Evaluation of Nurses' Competency, Motivation, and Stress Levels in Disaster Management

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Abstract

Objectives: This study was conducted to determine the relationships between nurses' competency, motivation, and stress levels in disaster management, as well as to shed light on the establishment of effective disaster management programs.

Methods: In our research we used a correlational, descriptive, cross-sectional design. The sample of the study was composed of 498 nurses working in Turkey. The "Descriptive and Professional Characteristics and Disaster Experiences of Nurses" form, the "Competencies for Disaster Nursing Management Questionnaire," the "Perceived Stress Scale," and the "Nurses Job Motivation Scale" were used in data collection.

Results: Nurses' disaster management competency and motivation levels were found to be adequate, and their stress levels were found to be moderate. A weak positive correlation was found between disaster management competency and motivation, but a weak negative correlation was found between stress levels. Age, education level, experience level, training in disaster nursing, and knowledge of duties and responsibilities in disasters were associated with significant differences in terms of disaster competency and its dimensions, motivation, and stress levels.

Conclusions: The study found that nurses' disaster experiences impacted their competency, feeling of preparedness, and stress and motivation levels, and motivation was found to be a predictor of increasing competency.

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The number of natural and man-made disasters, which have been reported throughout the history of humanity, continues to rise worldwide, and disasters influence the lives of communities in many ways.[1] The 2020 World Disasters Report stated that the number of climate-related and air-related disasters increased by approximately 35% since 1960, that more than 410,000 people died over the last decade in such circumstances, and that 1.7 billion people were affected.[2] Turkey is an earthquake-prone country and is also exposed to many other natural and man-made disasters. A review prepared by Bahadır and Uçku using an international emergency database (2018)[3] reported that 313 disasters occurred in Turkey between 1923 and 2016, that one fifth of these disasters were earthquakes that caused more than 90% of losses of life, and that Turkey ranked twelfth in the global disaster risk category.[4] In this context, exposure to and preparedness for natural disasters are considered a critical phenomenon in Turkey, as well as in the rest of the world.

The World Health Organization (WHO) describes a disaster as "a sudden ecologic phenomenon that is unexpected, overwhelms the coping resources of a local community, disrupts normal function and requires external assistance."[5] It has been reported that in addition to exhibiting high levels of competence to minimize potential health hazards and life-threatening circumstances, health care professionals should also be able to provide efficient care in cases of disasters.[5–7] Forming the backbone of the health care system, nurses are health professionals who play an active role in the development and protection of the health of their own, as well as the health of their immediate environment and community before, during, and after disasters.[4,8,9] Therefore, nurses are expected to be both physically and psychologically prepared for disasters (by exhibiting the necessary knowledge and skills) to be motivated to voluntarily participate and manage chaotic settings and stress.[10] It has been reported that the majority of health care professionals display little to no disaster management competence[11–13] and experience high levels of psychological and emotional stress during disasters, with the majority being not psychologically prepared when asked to participate in disaster management due to individual losses caused by disasters or worries about the health of their families.[14–18] The International Council of Nurses (ICN) defines competence as "a level of performance demonstrating the effective application of knowledge, skill, and judgment."[19] To achieve the goals of disaster nursing, all nurses must exhibit core competencies. Nurses who may potentially participate in disaster work should be trained and empowered in managing disaster situations in the hospital environment.[20]

Recent studies have revealed that although nurses have basic competencies, they are not prepared for disasters for various reasons [21] and they are not willing to intervene in disasters because they do not have experience or formal education in this area.[22] Similarly, studies investigating the roles, preparations, perceptions, knowledge, psychological characteristics, and competencies of nurses in disaster risk management in Europe, United States of America, Australia, China and Turkey have emphasized that nurses have deficiencies in their perceptions of disaster core competencies. Results indicate that nurses are confused and shocked during events and disasters, as they were unprepared. Therefore, these studies highlighted the need to improve the nurses' competencies and the necessity of further research.[23,24]

Stress is defined as "any internal or external element that disrupts the balance between person and environment and causes the person to try harder to maintain or the balance."[18,25] Due to the challenging conditions of disaster areas and the intensity of exposure to traumatic events, stress disorders may be observed in disaster workers.[19–25] The cause of stress may stem from the disaster environment, and safety concerns for the health care team during the disaster event, negatively affecting nurses' motivation to assume responsibilities on site. Motivation explains one's willingness with adding value to the aim, competence, and emotional reactions.[15,25] The higher the level of nursing staff's motivation, the higher the willingness to participate in disaster nursing.[25] Preparation in terms of skills, professional competencies, and motivation to participate is essential to the success or failure of disaster rescue.[13,14,21] Regarding the relationships between disaster nursing competence, anticipatory disaster stress, and motivation for disaster engagement, Deci and Ryan[26] noted that individuals' motivation for engagement is influenced by individual competence. When performing any action, individuals' perceived competence is important since individuals feel more confident and have higher levels of motivation to perform expected actions when they perceive themselves to be competent. Individuals involved in disaster events may be prone to experience stress. Therefore, the nature of potential stressors and incompetence in response to disaster events may influence individuals' commitment to attend the site.[13,26]

