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Factors Affecting Nurses' Disaster Preparedness in Türkiye: A Cross-Sectional Study

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Abstract

Objective: It is of critical importance to determine the factors that contribute to nurses' disaster preparedness. This study aimed to examine nurses' perceptions of disaster preparedness and the factors affecting it.

Methods: This descriptive study was conducted with 464 nurses working in the East Marmara region of Türkiye. The data were collected online using the "Personal Information Form," "The Scale of Perception of Disaster Preparedness on Nurses," and the "Adult Motivation Scale." Linear regression analysis was used to analyze the influencing factors.

Results: It was found that nurses possessed a high level of perceived disaster preparedness, influenced by individual disaster preparedness, status of receiving disaster-related training, willingness to respond in the case of a disaster, disaster plan awareness, experience with caring for disaster victims, extrinsic motivation, and general motivation.

Conclusions: The results of the study offer evidence that can be implemented by managers and educators to better prepare nurses for disasters. Hospital administrators and policy makers should consider the factors affecting nurses' perception of disaster preparedness to develop solutions for such disasters.

All communities are at risk of emergencies and disasters, including those associated with hazards related to nature and technology, infectious disease outbreaks, conflicts, and climate change. Factors such as climate change, distorted urbanization, population growth, migration, and state fragility increase the frequency, severity, and impact of various emergencies across the globe.¹ According to the records of the Emergency Events Database (EM-DAT), an increase in the number of global disaster events and major financial losses left its mark in 2021.² Therefore, implementation of a disaster management strategy designed to manage the possible adverse effects of disasters is essential.³

The health-care sector plays a critical role in preventing and minimizing the health-related consequences of emergencies caused by all types of hazards.¹ Because nurses constitute the vast majority of the health-care workforce, they are widely reported to play important roles at all stages of disasters.^{4–7} Issues related to nurses' disaster preparedness and response competence levels, knowledge, and skills have attracted attention throughout the history of nursing.⁸ The International Council of Nurses (ICN) and World Health Organization (WHO) have emphasized the important role that nurses play in disasters and emergencies and have identified the knowledge, skills, and abilities that nurses should possess at each stage of a disaster (ie, mitigation, preparedness, response, and recovery).⁵ Each competency constitutes an important component of disaster management processes. However, preparedness is the stage most vital to reducing the impact of disasters.^{5,7} Disaster preparedness refers to all action plans and efforts to establish a disaster response system before a disaster occurs.⁹ Effective preparedness increases community resilience by shortening the time required to overcome a disaster and facilitating a timely and effective response to a disaster event.¹⁰ As such, the success of disaster management depends on disaster teams' preparedness and full understanding of their role before participating in a disaster.¹¹ Therefore, nurses must be well prepared and have adequate knowledge of effective disaster response.^{6,12} However, it is reported that nurses encounter various difficulties at all stages of disaster management. One systematic review revealed that 1 of the biggest challenges in disaster response is nurses' ability to achieve the required level of preparedness to effectively perform their roles.¹³ Studies show that nurses are often not adequately prepared to cope with disaster-related responsibilities.^{6,14–17} Factors such as training programs, previous disaster response experiences, work experience, self-regulation, participation in disaster simulation trainings, educational status, and perceived health-care environment have been reported to have an impact on nurses' disaster preparedness.^{6,12,18} However, research on nurses' level of preparedness and the factors affecting it is limited.^{6,13}

In Türkiye, hazards and/or threats that cause disasters, particularly earthquakes, are frequently encountered due to its geological structure, topography, and climate.¹⁹ Despite Türkiye's efforts toward preparedness in disaster management, disaster nursing is still a

developing field.²⁰ The results of a recent study show that, although nurses consider themselves adequate in disaster management, they are nevertheless unprepared.²¹ In recent years, Türkiye has been coping with forest fires, floods, and consecutive earthquakes, with 2 severe earthquakes occurring on the same day at the beginning of 2023, affecting 11 provinces and resulting in heavy losses. These incidents increase the importance of disaster preparedness in that nurses should be able to effectively intervene during a disaster event in Türkiye.

