinent and debated. The potential contribution of medical school students to disaster response has been discussed in the literature, especially during events such as the Coronavirus disease-2019 pandemic (2). In countries such as Turkey, where hospitals are frequently overcrowded (3), medical students can provide valuable support, particularly since medical faculties are usually located close to hospitals (4,5). These students can respond rapidly to emergency calls, given the flexible nature of their daily responsibilities. With adequate training, they can perform specific roles as part of a team (6). However, minimal education is provided in medical schools on disaster management, and students may lack the general knowledge required to competently manage such roles. Therefore, infrastructure development and provision

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of education and training are necessary to ensure that students are adequately prepared to perform these roles safely (7).

The TEAMS project, funded by the European Union Humanitarian Aid and Civil Protection, aims to develop a standardized, cost-effective training package focused on operational team training for emergency response teams, pilot implementation, and evaluation. In a pilot study conducted in Turkey between August 2 and 7, 2022, medical students participated as role players, facilitators, interpreters, and observers in functional and tabletop exercises simulating disasters.

In this study, we aimed to evaluate the willingness of medical students to respond to disasters, the roles they prefer to be assigned to, and the factors that influence their decision-making, including their participation in the TEAMS project.

Materials and Methods

A cross-sectional quantitative observational survey-based study was conducted to assess the motivation and attitude of undergraduate students in their fifth or sixth semester regarding disaster response at a İstanbul Medeniyet University. The Institutional Review Board of the İstanbul Medeniyet University approved the study, and the medical college's administrative division also consented to the participation of medical students. The participants were contacted via phone, WhatsApp, and personal mail addresses and were provided with a consent form to acknowledge their willingness to participate in the study. All undergraduate students in the fifth and sixth semesters İstanbul Medeniyet University's Faculty of Medicine were included in the study without any exclusion criteria.

Study Questionnaire

For our research, the survey questions were developed on the basis of a review of relevant literature (8-13). The survey questions presented here have been rated using a Likert scale, where zero denotes strong disagreement and five denotes strong agreement. In this study, fifteen questions were prepared for students to self-assess their readiness to participate in disaster relief efforts, while 25 questions evaluated the factors that influence their volunteering decisions across different disaster scenarios. Furthermore, the study investigated the students' preferences regarding the specific hospital departments where they would like to volunteer during a disaster, as well as the areas where they perceive themselves to be competent. The relationships between volunteering behavior, self-perceived competency, and demographic variables such as semester, age, gender, dependent status, and prior participation in disaster education were also examined. The questionnaire was disseminated using Google Forms.

The question, "What are the potential barriers to volunteerism in disaster response from your perspective?" was designed to elicit open-ended responses to determine obstacles that could discourage students from volunteering during crises. Answers to this open-ended inquiry were meticulously coded and input into an anonymous database for examination using Stata 11, a software product from Stata Corp. College Station, TX, USA.

The collected narratives were subjected to independent review and compilation via a qualitative thematic framework undertaken by the research team members. As emerging results were identified, they were deliberated upon, and themes were negotiated and agreed to. The research team, which was composed of emergency medicine professionals, validated the interpretations.

Roles of Students in the TEAMS 3.0 Project

As part of Turkey's contribution to the TEAMS 3.0 project, students assumed various roles in different emergency response scenarios. For instance, in the mass casualty response scenario, students functioned as patients and visited a field hospital following an aftershock. In the biological agent response scenario, they played the roles of both a sample patient and a patient's family member. Furthermore, in planning the exit scenario, they assumed the role of a journalist (14).

During the project's training of the trainee segment, students participated in courses on the importance of team roles in disasters, field hospital setup, mass casualty management, triage, and ethical issues in disasters. In addition, as part of this international project, students also took on administrative tasks, such as English-Turkish translation and assisting trainers.

The research was submitted to the Clinical Research Ethics Committee at University of Health Sciences Turkey, İstanbul Medeniyet University, Göztepe Training and Research Hospital and approved under decision number: 2022/0760, date: 21.12.2022.

Statistical Analysis

The data obtained from the surveys that were distributed using Google Forms were analyzed using the Statistical Package for Social Sciences (SPSS) (SPSS 26; IBM Inc., Chicago, IL, USA). The categorical variables were expressed as frequencies and percentages, and the chi-square test was used to analyze them. The homogeneity of items in the subscales of the questionnaire was evaluated using Cronbach's alpha, and the questionnaire results were compared with the categorical variables using the t-test. A p value of 0.05 was considered statistically significant.

