



## EVALUATION OF THE HOSPITAL DISASTER PREPAREDNESS INFORMATION OF HEALTH PERSONNEL

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### ABSTRACT

**Background:** Hospitals are institutions that provide continuous services and play a primary role in the emergency aid and life-saving process. The aim of this study was to evaluate the information of health personnel about the hospital disaster preparedness. **Methods:** In this observational cross-sectional study, a questionnaire for the calculation of the Hospital Disaster Preparedness Information Score of Health Personnel which was applied in a foundation university hospital and 276 questionnaire data were analyzed. **Results:** The mean Hospital Disaster Preparedness Information Score of Health Personnel was  $64.96 \pm 13.57$  (minimum 8-maximum 84). The information scores of those who read the disaster plan, participated in disaster training and disaster drills and disaster plan preparing and updating were higher than those who did not, and the difference was statistically significant. Most participants stated that there were emergency exit signs (95.29%), fire measures (94.93%), an emergency warning system (89.49%) in the hospital. 19.2% of the participants stated that they were not informed about their responsibilities and duties in case of disasters and 15.49% stated that the current disaster and emergency plan was not told to them. **Conclusions:** Although the hospital fulfills physical precautions such as emergency exit signs, fire extinguishing tubes and an alarm system, it is thought that there are deficiencies in the participation of health personnel in the disaster management process. It is thought that works on increasing the sensitivity of health workers to disasters, informing them about the measures taken and being involved in this process will increase the effectiveness of the disaster management process.

**Keywords:** disaster management, hospital's disaster management, hospital's disaster preparedness

### ARTICLE INFO

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## **1. INTRODUCTION**

Disasters are extraordinary situations that occur due to human- or nature-related reasons, where the existing resources of the society are insufficient in the struggle, causing material and environmental losses due to the damage of a large number of people and resulting in a deterioration in the functioning of the society. Risk is a measure of expected losses such as death, injury and economic losses that may arise from disasters. In disaster management, there are two basic steps as preparedness, which aims to minimize all the losses that may occur in the disaster, and mitigation, which aims to mitigate the losses that may occur (UNDP India, 2008; Horrocks, Hobbs, Tippett, and Aitken, 2019).

Hospitals are institutions that provide continuous services and play a primary role in the emergency aid and life-saving process. With these characteristics, hospitals have an active role in case of a disaster. There are some basic requirements for the preparedness of hospitals against disasters, such as disaster plans, precautions taken in line with this plan, personnel training and drills. The hospital disaster plan provides the opportunity for hospitals to be planned and prepared for disasters that may lead to chaos. It is very important that hospital workers are educated on the measures taken against disasters, work flows and related duties, their responsibilities and conducting regular disaster drills (UNDP India, 2008; Naser, Ingrassia, Aladhrae, and Abdulraheem, 2018). In a study by Samsuddin, 17 indicators effective in the preparedness of hospitals against disasters were examined, and the training of human resources was determined as the most critical indicator (Samsuddin et. al., 2018).

Due to its geological, meteorological and topographical structure, Turkey faces natural disasters such as earthquakes, landslides, floods, rock falls and avalanches. In addition, it has risks for many extraordinary human-related events such as fire, chemical and biological events, terrorism-related events and industrial-related events. Turkey ranks 45th out of 191 countries in the Global Risk Index with a 5.0 index score, which represents high risk (AFAD, 2018). As the most populous city of Turkey, Istanbul is particularly confronted with natural disaster risks such as earthquakes due to its geographical location. Moreover, it is at high risk of industrial accidents and explosions and political attacks since it is a crowded industrial city.

In recent years, efforts have been focused on providing more systematic disaster management in Turkey. Health institutions constitute an important part of these efforts. In 2015, the Ministry of Health issued a Regulation on the Implementation of Hospital Disaster and Emergency Plans (Turkish Ministry of Health, 2015) covering all hospitals. In this regulation, issues such as establishing and updating hospital disaster and emergency plans in all hospitals were regulated.

Examining the national and international literature, it is seen that there are many studies on disaster management in hospitals and that these studies are conducted especially with nurses (Ibrahim, 2014; Basal and Ahmed, 2018; Çelik, 2010; Chapman and Arbon 2008; Hisar and Yurdakul, 2015; O'Sullivan et al., 2008; Özcan, 2013; Taşkıran, 2015; Tavan et. al., 2016; Vatan and Salur, 2010). In addition, considering the health services provided in hospitals as a whole, it is thought that studies involving all health personnel will contribute to both the literature and practice. One of the recommendations in the study of Gowing et al. was that disaster preparedness assessment studies cover the entire health care team in a multidisciplinary way (Gowing et al., 2017).