The number of studies on nurses' disaster preparedness in Türkiye is limited, with most focusing on nurses' general level of preparedness or response stage competence.^{21–25} Demirtaş and Altuntaş (2023)²¹ have examined nurses' opinions concerning their competencies in disaster nursing management by using the "Competencies for Disaster Nursing Management Questionnaire." In addition, Alan et al. (2022)²² have investigated nurses' disaster core competence levels and their relationship to psychological resilience. Similar to the current study, Tercan and Şahinöz (2021)²³ aimed to determine nurses' preparedness for disasters, as well as to measure their perceptions of preparedness before, during, and after disasters. Özcan and Erol (2013)²⁵ have also presented findings on nurses' perceptions of preparedness for disasters. Taskiran and Baykal (2019)²⁴ have studied nurses' perceptions of their core competencies by using the "Nurses' Perceptions of Disaster Core Competencies Scale," while Koçak and Kaplan (2023)²⁶ have focused on nurses' perceptions of disaster preparedness and readiness. In another study, Aykan et al. (2022)²⁷ used a questionnaire designed to evaluate nurses' preparedness for disasters and affecting factors. However, in Türkiye, the number of studies on this topic is limited.^{26,27} Understanding the factors affecting nurses' disaster preparedness, which is vital during pre-disaster, disaster, and post-disaster periods, will help nurses and decision makers to create new plans/policies and increase quality of care during disasters. Aiming to gather more evidence related to this issue, this study analyzed nurses' perceptions of preparedness and affecting factors, including those concerning the disaster preparedness phase, response phase, and post-disaster phase.

Methods

Aims and Design

This cross-sectional and descriptive study used an online survey method designed to determine the factors affecting nurses' perceptions of disaster preparedness and nurses' disaster preparedness status.

Setting and Participants

This study was conducted among the 8318 nurses working in 5 provinces (Düzce [775], Bolu [1059], Sakarya [1863], Yalova [538], and Kocaeli [4083]) located in the eastern Marmara region of Türkiye, where 1 of the largest earthquakes experienced in the last century in Türkiye occurred in 1999. Nurses who had been working for at least 3 mo across all sectors of health-care services, including public, private, university, and primary care, were included in the study.

A power analysis resulted in a requirement of at least 305 nurse participants. The sample consisted of volunteer nurses who were contacted using the convenience method. A total of 497 responses were received at the end of the data collection process. After excluding participants who did not meet the inclusion criteria or who provided the same responses, a total of 464 participants were included in the study.

Data Collection Instrument

The data were collected using a questionnaire consisting of 3 sections. The first section included 18 questions prepared by the researchers after consulting a literature review.^{4,6,18} It consisted of 8 questions about personal and occupational characteristics; 6 questions about individual and professional preparedness (individual preparation, disaster experience, receiving disaster training, care for disaster victims, participation in drills, and disaster plan awareness); 3 questions about trust in professional competence, willingness, and feelings about the profession; and a multiple-choice question about effective methods of disaster preparedness.

Disaster preparedness perception was assessed using the "The Scale of Perception of Disaster Preparedness on Nurses," developed by Özcan and Erol (2013).²⁵ The scale consists of 20 questions and 3 subscales (preparation phase, intervention phase, and post-disaster phase) and is scored using a 5-point Likert scale, with responses ranging between "1 (Strongly disagree)" and "5 (Strongly agree)." Scores ranging between 1.00 and 1.79 are considered very low, those between 1.80 and 2.9 are considered low, those between 2.60 and 3.39 are considered medium, those between 3.40 and 4.19 are considered high, and those between 4.20 and 5.00 are considered very high. The overall Cronbach's alpha of Özcan and Erol's (2013) scale is .90, while it is .87, .88, and .87 in the subscales, respectively. In this study, the Cronbach's alpha of the overall scale was .84, while it was .87, .79, and .82 in the subscales.

In their 2013 study on nurses' actions toward disaster preparedness, Baack and Alfred reported self-regulation to be 1 of the factors that significantly predicted nurses' perceived competence in disaster preparedness.¹⁸ Putra et al. (2020) and Ayenew et al. (2022) shared similar results on self-regulation's impact on nurses' disaster management preparedness.^{4,14} Based on these results, the current study used the Adult Motivation Scale, developed by Ateş and İhtiyaroğlu (2019), to measure the effect of self-regulation (motivation) on the perception of disaster preparedness in Turkish nurses.²⁸ The scale consists of 21 items and 2 subscales (intrinsic motivation and extrinsic motivation). Higher scores obtained from the scale indicate high levels of motivation. The overall Cronbach's alpha of the original scale was .94, while it was .92 (intrinsic motivation) and .82 (extrinsic motivation) for the subscales. In this study, the Cronbach's alpha of the overall scale was .88, while it was .88 and .71 for the subscales.

