


# Jordanian Nurses' Perceptions of Disaster Preparedness and Core Competencies

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## Original Research

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### Abstract

**Objective:** This study aims to identify the Jordanian nurses' perception of their disaster preparedness and core competencies.

**Methods:** A descriptive, cross-sectional research design was used. The data was collected via an online self-reported questionnaire using the disaster preparedness evaluation tool and the core disaster competencies tool.

**Results:** A total of 126 nurses participated in the study. Jordanian nurses had moderate to high levels of core disaster competencies and moderate levels of disaster preparedness. Core disaster competencies and disaster preparedness levels differed based on previous training on disaster preparedness, and the availability of an established emergency plan in their hospitals. Lastly, a previous training on disaster preparedness and core disaster competencies were statistically significant predictors of disaster preparedness among Jordanian nurses.

**Conclusions:** Organizational factors and environmental contexts play a role in the development of such capabilities. Future research should focus on understanding the barriers and facilitators of developing core disaster competencies and disaster preparedness among nurses.

## Background

The World Health Organization (WHO) defined a disaster as “an incident or incidents which may involve a significant number of individuals or groups of individuals, including a community or even a country where there is a development of an event or events that may affect the health, economy, or environment negatively.”<sup>1</sup> The awareness about the impact of disasters is emphasized by the extent of structural and economic damage, lives lost, and economic backlash that society sustained. For instance, the recent earthquakes in Turkey and Syria resulted in the deaths of 45 000 people, \$34 billion in damages to economic output, and infrastructure, as well as millions of homeless people.<sup>2</sup> Vulnerable populations, including the sick admitted in hospitals, are at higher risk of severe injuries, and even death during disaster situations because of their pre-existing illnesses, physical limitations, disabilities, and inability to make life-and-death decisions during highly stressful, uncertain, and acute situations.<sup>3</sup>

When patients in hospitals are involved, nurses play a significant role as direct care providers, rescuers, and helpers, as well as leaders during disaster situations. In a call to action, the roles that nurses can take in disaster preparedness and response was emphasized (such as leaders, educators, responders, and policymakers, as well as researchers).<sup>4</sup> The investigators enumerated the barriers and facilitators that might support or hinder the ability of nurses to take up such roles during disasters namely. One of these factors is related to *individual nurse factors* such as level of personal disaster preparedness, level of competencies regarding disasters, public health emergencies, and willingness to respond.<sup>4</sup> For nurses to be able to carry out the roles expected of them during disasters, they should possess necessary competencies (i.e., knowledge, skills, and attitudes) that enable them and increase their confidence in responding to disaster situations.<sup>5</sup>

Specific disaster competencies that nurses are expected to possess should encompass the 4 phases of disaster management which are preparedness, response, and recovery. During preparation, planning, continuous education/training, and assessment, as well as evaluation of activities involved in disaster management are carried out. Preparation is followed by mitigation during which a comprehensive plan for the identification of risks, strategies to address risks, and interventions to strengthen resilience of response mechanisms is drafted. In the response phase, nurses are activated together with other personnel and the focus of activities is on saving lives, reducing damage to infrastructure, and supporting survivors through provision of basic needs. Lastly, the recovery phase is intended to focus on the return to normal levels of social functioning.<sup>6</sup>

Despite increasing awareness about the significance of possessing the necessary competencies to be able to provide care and respond to disasters and public health emergencies, definitions of competencies remain imprecise, competencies have not been validated, and

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nurses remain uncertain about their roles during such situations.<sup>7</sup> Nurses possess insufficient knowledge despite education and training on pertinent areas of disaster management such as disasters in general, the proper use of protective equipment and trauma care, biological information, and management of bio-terrorism, as well as management and control of infectious diseases in disaster areas and living conditions, the implementation of disaster policies/plans, role of hospitals during disasters, and nurses' own roles during disasters and public health emergencies.<sup>8</sup> The lack of knowledge is adversely complemented by the lack of skills despite nurses' perceptions that diversity of skills is important to be able to effectively respond to life-threatening situations. In turn, the lack of knowledge and skills impacted the beliefs of nurses in their capacity to provide disaster-related patient care and in fulfilling their expected roles and responsibilities, and that there is an expectation on individuals to turn into a "strong nurse" when confronted with disaster situations.<sup>8</sup>