It is a prerequisite for hospitals to take the necessary precautions against disasters and to make all preparations technically to ensure the continuity of the health service provided in case of disasters. However, for the process to be managed correctly, it is necessary for the personnel to

be informed about these issues and to take an active role in the process. The aim of this study was to evaluate the hospital disaster preparedness information of health personnel working in a foundation university hospital in Istanbul.

## **2. MATERIALS AND METHODS**

### **Study Design**

This observational-cross-sectional research was designed to collect data from the health personnel working in the foundation university hospital by a questionnaire. The research was carried out in a foundation university hospital with 515 beds, 267 outpatient rooms and 25 operating rooms in the European side of Istanbul. Ethics committee approval and permission to conduct a questionnaire were given by the hospital management (Ethics committee approval of the Istanbul Medipol University Non-Interventional Clinical Research Ethics Committee No. 463, dated 15/08/2018).

The population of our study consisted of 1332 health personnel actively working in the hospital during the research period. The sample of this study was calculated as 299 with a 5% deviation by easy sampling method. The questionnaires were conducted between October 2018 and November 2018 on a voluntary basis. 300 questionnaires that were distributed in print form for the research were answered, but 276 questionnaire data were analyzed by excluding the missing questionnaires that were found to be unsuitable according to statistical evaluations.

### **Survey Instrument**

In this study, a questionnaire was developed by the researchers to evaluate Hospital Disaster Preparedness Information Score of Health Personnel. The questionnaire was prepared in accordance with expert opinions and studies on hospital disaster management (Ibrahim, 2014; Al-Ali and Abu Ibaid, 2015; Al Khalaileh et al., 2010; Kökçü, 2010; Moabi, 2008; (Sakhare, Waghmare and Joshi, 2016) utilizing the Hospital Disaster and Emergency Plan Preparation Guide of the Ministry of Health. The questionnaire consisted of instructions, some descriptive questions and 42 questions with yes, no or no idea options to assess Hospital Disaster Preparedness Information Score of Health Personnel. Descriptive questions contain questions about participants' sex, age, occupation, working years in the profession and hospital. Questions are related to professional preparedness of the hospital to respond to natural disaster and human-related disasters.

### **Data Analysis**

The characteristics of the health personnel participating in the study, such as gender, age, education, occupation, working years in the hospital and working years in the profession, are presented with descriptive statistics. Descriptive statistics of the health personnel, such as having previously worked in a hospital during a disaster, having read the current disaster and emergency plan, preparing and updating the disaster and emergency plan, participating in a disaster-related training and participating in disaster and emergency drills are presented with descriptive statistics.

The 42 questions included in the Hospital Disaster Preparedness Information Score of Health Personnel evaluation questionnaire were assessed based on a point system (I have no idea: 0 points, Yes: 1 point, No: -1 points), and the answers given to the whole scale were collected, and a single value was obtained. 42 points were added to the total score to make sure that the

total score was not a negative value (where No answers were more than Yes answers). In this case, the assessment of a participant was in the range of 0 to 84 points. The results were evaluated according to this calculation. The internal consistency (Cronbach's Alpha) value of the answers of the 276 participants was 0.945.

Whether the Hospital Disaster Preparedness Information Score of the Health Personnel differed according to their characteristics such as working years in the hospital, working years in the profession and their training and experience in disaster management was assessed using Statistical Package for the Social Sciences (SPSS) 22.0 software. Since the distribution of the data obtained did not show a normal distribution, in the comparison of groups of independent variables, the Mann-Whitney U test was used for two groups, and the Kruskal-Wallis test was used for three or more groups. In addition, Bonferroni correction was used as post hoc test in multiple comparisons. Statistical significance level was taken as 0.05.

### **Study limitations**

Our research was limited to the health workers of the foundation university hospital where the study was conducted.

### **3. RESULTS**

A total of 276 health care workers responded to the survey. The data presented in Table 1 reveal that among the 276 health care workers, most respondents (63.0%) were female health care workers. 192 respondents were nurses or midwives, and 84 were health technicians. The age of the participants varied between 19 and 46 years, and 56.9% of the participants were 24 years old or younger. 37.7% of the participants had a bachelor's degree, and 32.2% had a two-year associate degree. Among the respondents, 87 (31.5%) were working in the inpatient department, while 86 (31.2%) were working in the outpatient department, 54 (19.6%) were working in the operating room, 49 (17.8%) were working in intensive units. Most (41.7%) had 1-5 years of experience, while 24.3% had been working for less than a year in this hospital. (Table 1).

