

PUBLIC HEALTH NURSES' VIEWS ON DISASTER PREPAREDNESS: A COMPREHENSIVE STUDY

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Abstract

Disasters, defined by the World Health Organization as sudden ecological events of extraordinary magnitude necessitating external assistance, have persistently posed severe challenges to communities throughout history. The diversity, frequency, and detrimental consequences of these calamities have touched every facet of society. Recent years have witnessed a surge in disaster occurrences, notably meteorological, climatic, and geophysical events, as indicated in the 2018 World Disaster Report. Given the heightened incidence and devastating impact of these disasters, a critical need exists for every nation to establish dynamic and accessible disaster management plans. Effective disaster management encompasses a range of activities, from pre-disaster needs assessment to post-disaster recovery efforts, including risk analysis and damage mitigation. This includes addressing the healthcare, housing, clean water, food, and safety requirements of affected individuals. Such preparedness necessitates interdisciplinary collaboration, involving healthcare professionals, security forces, fire brigades, and emergency rescue teams, to develop a dynamic, community-focused, and solution-oriented disaster management strategy. In the aftermath of disasters, the affected population faces significant challenges, such as loss of life, injuries, disabilities, and disease outbreaks. The role of healthcare professionals becomes paramount. However, empirical evidence from various national and international hospital-based studies underscores a concerning inadequacy in the preparedness of both health institutions and professionals, highlighting the pressing need for comprehensive and effective disaster preparedness measures.

Keywords: disaster management, healthcare, preparedness, interdisciplinary collaboration, healthcare professionals.

1. Introduction

According to the World Health Organization (WHO), disaster is defined as "sudden ecological events of extraordinary magnitude and severity that require external assistance" (Labrague et al. 2018). Disasters have severely affected the lives of communities throughout human history. Over the years, disasters have affected all segments of society in terms of number, type, and negative effects (Baack and Alfred, 2013). Between 1998 and 2017, disasters increased all over the world. Especially meteorological, climatic, and geophysical disasters have increased alarmingly over the last 20 years (World Disaster Report, 2018). Due to their high incidences and devastating effects on society, all countries must have a dynamic and accessible disaster management plan against disaster events. Disaster management covers all of the works carried out to determine the needs before, during, and after the disaster to prevent disasters, to perform risk analyses and to minimize the damages that will occur, to ensure the health care, housing, clean water, food and safe environment needs of people suffered by disaster

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(Putra, 2011; Yamamoto, 2008; Demirbaş, et al., Kalanlar and Kubilay, 2015). Multisector cooperation (health professionals, security forces, fire brigade, emergency rescue teams) is needed in the preparation of a dynamic, solution-oriented, community-attended, and accessible disaster management plan. As a result of disasters, conditions such as death, injury, disability, and disease are experienced in large numbers, so health professionals play a large role (Savage, C., Kub, J.). The preparation of health professionals and health institutions in disaster preparedness is quite important, while the majority of hospital-based national and international studies suggest that health institutions and professionals are not sufficiently prepared (Army, et al., 2006; Gomez et al., 2011; Grenberg, 2002; Çakmak, 2010; Martono, et al., 2019; Sangkala and Gerdtz, 2018; Vatan and Salur, 2010). Martono et al. (2019) studied with nurses working in Indonesia and stated that nurses' disaster preparedness levels are at a low level. Sangkala et al. (2018) found that nurses have moderate disaster preparedness, but noted that public health nurses should take more education about participating in disaster management for society. Vatan and Salur (2010) observed that 78% of hospitals in a city in Turkey do not have a communication plan during a disaster. A study conducted by Gomez et al (2011) in Canada found that while 65% of trauma centers have a disaster plan, a third of managers at the center is not aware of the plan, and 59% do not know what to do in the first 72 hours in the event of a disaster.