When asked regarding their actual experiences during disasters and public health emergencies, nurses have highlighted the need for obtaining core competencies to enhance their preparedness, although several issues, and problems posed as challenges for them to achieve the required set of knowledge, skills, and attitudes in disaster management. This impacted on their ability to take on their expected roles during the actual disaster, which was further impeded by their lack of prior disaster experience, lack of adequate training, and education.<sup>9</sup> The researchers found that strategies such as provision of disaster training opportunities, compiling resource inventories, formulating, and implementing disaster drills/simulations, as well as training on emergency and disaster management, and emergency communication methods respectively, were valuable interventions to help nurses increase the levels of their disaster preparedness.<sup>10</sup>

In Jordan, there is a paucity of studies regarding disaster core competency assessment and disaster preparedness of nurses. Few studies showed that 65% of respondents had weak knowledge levels regarding disaster preparedness, and that less than 50% of respondents received any form of disaster training at any stage of their educational preparation. Al Khalailah measured the attitudes of nurse educators on the integration of disaster preparedness learning contents in nursing curricula,<sup>11</sup> and found that even nurse educators themselves had low levels of knowledge regarding disaster preparedness. The scarcity of evidence on disaster core competencies and disaster preparedness of nurses has the potential to adversely impede nurse managers, hospital administrators, and even government agencies in implementing strategies that enable, and empower nurses to take up their roles and responsibilities during disaster situations. In addition, the scarcity of evidence represents a significant gap in literature, of a topic that has critical implications to society and public health. Hence, this study aims to identify the Jordanian nurses' perception of their disaster preparedness and core competencies.

## Methodology

### Research Design

The study used a descriptive, correlational design.

### Setting, Population, and Sample Size

The study was conducted in 3 public hospitals; the target population was nurses working in these hospitals during the study period. These are the 3 biggest public hospitals in the central region which have the largest portion of Jordanian people.<sup>12</sup>

A convenience sampling technique was used to recruit participants. The inclusion criteria was: being a nurse, willing electively to participate in the study, working at any 'hospitals' wards or units, and having a minimum of 1 year experience in the same hospital to be familiar with the hospital policies and procedures. To determine the minimum sample size of the study's participants, the researchers calculated it based on a conventional power of 0.80, a conventional criterion of statistical significance ( $\alpha$ ) of 0.05, and a medium effect size by using the G\*Power 3.1.2 as well as 8 predictors. The sample size in this study was initially estimated to be 109, based on a multiple regression analysis. Additional 10% of participants were added to overcome incomplete questionnaires. Therefore, the sample size was 120.

### The Study Instrument

An online self-report questionnaire with a consent form was used to collect data. The questionnaire consists of 3 parts:

#### Demographic data

Demographic data used in the questionnaire were inferred from previous studies. These demographic data are gender (Male, Female), age (In years), education level (Diploma, Bachelor, Master's degree, PhD), and experiences (In years), as well as working areas, and if they have any previous experience/ training about disaster management.

#### Disaster preparedness evaluation tool (DPET)

This instrument contains 47 Likert type questions; with the first 25 items discussing "pre-disaster preparedness," in 3 categories: knowledge, disaster skills, and personal preparedness. The next 16 items discuss "response" and the items were grouped into 2 categories: knowledge and patient management. The last 6 items in the first section discuss the "recovery stage of disaster." The scale of answers ranges from 1 to 6 (Strongly Disagree to Strongly Agree). Cronbach's alpha internal consistency reliability for the original instrument was 0.91,<sup>13</sup> and in the current study was 0.96. If the value of the mean is 1 – 2.99, the nurses' perception of their preparation is weak; if the mean is 3 – 4.99, the nurses' perception of their preparation is moderate; if the value of the mean is 5 – 6, the nurses' perception of their preparation is strong.

#### Core competencies on disaster tool

A total of 15 questions were scored using a 5-point Likert scale that ranged from 5 points (strongly agree) to 1 point (strongly disagree). The total sum of the points ranged from 15 points to 75 points, and a higher score indicates a higher level of core competencies on the ability to perform regarding disaster nursing. The face validity of the questionnaire was verified by 3 nursing school professors and 3 nurses with disaster experiences, and a preliminary examination was conducted to modify and refine any inadequate content or phrases in the questionnaire. The Cronbach's alpha coefficient regarding the measurement tools for disaster nursing competencies was 0.94,<sup>14</sup> and in the current study was 0.97.