**Table 1: Demographic characteristics of the study participants (n = 276)**

<b>Sex</b>	<b>n</b>	<b>%</b>
Male	102	37,0
Female	174	63,0
<b>Age</b>	<b>N</b>	<b>%</b>
<24	157	56,9
25-30	84	30,4
31≤	35	12,7
<b>Specialty</b>	<b>N</b>	<b>%</b>
Nurse/midwife	192	69,6
Technician	84	30,4
<b>Level of education</b>	<b>N</b>	<b>%</b>
High school	74	26,8
Two-year associate degree	89	32,2
Bachelor's degree	104	37,7
Master's degree/Doctoral degree (PhD)	9	3,3
<b>Department</b>	<b>N</b>	<b>%</b>
Intensive Care Units	49	17,8
Outpatient department	86	31,2
Operation Theatre	54	19,6
Inpatient department	87	31,5
<b>Years of Working</b>	<b>N</b>	<b>%</b>
Less Than 1 Year	67	24,3
1- 5 Years	115	41,7
6- 10 Years	35	12,7
>10 Years	59	21,4
<b>Years of Working in This Hospital</b>	<b>N</b>	<b>%</b>
< 1 year	91	33,0
1-5 years	131	47,5
5-10 years	54	19,6

Table 2 presents the participants' training, experience and roles related to disaster management. 13.82% of the health personnel had previously worked in a hospital during a disaster. Among the respondents, 156 (56.5%) had training in disaster preparedness, 96 (34.8%) had been involved in the preparation and updating of disaster and emergency plans. Most (63%) participants had not yet read the current disaster and emergency plan, and 54.3% had not participated in disaster and emergency drills.

**Table 2: Characteristics related to the Disaster Preparedness of the study participants (n=276)**

	<b>No</b>		<b>Yes</b>	
	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>
Have you ever worked in a hospital during a disaster?	238	86,2	38	13,8
Did you read the current disaster and emergency plan?	174	63,0	102	37,0
Have you been involved in the preparation and updating of disaster and emergency plans?	180	65,2	96	34,8
Have you ever attended a training on disaster?	120	43,5	156	56,5
Did you take part in disaster and emergency drills?	150	54,3	126	45,7

Table 3 shows the frequency and percentages of "no idea", "yes" and "no" responses for the 42 statements aimed at determining the Hospital Disaster Preparedness Information Score of the Health Personnel. 74.64% of the participants stated that disaster and emergency preparedness trainings were done in the hospital, and 72.83% stated that emergency drills were done. However, the rate of participation in disaster trainings (56.5%) and the rate of participation in drills (45.7%) were lower. While most participants knew about the hospital having a disaster and emergency plan (84.78%) and an emergency response plan (86.96%), the percentage of reading this plan (37%) and the percentage of participation in the preparation and updating of this plan (34.8%) were lower. 55.07% of the participants stated that they were told about the disaster plan, 30.43% stated that they had no idea about it and 14.49% stated that they were not told about it. Moreover, 36.96% of the participants stated that they had no idea about the existence of work flow instructions, and 14.86% stated that they were not informed about the work flow instructions of the hospital. 19.2% of the health personnel stated that they were not informed about their responsibilities and duties in case of disasters, and 26.09% stated that they had no idea about this issue. 39.86% stated that they had no idea about the existence of forms to be used in case of disasters, 42.39% had no idea about the existence of event notification flow chart, and 46.01% had no idea about the existence of event-specific plans. 45.65% had no idea about the existence of a personnel information inventory in the disaster and emergency action plan, 44.2% had no idea about the personnel to be assigned in case of disasters, and 46.38% had no idea about the job descriptions of these people.