Data Collection

The data were collected between March 2021 and June 2021, using a Web-based survey. Due to the conditions of the pandemic period, the survey link was sent to nurses by means of social media platforms and instant messaging applications used on smartphones, and data were collected from volunteer nurses. Before data collection, the questionnaire was pilot tested by means of face-to-face interviews with 10 nurses. Two questions that were not understood by the nurses were edited, and the participants' responses were not included in the analysis.

Analysis of the Data

The data were analyzed using the IBM SPSS V23 program. The results of the analysis were given in mean \pm standard deviation and median (minimum – maximum). Compliance with the normal distribution was examined according to skewness-kurtosis values. Linear regression analysis was performed to evaluate the effect of

14 independent variables (educational background, professional experience, institution, unit, city, individual disaster preparedness, actual disaster experience, status of receiving disaster-related training, care for disaster victims, participation in drills, trust in professional competence, willingness to respond in disaster situations, disaster plan awareness, and feelings about the profession), and overall motivation and subscales that were determined to have an impact on primary analyses and the model were found to be significant ($F = 9.705$; $P < 0.001$). The enter method was used in the regression model. The option of “completely willing” in the intrinsic motivation variable and willingness to respond in the event of a disaster” variable was excluded from the model, because it led to a multi-connection problem. The significance level was set at $P < 0.050$.

Results

Nurses’ personal and professional characteristics and the findings regarding disaster preparedness are shown in Table 1. The results of the study showed that nurses exhibited a high level of perceived preparedness. The general average score of nurses’ perceived disaster preparedness was $3.76 \pm .43$: $4.27 \pm .60$ in the preparedness subscale, $3.48 \pm .55$ in the intervention subscale, and $3.65 \pm .66$ in the postdisaster subscale.

It was found that 7 independent variables (individual disaster preparedness, disaster-related training, willingness to respond, disaster plan awareness, caring for disaster victims, extrinsic motivation, and general motivation) had a significant effect on the overall scale score. This explains 41% of the variance of the total score (see Table 2). In addition, when participants were asked about effective methods of disaster preparation, 81% reported that undergraduate and graduate level of education did not contribute to preparedness, while 60.6% cited the effectiveness of in-house trainings, 55.4% cited institutional drills, 55% cited taking part in actual disasters, 40.1% cited participation in the institutional disaster plan, and 45.7% cited participation in national rescue teams. Most participants (84.7%) reported that factors such as the media were not effective in disaster preparation.

Discussion

The study’s results highlighted various areas related to factors affecting the perception of disaster preparedness. It was found that participants possessed a high level of perceived disaster preparedness. Previous studies that were conducted using the same measurement tool reported a medium-high level of nurse preparedness.^{23,25,26} However, the results of other studies have shown that nurses are often not adequately prepared to cope with disaster-related responsibilities.^{6,14–17} The high perception of preparedness found in this study may be related to disaster preparedness activities carried out at the national level in recent years.

This study found that the experience of providing care to disaster victims increased nurses’ level of perceived disaster preparedness. This finding is compatible with previous studies indicating a relationship between previous experience of disaster response and a higher level of perceived disaster preparedness.^{4,6,9,12,14,27,29} It has been shown that participation in actual disasters leads to better preparedness, because such experience enhances management-related knowledge/skills and increases the permanence of disaster preparedness.¹¹ This finding emphasizes the importance of using the experiences of nurses working in real disasters to improve disaster management. In addition, it shows that the inclusion of practical applications in trainings or

involvement in real disasters can increase nurses’ disaster preparedness skills.

This study also revealed that nurses who found previous disaster-related training useful possessed a higher perception of preparedness. Most of the participants (87.3%) reported that they had received previous disaster-related training, while only 31.9% reported that such training was very useful. However, the exact nature of participants’ previous training is unknown. Many studies have revealed that nurses who have received disaster preparedness training are more prepared for disaster events.^{6,12,27,29,30} It is believed that, to strengthen the level of nurse preparedness worldwide, educational and training programs aimed at general competencies or specific fields must be developed.³ In addition to educating nurses about concepts such as disaster preparedness and management, continuous trainings and simulated drills have also been recommended.^{12,31} However, the literature contains different recommendations concerning the content and implementation of training programs.¹⁵ Strengthening modifiable factors such as preparedness training will help nurses increase their level of knowledge. Therefore, greater efforts should be made to develop effective educational content.