#### Data Collection Procedure

After obtaining the needed approval, the authors contacted the managers of the selected hospitals to facilitate the data collection procedures, then visited the nursing director in each hospital to explain the purpose, and method, as well as data collection procedure. After that, the authors visited all departments in each

hospital to obtain permission from the head nurse to collect data from their nurses. The link to the data collection kit including the covering letter and questionnaire was shared with the WhatsApp group or emailed by the nurse manager for all selected hospital departments.

### Ethical Considerations

The authors obtained ethical approval for this study from the Committee of Scientific Research and Ethics of Research at the Faculty of Nursing at Zarqa Private University. Another Institutional Review Board (IRB) approval was gotten from the Ministry of Health and from each selected hospital as well. Additionally, to maintain freedom of participation or withdrawal in the study without negatively affecting their career, responding to the electronic link was considered as consent to participate. To preserve the anonymity of the participants, the authors avoided any questions that involved their personal details. The collected data was saved in an accessed controlled file in the principal investigator's personal computer, which is impossible to use by others, to maintain confidentiality. Finally, the authors obtained the approval to use the instruments used in the study from the original author.

### Data Analysis

SPSS version 26 (IBM Corp., Armonk, New York, USA) was used to analyze data. Descriptive statistical analysis for mean, frequency, standard deviation (SD), and percentage were used to describe the study sample. Inferential statistics were used to determine the differences and relationships among groups based on their demographical characteristics using correlation coefficient (Pearson's  $r$ ), independent  $t$ -test, and 1-way analysis of variance (ANOVA). Finally, multiple linear regression was used to determine predictors of perceived disaster preparedness.

## Results

### Sociodemographic Characteristics

A total of 126 nurses participated in the study. Table 1 shows the sociodemographic characteristics of the participants. Mean age of participants was 32 years old ( $SD \pm 6.5$ ). The highest percentage of the participants were females ( $n = 71, 56.3\%$ ) while the rest were males ( $n = 55, 43.7\%$ ). In terms of their educational attainment, the majority of the participants had a bachelor's degree ( $n = 92, 73.0\%$ ), others had completed a nursing diploma ( $n = 16, 12.7\%$ ), and the rest of them held a masters' degree ( $n = 18, 14.3\%$ ).

Mean length of working time as a nurse was 8 years ( $SD \pm 5.8$ ). Nurses worked in a variety of departments, including the medical ward ( $n = 35, 28.6\%$ ), followed by the emergency department ( $n = 24, 19.0\%$ ), and surgical ward ( $n = 23, 18.3\%$ ), as well as intensive care units ( $n = 21, 16.7\%$ ), and in operating theatres ( $n = 3, 2.4\%$ ). The rest of the participants who provided a response worked in other departments ( $n = 19, 15\%$ ).

With respect to disaster experience, the highest percentage of the participants reported that they received training on disaster preparation and management ( $n = 68, 54.0\%$ ) while the rest did not ( $n = 58, 46.0\%$ ). On the other hand, the highest percentage of the participants ( $n = 71, 56.3\%$ ) reported that their workplace has an established emergency (disaster) plan, while others reported no plan ( $n = 55, 43.7\%$ ).

**Table 1.** Frequencies and percentages of the study participants according to demographic characteristics ( $n = 126$ )

Characteristics	Mean (SD)
<b>Age</b>	32 (6.5)
<b>Length of experience (in years)</b>	8.3 (5.8)
	<b>n (%)</b>
<b>Gender</b>	
Male	55 (43.7)
Female	71 (56.3)
<b>Area of Work</b>	
Medical	36 (28.6)
Surgical	23 (18.3)
Operating Room	3 (2.4)
ICU/CCU	21 (16.7)
Emergency Department	24 (19.0)
Others	19 (15.0)
<b>Educational Attainment</b>	
Diploma	16 (12.7)
BSc	92 (73.0)
Masters' degree	18 (14.3)
<b>Disaster Preparedness Training/Drills</b>	
Yes	58 (46.0)
No	68 (54.0)
<b>Is there an established emergency (disaster) plan in your workplace</b>	
Yes	71 (56.3)
No	55 (43.7)

### The Level of Core Competencies on Disaster Nursing

The mean of the participants' responses was presented in Table 2. There were no cut-off scores set by the original tool developers, but higher scores meant higher levels of disaster competencies. The total score for the scale was 53.5 out of 75 ( $SD = 20.9$ ) which meant moderate to high levels of disaster competencies.