**Table 3. Health care personnel's opinions on the hospital's preparedness for a disaster (n=276)**

		Yes		No Idea		No	
		n	%	n	%	n	%
<b>Q1</b>	Is your hospital prepared for disasters and emergencies?	222	80.43	43	15.58	11	3.99
<b>Q2</b>	Is the hazard degree of your hospital for disasters and emergencies determined?	161	58.33	104	37.68	11	3.99
<b>Q3</b>	Does the hospital have a Disaster and Emergency Plan?	234	84.78	38	13.77	4	1.45
<b>Q4</b>	Does the hospital have an emergency response plan?	240	86.96	33	11.96	3	1.09
<b>Q5</b>	Have you been told about the current disaster and emergency plan of the hospital?	152	55.07	84	30.43	40	14.49
<b>Q6</b>	Does the hospital have an Event Management Team for disasters and emergencies?	177	64.13	85	30.8	14	5.07
<b>Q7</b>	Are work flow instructions created against disasters and emergencies?	159	57.61	102	36.96	15	5.43
<b>Q8</b>	Has an Event Management Center been designated for the hospital's disasters and emergencies?	154	55.8	114	41.3	8	2.9
<b>Q9</b>	Has the Hospital's Hazard and Vulnerability Analysis been performed?	135	48.91	125	45.29	16	5.8
<b>Q10</b>	Have you been informed about work flow instructions to be followed in case of emergency?	160	57.97	75	27.17	41	14.86
<b>Q11</b>	Were measures taken against the risk of fire in the hospital? (fire escape, extinguisher tubes, alarm system, etc.)	262	94.93	9	3.26	5	1.81
<b>Q12</b>	Have measures been taken against earthquakes and their risks (cabinet fixing, etc.)?	223	80.8	36	13.04	17	6.16
<b>Q13</b>	Is there a designated meeting area in the hospital for emergencies?	234	84.78	38	13.77	4	1.45
<b>Q14</b>	Is there an emergency warning system (siren, etc.) in the hospital for communication in case of disaster and emergency?	247	89.49	24	8.7	5	1.81
<b>Q15</b>	Are there emergency exit signs in the hospital?	263	95.29	9	3.26	4	1.45
<b>Q16</b>	Is there a place in the hospital where they can use as a shelter for	131	47.46	127	46.01	18	6.52

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	chemical disasters and emergencies?					
<b>Q17</b>	Is disaster preparedness and emergency training done in the hospital?	206	74.64	50	18.12	7.25
<b>Q18</b>	Are there emergency drills in the hospital?	201	72.83	50	18.12	9.06
<b>Q19</b>	Have measures been taken in the hospital against a possible chemical event?	139	50.36	118	42.75	6.88
<b>Q20</b>	Have measures been taken against situations that affect business continuity (such as power outages)?	192	69.57	73	26.45	3.99
<b>Q21</b>	Are emergency supplies regularly checked and maintained at the hospital?	184	66.67	79	28.62	4.71
<b>Q22</b>	Have you been informed about your responsibilities and duties in the event of a disaster in the hospital?	151	54.71	72	26.09	19.2
<b>Q23</b>	Are there any disaster and emergency forms in the Disaster and Emergency Plan of your hospital?	150	54.35	110	39.86	5.8
<b>Q24</b>	Is there a Work Flow of Events and Notifications Framework in the disaster and emergency plan of your hospital?	136	49.28	117	42.39	8.33
<b>Q25</b>	Are there any event-specific plans in the disaster and emergency plan of your hospital?	134	48.55	127	46.01	5.43
<b>Q26</b>	Are the personnel to be assigned in case of a disaster and emergency defined in the Disaster and Emergency Plan?	139	50.36	122	44.2	5.43
<b>Q27</b>	Are the duties of persons to be assigned in a disaster and emergency situation defined in the Disaster and Emergency Plan?	130	47.1	128	46.38	6.52
<b>Q28</b>	Are the places, areas and gaps that could be used in case of a disaster or emergency been specified in the Disaster and Emergency Plan?	194	70.29	72	26.09	3.62
<b>Q29</b>	Are issues related to mitigation against hazards (strengthening the building, fixing things, etc.) set out in the Disaster and Emergency Plan?	208	75.36	58	21.01	3.62
<b>Q30</b>	Are disaster and emergency response to all hazards identified in the Disaster and Emergency Plan?	183	66.3	76	27.54	6.16
<b>Q31</b>	Are improvements for all hazards identified in the Disaster and Emergency Plan?	172	62.32	86	31.16	6.52
<b>Q32</b>	Are emergency contact numbers included in the Disaster and Emergency Plan?	230	83.33	31	11.23	5.43
<b>Q33</b>	Are the evacuation routes specified in the Disaster and Emergency Plan?	210	76.09	48	17.39	6.52
<b>Q34</b>	Are infrastructure system charts such as gas infrastructure included in the Disaster and Emergency Plan?	137	49.64	127	46.01	4.35
<b>Q35</b>	Is there a list of emergency companies and financial suppliers in the Disaster and Emergency Plan? (for food, water, etc.)	158	57.25	95	34.42	8.33
<b>Q36</b>	Are maps or sketches showing hospital facilities (Site Plan) and hazard zones (gas station, etc.) included in the Disaster and Emergency Plan?	127	46.01	124	44.93	9.06
<b>Q37</b>	Are personnel with special needs (patients, disabilities, etc.) considered in the Disaster and Emergency Plan?	145	52.54	109	39.49	7.97
<b>Q38</b>	Is staff information available in the Disaster and Emergency Plan?	132	47.83	126	45.65	6.52
<b>Q39</b>	Is the Disaster and Emergency Plan of the hospital regularly updated?	132	47.83	129	46.74	5.43
<b>Q40</b>	Is the Disaster and Emergency Plan of the Hospital made after a hazard and risk analysis?	152	55.07	108	39.13	5.8
<b>Q41</b>	Has the Disaster and Emergency Plan of the hospital been prepared in cooperation with local administration units?	172	62.32	96	34.78	2.9
<b>Q42</b>	Has the Disaster and Emergency Plan of the hospital been shared with local administrations (Provincial/District Disaster Management Center, Civil Defense Directorate, etc.)?	179	64.86	86	31.16	3.99