Disaster preparedness cannot control or suppress the occurrence of natural disasters. However, efficient disaster preparedness can reduce the potential effects of future disasters on human life, health, and property.[18] WHO (2020) reports that no health care system should be considered prepared unless nurses are also prepared.[5] Understanding the factors that motivate nurses to voluntarily participate in disaster management may play a key role in a successful and efficient disaster management process by contributing to more effective preparedness.[27,28] The literature review conducted for this study revealed a limited number of studies addressing the relationships between nurses' competency, motivation, and stress levels in the context of disaster management.[29–31] Based on this dearth in the literature, this study aimed to establish a basis for successful and efficient disaster management programs (e.g., disaster education, psychological resilience and motivation training, disaster strategy, and risk management) by determining the relationships between the disaster management competency, motivation, and stress levels of nurses in Turkey. This study sought answers to the following questions:

✓ What is the competency, stress, and motivation levels of nurses in the context of disaster management?
✓ What are the relationships between nurses' disaster management competence, motivation, and stress levels?

✓ Are there differences in nurses' disaster management competencies, motivation for working in disaster management, and stress levels based on their descriptive characteristics, professional characteristics, and experiences in disasters?

Methods

Study Design

This study was conducted using a descriptive, correlational, cross-sectional design.

Setting

This study was carried out in 6 hospitals in a private hospital chain (Medical Park, Liv Hospital) in the province of Istanbul, Turkey's metropolis. The study was conducted in full-fledged, JCI-accredited hospitals providing services in all branches to more than 25 countries. The average bed capacity of these 6 hospitals was approximately 1600 patient beds, and the estimated number of nurses employed in these hospitals was approximately 1356. According to institutional policy, nurses working in specialized areas (e.g., intensive care or emergency units) are assigned to work based on their expertise and certification. Education level, professional experience, and communication skills are also considered in the selection of nurses, with orientation training provided by the hospital.

Sample size and participants

The population of the study was composed of 928 nurses who were actively working in hospitals in outpatient clinics, ward (internal medicine/surgery, operating room), emergency units, and intensive care units. The research was carried out in these clinics because they admitted patients initially affected by disasters. Also, in many cases, outpatient health professionals rotate work in disaster areas when needed. As such, competent and prepared health professionals are key to the success of disaster and crisis management. The study's sample size was calculated as 429 nurses, according to a moderate effect size (0.22) and 99% power in the power analysis. This study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist.[32]

Inclusion/exclusion criteria

Participants who could speak and read Turkish and were willing to participate in the study were included. Participants who were unwilling to participate or did not complete all questions in the questionnaire were excluded.

Instruments

Before data collection, the relevant literature was screened, and the "Descriptive Characteristics, Professional Characteristics, and Disaster Experiences Form" was created accordingly in the Turkish language.[29–31] The form included 13 questions concerning participants' demographic characteristics, professional characteristics, and disaster management education status. The "Competencies for Disaster Nursing Management Questionnaire" (CDNMQ), the "Perceived Stress Scale" (PSS), and the "Nurses Job Motivation Scale" (NJMS) were used as measurement instruments.

The "Competencies for Disaster Nursing Management Questionnaire" (CDNMQ) was developed by Al Thobaity et al. (2017) to measure nurses' competencies in disaster nursing

management.[22] This scale, whose Turkish validity and reliability study was conducted by Durgut and Yıldız (2021), is composed of a total of 43 items measuring the duties and responsibilities of nurses in disaster management (5 items), their basic competencies in disaster management (30 items), and their obstacles to developing basic competencies (8 items)[6]. The items in the first and second dimensions have response options that are scored from 1=never to 10=very frequently, while those in the third dimension have response options that are scored from 1=absolutely disagree to 10=absolutely agree. Competency levels are expected to increase as scores on the scale increase. The general Cronbach's alpha coefficient of the scale was reported to be 0.96, while the coefficients of its dimensions ranged between 0.88 and 0.98.[6,22]

The "Nurses Job Motivation Scale" (NJMS) was developed by Engin and Cam (2016) and is composed of 25 items.[33] The NJMS is a 3-point Likert-type scale (1-absolutely disagree, 3-agree), and possible scores range between 25 and 75. Higher scores indicate high levels of job motivation. The Cronbach's alpha coefficient of the scale was reported to be 0.85.

The "Perceived Stress Scale" was developed by Cohen et al. (1983) to measure the degree to which individuals perceive their lives as unpredictable, uncontrollable, or overburdened.[34] This scale has 3 different versions including 4, 10, and 14 items. This study used the 10-item version. The validity and reliability of the Turkish version of the scale were tested by Eskin et al. (2013).[35] The scale is a 5-point Likert-type scale (1-never, 5-very frequently), with 4 items being negatively worded statements (items 4, 5, 7, and 8) and the remaining 6 items being positively worded statements (items 1, 2, 3, 6, 9, and 10). Possible scores on the scale range between 0-40. A higher total score indicates that the respondent perceives a high level of stress.[34,35] The Cronbach's alpha coefficient of the scale was reported to be 0.88.

