

Is the Willingness and Ability of Nurses to Respond to Various Disasters the Same? A Cross-Sectional Study in Iran

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Abstract

Background: Healthcare centers, as the primary organizations involved in the occurrence of unexpected events, require to identify significant and influential motivational factors in the creation of willingness and, consequently, the ability of health personnel and staff (nurses) to respond to critical situations as the main organizational assets. This study was designed with the aim to determine the factors affecting the willingness and ability of nurses to deal with various disasters in Tehran hospitals.

Methods: This research is a cross-sectional study. The instrument used is a researcher-made questionnaire, which consists of three parts of demographic information, evaluation of the level of nurses' willingness and ability to respond to various disasters, and obstacles to continuing to work in disasters.

Results: A total of 308 questionnaires were completed. 39.3% of participants were female, and 60.7% of them were male. The level of willingness and ability of participants to continue working in crisis indicates that the highest willingness and ability are associated with natural disasters (floods, earthquakes), and the lowest willingness and ability are related to participating in response to the disease epidemic. The prioritization of the participants in this study in connection with the most critical barriers to responding to the crisis demonstrated that caring for children in natural disasters and Mass Casualty Incident, concern for family health in chemical disasters, fear of contamination in nuclear disasters, and fear of Infection in epidemic of diseases are among the most important obstacles. In examining the factors influencing the willingness and ability of research units to participate in disaster response raised, the factors of gender, age, marital status, and health level of individuals affected the level of willingness and ability of individuals. Besides, the components of income level, care for the elderly, and care for the disabled have only been influential on the willingness of people to participate in disaster response.

Conclusion: The professional preparation of health care personnel to perform their duties in critical conditions is essential. Hence, preventive measures to minimize the risk and strengthen the ethical obligations of employees in this profession in crises will be beneficial.

Background

Humans have always faced crises caused by the outbreak of epidemics. The Covid-19 crisis is the most recent pandemic that the world is still grappling to respond to it [1]. The rate of transmission and pathogenicity of the virus could create a Public Health Emergency of International Concern shortly after the announcement of the occurrence of the first case on January 30, 2020, by the WHO [1–4]. Similar to other major pandemics in the world, many patients are admitted in hospitals and nurses, as the main elements of patient care and treatment, while having increased workload, are directly exposed to infection. It seems that the motivation and willingness of nurses and physicians to continue to the delivery of services in various disasters are not the same. Although the rate of decrease in motivation to work in the context of biological disasters varies from country to country, this amount in this situation is less than other disasters [5, 6]. As revealed in the study of Masterson et al., the tendency to provide services to patients with biological events (54%) is in the last place compared to providing services to patients with trauma (98%) and patients with radioactive agents (85%) [7]. The lack of volunteers in such disasters has also been mentioned in other studies [6]. This is while crisis managers face a large number of volunteers in other natural disasters, such as earthquakes, floods, etc. Thus, one of the crucial factors in the discussion of human force in biological disasters is the supply and management of human resources required for treatment and care in hospitals. [8, 9, 10]. The preparation of healthcare staff in dealing with biological disasters necessitates the presentation of practical knowledge to them, preventive measures to minimize the risk and strengthen the ethical obligations of personnel in the profession to treat the

patients with biological agents [11]. Therefore, one should expect to face the shortage of staff in biological events in the hospital preparedness program [7]. The pathology of this issue highlights the need for further research on the willingness of health and service staff in hospitals during disasters [12].

Healthcare centers around the world are regarded as one of the prominent organizations involved in the occurrence of various disasters, especially the current crisis, i.e., the problem caused by the novel coronavirus (COVID-19). Iran's healthcare system, like many other countries, has been responsive from the beginning of the outbreak of the novel coronavirus (COVID-19), and medical centers have devoted their full capacity to treating COVID-19 patients. The construction of convalescent centers, which are, in fact, long-term treatment centers for COVID-19 patients, is among the other services of the health sector as well. Therefore, the activity of hospitals and hospices with a tremendous capacity of beds requires the activity of efficient, capable, and motivated human force. The allocation of sufficient and high-quality human resources requires the identification of effective and influential motivational factors in creating the willingness and, consequently, the ability of nurses to respond to critical situations as their main existential assets. Hence, this study was designed with the aim to determine the factors affecting the willingness and ability of nurses to deal with various disasters.