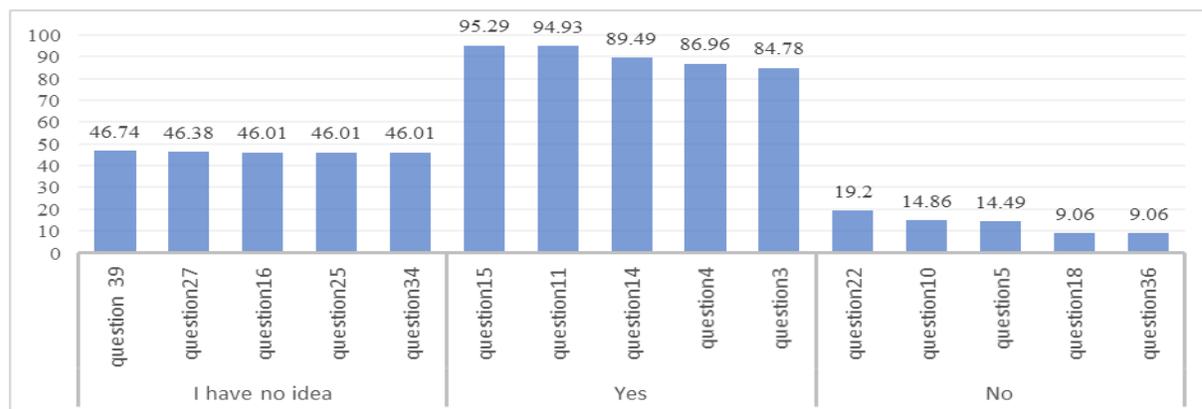
**Q:**Question

Most participants stated that measures were taken against risks such as fire (94.93%) and earthquake (80.8%) in the hospital. 84.78% stated that there was a designated gathering area for emergencies, 89.49% stated that there was an emergency warning system for communication in emergency situations, 95.29% stated that there were emergency exit signs, 70.29% stated that measures were taken against chemical events, 66.3% stated that there were interventions and 62.32% stated that there were improvements for all hazards, 69.57% stated that necessary measures were taken against situations affecting business continuity (such as power outages), and 66.67% stated that emergency supplies were regularly checked and maintained. Most respondents stated that there were emergency contact numbers (83.33%) and that evacuation routes were identified (76.09%) in the disaster plan.

However, 30.8% of the respondents stated that they had no idea whether the hospital had an incident management team for disasters and emergencies. 41.3% of the participants had no idea about the existence of the event management center, 46.01% had no idea about the existence of a shelter in case of chemical events, 46.01% had no idea about the existence of schedules of infrastructure systems such as gas in the disaster plan, 44.93% had no idea about the existence of maps or sketches showing hospital facilities and hazard zones. 34.78% of the respondents answered the question whether the Disaster and Emergency Plan was prepared in cooperation with the local administration units with "no idea" and 31.16% answered the question whether the Disaster and Emergency Plan was shared with the local administrations (Provincial/District Disaster Management Center, Civil Defense Directorate, etc.) with "no idea". 37.68% had no idea about the hazard level of the hospitals, and 45.29% had no idea about the hazard and vulnerability analysis of the hospital. However, most participants (80.43%) considered the hospital as prepared for disasters and emergencies.

Graph 1 shows the first 5 questions with the highest "yes", "no" and "no idea" answers among these 42 statements. The questions that most health personnel answered with "no idea" were: Is the hospital's disaster and emergency plan updated regularly (46.74%); Do the disaster and emergency plan provide job descriptions for persons to be employed in a disaster and emergency situation (46.38%); Is there a place in the hospital to use as a shelter for chemical disasters and emergencies (46.01%); Does the hospital's disaster and emergency plan include event-specific plans (46.01%); Does the hospital's disaster and emergency plan include schedules of infrastructure systems such as gas (46.01%). The questions that most health personnel answered with "yes" were: Are emergency exit signs available in the hospital (95.29%); Have precautions been taken for fire risk in the hospital (fire escape, extinguisher tubes, alarm system, etc.)(94.93%); Is there an emergency warning system (siren, etc.) in the hospital for communication in case of disaster and emergency (89.49%); Does the hospital have an emergency response plan (86.96%); Does the hospital have a disaster and emergency plan (84.78%). The question with the most "no" answer was whether they were informed about their responsibilities and duties in case of a disaster in the hospital (19.2%). 14.86% of the participants stated that they were not informed about the work flow instructions to be applied in case of emergency, 15.49% stated that the current disaster and emergency plan was not told to them; 9.06% stated that there were no emergency drills and that there were no maps or sketches showing hospital facilities and hazard zones (Graph 1).