Previous studies have found that nurses’ disaster plans awareness levels impacts disaster preparation effectiveness.^{3,6,17} The current study showed that most participants (74.8%) exhibited awareness of a disaster plan. However, according to 1 systematic review, nurses possessed a lack of awareness of corporate disaster plans, suggesting that most of the nurses, despite being aware of a workplace disaster protocol/plan, felt uncertain about the plan’s implementation.⁶ It is recommended that all stakeholders, including nurses, participate in the development of disaster plans to ensure that they understand each other during teamwork and intervention.¹³

Perceptions of disaster preparedness for those prepared for individual disasters were found to be higher than in those who were not prepared at all. A study by Aykan et al. found that those who prepared for disasters at home were more likely to feel prepared (2022).²⁷ Nurses’ individual preparedness to protect themselves and their families, as well as preparedness to manage the consequences of disasters, is said to strengthen self-confidence.³² Therefore, nurses’ individual preparedness should be assessed and supported to improve institutional preparedness and disaster response capabilities.

The current study found that nurses who are not at all willing to respond during a disaster event possess a higher perception of preparedness. Preparedness alone does not necessarily correspond to willingness to respond.^{9,33} The fact that nurses who possessed a high perception of preparedness were still reluctant to respond is an important finding, indicating that such individuals should be the focus of a review of studies aimed at increasing nurse preparedness.

Nurses’ motivation levels also affect emergency and disaster preparedness. As their extrinsic motivation score increases, the overall score of the “Perception of Disaster Preparedness Scale” decreases, and as the overall motivation score increases, the perceived preparedness score increases. As stated in the social-cognitive preparation model, an individual’s participation in disaster preparation begins with the first stage (motivation), and if the preliminary factors are deemed adequate, individuals move toward the next stage of development.³⁴ The effect of self-regulation (motivation) on nurses’ preparedness for disaster management is also mentioned in other studies.^{4,14,18,30} It can be concluded that even the most talented individual will not exhibit a

Table 1. Nurses' personal and occupational characteristics (N = 464)

Characteristics	n	%
Gender		
Male	48	10.3
Female	416	89.7
Age (y)		
20-30	171	36.8
31-40	133	28.7
≥ 41	160	34.5
Age (min.-max/ $\bar{x} \pm SS$)	17-58	34.73 \pm 9.03
Marital status		
Married	305	65.7
Single	159	34.3
Educational background		
Lower	178	38.4
Undergraduate	221	47.6
≥ Postgraduate	65	14.0
Current institution		
Private hospital	124	26.7
Public hospital	194	41.8
University hospital	47	10.1
Primary care	48	10.3
*Other	51	11.0
Current unit		
Inpatient	161	34.7
**Specialized	160	34.5
***Other	143	30.8
Professional experience (y)		
≤ 5	122	26.3
6-15	145	31.3
≥ 15	197	42.5
City		
Düzce	92	19.8
Bolu	83	17.9
Kocaeli	172	37.1
Sakarya	81	17.5
Yalova	36	7.8
Individual disaster preparedness		
Not at all prepared	79	17.0
Partially prepared	330	71.1
Completely prepared	55	11.9
Actual disaster experience		
Yes	229	49.4
No	235	50.6
Status of having received disaster-related training and its effectiveness		
Yes, it didn't help	20	4.3
Yes, it was somewhat helpful	237	51.1
Yes, it helped a lot	148	31.9
No, I did not	59	12.7
Status of providing care for disaster victims		
Yes	124	26.7
No	340	73.3
Participation in drills		
Yes	281	60.6
No	183	39.4

(Continued)

Table 1. (Continued)

Characteristics	n	%
Trust in professional competence in disaster situations		
I do not trust	18	3.9
I partially trust	185	39.9
No idea	44	9.5
I trust	217	46.8
Willingness to respond/report in disaster situations		
Not willing at all	7	1.5
Neither willing nor unwilling	87	18.8
Fully willing	306	65.9
If I am given a task, I work because I have to	64	13.8
Disaster plan awareness		
Yes, there is a disaster plan that I have read	219	47.2
Yes, there is a disaster plan, but I haven't read it yet	128	27.6
No, I don't think there is a disaster plan	33	7.1
I have no idea	84	18.1
Feelings about the profession		
I love nursing	324	69.8
I think it is the best job for me	39	8.4
I do it because I feel compelled	56	12.1
I don't like nursing	21	4.5
Other	24	5.2

*Private outpatient clinic.