Methods

This is a cross-sectional study in which the level of willingness and ability of nurses in selected hospitals of Tehran to respond to critical situations in 2020 is evaluated. In this survey, a researcher-made questionnaire consisting of three parts is exploited. The first part included questions about demographic variables and underlying factors. The second part assessed the level of nurses' willingness and ability to respond to various disasters by presenting scenarios. In this section, six scenarios were designed about the types of disasters (floods, earthquakes, Mass Casualty Incident, chemical agents, radioactive agents, and the epidemic of diseases). The participants were asked to specify the amount of their willingness and ability to respond to disasters posed in each scenario. The third part of the research units identified the barriers ahead to participate in critical conditions.

Using a conservative approach, to determine the validity of the instrument, the Inter-Rater Agreement (IRA) for relevancy, clarity, and comprehensiveness was 81.3%, 81.3%, and 87.5%, respectively. The total relevancy, clarity, importance, and comprehensiveness of the questionnaire were 98.7, 98.68, 97.5, and 86.7, respectively. In order to determine the reliability of the instrument, all 25 convenient samples responded in two steps at 2-week intervals. The repeatability was measured with the Intra Class Correlation coefficient (ICC) at excellent and good levels (68 to 1), and Cronbach's alpha of 81% was obtained.

In this study, quota and random sampling methods were done. Samples were selected on a quota basis from six hospitals according to the proportion of employed nurses randomly. That is, after determining the number of nursing staff in each hospital, the sample size related to each hospital was determined and simple random sampling was performed after referring to the hospitals in accordance with their list.

According to the table below, the sample size in this study was estimated at 308 people.

Table 1
the sample size in this study.

Name of Hospital	Number of Nurses	Share of Sample	Number of Samples
A	130	5/8%	26#18/26
B	500	5/32%	100#01/100
C	388	2/25%	78#61/77
D	128	3/8%	26#56/25
E	175	4/11%	35#11/35
F	121	9/7%	24#33/24
G	98	4/6%	20#71/19
Total	1540	100	308

Inclusion criteria included at least one year of clinical experience, lack of managerial background (position), willingness to cooperate, and lack of getting afflicted to chronic physical or mental diseases, which were assessed as self-reported. The informed consent was received from the individuals to participate in the study, and they were assured that their information would remain confidential to the researcher.

Results

Completion and collection of the questionnaire designed by the participants lasted for two months from February 29, 2020. A total of 308 questionnaires were completed. Demographic information of the participants was as follows.

The highest frequency of age was 26–30 years (41.9%), including female (39.3%) and male (60.7%). The highest age range was related to children aged less than three years (39.3%). The highest work experience was in the group of 11–15 years (34.4%). The maximum number of working shifts per month was between 20 and 25 (58.1%). 76.9% of participants did not have a second job. 84.7% of participants did not have an underlying disease. Income between 4–6 million had the highest frequency (51%). 67.5% of the participants expressed that between 2–4 people live in the house.

The demographic information of the research units is represented in Table 2 (Table 2).

Table 2
Demographic information of the participants

Age	Frequency	Percent
Less than 25	25	8.1
26–30	129	41.9
31–35	90	29.2
36–40	39	12.7
More than 40	25	8.1
Gender		
Female	121	39.3
Male	187	60.7
Age of Children		
Less than 3	121	39.3
3–6	104	33.8
7–10	55	17.8
More than 10	28	9.1
Work Experience		
Less than 5 years	63	20.5
5–10	68	22.1
11–15	106	34.4
16–20	56	18.2
More than 20 years	15	4.8
Number of Work Shifts		
Less than 20	23	7.5
20–25	179	58.1
More than 26	106	34.4
Second Job		
Yes	71	23.1
No	237	76.9
Health Status		
No Disease	261	84.7
Disease	47	15.3
Income Level		

Age	Frequency	Percent
Less than 2 million Tomans	2	0.6
2–4 million Tomans	105	34.1
4–6 million Tomans	157	51
6–8 million Tomans	43	14
More than 8 million Tomans	1	0.3
Number of People Living in the House		
Less than 2 people	66	21.4
2–4 people	208	67.5
4–6 people	27	8.8
More than 6 people	7	2.3

Analysis of the findings in the study of the level of willingness and ability of participants showed that the highest willingness and ability to participate are related to the natural disaster scenario (flood, earthquake), and the lowest willingness and ability are related to the epidemic scenario (Figs. 1 and 2).