Results

In this study, 172 participants, consisting of 71 (41.3%) males and 101 (58.7%) females, participated. The mean age of the participants was found to be 23.59±2.088. Of the total participants, 55 (32.0%) were from the fifth semester, while 117 (68.0%) were from the sixth semester. Additionally, 17 participants (9.9%) reported attending disaster courses, whereas 38 participants (22.1%) reported participating in the TEAMS project. Furthermore, 59 participants (34.8%) reported receiving disaster education during their medical studies.

Moreover, 55 participants (32%) reported having a dependent individual in their family. Thirty students participated in the TEAMS project as role models, focusing on topics such as mass casualties and Severe acute respiratory syndrome, while eight students served in administrative roles such as facilitators and translators, aiding the trainers.

Tables 1, 2, and 3 provide an overview of the factors that affect students' self-assessment, motivation, and willingness and selection of hospital areas to intervene in natural disasters, mass casualty incidents, and pandemic outbreaks.

Self-reported competency and their preferred work areas, as well as the factors that influence self-supported competency.

Participants in the TEAMS training felt more competent in trauma care and drug/injection administration ($p<0.05$) compared to those who were not. Those who received disaster training felt more competent in triage, trauma care, drug/injection administration, patient follow-up, and psychological support ($p<0.05$). Males felt more competent in critical care ($p<0.05$), whereas sixth-semester students felt more competent in trauma care, psychological support, community health services, and public relations work.

Table 1. Factors effecting self-competency of medical students in disaster response

	Sex	Semester	Disaster education	TEAMS' Project participation	Dependent person in household	Mean±SD	Cronbach
I can identify the relative damage caused by the disaster	**0.04**	0.547	**0.000**	**0.001**	0.059	3.01±0.98	0.896
I can assess wounds accurately and quickly	**0.031**	0.115	**0.001**	**0.010**	0.149	3.21±0.91	0.895
I can assess epidemic situations such as infectious diseases or acute poisoning that may occur after a disaster	0.121	0.064	**0.001**	**0.000**	0.056	2.82±0.98	0.897
I can recognize vulnerable groups such as chronically ill and disabled people	0.442	0.964	**0.013**	**0.048**	0.090	3.82±0.83	0.902
I can perform triage	0.155	0.109	**0.003**	**0.007**	0.218	3.64±0.92	0.899
I can perform debridement, hemostasis, bandaging and splinting/limb fixation	0.134	0.096	**0.050**	**0.044**	**0.035**	3.31±1.10	0.899
I can lift the wounded at the moment of transfer	**0.000**	0.347	0.213	0.169	**0.018**	2.90±1.22	0.901
I can transport the wounded	**0.002**	0.928	0.058	0.085	**0.003**	2.98±1.07	0.895
I can apply emergency rescue techniques	**0.004**	0.241	**0.002**	0.034	**0.003**	3.20±1.03	0.897
I can do intensive care and patient care of critically ill patients	0.121	0.585	**0.003**	0.054	0.053	2.46±0.97	0.898
I can prevent and control infectious diseases in the disaster area	0.984	0.050	**0.000**	0.000	**0.046**	2.80±1.04	0.900
I can quickly adapt to the work environment by adjusting my own psychological state	**0.001**	0.993	**0.011**	0.101	**0.006**	3.44±1.10	0.904
I can communicate with other team members to create a good collaborative relationship	0.173	0.633	0.171	0.734	**0.010**	4.07±0.85	0.904
I can communicate effectively with disaster survivors and their relatives and create a good provider-patient relationship	0.990	0.610	0.480	0.835	0.228	3.76±0.92	0.901
I can comply with professional ethical rules with a humane approach, empathy and love	0.548	0.675	0.529	0.857	0.116	4.22±0.84	0.907
P1 Total							0.0906

SD: Standard deviation

Students who feel competent in triage, patient follow-up, and community health prefer to work in triage; those who feel competent in trauma care and drug/injection administration prefer to work in the emergency room; and those who feel competent in trauma care prefer to work in the ambulance ($p<0.05$). Those who felt competent in triage, trauma care, critical care, drug/injection administration, patient follow-up, and porter work preferred to work in the trauma area ($p<0.05$), whereas those who felt competent in-patient follow-up and critical care preferred to work in the critical care area ($p<0.05$). Those who