### The Level of Preparation for Disaster

The mean of the participants' responses was presented in Table 3. The mean score showed a moderate level of disaster preparedness (mean = 3.83 out of 6,  $SD = 1.7$ ). Per domain scores also showed moderate levels of disaster preparation (mean = 3.80 out of 6,  $SD = 1.7$ ), disaster response (mean = 3.91 out of 6,  $SD = 1.7$ ), and disaster recovery (mean = 3.89 out of 6,  $SD = 1.8$ ).

### Differences/ Relationships in the Levels of Perceived Disaster Preparedness and Core Competencies Based on Their Demographical Characteristics

Nurses who had a previous training on disaster had statistically significant higher scores on core disaster competencies ( $t = 1.02, P = 0.02$ ) and higher scores on overall disaster preparedness ( $t = -0.55, P < 0.001$ ) compared to nurses who had no previous training. Furthermore, nurses who reported the availability of an established emergency (disaster) plan had statistically significant higher scores on core disaster competencies ( $t = 1.09, P = 0.02$ ) and higher scores on overall disaster preparedness ( $t = 0.41, P < 0.001$ ) compared to nurses who denied the availability of

**Table 2.** The level of core competencies on disaster nursing (n = 126)

Item No.	Items	Mean	SD
1	Aware of procedure to record nursing documents	3.58	1.482
2	Aware of procedure to transfer information of important targets to other medical staffs and those concerned	3.60	1.476
3	Able to inspect, monitor, and report on patients as nurses	3.62	1.496
4	Aware of medical system of local community and perform nurses' roles	3.56	1.483
5	Able to collect necessary information and share it with health managers effectively	3.62	1.491
6	Aware of disaster-related guidelines of current respective organization	3.49	1.452
7	Able to provide proper nursing care according to triage	3.63	1.429
8	Health consulting/training can be provided to targets on long-term impact by disaster	3.56	1.412
9	Missions can be shared together with main partners who are concerned in disaster prevention	3.57	1.422
10	Backgrounds and conditions of different targets can be understood and inspected	3.56	1.434
11	Aware of role and general response to disaster situation	3.48	1.452
12	Sensitive and weak targets (seniors, pregnant women, the disabled, etc.) can be provided with proper nursing care during disaster	3.54	1.468
13	Proper psychological support can be provided to all people concerned in disaster occurrence	3.58	1.488
14	Able to provide emergency first-aid to victims of disaster	3.59	1.460
15	Aware of duties medical staffs have to perform under disaster	3.52	1.495
<b>Overall</b>		<b>53.5</b>	<b>20.9</b>

**Table 3.** The level of preparedness on disaster nursing (n = 126)

No.	Items	Mean	SD
<b>Preparedness Domain</b>		<b>3.8</b>	<b>1.7</b>
1	I participate in disaster drills or exercises at my workplace (clinic, hospital, etc.) on a regular basis.	3.58	2.0
2	I have participated in emergency plan drafting and emergency planning for disaster situations in my community.	3.61	2.0
3	I know who to contact (chain of command) in disaster situations in my community.	3.67	2.0
4	I participate in 1 of the following educational activities on a regular basis: continuing education classes, seminars, or conferences dealing with disaster preparedness.	3.59	2.0
5	I read journal articles related to disaster preparedness.	3.61	1.9
6	I am aware of classes about disaster preparedness and management that are offered for example, at either my workplace, the university, or community.	3.77	2.0
7	I would be interested in educational classes on disaster preparedness that relate specifically to my community situation.	4.13	2.0
8	I find that the research literature on disaster preparedness and management is easily accessible.	3.76	1.8
9	I find that the research literature on disaster preparedness is understandable.	3.65	1.9
10	I consider myself prepared for the management of disasters.	3.74	1.9
11	Finding relevant information about disaster preparedness related to my community needs is an obstacle to my level of preparedness.	3.71	1.9
12	I know where to find relevant research or information related to disaster preparedness and management to fill in gaps in my knowledge.	3.80	1.9
13	I have a list of contacts in the medical or health community in which I practice. I know referral contacts in case of a disaster situation (e.g., health department).	3.59	1.9
14	In case of a disaster situation I think that there is sufficient support from local officials at the county or state level.	3.74	1.9
15	I participate/have participated in creating, at the local or national level, new guidelines, and emergency plans, or lobbying for improvements.	3.66	2.0
16	I would be considered a key leadership figure in my community in a disaster situation.	3.78	1.9
17	I am aware of what the potential vulnerabilities in my community are (e.g., earthquake, floods, and terror, etc.).	3.71	1.9
18	I know the limits of my knowledge, skills, as well as authority as an RN to act in disaster situations, and I would know when I exceed them.	3.94	1.9
19	In case of a bioterrorism/biological attack, I know how to use personal protective equipment.	3.92	1.9
20	In case of a bioterrorism/biological attack, I know how to execute decontamination procedures.	3.87	1.8
21	In a case of bioterrorism/biological attack, I know how to perform isolation procedures so that I minimize the risks of community exposure.	3.94	1.9
22	I am familiar with the local emergency response system for disasters.	3.96	1.9
23	I am familiar with accepted triage principles used in disaster situations.	3.94	1.9
24	I have personal/family emergency plans in place for disaster situations.	3.75	1.9
25	I have an agreement with loved ones and family members on how to execute our personal/family emergency plans.	3.82	1.8