Data Collection Procedures

In this study, a total of 1356 nurses were working in the units where the research was carried out, within the scope of the hospital chain. The universe of the research consisted of 928 nurses who worked in defined clinics. Data were collected online between May 15, 2021 and August 10, 2021. The data collection questionnaire was created on the Google Forms platform and was distributed via email and WhatsApp groups. All nurses were informed about the aim of the study, and the first part of the online questionnaire included an explanation of the study's purpose and details. Participants could complete the questionnaire after confirming their voluntary participation. Participants who chose the "no" option could not continue with the survey. Potential participants were also encouraged to invite their co-worker nurses to take part in the study. Thus, this study used the sampling technique of mixed/snowball sampling. The researchers reviewed all data collection forms, with the aim of collecting 429 samples. Data collection ended after 515 nurses volunteered to participate. Seventeen blank or incomplete forms were excluded from the study, with 498 participants fully completing the questionnaire. No negative feedback was obtained from the participants regarding the data collection process. A professional company provided support for creating the data collection forms on the Google Forms platform and performing statistical analyses.

Ethical Considerations

Approval for this study was obtained from the Clinical Studies Ethics Committee of Istinye University (2021/02/11), and institutional permission was received from the hospital before initiating the study. Approval for use of the scales used in the study was obtained from the researchers who developed the scales. The first part of the online questionnaire form included information about the study and informed consent. Participants were allowed to respond by choosing the option "I accept" after reading the informed consent text. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Data Analysis

SPSS (Statistical Package for the Social Sciences) 23.0 was used for statistical analyses of the data. The categorical measurements are presented as frequencies and percentages, and the continuous measurements are presented as mean and standard deviation (median and maximum- minimum when necessary) values. The Kolmogorov Smirnov test was used to determine whether the parameters included in the study showed normal distribution. For the variables that did not show a normal distribution, the Mann-Whitney U test was used in the analyses of 2 groups, and the Kruskal-Wallis test was used in analyses of more than 2 groups. Tukey's and Tamhane's $T2$ tests, which are post hoc tests, were used to identify the source of the significant difference between groups. The Spearman correlation test was used to determine the relationship between scale scores. A P value of ≤ 0.05 was considered statistically significant for all tests.

Results

The results of the analysis on the correlation between the mean, median total CDNMQ, NJMS, PSS, and subscale scores of the participants are shown in Table 1. In this study, the total Cronbach's alpha coefficient of the CDNMQ was found to be 0.976. Regarding its dimensions, the Cronbach's alpha coefficients were 0.867 for duties and responsibilities in disaster management, 0.992 for basic competencies in disaster management, and 0.964 for barriers to developing basic competencies. The Cronbach's alpha coefficients of the PSS and NJMS scales were 0.78 and 0.94, respectively. The mean total CDNMQ score of the participants was found to be 7.7±1.62. The mean NJMS score of the participants was 64.7 ±9.5, whereas their mean PSS score was 19.46±6.02. In the correlation analyses, a positive correlation was found between the CDNMQ and NJMS scores of the participants ($r = 0.197$; $P < 0.001$), and a weak negative correlation was found between their NJMS and PSS scores ($r = -0.317$; $P < 0.001$). However, no significant relationship was found between the mean CDNMQ and PSS scores of the participants ($r = 0.016$; $P > 0.05$).

The descriptive and professional characteristics of the participants and the results of the comparisons of their median CDNMQ, NJMS, and PSS scores are shown in Table 2. It was found that 71.9% ($n = 358$) of the participants were aged between 20 and 29 years, 84.1% ($n = 419$) were female, 33.9% ($n = 169$) were high school graduates, 35.3% ($n = 176$) worked in intensive care units, and 32.9% ($n = 164$) had 1-5 years of professional experience. The mean age of the participants was 29.47 ± 5.2 years. In the comparisons of the scale scores of the participants based on their descriptive and professional characteristics, it was determined that participants in the 20-29-year-old age group displayed significantly higher total CDNMQ ($KW = 5.024$; $P < 0.025$), "duties and responsibilities in disaster management" dimension ($KW = 16.199$; $P = 0.003$), and "basic competencies

Table 1. Correlation between the mean scores obtained from CDNMQ, NJMS and PSS and the scales (N = 498)

		Mean					Correlation					
	Scales	Number of statements	Mean ±SD	Med (Min-Max)	Kolmogorov Smirnov	Cronbach alpha	1.	2.	3.	4.	5.	6.
1.	Nurses' Duties and Responsibilities in Disaster Management	5	5.51 ± 2.35	5 (1–10)	<0.001	0.867	1.00	0.373†	0.101*	0.492†	0.307†	−0.197†
2.	Nurses' Basic Competencies in Disaster Management	30	8.38 ± 1.84	8.96 (1–10)	<0.001	0.992		1.00	0.262†	0.878†	0.230†	−0.018
3.	Barriers to Developing Basic Competencies	8	6.53 ± 2.46	6.62 (1–10)	<0.001	0.964			1.00	0.603†	0.008	0.126*
4.	Competencies for Disaster Nursing Management Questionnaire	43	7.70 ± 1.62	8.11 (1–10)	<0.001	0.976				1.00	0.197†	0.016
5.	Nurses Job Motivation Scale	25	64.70 ± 9.50	67 (25–75)	<0.001	0.941					1.00	−0.317†
6.	Perceived Stress Scale	10	19.46 ± 6.02	20 (0–40)	<0.001							1.00