Although nurses have important roles in disaster management, public health nurses, unlike nurses working in hospitals, serve not only the sick person but also healthy community groups. For this reason, nurses are active in tasks such as setting priorities in disaster management, triage, and acute care, also, public health nurses have many tasks such as ensuring community participation in disaster management, monitoring in the disaster zone, providing training for community health, providing the necessary public health services, transporting social resources and communication, community advocacy, and consulting (APHA, 2013; Jakeway, et al., 2008; Magnaye, et al., 2011). According to the American Public Health Association (APHA), public health nurses develop strategies for improving the health of individuals, families, and groups, preventing diseases/injuries, and maintaining health. Public health nurses have a key role in disaster preparedness due to their community-oriented work in their daily practice, extensive knowledge of the general structure and health status of society, and expertise in program planning, community evaluation, and group dynamics (APHA, 2009, ICN, 2009). Public health nurses try to minimize the health hazards and life-threatening damages that may occur due to disasters with nursing practices taking into account the principles of public health practices, surveillance, and sanitation (Putra, et al., 2011 10). Public health nurses have important tasks at all levels of disaster management (APHA, 2009, ICN, 2009).). During the preparation phase, nurses should know the burden and impact of a possible disaster on the health system by using past disaster experience when preparing a future disaster plan. Health trainings should be organized in cooperation with other institutions to ensure the effective participation of the community in disaster management. Public health nurses, together with other stakeholders in the region where they work, should

perform a risk analysis of the region and mark the dangers on the map (ICN, 2009, Hasmiller, S. B.). The main goal of public health nurses during the disaster management intervention phase is to keep mortality and injury rates to a minimal level. In this context, the public health nurse participates in emergency rescue and triage works. After the evacuation, public health nurses quickly conduct surveillance works to identify the immediate needs of the community in the disaster zone and prevent the spread of infectious diseases (Hasmillier, et al, 2006). The recovery phase includes a rehabilitation period in which the negative effects of the disaster are left behind at the primary level and life returns to normal. During this period, public health nurse provides psychological support for the treatment of mental problems such as post-traumatic stress disorder, anxiety, which are increasing in prevalence in society and conducts environmental health control and immunization tasks. (Putra, et al, 2011).

Objective

For measuring the level of disaster preparedness of public health nurses who have important tasks at all levels of disaster management, field works are needed. This study aims to examine the disaster preparedness of public health nurses working in primary health care institutions.

2. **Material-Method**

2.1. **Purpose and type of research**

This study aimed to examine the perceptions of public health nurses on disaster preparedness. The study was planned in the descriptive type.

2.2. **Population and sample of research**

The population of the study consists of 163 public health nurses in family medicine in Elazığ city center. The study was conducted with the whole population without sample selection. The participation rate in the study is 91% (n=149).

2.3. **Place and time of the research**

This study was conducted on public health nurses working in Family Medicine in Elazığ provincial center between 01/09/2020 and 01/12/2020.

2.4. **Data Collection Tools**

An introductory information form and "Nurses ' Perception of disaster Preparedness Scale" (NPDP) were used to obtain the data. Data were collected by face-to-face interview technique. An informed voluntary consent form was obtained from the nurses who will participate in the study.

2.4.1. **Introductory information form**

The introductory in formation form includes public health nurses ' age, gender, educational status, disaster preparedness straining, disaster management plan knowledge, disaster training during their education, disaster care provision status, as well as, public health nurse's role in the disaster process and individual disaster preparedness.

2.4.2. Nurses ' perception of disaster preparedness questionnaire

NPDP was developed by Özcan (2013) as part of a master's thesis to measure nurses ' perceptions of preparedness according to the stage of disaster (APHA, 2013). The scale was prepared as a 5-point Likert scale and consists of a total of 20 items and three sub-dimensions. These sub-dimensions are preparation, intervention, and post-disaster, respectively. There are 6 items in the preparation sub-dimension, 9 items in the intervention sub-dimension, and 5 items in the post-disaster sub-dimension. Excess scores from the scale indicate a high perception of disaster preparedness. Cronbach Alpha coefficient of the scale was determined as 0.90.