The prioritization of the participants in this study in connection with the most critical barriers to responding to the crisis demonstrated that caring for children in natural disasters and Mass Casualty Incident, concern for family health in chemical disasters, fear of contamination in nuclear disasters, and fear of Infection in epidemic of diseases are among the most significant obstacles (Fig. 3).

The results of Chi-square test in examining the factors affecting the willingness and ability of participants to cope with the disasters raised indicated that the level of willingness and ability to participate in disaster response in males under 35 years is more. In the component of marital status, there is a statistically significant difference between single and married people in terms of willingness to participate in disasters, and married people were more willing to participate in responding to various disasters. In connection with the ability to participate in responding to various disasters, there was no statistically significant difference between married and single people.

Besides, analysis of the findings showed that people with income levels below 4 million are more willing to participate in disaster response. However, there was no statistically significant difference between the income factor and the ability to participate in disaster response. Moreover, people with an excellent level of health exhibited a greater willingness and ability to participate in disaster response. People in charge of caring for the elderly or a disabled family member were less willing to participate in responding to disasters. Still, the level of their ability was similar to other individuals. The presence or absence of a pet did not make a statistically significant difference in the willingness and ability of individuals to participate in disaster response (Table 3).

Table 3
Factors affecting the willingness and ability of research units to participate in disaster response

Willingness					Ability						
Effective factors	Yes	No	Not Sure	P-value	Yes	No	Not Sure	P-value			
Gender											
Male	Frequency	156	24	7	0.000	Frequency	Frequency	109	63	15	0.025
	Percent	83.4	12.8	3.8		Percent	Percent	58.3	33.7	8	
Female	Frequency	99	14	8		Frequency	Frequency	69	44	8	
	Percent	81.8	11.6	6.6		Percent	Percent	57	36.4	6.6	
Age											
Less than 35	Frequency	204	30	10	0.000	Frequency	Frequency	146	82	16	0.01
	Percent	83.6	12.3	4.1		Percent	Percent	59.8	33.6	6.6	
More than 35	Frequency	51	8	5		Frequency	Frequency	32	25	7	
	Percent	79.7	12.5	7.8		Percent	Percent	50	39.1	10.9	
Marital Status											
Single	Frequency	82	7	7	0.04	Frequency	Frequency	54	36	6	0.72
	Percent	85.4	7.3	7.3		Percent	Percent	56.2	37.5	6.3	
Married	Frequency	173	31	8		Frequency	Frequency	124	71	17	
	Percent	81.6	14.6	3.8		Percent	Percent	58.4	33.5	8.1	
Income Level											
4 - 8 Million	Frequency	167	26	8	0.02	Frequency	Frequency	116	71	14	0.811
	Percent	83.1	12.9	4		Percent	Percent	57.7	35.3	7	
4 - 8 Million	Frequency	88	12	7		Frequency	Frequency	62	36	9	
	Percent	82.3	11.2	6.5		Percent	Percent	57.9	33.6	8.5	
Health Status											
Yes	Frequency	218	31	12	0.035	Frequency	Frequency	156	85	20	0.05
	Percent	83.5	11.9	4.6		Percent	Percent	59.8	32.6	7.6	
No	Frequency	37	7	3		Frequency	Frequency	22	22	3	
	Percent	78.7	14.9	6.4		Percent	Percent	46.8	46.8	6.4	
Pet											
Yes	Frequency	4	1	0	0.781	Frequency	Frequency	2	2	1	0.581
	Percent	80	20	0		Percent	Percent	40	40	20	
Loading [MathJax]/jax/output/CommonHTML/fonts/TeX/fontdata.js						Frequency	Frequency	176	105	22	