CDNMQ: Competencies for Disaster Nursing Management Questionnaire; PSS: Perceived Stress Scale; NJMS: Nurses Job Motıvatıon Scale; SD: Standard Deviation;
*P < 0.05.
†P < 0.001.

in disaster management" dimension (KW = 6.199; P = 0.044) scores. Participants who held undergraduate or postgraduate degrees were found to display significantly higher total CDNMQ and "basic competencies in disaster management" dimension (KW = 16.159; P < .001) scores. Median PSS scores were determined to be significantly lower among the participants who were aged 40 years or older (KW = 1.377; P = 0.001) and those who had 11 or more years of professional experience (KW = 12.149; P = 0.007).

The results of the comparisons of the scale scores of the participants based on their disaster experiences are shown in Table 3. It was found that 92.6% (n = 461) of the participants had received disaster training, 72.5% (n = 361) had not participated in disaster drills, 78.3% (n = 390) had not been assigned to any disaster/exceptional situation in their professional lives, and 95.4% (n = 475) had not experienced loss in a disaster. It was also found that 50.6% (n = 252) of the participants had not received training in disaster nursing, 56.4% (n = 281) believed that they were prepared for potential disasters, and 58.2% (n = 290) believed that they were aware of their roles and responsibilities. It was found that the participants who had received training in disaster nursing (U = 26703; P = 0.007), those who had received training in general nursing (U = 0.046; P = 0.046), those who believed that they were aware of their roles and responsibilities (KW=12.848; P = 0.002), and those who had been exposed to natural disasters and assigned to serve in disasters displayed significantly higher median CDNMQ scores (U = 15441; P < 0.001). The participants who had previous disaster experience and those who had not experienced loss in cases of disasters had significantly higher median scores in the "duties and responsibilities in disaster management" dimension of the CDNMQ (P < 0.001). Again, the participants who had participated in any disaster drill in the previous year (U = 21629; P = 0.030), those who had faced any natural disaster (U = 27151.5; P = 0.020), and those who had been assigned to serve in any disaster/exceptional situation during their professional lives (U = 17672.5; P = 0.010) had higher scores in the "basic competencies in disaster management" dimension of the CDNMQ (U = 27589.0; P < 0.03). It was observed that the participants who had received training in disaster nursing and disasters (U = 26991.5; P = 0.012),

those who had participated in disaster drills in the previous year (U = 21780.0; P = 0.039), those who believed that they were prepared for disasters (U = 24409.5; P < 0.001), and those who believed that they were aware of their duties and responsibilities (KW = 13.345; P = 0.001) had significantly higher median PSS scores. In the comparisons of the scores of the participants, the median NJMS scores of the participants who had received training in disaster nursing (U = 26422.0; P = 0.004), those who had participated in a drill in the previous year (U = 20617.0; P = 0.004), those who believed that they were prepared for disasters (U = 20524.5; P < 0.001), and those who believed that they were aware of their roles and responsibilities (KW = 19.174; P = 0.001) were significantly lower. Figure 1 shows the types of training programs that nurses need in the context of disasters. It was determined that the participants of this study needed basic life support training (n = 437; 88.6%), field triage training (n = 384; 77.9%), posttraumatic psychological approach training (n = 318; 64.2%), and infection control training (n = 212; 43%).

Discussion

The ICN Framework of Disaster Nursing Competencies emphasizes that nurses should be prepared in all stages of a disaster, independent of their specialty (e.g., clinician, academician, researcher, or manager), with optimal knowledge and skills in terms of preparedness for disasters, planning, care, intervention, and management.[1] This study's results showed that the majority of the participants were under the age of 30, female, and high school graduates, with most working in intensive care units and having between 1-5 years of professional experience.

Nurses are in the forefront of epidemic and disaster management.[36,37] In this study, the total CDNMQ scores of the participants and their scores in the dimension of "basic competency in disaster management" were found to be favorable, similar to a study conducted by Durgut and Yıldız (2021).[6] In a study on disaster management, in which both quantitative and qualitative studies in Iran were evaluated, the disaster competency levels of nurses were also found to be favorable.[38] Other studies have reported that nurses exhibit low to moderate levels of preparedness for disaster events in