**Emergency-intensive care-operation room.

***Organ transplant-home health-blood collection-outpatient clinic.

high level of performance unless they possess sufficient motivation. Therefore, the implementation of various strategies designed to encourage nurses to be prepared for emergency situations is crucial.

Extrinsic motivation is a type of motivation in which behavior is exhibited in the cause of a result, and the individual exhibits behaviors not to achieve inner satisfaction but to either obtain a reward or avoid punishment.³⁵ The perception of being supported by one's work environment is a significant motivating factor in the decisions of health-care professionals.³⁰ A decrease in the perceived preparedness of nurses with high extrinsic motivation suggests that they may be experiencing a feeling of unpreparedness, even though they may actually be prepared. The fear of not being able to manage the post-disaster process may lead them to believe that they are unprepared.

Limitations

The results of this study are limited to the perceptions of nurses working in the eastern Marmara region of Türkiye and those participating in the study. Studies have reported preparedness levels by using different data collection tools. The answers given in the questionnaire are the nurses' own statements.

Conclusions

Due to the increase in society's health-care needs, health services play a critical role in all types of disasters and emergencies. Given the frequency and unpredictability of such disasters, nurses, who

Table 2. Independent variables affecting the overall score of “The Scale of Perception of Disaster Preparedness On Nurses Scale”: Results of multiple regression analysis (N = 464)

Parameter	β_0 (%95 CI)	S. Hata	β_1	t	P	r ¹	r ²	VIF
Stable	2.231 (1.771 – 2.69)	0.234		9.537	<0.001			
Individual disaster preparedness	0.103 (0.013 – 0.193)	0,046	0.108	2.251	0.025	0.037	0.108	1.818
Status of having received disaster-related training and its effectiveness	0.197 (0.028 – 0.366)	0,086	0.213	2.29	0.022	0.423	0.11	6.785
Willingness to respond/report in disaster situations	-0.139 (-0.227 – -0.052)	0.044	-0.126	-3.144	0.002	-0.301	-0.151	1.268
Disaster plan awareness	-0.121 (-0.205 – -0.036)	0.043	-0.125	-2.807	0.005	-0.254	-0.135	1.562
Status of providing care for disaster victims	0.136 (0.049 – 0.222)	0.044	0.139	3.069	0.002	0.218	0.147	1.616
Extrinsic motivation score	-0.019 (-0.035 – -0.002)	0.008	-0.162	-2.24	0.026	0.232	-0.108	4.13
General motivation score	0.021 (0.014 – 0.028)	0.004	0.405	5.606	<0.001	0.364	0.262	4.106

Note: F = 9.705, P < 0.001, R² = %45.7, Corrected R² = %41.

Abbreviations: β_0 , unstandardized beta coefficient; β_1 , standardized beta coefficient, r¹, zero-order correlation; r², partial correlation.

make up the largest group in and are at the forefront of the health sector, must be prepared to successfully fulfill their role in disasters. This study reveals the factors that affect nurses' disaster preparedness and includes implications for practice, research, education, and management related to disaster nursing. It found that nurses possess a high level of perceived preparedness. The factors affecting nurses' perceptions of preparedness were: the status of individual disaster preparedness, receiving disaster-related training, willingness to respond, disaster plan awareness, caring for disaster victims, and levels of extrinsic and general motivation. This study's results not only emphasize the importance of disaster training provided to nurses but also suggest that such training should be both effective and efficient. Learning methods based on the simulation method may be used in disaster training. It is essential that nurses are aware of institutional disaster plans; therefore, nurses should participate in all stages of disaster planning so that they may better understand their duties and responsibilities. Nurses' individual disaster preparedness should also be supported and encouraged. Various strategies may be used to support disaster preparedness activities in the workplace designed to increase the nurses' willingness to respond/report in case of a disaster.

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Ethical standards. Düzce University Non-Interventional Health Research Ethics Committee (Decision no: 2021/22).

Ethical considerations. Approval for this study was obtained from the Düzce University Non-Interventional Health Research Ethics Committee (01/02/2021 2021/22). Those who agreed to participate in the study were able to complete the survey after reading the informed consent form on the first page of the online survey and voluntarily confirming their participation. Participants were informed that they could withdraw from the study at any time. They were also informed that all information and views would be kept confidential and anonymous, and their consent was obtained online.

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