2.5. Data Analysis

The data obtained in the study were analyzed using the statistical package for social science 22.00 (SPSS) software. When evaluating the study data, in addition to descriptive statistical methods (number, percentage, mean, standard deviation), independent variables and scales cores were compared using independent sample t-test and one-way variance analysis in all sub-dimensions. The significance value was determined as $p < 0.05$.

2.6. Ethical Aspect of Research

The aim of the study was explained to the nurses before the study by paying attention to the principle of volunteerism. Those who agreed to participate in the study filled out the questionnaire. Before the study, ethics approval was obtained from the Ethics Committee for non-interventional research of Fırat University (2020/1219).

3. Results

The average age of the nurses involved in the study was 32.87 ± 7.61 and 88.6% (n=132) of them were women. Also, 43.6% of nurses (n=65) graduated with a bachelor's degree, 30.2% (n=45) graduated with an associate degree, and 21.5% (n=32) graduated from a vocational high school of health. Additionally, 43.0% (n=64) of nurses stated their working time as 11 years or more, 26.8% (n=40) as 6-10 years, 22.8% (n=34) as 2-5 years and 7.4% (n=11) as 0-1 years (Table 1).

Table 1. Socio-Demographic Characteristics of Nurses Participating in the Research

Socio-Demographic Features	n	%
The average age	32.87±7.61	Min. (20)-Max (51)
Gender		
Woman	132 17	88.6 11.4
Man	149	100.0
Total		
Education Status		

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High school graduate	32	21.5	30.2	43.6
Associate Degree	45	4.7		
Undergraduate	65	100.0		
Graduate degree	7			
Total	149			

Working Time

0-1 year	11	7.4		
2-5 years	34	22.8	26.8	43.0
6-10 years	40	100.0		
11 Years and above	64			
Total	149			

We found that 46.3% (n=69) of the nurses participating in the study took disaster training, and 63.8% (n=44) of these people took the training theoretically. Also, 38.3% (n=57) of the participating nurses stated to have read the disaster plan of their institution, while only 11.4% of nurses (n=17) had contributed to the disaster plan preparation in their institution. We determined that only 24.2% (n=36) of these nurses had participated in disaster exercises during their working life. When nurses were asked about disaster preparedness, 34.9% (n=52) said that they were not ready at all, 60.4% (n=90) were partially ready, and only 4.7% (n=7) were fully ready (Table 2).

Table 2. Distribution of responses of nurses to disaster-related survey questions (n=149)

Some features related to disaster	n	%
Have you taken disaster training?		
Yes	69	46.3
No	80	53.7
Total	149	100.0
How you took the disaster training *		
Theoretical	44	63.8
Theoretical + Practical	25	36.2
Total	69	100.0
Have you read the disaster plan of your institution?		
Yes	57	38.3
No	92	61.7
Total	149	100.0

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Did you contribute to the preparation of your institution's disaster plan?

Yes	17	11.4
No	132	88.6
Total	149	100.0

Have you participated in a disaster exercise?

Yes	36	24.2
No	113	75.8
Total	149	100.0

Rate your preparedness for disasters as a nurse

Not ready at all	52	34.9
Partially ready	90	60.4
Fully ready	7	4.7
Total	149	100.0

* Only trainees are evaluated.

The average NPDP score of the nurses participating in the study was 3.45 ± 1.49 for the “preparation phase”, 3.28 ± 0.93 for the “intervention phase”, 3.48 ± 1.12 for the “post-disaster phase” and 3.38 ± 0.94 for the NPDP on the scale of 5 points. NPDP perceptions of nurses were found to be moderate in preparation, intervention, and post-disaster phase (Table 3).