Willingness					Ability						
	Percent	82.8	12.2	5		Percent	Percent	58.1	34.7	7.2	
Care of the elderly											
Yes	Frequency	0	13	0	0.000	Frequency	Frequency	7	5	1	0.955
	Percent	0	100	0		Percent	Percent	53.8	38.5	7.7	
No	Frequency	255	25	15		Frequency	Frequency	17	102	22	
	Percent	86.5	8.5	5		Percent	Percent	58	34.6	7.4	
Care of the disabled											
Yes	Frequency	2	6	0	0.000	Frequency	Frequency	4	3	1	0.34
	Percent	25	75	0		Percent	Percent	50	37.5	12.5	
No	Frequency	249	36	15		Frequency	Frequency	174	104	22	
	Percent	83	12	5		Percent	Percent	58	34.7	7.3	

Discussion

Critical condition or crisis is a specific situation in which the participation and cooperation of all members and trained healthcare personnel are required. The occurrence of various events needs an experienced workforce with adequate knowledge, skills, and attitudes to apply clinical skills [13–14]. The present study demonstrated that the ability and willingness of employees to continue working in crises varies, taking into account the type of event. Some components associated with the obstacles of ability and willingness are different. This indicates that ability and willingness have, indeed, two separate structures. The results of this study can be discussed in several categories:

1- The level of willingness and ability of the participants indicates that the highest willingness and ability are related to natural disasters (floods, earthquakes), and the lowest level of willingness and ability are associated with the disease epidemic. The least amount of ability and willingness is reported for the events that employees are most likely to perceive as the highest degree of danger to themselves or their family (epidemic, chemical, nuclear scenarios). In the study of Masterson et al., the tendency to provide services to patients with biological accidents was in the last place compared to providing services to patients with trauma and the patients with radioactive agents [7], which is in line with the present study concerning the willingness of participants to continue working in a crisis. In a survey conducted by Boyle et al. in 2005, working during a bioterrorism incident would be difficult and horrible from the nurses' perspective, and some nurses have refused to stay in the clinical setting [15]. Moghadam et al. in 2016, by examining the knowledge and attitude of volunteers and rescuers of the Red Crescent Society of the Islamic Republic of Iran in a bioterrorism attack in West Azerbaijan province indicated that only one person had a proper attitude (willingness) to participate in providing relief to affected areas. Besides, six volunteers expressed that they were ready to continue working and be sent to the crisis-hit region [16]. In this study, 25.3% of participants exhibited their willingness to participate in responding to the epidemic and 52.9% their ability. Hamzeh pour in the study of the level of knowledge and performance (readiness) of the members of the medical groups of the Basij Organization of the Medical Society of West Azerbaijan Province in the face of biological accidents showed that the members participating in the study did not have necessary preparation (ability and skill) to respond to the critical situation arisen, and the results indicated their poor performance [17].

2- The prioritization of the participants in this study in connection with the most critical barriers to responding to the crisis demonstrated that caring for children in natural disasters and Mass Casualty Incident, concern for family health in chemical disasters, fear of contamination in nuclear disasters, and fear of Infection in epidemic of diseases are among the most significant obstacles. A study by carried out by French et al. in 2002 on 30 nurses in four hospitals after the Florida storm revealed that the primary concerns of the nurses included their own safety and that of their family during work, and their secondary concerns included the provision of basic needs such as food, water, shelter, sleep, and rest [19]. The results of studies conducted by DiMaggio et al. and Stevens et al. represented that biological (bioterrorism) and chemical events are an unfamiliar study scope for most healthcare professionals. This may be due to fear of infectious, toxic agents, hazardous radiation and its transmission to family and relatives, which leads to low awareness and unpreparedness to respond appropriately to such events to natural disasters such as floods and earthquakes [20–21]. In a study by Rocach et al. in 2010 on 76 nurses and physicians working in the emergency department of a hospital in Israel, it was found that those who had the highest awareness in the field of anthrax were 50% more willing than others to attend their workplace in the event of a bioterrorist attack. 37% were more willing than others to treat patients suspected of having anthrax, and 28% more than those who were not trained were willing to treat patients who definitely suffered from anthrax [22]. In this study, the lack of proper training is one of the barriers to the willingness and ability of participants to attend the crisis. The findings of Shapira et al. indicated that providing appropriate personal protective equipment can be beneficial in facilitating the readiness of healthcare workers to continue working during a critical event, and all employees should receive ongoing training with regard to critical events and emerging dangerous pathogens [23].