(Continued)

**Table 3.** (Continued)

No.	Items	Mean	SD
<b>Response Domain</b>		<b>3.91</b>	<b>1.7</b>
26	I can identify possible indicators of mass exposure evidenced by a clustering of patients with similar symptoms.	3.80	1.9
27	I can manage the common symptoms and reactions of disaster survivors that are affective, behavioral, cognitive, and physical in nature.	3.89	1.9
28	I am familiar with psychological interventions, behavioral therapy, cognitive strategies, and support groups, as well as incident debriefing for patients who experience emotional or physical trauma.	3.77	1.9
29	I am able to describe my role in the response phase of a disaster in the context of my workplace, the general public, media, and personal contacts.	3.89	1.9
30	I am familiar with the main Groups (A, B, C) of biological weapons (Anthrax, Plague, Botulism, Smallpox, etc.), their signs, symptoms, and effective treatments.	3.79	1.9
31	I feel confident discerning deviations in health assessments indicating potential exposure to biological agents.	3.83	1.9
32	As an RN, I would feel confident in my abilities as a direct care provider and first responder in disaster situations.	4.06	1.9
33	As an RN, I would feel confident as a manager or coordinator of a shelter.	4.01	1.9
34	As an RN, I would feel reasonably confident in my abilities to be a member of a decontamination team.	4.04	1.9
35	In case of a bioterrorism/biological attack, I know how to perform focused health history and assessment, specific to the bio agents that are used.	3.82	1.8
36	I would feel confident working as a triage nurse practitioner and setting up temporary clinics in disaster situations.	4.00	1.9
37	I feel reasonably confident that I can treat patients independently without supervision of a physician in a disaster situation.	3.87	1.9
38	I am familiar with the organizational logistics and roles among local, state, and federal agencies in disaster response situations.	3.88	1.8
39	I would feel confident implementing emergency plans, evacuation procedures, and similar functions.	3.98	1.8
40	I would feel confident providing patient education on stress and abnormal functioning related to trauma.	4.02	1.9
<b>Recovery Domain</b>		<b>3.89</b>	<b>1.8</b>
41	I would feel confident providing education on coping skills and training for patients who experience traumatic situations, so they are able to manage themselves.	3.91	1.9
42	I am able to discern the signs and symptoms of Acute Stress disorder and Post Traumatic Stress Syndrome (PTSD).	3.90	1.9
43	I am familiar with what the scope of my role as a nurse practitioner in a post-disaster situation would be.	3.89	1.9
44	I participate in peer evaluation of skills on disaster preparedness and response.	3.84	1.9
45	I am familiar with how to perform focused health assessment for PTSD.	3.87	1.9
46	I feel confident managing (treating, evaluating) emotional outcomes for Acute Stress Disorder or PTSD following disaster or trauma in a multi-disciplinary way such as referrals, and follow-ups and I know what to expect in ensuing months.	3.94	1.9
<b>Overall</b>		<b>3.83</b>	<b>1.7</b>

an established emergency (disaster) plan. Further details are shown in [Table 4](#).

#### *Relationship Between the Levels of Perceived Disaster Preparedness and Core Competencies*

The core disaster competencies had a very strong, positive significant relationship with overall disaster preparedness ( $r=0.78$ ,  $P<0.001$ ) which meant that nurses who had high scores on core disaster competencies had high scores on disaster preparedness. Similarly, very strong, positive significant relationships were found between core disaster competencies and the domains of disaster preparedness ( $r=0.76$ ,  $P<0.001$ ), disaster response ( $r=0.77$ ,  $P<0.001$ ) and disaster recovery ( $r=0.77$ ,  $P<0.001$ ) which meant that nurses who had high scores on core disaster competencies also had high scores on each of the 3 mentioned domains.

