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ISSN No: 2319-5886

International Journal of Medical Research & Health Sciences, 2018, 7(8):165-174

Knowledge Levels of Nursing Students on Disaster Nursing and Their State of Disaster Preparedness

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ABSTRACT

Background: *Turkey is a country that very frequently experiences disasters due to its geological structure, and earthquakes are Turkey's most frequent type of natural disaster. To best fulfill their roles and responsibilities during a disaster, nurses are expected to enhance their knowledge and experience.* ***Aim:*** *This was a descriptive study and aimed to determine nursing students' knowledge levels on disaster nursing and their state of disaster preparedness.* ***Method:*** *This study included fourth-year nursing students in two universities located in the Ankara and Konya provinces of Turkey. It was conducted in the second education terms between 2015-2016 and 2016-2017. For data analysis, this study used frequency values, a chi-square test to assess students' views on disaster nursing courses by their universities, and an independent sample t-test.* ***Results:*** *51.6% students were nursing students in University A located in Konya, with 48.4% studying at University B in Ankara. The mean age of students was 2.41 ± 0.95 years, and 85.5% were female. Most of students studying in University A (67.8%) reported that they had received education about disasters, and this rose to 83.2% in University B students. This showed that students' disaster education status differed between universities. Only 6.8% of University A students reported that they had received disaster nursing education, while 68.6% of students studying at University B had received education about disaster nursing. The data obtained from this study showed that the status of receiving disaster nursing education varied according to the university attended ($p<0.05$), that there were statistically significant relationships between disaster nursing knowledge scores and students' universities, genders, whether they had received education about disasters and disaster nursing.* ***Conclusion:*** *This study found significant differences between students in both universities in terms of their having received education about disasters, disaster nursing, and knowledge scores on disaster nursing.*

Keywords: Nursing students, Disaster preparedness, Disaster nursing, Knowledge level

INTRODUCTION

Disasters are generally defined as ecological or man-made events that occur beyond the control of people, cause loss of life and property, disturb daily life, and can create the need for foreign assistance if they exceed the capacity of a society to respond and adapt [1]. Around the world, millions of people have been negatively affected by natural or man-made disasters, either by death, disability, or disease that occurred as a result of these disasters [2]. Natural disasters include earthquake and flood, but also there are also unnatural disasters, including nuclear accidents, dam collapse, etc. Natural disasters occur frequently and vary a lot in Turkey, primarily earthquakes, causing humanitarian and economic losses [1]. During disasters, it is expected that healthcare services will be maintained in the best possible way. From the perspective of healthcare services, the type and duration of disasters are important in terms of being indicators of disease, and injuries and providing information about the quality and speed of the needed service. The disaster preparedness of nurses is important as they are members of a health care team that should work systematically in all conditions [3,4]. In disasters, many recurrent problems which impede medical response arise from the inadequate education and training of health care professionals, from not understanding disaster medicine plans and protocols well, and from skill inadequacy and lack of experience [5]. In many countries, disaster nursing education is rarely provided to students to the same degree as fundamental nursing education, there are few models and drafts related to the process of understanding disaster nursing to guide nurses [6].

Understanding the importance of disaster nursing enables nurses to take part in all stages of a disaster, and to actively and effectively participate in disaster management plans made in all fields, included in the health system [7]. There are only a limited number of studies in the Turkish literature, and it is important to highlight the need for disaster nursing to increase the number of these studies. Based on this, this descriptive study aimed to determine nursing students' knowledge levels of disaster nursing and their state of disaster preparedness.

MATERIALS AND METHODS

This was a cross-sectional and descriptive study. The population of this study included nursing students in two universities that conduct university-level learning-teaching activities in in the Ankara and Konya provinces of Turkey. Data was collected in the second terms in the 2015 and 2017 school years. A trial of this study was administered to fourth-year nursing students (n=80) of a private university in Ankara, which was not included in the population of this study. Following this, the researchers corrected incomprehensible and incomplete questions and the main study began. The sample of this study comprised 146 students who were studying in a nursing department of University A in the province of Konya, and 137 students who were studying in the nursing faculty of University B in Ankara province. A questionnaire form was developed as a data collection tool. The three-part questionnaire was developed following a literature review [8-12].