Table 2. Comparison of the nurses' descriptive characteristics, professional characteristics and the median CDNMQ, NJMS, and PSS scores (N = 498)

	n (%)	Nurses' Duties and Responsibilities in Disaster Management Med (Min-Max)	Nurses' Basic Competencies in Disaster Management Med (Min-Max)	Barriers to Developing Basic Competencies Med (Min-Max)	Competencies for Disaster Nursing Management Questionnaire Med (Min-Max)	Nurses Job Motivation Scale Med (Min-Max)	Perceived Stress Scale Med (Min-Max)
Age							
20–29 [a]	358 (71.9)	4.2 (1–9.6)	9.2 (1–10)	8.1 (1–10)	8.4 (3.4–9.6)	63 (25–75)	20 (3–38)
30–39 [b]	67 (13.5)	2.9 (1–9)	8.9 (3.2–10)	7.3 (2.8–10)	8.0 (3.1–9.7)	62 (25–75)	20 (0–40)
40 ≤ [c]	73 (14.6)	2.7 (1–10)	9.3 (3–10)	7.5 (2–10)	8.2 (2.6–10)	61 (25–75)	19 (0–30)
KW		16.199	6.190	5.403	5.024	1.262	1.377
P		[a-c] **0.003**	[c-b] **0.044**	0.147	[a-b] **0.025**	0.520	[a-c] **0.001**
Sex							
Male	79 (15.9)	5.4 (1–10)	9.0 (1–10)	6.6 (1–10)	8.1(1.0–10)	67 (25–75)	20 (0–40)
Female	419 (84.1)	5.6 (1–10)	8.4 (1.7–10)	7.3 (1.63–10)	7.8 (1.7–10)	62 (45–75)	20 (0–38)
U		16468.5	15073.5	14439.0	15988	12085	15188.0
P		0.944	0.206	0.072	0.632	**<0.001**	0.244
Education level							
High school [a]	169 (33.9)	5.4 (1–10)	8.4 (1–10)	6.5 (1–10)	7.6 (1.0–10)	69.0 (25–75)	20 (0–38)
Associate degree [b]	134 (26.9)	5.4 (1–10)	8.8 (1–10)	6 (1–10)	7.9 (1–9.9)	69.0 (25–75)	19 (4–40)
Undergraduate [c]	148 (29.7)	5.4 (1–10)	9.4 (3.1–10)	7.1 (1–10)	8.4 (2.7–10)	64.0 (25–75)	20 (2–31)
Postgraduate [d]	47 (9.4)	6 (1.8–9.8)	9.3 (6.7–10)	7.1 (3.1–10)	8.3 (6.6–9.6)	66.0 (25–75)	20 (10–27)
KW		0.907	16.159	12.768	23.440	8.520	4.300
P		0.824	**0.001**	**0.005**	**0.001**	**0.036**	0.231
			c-a; d-a; d-b	c-a; c-b; d-b	c-a; c-b; d-a; d-b	b-c	
Clinic of work							
ward (internal medicine/ surgery) [a]	165 (33.1)	5.6 (1–10)	8.7 (1.0–10)	6.5 (1–10)	7.9 (1.0–10)	69.0 (25–75)	19 (0–37)
Intensive care [b]	176 (35.3)	5.5 (1–10)	8.9 (1–10)	6.8 (1–10)	8.1 (1.0–10)	65.0 (25–75)	20 (0–40)
Operation room [c]	19 (3.8)	4.6 (1.8–10)	8.4 (2.7–10)	6.8 (3–10)	7.5 (2.6–10)	61.0 (41–75)	21 (11–30)
Emergency department [d]	28 (5.6)	5.9 (1.4–9.4)	8.6 (3.1–10)	6.6 (2–10)	8.1 (2.7–9.5)	65.5 (50–75)	18 (9–31)
Other (outpatient clinic) [e]	110 (22.1)	5.4 (1–10)	9.4 (1.7–10)	6.6 (1–10)	8.3 (1.7–9.9)	67.0 (25–75)	19 (0–31)
KW		4.646	9.145	1.639	8.786	16.199	9.086
P		0.326	0.058	0.802	0.067	[a-c] **0.003**	0.059
Professional working period (years)							
≤ 1 [a]	102 (20.5)	5.3 (1.2–10)	8.9 (2.2–10)	6.3 (1–10)	7.9 (2.4–10)	68 (47–75)	20 (3–38)
1–5 [b]	164 (32.9)	5.4 (1–10)	8.9 (1–10)	6.3 (1–10)	7.9 (1.0–10)	67 (25–75)	20 (0–40)
6–10 [c]	91 (18.3)	5.2 (1–10)	8.7 (1.2–10)	6.8 (1–10)	7.9 (1.6–9.9)	65 (25–75)	21 (4–33)
11 ≤ [d]	141 (28.3)	5.6 (1–10)	9.2 (1.0–10)	6.8 (1–10)	8.3(1.0–10)	66 (35–75)	19 (0–30)
KW		1.064	4.176	2.709	7.735	7.377	12.149
P		0.786	0.243	0.439	0.052	0.061	[b-d] **0.007**

	Ort ± SD	Med	Min-Max
Mean age	29.47 ± 5.2	25.5	20–59
Mean working period (years)	4.76 ± 2.3	4.5	1–15

CDNMQ: Competencies for Disaster Nursing Management Questionnaire; PSS: Perceived Stress Scale; NJMS: Nurses Job Motivation Scale; KW: Kruskall Walls test was used; U: Mann Whitney *U* test was used; Tamhane's T2 test was used to examine the differences between the groups (post-hoc).

Lowercase letters (a,b,c,d) show statistically significant intragroup differences in median CDNMQ, PSS and NJMS scores are supposed to be viewed vertically. Statistically significant P values are in bold.