#### *Predictors of Perceived Disaster Preparedness*

Multiple linear regression was performed, the model was statistically significant,  $F(3,122) = 68.75$ ,  $P<0.001$ , and 62% of the variance in disaster preparedness was predicted. A previous training on disaster nursing and core disaster competencies were statistically significant predictors. Further details are shown in [Table 5](#).

## **Discussion**

### *Levels of Core Disaster Competencies and Disaster Preparedness*

Results of the study showed that Jordanian nurses working in public hospitals had moderate to high levels of core disaster competencies. This result was contrary to other studies that measured low levels of core disaster competencies among nurses working in other settings and countries, although it must be noted that other studies measured levels of core disaster competencies using different survey instruments.<sup>1,15,16</sup> Due to the lack of previous studies that measured levels of core disaster competencies in Jordan, it is difficult to make conclusions on whether the results were only applicable to nurses sampled from the participating hospitals or Jordanian nurses had already high levels of core disaster competencies to begin with.<sup>8</sup> Nevertheless, having moderate to high levels of core disaster competencies suggest that Jordanian nurses receive appropriate support, training, and education to ensure that they will be able to provide safe, quality, and responsive nursing care during emergencies.

However, the moderate to high levels of core disaster competencies did not mean that nurses no longer have any role or responsibility when it comes to the level of their knowledge and skills. While the scores were already on the moderate to high level, scores were only a snapshot of time, and were not guarantees that competency levels will remain high when an actual disaster

**Table 4.** Differences in nurses' perception of core disaster competencies and disaster preparedness based on their demographical characteristics

Variables	Overall (CCD*)		D - Preparedness		D - Response		D - Recovery		Overall (DP)*	
	Mean (SD)	P - value	Mean (SD)	P - value	Mean (SD)	P - value	Mean (SD)	P - value	Mean (SD)	P - value
<b>Gender</b>		0.61		0.68		0.08		0.09		0.17
Male	53.33 (21.74)		3.79 (1.71)		3.81 (1.85)		3.70 (1.94)		3.78 (1.76)	
Female	53.63 (20.44)		3.76 (1.68)		3.98 (1.66)		4.04 (1.76)		3.87 (1.65)	
<b>Educational Attainment</b>		0.24		0.24		0.42		0.49		0.32
Practical nursing	46.31 (23.49)		3.12 (1.85)		3.41 (1.90)		3.44 (1.91)		3.26 (1.84)	
Bachelor (undergraduate)	50.83 (17.87)		3.89 (1.69)		4.02 (1.75)		4.00 (1.87)		3.95 (1.70)	
Masters' (postgraduate)	53.50 (20.93)		3.72 (1.44)		3.77 (1.59)		3.73 (1.70)		3.74 (1.49)	
<b>Area of Work</b>		0.07		0.74		0.63		0.40		0.67
Medical Ward	49.49 (23.24)		3.60 (1.83)		3.73 (1.85)		3.78 (1.93)		3.67 (1.81)	
Surgical Ward	62.83 (17.54)		4.09 (1.47)		4.29 (1.54)		4.54 (1.67)		4.22 (1.48)	
Operation Room/ Theatre	52.67 (18.15)		3.64 (0.32)		4.73 (0.24)		4.22 (0.84)		4.62 (0.28)	
ICU/CCU	49.14 (20.64)		3.63 (1.85)		3.58 (2.00)		3.44 (2.05)		3.59 (1.90)	
Emergency Department	57.50 (21.25)		3.86 (1.76)		4.05 (1.74)		1.91 (0.39)		3.93 (1.75)	
Other	43.54 (18.84)		3.40 (1.63)		3.54 (1.74)		3.37 (1.68)		3.45 (1.64)	
<b>Previous Training/ Drills on Disaster</b>		<b>0.02*</b>		<b>&lt;0.001*</b>		<b>&lt;0.001*</b>		<b>0.003*</b>		<b>&lt;0.001*</b>
No	51.75 (22.67)		3.67 (1.41)		3.84 (1.48)		3.79 (1.65)		3.74 (1.40)	
Yes	55.55 (18.67)		3.86 (1.90)		3.96 (1.95)		3.98 (2.00)		3.91 (1.91)	
<b>Availability of an established emergency (disaster) plan</b>		<b>0.02*</b>		<b>&lt;0.001*</b>		<b>&lt;0.001*</b>		<b>&lt;0.001*</b>		<b>&lt;0.001*</b>
No	51.72 (22.68)		3.76 (1.90)		3.79 (1.97)		3.80 (2.03)		3.77 (1.93)	
Yes	55.80 (18.37)		3.78 (1.38)		4.05 (1.40)		4.01 (1.58)		3.90 (1.35)	

**Abbreviations:** CCD, Core competencies on disaster; DP, Disaster preparedness.

\*Significant at  $P < 0.05$ .