**Graph 1: Top 5 Questions with Yes, No and No Idea Answers (%)**



The minimum score of the 276 health personnel from the 42 questions was 8, and the maximum score was 84. Mean Hospital Disaster Preparedness Information Score of the Health Personnel was calculated as  $64.96 \pm 13.57$ . Whether there was a statistically significant difference between the Hospital Disaster Preparedness Information Scores of the Health Personnel according to their roles and experience about disasters was investigated. The Hospital Disaster Preparedness Information Scores ( $67.45 \pm 15.27$ ) of those previously employed in any hospital during a disaster were higher than those who were not ( $64.56 \pm 13.27$ ), but the difference was not statistically significant ( $p > 0.05$ ). The Hospital Disaster Preparedness Information Scores ( $73.4 \pm 12.61$ ) of those who read the current disaster plan were higher than those who did not ( $60.01 \pm 11.53$ ), and the difference was statistically significant ( $p < 0.001$ ). The Hospital Disaster Preparedness Information Scores of those who participated in disaster and emergency plan preparation and updating works, disaster and emergency preparedness trainings and disaster and emergency drills were higher than those who did not, and the difference was statistically significant ( $p < 0.001$ ) (Table 4).

**Table 4: Analysis of the Hospital Disaster Preparedness Information Scores of the Health Personnel According to Disaster-Related Experiences**

	n	Mean + Standard Dev.	Median (Min-Max)	Mean Rank
<b>Have you ever worked in a hospital during a disaster?</b>				
Yes	38	67.45±15.27	37.0-84.0	157.86
No	238	64.56±13.27	8.0-84.0	135.41
Test Statistics		U:5257.5	Z:1.611	p=0.107
<b>Did you read the current disaster and emergency plan?</b>				
Yes	102	73.4±12.61	17.0-84.0	196.18
No	174	60.01±11.53	8.0-84.0	104.69
Test Statistics		U:14757.5	Z:9.198	p:<0.001
<b>Have you been involved in the preparation and updating of disaster and emergency plans?</b>				
Yes	96	72.75±13.09	17.0-84.0	191.95
No	180	60.81±11.92	8.0-84.0	109.99
Test Statistics		U:13771.0	Z:-8.130	p:<0.001
<b>Have you participated in disaster and emergency preparedness trainings?</b>				
Yes	156	70.43±11.03	17.0-84.0	172.11
No	120	57.85±13.3	8.0-84.0	94.8
Test Statistics		U:14603.5	Z:-7.982	p:<0.001
<b>Did you take part in disaster and emergency drills?</b>				
Yes	126	71.31±11.47	41.0-84.0	176.99
No	150	59.63±12.91	8.0-82.0	106.17
Test Statistics		U:14299.5	Z:-7.347	(p:<0.001)

The Hospital Disaster Preparedness Information Score of the Health Personnel increased as their working years in the hospital increased, and the scores between the groups formed according to working years showed statistically significant differences (KW: 17.815; p: <0.001). The Hospital Disaster Preparedness Information Score of those with a working experience of 5-10 years was higher than those with less than 1 year experience and those with 1-5 years of experience, and there was a statistically significant difference (p<0.001 and p:0.005) (Table 5).

**Table 5: Analysis of the Hospital Disaster Preparedness Information Scores of the Health Personnel According to Working Years**

	<b>N</b>	<b>Mean + Standard Dev.</b>	<b>Median (Min-Max)</b>	<b>Mean Rank</b>
<b>Working Time in This Hospital</b>				
< 1 year	91	62.21±12.53	37.0-84.0	119.40
1-5 years	131	64.56±13.49	8.0-84.0	135.97
5-10 years	54	70.56±14.03	14.0-84.0	176.82
Test Statistics			KW:17.815	(p:<0.001)
<b>Pairwise Comparison</b>				
< 1 Year vs 5-10 Years			Std. Test Statistics: -4.191	Adj. Sig: <0.001
1-5 Years vs 5-10 Years			Std. Test Statistics: -3.167	Adj. Sig: 0.005
<b>Time in the Profession</b>				
< 1 year	67	61.78±11.04	37.0-84.0	114.90
1-5 years	115	63.35±14.29	8.0-84.0	129.68
5-10 years	35	67.89±10.17	50.0-84.0	151.56
>=10 years	59	69.98±14.99	14.0-84.0	174.75
Test Statistics			KW:20.400	(p:<0.001)
<b>Pairwise Comparison</b>				
< 1 Year vs >=10 Years			Std. Test Statistics: -4.203	Adj. Sig: <0.001
1-5 Years vs >=10 Years			Std. Test Statistics: -3.529	Adj. Sig: 0.003