3- In examining the factors influencing the willingness and ability of study participants in dealing with the disasters raised, the factors of gender, age, marital status, and health level affected the level of willingness and ability of individuals so that the willingness and ability of men, age group under 35 years, married people, and people with a high level of health to participate in different types of disasters were higher. The components of income level, care for the elderly, and care for the disabled have only affected the willingness of people to participate in various types of disasters. This means that people with incomes below 4 million, lack of care for the elderly and disabled exhibited a greater willingness to participate in disaster response. In the study performed by Qureshi et al., the factors of the female gender, marital status, care of children or commitments related to the elderly, issues associated with personal health, and lack of transportation were indicated to reduce the probability of respondents' ability to work during disasters for a variety of events. Moreover, factors such as female gender, marital status, care of children, and commitments were pointed out to reduce the likelihood of the willingness to continue working in the occurrence of disasters for most events [18].

Conclusion

Today, the readiness of healthcare personnel in hospitals, which are taken into account as fixed and specialized centers for providing medical services, is one of the crucial components of the process of responding to unexpected and critical events, is of utmost importance since they have the mission of saving the life and health of the injured and patients. The professional preparation of the healthcare personnel of Tehran hospitals to perform their duties in critical situations (crises) is essential as well.

The findings achieved from this study provide an opportunity to strengthen the ability and willingness of healthcare workers by addressing the obstacles that threaten this group for intervention in times of crisis. Healthcare centers can support employees who take care of children, elderly, or disabled. This may influence the continuation of working in crisis by this group. Planning to establish emergency care centers for children or the elderly that are unattended or out

The most outstanding reason for the lack of willingness of employees to work in the occurrence of disasters was fear and concern about the safety of their families and themselves. During a catastrophic event, the authorities should know that healthcare workers are concerned to the extent of ordinary citizens (or even more), because they may have a greater understanding of the associated risks.

The most beneficial approaches to address fears and concerns about personal safety concerning staff training, providing proper and adequate personal protective equipment, can be helpful. In this respect, holding training courses related to a variety of risks for the preparation, control, and effective responsiveness of nurses as first-line healthcare workers and training maneuvers, the prediction of appropriate personal protective equipment is recommended.

Limitations of the research

In this study, nurses in hospitals of Tehran were examined. These findings may not be generalizable to the population of healthcare workers in other geographical regions. Additional studies will contribute to the elaboration of the issue. Eventually, the final question is whether healthcare workers will respond to critical events in the method they have announced. Certainly, in the event of a real event, this can be answered.

Despite these limitations, these findings suggested that some differences were observed in the ability and willingness of nurses to continue working in various catastrophic events, and there were obstacles to ability and willingness. Most of the identified barriers can be resolved through intervention with effective planning. In this regard, it is suggested that future research comparatively examine the level of willingness and ability of physicians and nurses in different geographical areas.

Abbreviations

Inter-Rater Agreement (IRA)

Intra Class Correlation coefficient (ICC)

Declarations

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Authors 'contributions

'SSH' (as first author): Conception and design of the study, analysis and interpretation of data, revising it critically for important intellectual content, final approval of the submitted version.

'JH': Conception and design of the study, acquisition of data, revising for important intellectual content, final approval of the submitted version.

'M M': Conception and design of the study, revising for important intellectual content, final approval of the submitted version.

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Availability of data and materials

The datasets analyzed during the current study are available from the corresponding author on reasonable request.

Declaration

I, as the author, by signing the below letter declare that:

1. The manuscript is original work of author(s). All data, tables, figures, etc. used in the manuscript are prepared originally by authors, otherwise the sources are cited and reprint permission is attached.
2. The manuscript has not been and will not be published elsewhere or submitted elsewhere for publication.
3. Authors mention that there is no conflict of interest in this study.
4. The paper, If you have any further question, be free to contact us. Thank you for your attention. the final version of which I enclose, is not substantially the same as any that I/we have already published elsewhere.
5. No more changes in the authors or main results is accepted from my side after submitting to the journal.