**Table 5.** Multiple linear regression analysis for variables associated with perceived disaster preparedness (n = 126)

Variable	B	SE	$\beta$	t	P-value
(Constant)	0.260	0.290		0.894	0.373
Availability of an established disaster plan	-0.350	0.274	-0.103	-1.278	0.204
Previous training in disaster management	0.664	0.273	0.196	2.435	<b>0.016</b>
CCD Total	0.064	0.004	0.788	14.204	<b>0.000</b>

**Abbreviation:** CCD, Core competencies on disaster.

occurs. In addition, the moderate level of scores suggest room for improvement that can be addressed by the implementation of training, teaching, and learning sessions developed by and for nurses in collaboration with the wider multidisciplinary team.<sup>9,10</sup>

Results of the study showed that nurses had moderate levels of scores on each of the domains and overall disaster preparedness. This result was consistent with other studies that reported measures of disaster preparedness among nurses working in different settings.<sup>17-19</sup> Similar to scores on core disaster competencies, the moderate level of scores suggests room for improvement which could be targeted by specific, bespoke

educational intervention, and continuous managerial support, as well as collaborative work with multidisciplinary teams both inside and outside of the hospital.<sup>20,21</sup> Teaching and learning opportunities are all the more significant since the item with the highest score among the participants was expressing interest in accessing educational classes on disaster preparedness.

Either way, results showed that nurse educators, nurse managers, and hospital administrators should encourage and pursue the use of simulation as an educational strategy to develop disaster preparedness, as it is with core disaster competencies.<sup>22,23</sup> When simulation scenarios such as drills, are scheduled, nurse managers should grant staff nurses the time to attend such drills, or find ways to cover nurses at the wards if they are working.<sup>24,25</sup> In other methods, nurse educators can also implement simulation scenarios to include patients, families, and other hospital personnel, as if there really was an occurring disaster.<sup>26</sup> After all, when disasters happen, the effects are wide in scale and do not discriminate against hospital departments, patient types, locations, or time of the day.

### Sociodemographic and Professional Characteristics

Of the socio-demographic and professional characteristics, only the previous training in disaster management, and the availability of an established emergency (disaster) plan were significantly

related with core disaster competencies. No significant differences or relationships were found based on other sociodemographic and professional characteristics. This result was contrary to those of other studies that showed that core disaster competencies differed by age and length of experience.<sup>27,28</sup> What the results suggest was that core disaster competencies were similar across all nurses regardless of sex, age, educational attainment, and area of work, as well as length of experience; highlighting the fact that core disaster competencies are expected to be acquired and of the highest level, if possible, among all nurses working in all departments since it is all nurses' responsibility to be able to provide safe, and quality nursing care during disasters.<sup>1,29</sup> After all, nurses will not be grouped into specializations during an actual disaster – each and every 1 will be expected to perform a role specific to the demands of the population when the disaster or calamity occurs.

Similar to results in core disaster competencies, and yet coinciding with evidence from literature, nurses who had previous training and who had an established emergency (disaster) plan in their hospitals had significantly higher levels of disaster preparedness compared to nurses who did not have any previous training and had no established emergency (disaster) plan in their hospitals.<sup>1,8</sup> After all, the expectation is that prior exposure to training and education, and prior personal experience of a disaster should enable individual nurses to gain more relevant insight on what entails disaster preparedness. Nurses should be able to incorporate their learnings with their experiences so that their ability to prepare, respond, and recover from disasters will be improved.<sup>30</sup>

### **Core Disaster Competencies and Disaster Preparedness**

Results showed that core disaster competencies have a strong significant, positive correlation with disaster preparedness, which meant that nurses who had high levels of core disaster competencies also had significantly higher levels of disaster preparedness. Literature supports the result since acquiring the competency should theoretically enable nurses to have high levels of disaster preparedness.<sup>28,31</sup> Similar correlations were found for the other dimensions of disaster preparedness which meant that acquiring core disaster competencies also improved abilities of nurses in the areas of disaster response and recovery. This result is crucial since disaster management does not only consist of being prepared for when disasters occur but also demands the ability of nurses to respond and support measures for rehabilitation and recovery after the disaster event.<sup>32</sup>