Table 3. Comparison of the nurses' disaster experiences by the median scored obtained from CDNMQ, NJMS, and PSS (N = 498)

	n (%)	Nurses' Duties and Responsibilities in Disaster Management Med (Min–Max)	Nurses' Basic Competencies in Disaster Management Med (Min–Max)	Barriers to Developing Basic Competencies Med (Min–Max)	Competencies for Disaster Nursing Management Questionnaire Med (Min–Max)	Nurses Job Motivation Scale Med (Min–Max)	Perceived Stress Scale Med(Min–Max)
Having received training of disaster nursing							
Yes	246 (49.4)	6.4 (1.2–10)	8.9 (2.7–10)	6.8 (1–10)	8.2 (2.6–10)	69 (25–75)	19.5 (0–32)
No	252 (50.6)	4.6 (1–10)	8.9 (1–10)	6.5 (1–10)	7.9 (1.0–10)	66 (25–75)	20 (3–40)
U		17557.0	27589.0	30065.0	26703	26422.0	26991.5
P		**<0.001**	**0.033**	0.562	**0.007**	**0.004**	**0.012**
Having received training on emergency cases/disasters							
Yes	461 (92.6)	5.6 (1–10)	8.9 (1–10)	6.7 (1–10)	8.1 (1.0–10)	67 (25–75)	20 (0–40)
No	37 (7.4)	3.6 (1–7.8)	8.2 (1.03–10)	6.1 (1–10)	7.7 (1.0–9.5)	62 (25–75)	22 (6–34)
U		4604.5	7691.0	7400.5	6844.5	5918.0	21780
P		**<0.001**	0.318	0.180	**0.046**	**0.004**	0.08
Having participated in any disaster drill in the last year							
Yes	137 (27.5)	6.8 (1.4–10)	9.2 (3.1–10)	6.5 (1–10)	8.1 (2.7–10)	69 (41–75)	19 (0–33)
No	361(72.5)	5 (1–10)	8.8 (1–10)	6.8 (1–10)	8.0 (1.0–10)	66 (25–75)	20 (3–40)
U		14570.0	21629.0	21946.5	22206.5	20617.0	21780.0
P		**<0.001**	**0.030**	0.052	0.079	**0.004**	**0.039**
Having faced any natural disaster so far							
Yes	226 (46.6)	5.6 (1–10)	9.1 (2.1–10)	6.6 (1–10)	8.1 (1.9–10)	67.0 (25–75)	20 (2–38)
No	232 (53.4)	5 (1–10)	8.7 (1–10)	6.7 (1–10)	7.8 (1.0–10)	66.5 (25–75)	20 (0–40)
U		26641.0	27151.5	30462.0	26697.5	30289.0	30134.0
P		**0.008**	**0.020**	0.806	0.009	0.723	0.651
Having been assigned in any disaster/exception in professional life							
Yes	108 (21.7)	6.3 (1–10)	9.4 (3.1–10)	7.2 (1.75–10)	8.5 (2.7–10)	67 (35–75)	20 (2–31)
No	390 (78.3)	5.4 (1–10)	8.7 (1–10)	6.5 (1–10)	7.9 (1.0–10)	67 (25–75)	20 (0–40)
U		17300.0	17672.5	17668.5	15441.0	20883.0	20824.0
P		**0.004**	**0.010**	**0.010**	**<.001**	0.893	0.858
Having experienced any loss in disaster							
Yes	23 (4.6)	5 (1.2–10)	8.8 (5–10)	7.1 (1.75–10)	7.8 (4.6–9.4)	69 (43–75)	20 (4–30)
No	475 (95.4)	5.6 (1–10)	8.9 (1–10)	6.6 (1–10)	8.1 (1.0–10)	67 (25–75)	20 (0–40)
U		5270.5	5370.0	5268.5	5312.0	4792.0	5250.0
P		0.776	0.890	0.773	0.823	0.319	0.752
Feeling prepared for potential disasters							
Yes	281 (56.4)	6.2 (1–10)	9.1 (1–10)	6.2 (1–10)	8.1 (1.0–10)	69 (25–75)	19 (0–40)
No	217 (43.6)	4.4 (1–10)	8.8 (1.03–10)	7.1 (1–10)	8.1 (1.0–10)	64 (25–75)	20 (0–38)
U		17047.0	27882.0	24500.5	28841.5	20524.5	24409.5
P		**<0.001**	0.100	**<0.001**	0.301	**<.001**	**<.001**
Knowing duties and responsibilities in disasters							
Yes [a]	290 (58.2)	6.5 (1–10)	9.0 (1–10)	6.7 (1–10)	8.2 (1.0–10)	69 (25–275)	19 (0–40)
Partially [b]	151 (30.4)	4.8 (1–10)	9.0 (2.2–10)	6.5 (1–10)	7.8 (2.4–10)	65 (25–75)	21 (3–35)
No [c]	57 (11.4)	3.4 (1–8)	8.2 (1.0–10)	6.7 (1–10)	7.6 (1.0–9.4)	64 (25–75)	20 (7–38)
KW		105.10	8.891	0.481	12.848	19.174	13.345
P		a-b; a-c; b-c **<0.001**	a-c; b-c **0.012**	0.786	a-c; b-c **0.002**	a-b; a-c; b-c **<.001**	b-a; c-a **0.001**