- **Socio-demographic Characteristics of Nursing students**

The first part of questionnaire had four questions about students' age, gender, grade and where they lived.

- **Students' Characteristics about their State of Disaster Preparedness**

The second part had 14 questions to determine whether students had experienced a disaster, if they were ready to manage disasters, if they had received education about disasters and disaster nursing, if they had worked as a volunteer during disasters, if they had a desire to become a disaster nurse, if they considered themselves adequate to perform their tasks and responsibilities, and to define their educational needs about disaster nursing.

- **Disaster Nursing Information Form**

There were 20 questions in the last part of this questionnaire. These questions aimed to determine knowledge levels of students about disaster nursing and gave disaster nursing knowledge scores out of 100.

Inclusion Criteria

The inclusion criteria for this study were being a fourth-year student and studying a community health nursing course. The participating students voluntarily completed questionnaires in 15-20 minutes.

Data Analysis

The data collected from this study were analyzed using the SPSS version 17.0 (Statistical Package for Social Sciences for Windows) software. As well as frequency values, this study also used the chi-square test to compare nursing students' opinions about the disaster nursing education given by their universities, and the independent groups sample t-test to compare students' characteristics and disaster nursing knowledge scores.

RESULTS

More than half of participating students (51.6%) were students in University A, and 48.4% were studying in University B. The mean age of students was 2.41 ± 0.95 years and the majority (85.5%) were female. More than half of the participants (52.7%) were living in dormitories, two participants, who selected the "other" option, were living in student apartment (Table 1).

Table 1 Socio-demographic characteristics of nursing students

Variables	**Min-Max**	**X ± SS**
Age	20-26	22.41±.95
University	**n**	**%**
A University	146	51.6
B University	137	48.4
Gender		
Female	242	85.5
Male	41	14.5
Where Living in		
Home	149	52.7
Dormitory	132	46.6
Other	2	0.7
Total	283	100

More than half of the participating students had experienced a disaster once before (University A 52.7%, University B 52.6%) and almost all disasters experienced were earthquakes (University A 91.5%, University B 93.4%). There were a few students who had knowledge about the resistance to disaster of the place where they lived (University A 34.2%, University B 36.5%), there were 13 students who had knowledge about the disaster resistance of their university, and 17 students had a disaster emergency kit (Table 2).

Table 2 Nursing students' disaster experience

Variables	**University A**		**University B**	
Effected Disaster Events Before	**n**	**%**	**n**	**%**
Yes	77	52.7	72	52.6
No	69	47.3	65	47.4
Total	146	100	137	100
Types of Disasters*				
Earthquake	75	91.5	71	93.4
Flood	4	4.9	5	6.6
Landslide	1	1.2	-	-
Others	2	2.4	-	-
Total	82	100	76	100
Resistance of Buildings to Disasters in Where Living				
No	96	65.8	87	63.5
Yes	50	34.2	50	36.5
Resistance of University to Disasters				
No	141	96.6	129	94.2
Yes	5	3.4	8	5.8
Have Earthquake Pouch in Where Living				
No	138	94.5	128	93.4
Yes	8	5.5	9	6.6
Total	146	100	137	100
Materials in the Earthquake Pouch*				
First aid	8	27.6	12	35.3
Water	9	31	8	23.5
Dried Foods	8	27.6	7	20.6
Canned Foods	3	10.3	6	17.7
Others	1	3.5	1	2.9
Total	29	100	34	100
*Students could give more than one answer				

The majority of University A students (67.8%) reported that they had received education on disasters; however this rose to 83.2% for University B students. A great majority of University B students (72.6%) had knowledge about

disasters due to school courses. Only 6.8% of University A students stated that they had received disaster nursing education, while 68.6% of students studying in University B received education about disaster nursing. The primary source of knowledge of students who stated that they had received education on disaster nursing, was school courses at the rate of 54.5% in University A students, and of 95.0% in University B students. There were only 6 students who had participated in volunteer works for a disaster (Table 3).