### **Predictors of Core Disaster Competencies and Disaster Preparedness**

In fact, regression models only explained 62% of the measured variation for disaster preparedness. This meant that other unexplored factors accounting for the remaining 38% of variation might have influenced the scores for disaster preparedness. The results of the study showed that previous training in disaster and core disaster competencies were significant predictors of measured levels of disaster preparedness. This result provided emphasis on the significant role of the organization in ensuring that nurses possess the competencies and the confidence required to become prepared in responding to disasters and calamities as part of a multidisciplinary, multisectoral team. This is consistent with results from other studies that explained the value of the organization in developing core disaster competencies and disaster

preparedness, not only among nurses, but also among other healthcare professionals.<sup>33–36</sup>

## **Implications**

### **Implications for Practice**

Results of the study can help guide the development of strategies that can deliver teaching, learning, and simulation to improve nurse competencies in disaster preparedness/ response, and recovery. It is critical that nurses possess the necessary competencies in disaster preparedness and management to be able to mobilize the multidisciplinary healthcare team in providing fast, responsive, and effective emergent care to individuals who become victims of disasters and calamities.

### **Implications for Policy**

Results of the study can be utilized by policy makers to understand the components needed to support nurses in meeting their core competencies for preparing, responding to, and managing disasters. Policies written to invest manpower, resources, supplies, and equipment, as well as time to develop nurse competencies, should be designed within the larger context of multidisciplinary teamwork, and what nurses can uniquely, and collaboratively, contribute to large scale disaster response. Moreover, results of the study can help guide policy makers and guideline writers on how best to increase the capability of hospital-based nurses to utilize hospital-based resources when victims of disasters start to come in through emergency departments, wards, operating theatres, and intensive care units.

## **Study Recommendations**

In view of the findings, the following recommendations are made:

- 1) Nurse educators should formulate educational strategies such as workshops, seminars, lectures, and simulations to improve the levels of core disaster competencies and disaster preparedness among nurses.
- 2) Enforcing hospital policies that encourage nurses to become engaged with disaster preparedness within the context of effective teamwork, collaboration, communication, and networking. Hospital executives and administrators should foster a culture that inculcates the crucial role of nurses in disaster preparedness, response, and recovery.
- 3) Creating opportunities outside of the hospital setting for nurses to be involved with training courses on emergency care, resuscitation, rescue, triage, and effective resource/ supply management, as well as debriefing, etc.
- 4) Developing plan and implement simulation scenarios for nurses to be able to put their knowledge into practice. A significant barrier in developing core disaster competencies on disaster preparedness, response, and recovery is the fact that theoretical foundations can only ever be demonstrated during an actual disaster.
- 5) Future research should explore the experiences, feelings, and thoughts of nurses regarding developing competencies, and preparedness in disaster management. In addition, longitudinal research designs can help elucidate whether disaster competencies are sustained over time, given that competencies can only ever be put into practice during actual disasters.

## Strengths and Limitations

The study has methodological and theoretical strengths. Theoretically, this study is 1 of the few studies currently exploring the levels of core disaster competencies and disaster preparedness among Jordanian nurses working in hospital settings, and the relationships between the 2 variables. The study used a descriptive, cross-sectional, correlational research design which enabled the measurement of scores and relationships. Methodologically, the study met its target sample size using appropriate sampling designs, thus ensuring that statistical tests were adequately powered, and within intended error rates and confidence intervals. On the other hand, the study has some limitations. First, the use of the descriptive, cross-sectional design meant that only correlations can be inferred from statistical tests (not causation), and that measurements only offered a snapshot of real time. Two, the study used self-report questionnaires which are at risk of recall bias (i.e., participants rely on the accuracy of their recall).

## Conclusion

The study was only 1 of the few to generate data on the relationships between core disaster competencies and disaster preparedness of Jordanian nurses working in hospital settings. When nurses increase their scores on core disaster competencies, they become equipped with the necessary knowledge and skills in disaster preparedness. Future research should focus on understanding the barriers and facilitators of developing core disaster competencies and disaster preparedness among nurses who are ideally positioned to provide safe and quality care even during emergent and life-threatening situations.

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