Ethical statement and consent to participate

The study was reviewed and approved by the Ethics Committee of Aja University of Medical Science (IR.AJAUMS.REC.1399.093). Attached to each questionnaire was a cover letter explaining what was expected of the respondents who had to sign, indicating their informed consent before they provided answers. In this way, the full understanding and the voluntary participation of the respondents was established. Throughout the research, confidentiality was respected and ensured.

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests.

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Figures

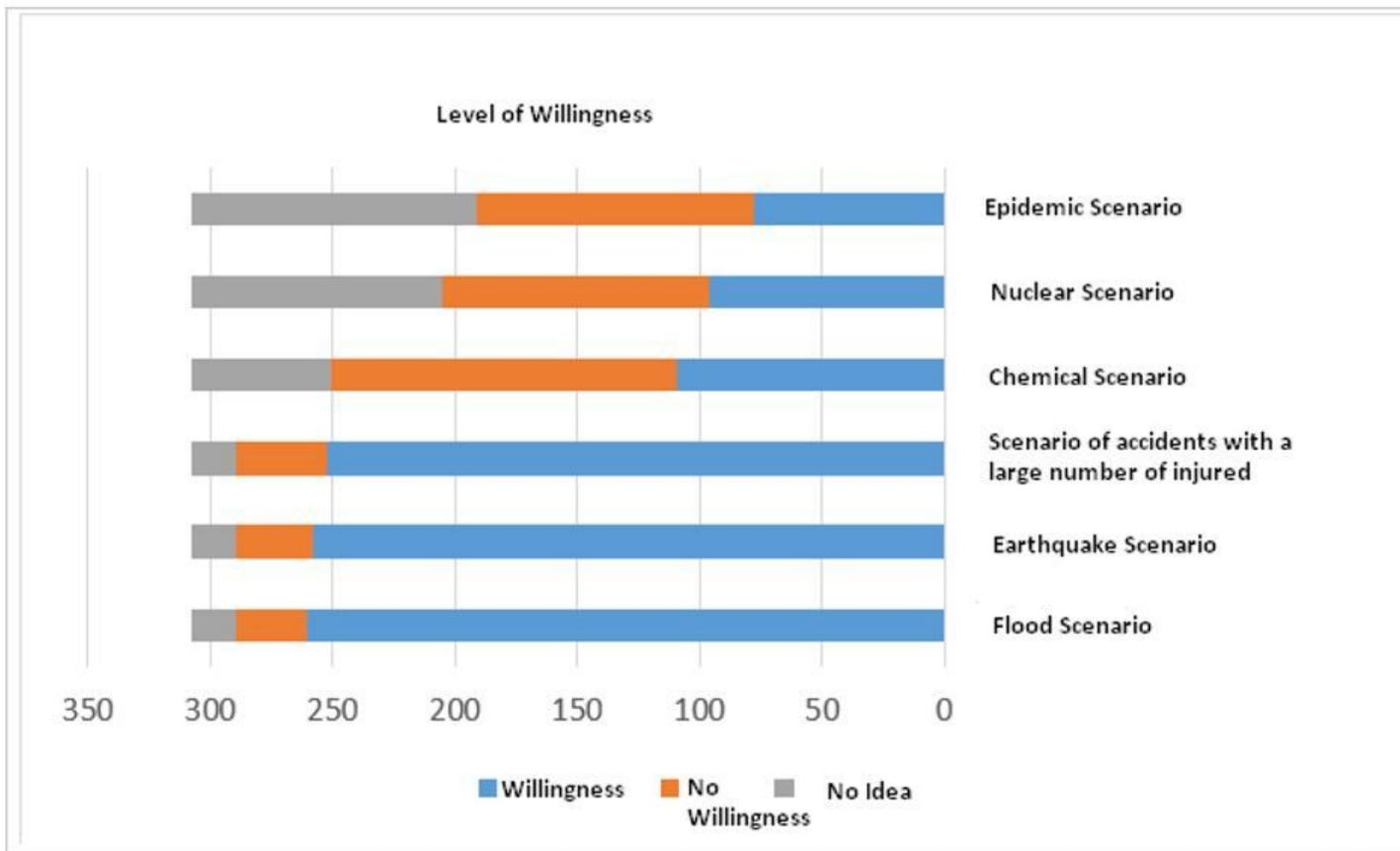


Figure 1

Evaluation of the level of nurses' willingness in participation to respond to various disasters