Similarly, the longer the experience in the profession, the higher the Hospital Disaster Preparedness Information Score was (KW: 20.400; p:<0.001). The Hospital Disaster Preparedness Information Score of those with 10 or more years of working experience was higher than those with less than 1 year and 1-5 years of experience, and there were statistically significant differences (p<0.001 and p:0.003).

#### **4. DISCUSSION**

In this study, which aimed to evaluate the hospital disaster preparedness information of health personnel, important findings were reached that will guide hospitals' assessment of their current situation against disasters and improving their activities. In this study, the lowest score obtained from 276 health personnel was 8, and the highest score was 84. The mean Disaster Preparedness Information Score of the Health Personnel was calculated as 64.96±13.57. In the study of Sakhare, it was stated that health workers had moderate disaster preparedness information 78% (Sakhare, Waghmare and Joshi, 2016).

As the working years of the health personnel increased, their Hospital Disaster Preparedness Information Score increased, and the scores between the groups formed according to their working years showed a statistically significant difference (KW: 17.815;  $p < 0.001$ ). The Hospital Disaster Preparedness Information Score of those with 5-10 years of working experience was higher than those with less than 1 year and 1-5 years of experience, and there were statistically significant differences ( $p < 0.001$  and  $p < 0.005$ ). Significant relationships were found between working years and disaster preparedness information (Gürsoy 2019; Basal and Ahmed, 2018; Nofal et al., 2018).

In this study, 74.64% of the participants stated that disaster and emergency preparedness training was done in the hospital, and 72.83% stated that emergency drills were performed. However, participation in disaster trainings (56.5%) and drills (45.7%) was low. In the study of Işık in 2004, 16.2% of the participants stated that they had drills, and 37.8% stated that they had no idea of these (Işık, 2004). In the study of Yurdakul in 2013, 56% of the participants stated that drills were performed, and 55% stated that participating in these exercises was mandatory (Yurdakul, Piroğlu and Okay, 2013). In the study of Şen and Ersoy in 2017, it was concluded that participation in disaster plan trainings was 42.9% (Şen and Ersoy, 2017). In a study in India, 61.5% of the participants stated that they did not receive disaster preparedness training ((Sakhare, Waghmare, and Joshi 2016). Surveys (Nofal et.al. 2018) have shown that hospitals conduct disaster trainings (Nofal et al., 2018), although the training needs of health personnel on disaster preparedness and management were emphasized (Berhanu et al. 2016; O’Sullivan et al. 2008; (Sakhare, Waghmare and Joshi, 2016). An important issue here is the adequacy of disaster education and encouragement of health personnel for these trainings. It was seen that more than one quarter of the workers of critical positions did not receive disaster management training and did not feel comfortable about being given a role in a disaster situation. Moreover, more than 85% of these people expect to face disaster in future work periods (Walczyszyn et. al., 2016). In the study of Canatan et al., it was emphasized that drills had a positive effect on disaster management (Canatan, Erdogan and Yilmaz, 2015). Drills are one of the most effective activities in the disaster preparedness process along with disaster trainings. Examining the studies, different results are seen regarding drills. While one study showed 81% of the respondents to state that there were disaster drills (Nofal et al., 2018), a study in Nigeria had this rate at 35.1% (Adenekan, Balogun and Inem, 2016). Research results generally indicate that health personnel should have regular training and drills for disaster and emergency preparedness and that health personnel should be encouraged to participate in these activities.

Research shows different findings on the disaster plan of hospitals and awareness of health personnel. Different studies have given percentages of 78% (Sakhare, Waghmare and Joshi, 2016), 58% (Adenekan, Balogun and Inem, 2016) and 40% (O’Sullivan et al. 2008) for those who said yes to the question whether their hospitals had a disaster plan. It can be said that there are developments regarding disaster plans in hospitals in Turkey. 37.8% of the participants in the study of Işık in 2004 and 64% of the participants in the study of Yurdakul in 2013 stated that their hospitals had a disaster plan (Şen and Ersoy, 2017; (Yurdakul, Piroğlu and Okay, 2013). In this study, 84.78% of the participants stated that there was a disaster plan, and 86.96% states that there was an emergency response plan. In line with these results and considering the Disaster Plan Preparation Directive in Turkey, it is thought that progress has been made in the field of disaster management in Turkey over the years and that the health personnel in the foundation university hospital where the study was conducted were informed about the disaster