Table 3. Minimum, maximum, average, and standard deviation values of NPDP and sub-dimension scores

NPDP and sub-dimensions	n	$\bar{X}$	SD
Preparation Phase	149	3.45	1.49
Intervention phase	149	3.28	0.93
Post-Disaster Phase	149	3.48	1.12
NPDP total	149	3.38	0.94

$\bar{X}$: arithmetic mean SD: standard deviation

The average NPDP score of the nurses participating in the study was compared with gender in the preparation phase, intervention phase, and post-disaster phase. According to this, although women's scores were higher than men's, the difference was not statistically significant for the preparation phase and intervention phase. A significant difference was found between the NPDP post-disaster scores of different genders ($p > 0.05$). The NPDP score averages of the nurses were compared depending on whether they took disaster training in the preparedness phase, intervention phase, and post-disaster phase. No statistically significant difference was found ($p > 0.05$). The preparatory phase NPDP mean scores of the nurses were statistically significantly different depending on whether

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they took disaster education ($p < 0.05$). It was found that the intervention phase and postdisaster phase NPDP score averages of the nurses did not differ significantly depending on whether they took disaster education ($p > 0.05$). Although the preparation phase and intervention phase scores of the nurses participating in the exercises were higher than the scores of those who did not participate, the difference between the averages scores in the preparation phase, intervention phase, and post-disaster phase of the nurses was not significant ($p > 0.05$) (Table 4). Disaster preparedness status was compared with nurses' NPDP score averages in the preparedness phase, intervention phase, and post-disaster phase. Depending on the disaster preparedness status of the nurses, the difference in the average NPDP score in the preparation phase was found statistically significant ($p < 0.05$) (Table 4).

Table 4. Nurses' Individual Characteristics and NPDP sub-dimension mean scores

	NPDP Phase $\bar{X} \pm SS$	Preparation NPDP phase $\bar{X} \pm SS$	Intervention NPDP Phase $\bar{X} \pm SS$	Post-Disaster NPDP Phase $\bar{X} \pm SS$
Gender				
Woman	3.51 $\pm$ 1.50	3.33 $\pm$ 0.93	3.61 $\pm$ 1.07	
Man	2.96 $\pm$ 1.35	2.94 $\pm$ 0.82	2.51 $\pm$ 0.98	
	1.454, $p = 0.148$	$t = -0.110$	$t = -1.609$, $p = 0.000$	$t = -3.969$, $p = 0.000$
Disaster Education				
Nurses who took	3.49 $\pm$ 1.49	3.30 $\pm$ 0.93	3.31 $\pm$ 1.21	
Nurses who did not take	3.41 $\pm$ 1.50	3.27 $\pm$ 0.93	3.63 $\pm$ 1.02	
	$p = 0.750$	$t = 0.320$, $p = 0.811$	$t = 0.239$, $p = 0.991$	$t = -1.701$, $p = 0.091$
Disaster Plan				
Nurses who read	3.72 $\pm$ 1.42	3.27 $\pm$ 1.02	3.31 $\pm$ 1.30	
Nurses who did not read	3.01 $\pm$ 1.51	3.29 $\pm$ 0.87	3.59 $\pm$ 0.98	
	$t = 2.881$, $p = 0.005$	$p = 0.894$	$t = -0.134$, $p = 0.145$	$t = -1.464$, $p = 0.145$
Disaster Exercise				
Nurses who participated	3.66 $\pm$ 1.42	3.47 $\pm$ 1.03	3.48 $\pm$ 1.39	
Nurses who did not participate	3.38 $\pm$ 1.51	3.22 $\pm$ 0.89	3.48 $\pm$ 1.02	
	$p = 0.343$	$t = 0.952$, $p = 0.159$	$t = 1.415$, $p = 0.985$	$t = 0.018$, $p = 0.985$
Preparedness for Disasters				
Not ready at all				