Table 2. Factors effecting the medical student's willingness to disaster response

	Sex	Semester	Disaster education	TEAMS Project participation	Dependent person in household	Mean±SD	Cronbach
I am willing to join Natural Disasters response If..							
I know my family is safe and cared for	0.432	0.524	0.724	0.811	0.816	4.39±0.92	0.783
I am confident that good lines of communication with my family are in place	0.376	0.528	0.849	0.616	0.512	4.36±0.90	0.777
And if my supervisor works with me	0.084	0.628	0.206	0.278	0.635	4.32±0.86	0.790
I receive appropriate training to deal with the situation	0.383	0.203	0.357	0.308	0.594	4.57±0.68	0.800
I receive regular updates on the progress of the case.	0.286	0.457	0.379	0.110	0.505	4.35±0.84	0.797
I get paid extra for it	**0.012**	0.961	0.972	0.252	**0.015**	3.18±1.33	0.860
Transportation will be provided	0.305	0.753	0.932	0.466	0.464	4.12±1.07	795
							0.846
I am willing to join Natural Disasters response If..							
I know my family is safe and cared for	0.502	0.223	0.929	0.992	0.450	4.26±1.02	0.856
I am confident that good lines of communication with my family are in place	0.229	0.159	0.375	0.347	0.657	4.25±0.92	0.856
My supervisor plays with me	0.052	0.238	0.395	0.120	0.773	4.24±0.95	0.863
I am trained to deal with the situation	0.548	**0.033**	0.937	0.747	0.874	4.33±0.91	0.855
I receive regular updates on the progress of the case	0.617	0.353	0.832	0.576	0.310	4.31±0.89	0.856
Adequate personal protective equipment is provided.	0.459	0.148	0.844	0.769	0.159	4.15±1.13	0.873
I get paid extra for it	0.320	0.667	0.926	0.207	0.710	3.62±1.22	0.875
I can get antivirals (e.g., Tamiflu) for free.	0.299	0.830	0.803	0.420	**0.032**	3.91±1.16	0.861
I can get my vaccinations for free	0.954	0.164	0.500	0.199	0.966	4.09±1.15	0.864
							0.883
I am willing to join Natural Disasters response If..							
I know my family is safe and cared for	0.782	0.678	0.760	0.754	0.919	4.24±1.10	0.822
I am confident that good lines of communication with my family are in place	0.631	0.752	0.499	0.163	0.389	4.22±1.08	0.814
And if my supervisor works with me.	0.554	0.769	0.612	0.934	0.327	4.23±0.98	0.815
I am trained to deal with the situation.	0.788	0.111	0.291	0.916	0.672	4.35±0.96	0.816
I receive regular updates on the development of the incident.	0.418	0.305	0.817	0.634	0.574	4.25±0.98	0.818
I am provided with adequate personal protective equipment.	0.844	0.166	0.688	0.719	0.092	4.03±1.19	0.838
I am paid extra for it	0.223	0.075	0.685	0.269	0.861	3.50±1.38	0.886
Transportation will be provided	0.924	0.746	0.458	0.645	0.297	3.73±1.29	0.854
							0.870