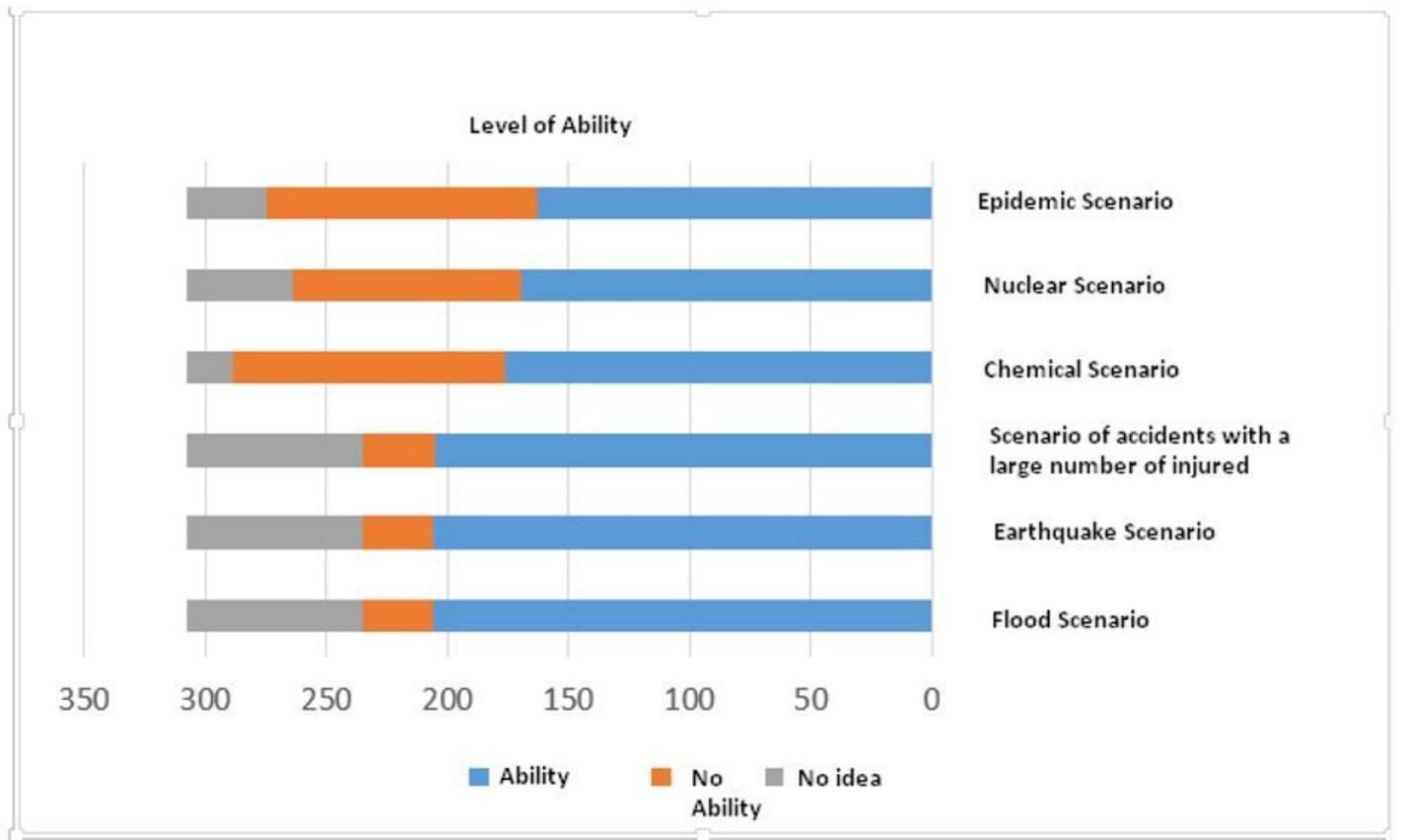


Figure 2

Evaluation of the level of nurses' ability in participation to respond to various disasters