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Partially ready	3.02±1.58	3.73±1.37	3.12±0.93	3.41±0.85	3.42±1.11	3.58±1.05
Fully Ready	3.02±1.73		2.80±1.52		2.71±1.67	
	F=4.268, p=0.016		F=2.653, p=0.074		F=2.104, p=0.126	

$\bar{X}$: Arithmetic Mean SD: Standard Deviation t: Independent sample t-test critical value, F: ANOVA test critical value p: test probability level

4. Discussion

This study was conducted to determine the perception of disaster preparedness of public health nurses working in primary health care institutions. A large proportion of the public health nurses involved in the study did not take disaster training. In the presence of a disaster, nurses are among the medical personnel who are first responders to disaster. Disaster education plays an important role in the response of nurses to disasters so that this can be done literally (Yin, et al., 2012). Labraque et al. (2018) found that nurses do not have sufficient knowledge of disasters (1) considering the important roles and responsibilities of public health nurses in disaster preparedness, intervention, and post-disaster phase, it is considered an unavoidable fact that they must take disaster training.

A large proportion of the nurses involved in the study had taken disaster training in a conceptual dimension. Usher and Mayner (2011) note that disaster training in nursing schools in Australia is provided only theoretically, but this is insufficient. Robinson (2010) states that nurses can intervene more effectively in disasters when they take theoretical and practical training together. It is believed that there is a serious need for public health nurses to receive theoretical and practical training, given their important roles and responsibilities at all stages of the disaster. It is observed that most of the nurses involved in the study did not read the disaster plan of their institution and did not contribute to it. Achora and Kamanyire (2016) state that nurses should master the disaster plan because they are involved in disasters. Especially considering the role and responsibilities of public health nurses in all stages of disasters, they should definitely take part in the preparation of the disaster plan. It is observed that the participation of the nurses in disaster exercises remains at a low level. We believe that nurses' knowledge and wisdom will increase with pre-disaster exercises and that they will respond to disasters correctly and effectively. A very small proportion (4.7%) of the nurses involved in the study were found to be fully prepared for disasters. Looking at other studies, it seems that nurses are insufficient to prepare for disasters (Baack and Alfred, 2013; Usher and Mayner, 2011; Duong, 2009; Nilsson, et al., 2016). The absence of courses related to disaster nursing in nursing undergraduate education is perceived as insufficiency in preparing for disasters. In particular, public health nurses should increase their knowledge and wisdom after graduation, given their role and responsibilities in disasters.

The average score of the nurses involved in the study was 3.38 ± 0.94 , which means moderate. Fung et al. (2008) reported that 97% of nurses were not ready for disasters. Baack and Alfred (2013) also found that the majority of

nurses perceived their basic competence to intervene in the event of a major disaster to be low, and their perception scores were below average (Baack And Alfred, 2013). According to Garbutt et al. (2008), nurses clearly stated that their preparation for disasters was insufficient and that they needed training. Female nurses participating in the study appear to be more prepared for the post-disaster phase than male nurses. It is thought that this is due to the fact that female nurses work longer in the profession than men and are more abundant.

We found that nurses who read the disaster plan were more prepared in the disaster preparedness phase than nurses who did not read it. Understanding the content and location of a disaster plan and knowledge of fundamental competence fields, such as communication and ethical issues during a disaster, are considered essential for public health nurses. Especially since the public health nurse is involved in all stages of disasters, he/she is expected to contribute to the preparation of the disaster plan (Achora, and Kamanyire,2016).

Conclusion

It is seen that nurses' perception of disaster preparedness remains moderate. The training that nurses take to be prepared for disasters is insufficient. It is seen that nurses do not contribute to the disaster plan of the institution where they work, and most of them do not read these plans.

Financial Resource

During this study, no financial and/or immaterial support was received for the subject of the study.

Conflict of Interest

The authors declare there is no conflict of interest in relation to this work.

Author Contributions

All authors contributed equally in the preparation of this study.

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