SD: Standard deviation

Table 3. Factors affecting the preferred work area of students during disasters

	Sex			Semester			Dependent person in the family			Disaster training			TEAMS training		
	Male	Female	p	5	6	p	No	Yes	p	No	Yes	p	No	Yes	p
Area															
Emergency room	44	51	0.091	26	69	0.101	78	17	0.558	53	42	**0.002**	69	26	**0.047**
Wards	43	62	0.519	35	70	0.380	87	18	0.428	68	37	0.438	83	22	0.394
Ambulance	9	11	0.449	8	12	0.281	19	1	0.088	11	9	0.320	14	6	0.260
No	4	7	0.496	3	8	0.510	7	4	0.113	8	3	0.441	8	3	0.454
Triage	26	44	0.225	24	46	0.354	57	13	0.515	46	24	0.565	53	17	0.347
Clinical work															
Triage	33	43	0.362	30	46	**0.044**	61	15	0.373	51	25	0.428	61	15	0.318
Trauma	41	51	0.181	31	60	0.324	74	17	0.485	57	34	0.231	69	22	0.304
Critical care	15	15	0.193	13	17	0.107	26	4	0.329	15	15	**0.039**	20	10	0.085
Drug injection	19	37	0.116	22	34	0.106	51	5	**0.022**	35	21	0.327	42	14	0.326
Patient follow-up	35	55	0.281	30	60	0.429	73	17	0.472	57	33	0.262	72	18	0.358
Psychological support	21	44	**0.044**	12	53	**0.002**	53	12	0.531	37	28	**0.043**	48	17	0.208
Community health	18	26	0.550	10	34	0.089	36	8	0.568	23	21	**0.024**	27	17	**0.003**
No clinical support				3	7	0.597	6	4	**0.046**	7	3	0.532	7	3	0.386
Workspace															
Does not want to work	4	6	0.603	6	13	0.596	13	6	0.098	12	7	0.495	13	6	0.217
Ward	49	77	0.190	42	84	0.331	106	20	0.181	85	41	0.265	102	24	0.085
Urgent care	49	55	**0.038**	33	71	0.531	85	19	0.543	64	40	0.104	79	25	0.285
Intensive care support	23	12	**0.001**	17	18	**0.017**	31	4	0.188	24	11	0.425	30	5	0.154
Administrative support															
Patient registration	37	62	0.146	35	64	0.174	82	17	0.443	62	37	0.205	74	25	0.164
Public relations	35	41	0.165	21	55	0.178	62	14	0.529	45	31	0.076	57	19	0.263
Administrative record	29	36	0.297	21	44	0.536	55	10	0.313	36	29	**0.020**	44	21	**0.011**
Porter	25	27	0.153	19	33	0.251	46	6	0.105	34	18	0.544	40	12	0.492
No administrative support	8	19	0.129	9	18	0.516	20	7	0.184	21	6	0.109	22	5	0.320
	71	101		55	117		141	31		113	59		134	38	

feel competent in psychological support and community health services prefer to work in the psychosocial area ($p<0.05$).

Quantitative Analysis

The students were asked about barriers in their volunteering for disaster response, and the answers given were thematized and presented. "Seventy-six students have responded, and 85 different ideas have been proposed".

Barriers to Volunteering

1. Medical Knowledge and Preparedness (n=29)

Sample Answer

"The theoretical information given during the training we received is sufficient, but practical training is insufficient, and disaster response is a field that requires a lot of experience and quick decisions".

2. Psychological Factors and Preparedness (n=22)

a. Known chronic psychological illness (n=6)

b. Personality traits (n=3)

c. Lack of psychological training (n=2)

d. Self-confidence (n=4)

e. Lack of motivation (n=4)

Sample Answer

"Lack of information and lack of psychological support is the biggest factor. In other words, I do not feel that I am in a good

enough psychology to be cold-blooded in that environment if a major incident occurs. To have that psychology, it is necessary to receive continuous training. I could have prepared myself in that way."

3. Family- and Personal-related Problems (n=31)

a. Family-related problems (n=20)

i. Safety issues (n=14)

ii. Communication issues with family (n=6)

b. Personal safety (n=9)

c. Inability to allocate time (n=2)

d. Facilities-Funding (n=14)

i. Hospital equipment problems (n=2)

ii. Transport (n=8)

iii. Funding (n=4)

4. Volunteering Related (n=7)

a. Ignorance (n=5)

b. Underappreciation (2)

Sample Answer

"I think I won't get the value and reputation you deserve when you volunteer".

"The idea of getting in the way of situations that more educated people can manage, the lack of a sense of professional competence may prevent me".

5. Intervention Related (n=6)

a. Fear of wrong intervention (n=5)

b. Avoiding legal proceedings (n=1)

Discussion

In disaster situations, the responsibilities of licensed healthcare professionals, such as physicians, nurses, and auxiliary staff, are clearly defined according to their certifications, whereas the role of medical students is less clear.

Student Competence Training and Preparation

In our study, involvement in the TEAMS project was also associated with competence in various disaster skills. Overall, it is encouraging to see that simulations and other experiential learning activities are being used to enhance medical education and improve patient care. These approaches can help bridge the gap between theory and practice and provide opportunities for learners to apply their knowledge and skills in a realistic setting. In a previous study where students functioned as standardized patients during clinical training, all participating interns reported that the activity was both meaningful and educational, either by indicating "agreed" or "strongly agreed". Moreover, 90% of these interns stated that the experience would impact their clinical practice during their first year. These positive results have been consistently observed over time, as demonstrated by a follow-up survey of second-year residents one year later. Specifically, 90% of the residents stated that the activity was meaningful and educational, and 75% reported that the experience had influenced their clinical practice (15). In another standardized patient study, the interns expressed a highly favorable outlook toward the simulation, acknowledging its value in reinforcing the knowledge and skills they had acquired. They highlighted the significance of the post-exercise focus group discussions in solidifying their understanding of the exercise's key concepts and experiences (16).