plan. In this study, 46.74% of the participants answered the question whether the disaster plan was updated regularly with "no idea". Similar results are observed in other studies (Adenekan, Balogun and Inem, 2016). However, it was found that 63% of the participants did not read the plan, 19.2% were not informed about their responsibilities and duties in case of a disaster and 26.09% had no idea of the issue. In the study of Şen and Ersoy, it was concluded that 53.6% of those assigned to the disaster team did not know their task, and 6.3% were incorrect about it (Şen and Ersoy, 2017). In general, with the effect of related legal regulations, it is seen that hospitals have created their disaster plans, but there are limitations in terms of reading, learning and understanding of the disaster plans by health personnel.

One of the important risks for hospitals is fire. There are significant concrete measures to reduce the risk of fire such as fire escapes, extinguisher tubes and alarm systems. In this study, 94.93% of the participants stated that measures such as fire escapes, extinguisher tubes and alarm system were taken against the risk of fire. In the study of Işık, 76.4% of the participants stated that there was a fire escape, and 61.5% stated that there was an alarm system (Işık, 2004). In the study of Yurdakul, %92.7% of the participants stated that there were fire alarm systems and fire extinguishing devices ((Yurdakul, Piroğlu and Okay, 2013). According to research results, it can be said that hospitals take basic precautions against fire risks. However, there are various risks for hospitals. As stated in the Disaster Action Plan Preparation Guide, different scenarios and plans should be developed for these risks. In this study, 48.55% of the participants stated that they had plans for special events, and 46.01% stated that they had no idea about this issue. In the study of Bozkırlı, 48.55% of the participants stated that they had event-specific plans, while %46.01i said they had no idea (Bozkırlı, 2004). In the study of Gürsoy, 48.8% of the respondents stated that scenarios were created for severe epidemics, 52.2% for nature disasters, 48.8% for biological accidents or attacks, 51.2% for chemical accidents or attacks, 49.8% for radiological/nuclear accidents or attacks, 52.7% for explosive or flammable accidents or attacks (Gürsoy, 2019). In our study, 47.46% of the participants stated that they had a place to use as a shelter for chemical disasters and emergencies. In the study of Işık, %27.8i of the participants stated that there was a shelter in their hospital, and 39.4% stated that they had no idea about this issue (Işık, 2004). When the results of previous studies are considered in general, it is seen that participants had relatively less information on scenarios against special events, especially on measures against chemical and biological events. In our study, one of the issues in which relatively more health personnel had no idea (41.3%) was the presence of the event management center. In the study of Şen and Ersoy, only 23.6% of the participants knew the location of the hospital disaster management center correctly (Şen and Ersoy, 2017).

In this study, 34.78% of respondents answered the question whether the disaster and emergency plan was prepared in cooperation with the local government units with "no idea", and %31.16s of the respondents answered the question is the disaster and emergency plan shared with local authorities with "no idea". In the study of Gürsoy, 62.32% of the respondents stated that the disaster plan was prepared in cooperation with local governments, and 64.86% stated that the plan was shared with local governments (Gürsoy, 2019). In the study of Bozkırlı, the rate of hospitals working in cooperation with official institutions and local administrations was determined as 71% (Bozkırlı, 2004).

## **5. CONCLUSIONS**

The hospital disaster preparedness information score of health personnel increases as their working years increases. Disaster trainings, participation in drills and reading the disaster plan

increase the information score. Hospitals have taken physical measures such as emergency exit signs, fire extinguisher tubes and alarm system and formed disaster plans. However, most participants did not read the disaster plan. There is a lack of information on disaster plans, which are to guide people in case of a disaster, work flow instructions to be applied and roles and responsibilities of the assigned personnel. Similar results are observed in previous research. It is thought that the effectiveness of the disaster management process will be increased by not only taking concrete measures but also by increasing the sensitivity of health workers to disasters, informing them about the measures taken and including them in this process.

Hospitals, especially where most of their staff have a working time of 1 year or less, should give priority to the training of hospital staff about disasters and to informing the hospital about the measures taken for disaster. In case of disaster, all hospital employees become an important factor in terms of the sustainability of health services. For this reason, planning disaster training and drills to cover all personnel will be beneficial in terms of the management of this extraordinary situation. Moreover, the relevant official institutions should be included in these processes during the preparation of disaster and emergency plans.

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**Conflict of Interest:**

This article was produced from the master thesis titled "Hospital Management in Extraordinary Situations" by Samet Dinçer under the supervision of Seda Kumru. All of the authors have approved that no conflict of interest in this study.

**Ethical Approval:**

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