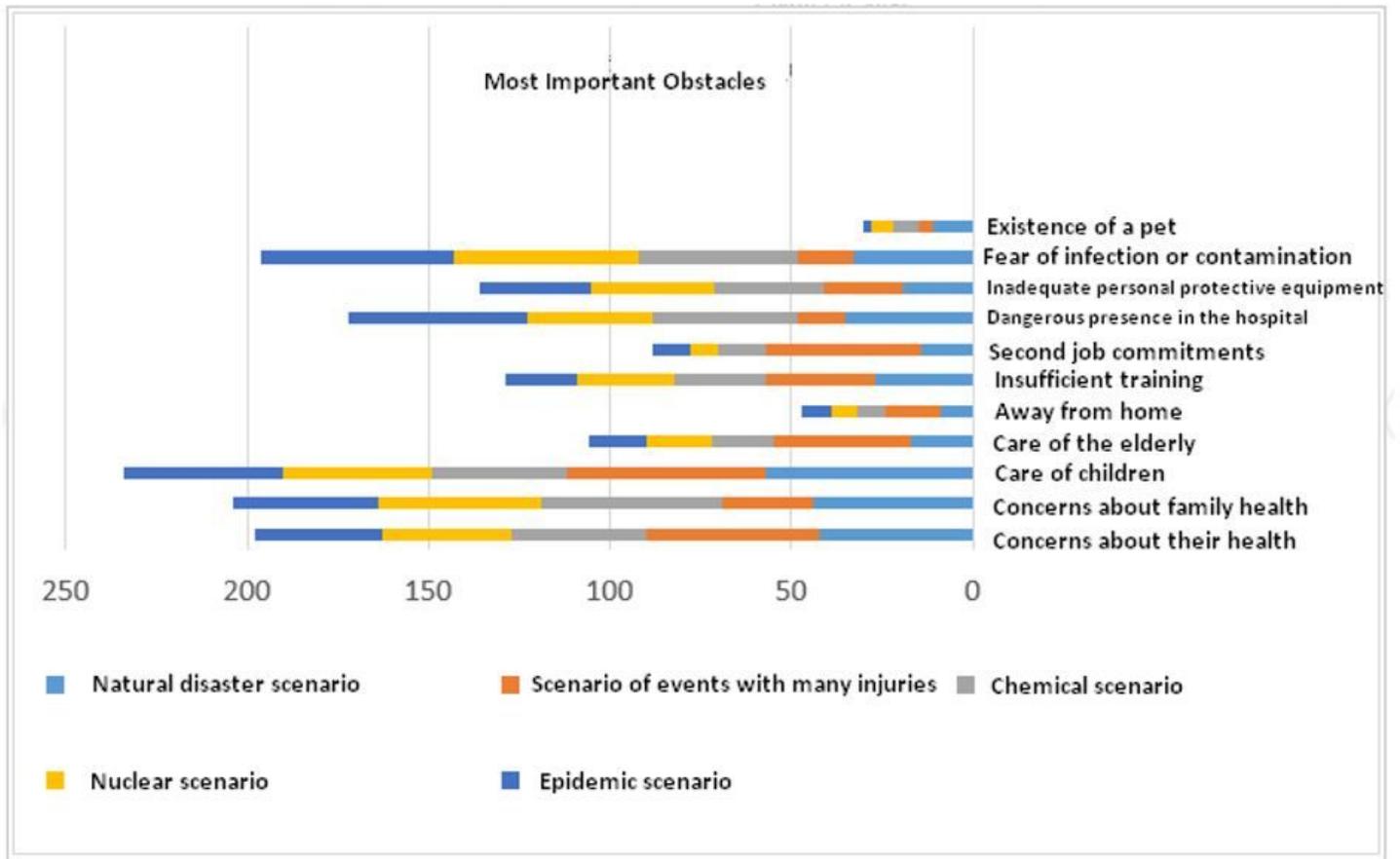


Figure 3

Evaluation of the most important barriers to participation in a variety of disasters

Supplementary Files

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