CDNMQ: Competencies for Disaster Nursing Management Questionnaire; PSS: Perceived Stress Scale; NJMS: Nurses Job Motıvatıon Scale; KW: Kruskall Walls test; U: Mann Whitney U test; Tamhane's T2 test was used to examine the differences between the groups (post-hoc).
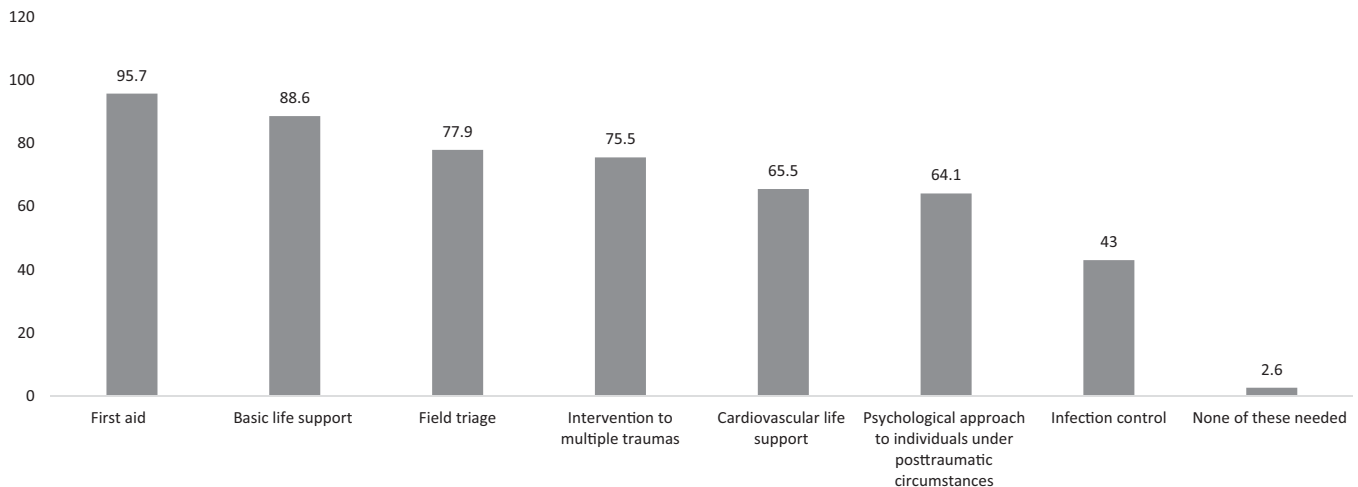
Figure 1. Types of training required by nurses in disaster education programs.

assessments involving the dimensions of critical thinking skills, special diagnostic skills, general diagnostic skills, technical skills, and communication skills.[22,29,36,39] In studies conducted in Turkey, nurses have been reported to have moderate to slightly higher than moderate levels of preparedness for disaster events.[4,22] In this study, the participants aged between 20-29 years were found to have significantly higher mean CDNMQ scores. Additionally, the levels of preparedness, education, and awareness in relation to disasters are increasing in Turkey. In fact, the increase in the rates of nurses who experienced disasters, those who had received relevant training, and those who were prepared for disasters support this conclusion.[4,22] Competency, skills, and ability to practice in any field are essential qualities for nurses.

The results concerning the aforementioned factors, excluding professional experience, showed similarities to those found in the general literature. However, the fact that about one third of the participants of this study had participated in disaster drills, and that half of them felt prepared for disasters, was impressive. In a systematic review conducted by Laprague et al. (2018), in which 17 studies from 18 countries were evaluated, it was found that nurses did not feel confident in terms of performing efficient interventions.[13] A study conducted by Wenji et al. (2015) with 12 nurses who had disaster experience reported that nurses needed top-level knowledge and skills.[40] In Japan, China, and Indonesia, it was reported that education levels, disaster training rates, previous disaster experiences, previous assignments in disasters, and working durations were important factors regarding preparedness for disaster events among nurses.[41−43] Studies conducted with nurses in countries that have experienced disasters have indicated that realistic disaster drills should be included in education programs (e.g., disaster simulations, high-level first aid, and life support education), as well as that disaster drills should be continuously implemented and evaluated in all types of hospital organizations and under all circumstances.