In our study, students who participated in elective disaster courses or external training programs felt more competent. Preparedness and competence are critical for healthcare professionals during extraordinary events, such as disasters, as they enable them to assume managerial roles and perform their duties professionally (17). Medical schools should consider incorporating disaster medicine and emergency management elements into their required or elective curricula. Completing all or a defined portion of this coursework could become a prerequisite for participation in hospital, clinic, or community response efforts (18). The findings in the literature indicate the importance of healthcare colleges for building students' knowledge, attitudes, and readiness to practice disaster medicine and preparedness before joining the profession (19).

Barriers to Volunteering

Several factors can impact an individual's inclination to participate in volunteer work, including previous training and emergency volunteer experience, perception of the experience's value, belief in duty, financial stability, and access to personal protective equipment. Recruitment of volunteers is a significant challenge, as evidenced by previous emergency planning experience. However, medical students exhibit a keen interest in stepping up to fill this gap, provided that they receive adequate training (9).

Our research has revealed that the primary factors influencing voluntarism are family safety and previous education, whereas financial factors such as salary or transportation exert a minor effect on willingness. These findings underscore the critical role of imparting the necessary knowledge and skills to students

to enhance their self-assurance and ensure the security of their families when soliciting their involvement in volunteer activities. Thus, when developing plans, it is crucial to consider these factors. Moreover, it is imperative to ensure that volunteer students are psychologically prepared for the task at hand.

Locations where students want to work during disasters in hospitals.

In fact, during disasters or public health emergencies, hospitals often need additional personnel to help manage the increased demand for healthcare services. Along with medical aid, medical students can provide administrative support by performing tasks such as answering phone calls, scheduling appointments, and maintaining patient records. In addition, they can assist with coordination, such as ensuring the timely delivery of medical supplies and equipment.

In many cases, medical students may not have direct patient care responsibilities during disasters, but their administrative support roles can still make a significant contribution to the overall healthcare response. By taking on administrative tasks, medical students can help healthcare professionals focus on providing direct care to patients.

In our study, students expressed no hesitation about performing tasks such as transporting patients as part of their duties, and their willingness to participate in a particular area was found to be related to their perceived competency in that area.

Study Limitations

This study is not without limitations, which should be considered when interpreting the results. First, the sample size may not be representative of the wider population, and the findings may not be generalizable. Therefore, caution should be exercised when applying the results to other contexts or populations. Second, the study relied on self-reported data, which may be subject to biases and inaccuracies. It is possible that participants may have overestimated or underestimated their level of competency or motivation. Third, it should be acknowledged that each generation of medical students may have various levels of motivation and willingness to participate in disaster relief efforts. Therefore, it is recommended that similar studies be conducted at regular intervals, such as every five years, to ensure continuity and keep up to date with changes in students' attitudes and perceptions toward disaster response.

Conclusion

Our study demonstrates that students are willing to participate in disaster relief efforts, but they must feel psychologically and medically prepared to increase their motivation. It was found that even actively participating in disaster training programs as trainees or role-players and being in the training environment itself made students feel competent and increased their motivation.

Ethics

Ethics Committee Approval: The research was submitted to the Clinical Research Ethics Committee at University of Health Sciences Turkey, İstanbul Medeniyet University, Göztepe Training and Research Hospital and approved under decision number: 2022/0760, date: 21.12.2022.

Informed Consent: Prior to study, all patients were informed about the nature of the study and a written informed consent was obtained.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: G.A.S., K.A., B.A., Concept: G.A.S., G.T.V., K.A., M.K., Design: G.A.S., G.T.V., B.A., Data Collection or Processing: G.A.S., K.A., M.K., Analysis or Interpretation: G.A.S., G.T.V., K.A., B.A., M.K., Literature Search: G.T.V., B.A., M.K., Writing: G.A.S., G.T.V.

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