In this study, CDNMQ scores were found to be high in the participants who held bachelor's or master's degrees. Previous studies have proven that nurses' preparedness levels increase as their education levels increase, and nurses who participate in disaster training programs have higher levels of self-confidence.[13,31,43] Nurses holding postgraduate/doctoral degrees have been found to exhibit higher disaster preparedness levels in Turkey,[31] an expected result. The

finding that participants' disaster preparedness levels increased as their education levels increased may be explained by their education programs and curriculum content. Willing nurses and those exhibiting high levels of motivation are essential to a successful and efficient disaster management process.[18,28]

Participants' job motivation levels were found to be favorable, and those who had participated in disaster management training programs and disaster drills, those who believed they were aware of their duties and responsibilities, and those who felt prepared for disasters were found to have higher levels of motivation. In Taiwan and Israel, it was reported that a very limited number of nurses were prepared to participate in cases of disasters,[28,44] and nurses displayed low levels of motivation for participating in disaster management.[24] It has been reported that nurses do not participate in disaster training and drills because they do not have time due to heavy workloads,[17] and disaster drills are generally not performed because of the economic burden on hospitals.[14] On the other hand, nurses exhibit motivation and responsibility when they have received relevant training[28] and have participated in disaster drills.[14,18,27] The natural and compulsory experience gained in geographies where disasters are frequent, the sensitivity of health institutions towards the issue, the sanctions of health policies, and the high awareness of society positively affect motivation for participation in disasters. The fact that this study was carried out after the Izmir earthquake (30 October 2020) reflects its results,[45] and the result that nurses displayed favorable work motivation levels and the necessary motivation for participating in training programs and disaster management processes is promising.

Being the first responders in disasters, nurses assume the obligation of caring for patients who experience different types and degrees of trauma.[17] In this study, significantly higher perceived stress levels and a moderate median general scale score were found in participants aged between 20 and 29 years and those who had 1-5 years of working experience. Studies have revealed that only 50% of nurses are able to cope with stress in case of disasters,[46] that nurses who have experienced disasters display high levels of stress, and that training programs for psychological preparedness are not sufficient in the context of disaster management education.[17,29,46] Disasters occur very frequently in Turkey, requiring nurses to have the ability to manage stress. In fact, more than half of the participants in this study requested psychological preparedness training as

part of their education. Our research results revealed that although the competencies of younger health care workers were high, their stress levels were also high. Like the results revealed by Lio et al., this may be due to the belief that nurses will never be sufficiently competent when faced with an unforeseen disaster.[29] In addition, the fact that the majority of the participants in our study were female, and the fact that most were responsible for providing care at home (i.e., had children), may explain the high stress levels due to not being able to reach family members in case of disaster. Previous studies have found that nurses assume responsibility and are motivated in cases of disasters when they feel more confidence in their own disaster competency and knowledge.[18,28]

This study revealed a positive correlation between the CDNMQ and NJMS scores of the participants, and a negative correlation between their NJMS and PSS scores. In fact, the participants who had participated in disaster training programs and drills and those who believed they were aware of their duties and responsibilities displayed increased disaster competency and motivation levels and lower stress levels. Alan et al. (2022) identified a positive correlation between the competency levels of nurses in disaster management and their psychological resilience levels.[39] In contrast to the information in the relevant literature, Liou et al. (2020) reported negative correlations among the parameters of disaster competency, expected disaster stress, and motivation levels in students and nurses, perhaps explained by the stress that develops due to feelings of disaster unpreparedness, which usually cannot be predicted.[22,30,39,47] These results support the results of other studies in the literature. The fact that young nurses displaying favorable disaster competency and motivation levels would be assigned to serve in disaster management processes in Turkey is promising. However, a successful disaster management process cannot be expected when most nurses do not feel prepared, are not aware of their duties and responsibilities, have little experience, and exhibit high stress levels.[47]

Limitations

Research was carried out using a cross-sectional design. This study included a limited sample size; while there are different categories of hospitals in Turkey (university, state, and private), the data were only collected from nurses working in a private hospital chain. Because Turkey contains over 30 000 intensive care nurses, our sample number may not represent the entire country. For this reason, future studies are recommended.

Conclusion

Participants of this study displayed favorable competency, motivation, and stress levels, but the majority did not feel prepared for disasters because they were young and had little disaster experience. Those who received training on disaster nursing and disasters and participated in disaster drills the previous year who thought that they were prepared for disasters and were aware of their duties and responsibilities had higher stress levels. The study found a weak positive correlation between disaster management competency and motivation, but a weak negative correlation between stress levels. We found that age, education level, and the variables that required disaster experience were associated with significant differences in terms of disaster competency and its dimensions, motivation, and stress levels. We also found

that nurses' disaster experiences impacted their competency, feelings of preparedness, and stress and motivation levels, with motivation being a predictor of increased competency. Because the sample of the study was not homogeneously distributed, the mediating role of stress level between disaster competence and motivation could not be investigated with advanced statistical methods.

In line with the findings of our research, each organization/ institution should regularly assess the disaster preparedness competencies and factors that influence health workers, as well as implement development and strengthening programs in line with individual needs and underdeveloped areas. We recommend the inclusion of theoretical and practical disaster nursing as a compulsory course in the curriculum of nursing education in geographies where disasters are frequently experienced (as in Turkey), the implementation of certificate programs in disaster management after graduation, the implementation of health policies at the ministry level, and the development of disaster nursing as a specialized field. We also recommend the application of education methods involving realistic disaster drills and the organization of regular training programs.

Further studies with homogeneously distributed sample groups that confirm our results and provide a better understanding of the obstacles nurses face while preparing for possible disasters are recommended.

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