Table 3 Nursing students' opinions about disaster nursing

Variables	University A		University B		X2	P
Taking Disaster Training Before	**n**	**%**	**n**	**%**		
Yes	99	67.8	114	83.2	9	0.004**
No	47	32.2	23	16.8		
Total	146	100	137	100		
Disaster Training's Types*						
School Lessons	65	45.8	111	72.6	-	-
Conference/Congress/Symposium	37	26.1	18	11.8		
Internet	23	16.2	15	9.8		
Others	17	11.9	9	5.8		
Total	142	100	153	100		
Taking Disaster Nursing Training Before						
Yes	10	6.8	94	68.6	115.99	0.000**
No	136	93.2	43	31.4		
Total	146	100	137	100		
Disaster Nursing Training Types*						
School lessons	6	54.5	95	95	-	-
Conference/Congress/Symposium	3	27.3	2	2		
Internet	1	9.1	2	2		
Others	1	9.1	1	1		
Total	11	100	100	100		
Worked as a Volunteer at any Disaster						
Yes	4	2.7	2	1.5	-	-
No	142	97.3	135	98.5		
Want to Work as a Disaster Nurse						
Yes	90	61.6	87	63.5	0.104	0.806**
No	56	38.4	50	36.5		
Need for Disaster Nursing Training						
Yes	141	96.6	133	97.1	-	-
No	5	3.4	4	2.9		
Total	146	100	137	100		
*Students could give more than one answer; ** Fisher's exact test was administered						

More than half of the participating students wanted to become a disaster nurse (University A 61.6%, University B 63.5%), almost all students thought that they needed to receive education on disaster nursing (University A 96.6%, University B 97.1%).

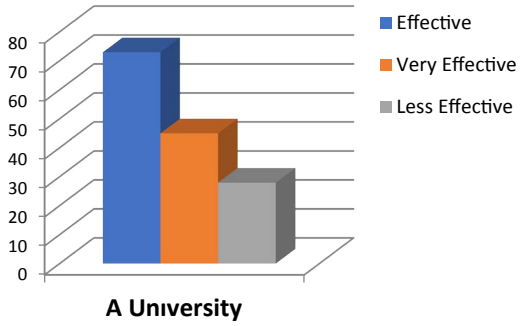


Figure 1A Finding self-effective status in any disaster (University A)

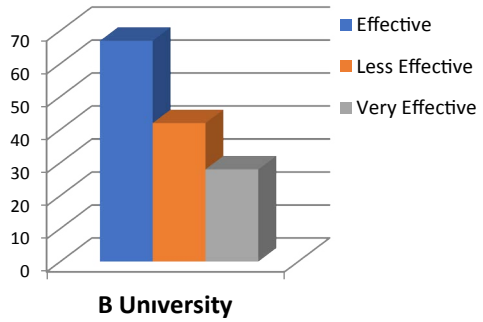


Figure 1B Students' thoughts about whether they could be effective during a disaster (University B)

In both universities, half of the participating students thought that they could be effective during a disaster. Of University A and B students, 19.2% and 30.7% respectively stated that they could be less effective (Figures 1A and 1B).

Most of the students correctly answered the statement, "No intervention should be performed on people buried in the wreckage until they arrive at the hospital." (University A 80.8%, University B 86.1%). Similarly, a great majority of students gave the correct response to the statement, "In the event of extension of disaster time, a nurse ensures people who have to live in shelters and tent cities to receive health care services." (University A 70.5%, University B 86.9%). The statement, "Tasks, roles and responsibilities given to nurses should be clearly defined in regulations," was correctly answered by only 18.5% of University A students and by 51.8% of University B students (Table 4).

Table 4 Distribution of nursing students' responses to questions on disaster nursing knowledge

Answers	University A		University B	
	n	%	n	%
No intervention should be performed on people buried in the wreckage until they arrive at the hospital.	118	80.8	118	86.1
In the event of extension of disaster time, a nurse ensures people who have to live in shelters and tent cities to receive health care services.	103	70.5	119	86.9
In disaster management, disaster intervention is more important than disaster preparedness.	94	64.4	116	84.7
A nurse ensures people with chronic diseases, as well as those who need immediate aid, can receive health care services.	88	60.3	115	83.9
During disasters, triage is done by specialized physicians.	57	39	115	83.9
In disaster management, more attention is paid to an integrated approach than to short-term efforts.	72	49.3	110	80.3
In disasters, triage is related to the needs of physicians or the institution.	55	37.7	110	80.3
In disaster management, damage reduction efforts are enhanced rather than relieving disaster-victims.	86	58.9	104	75.9

After a disaster, all disaster-victims are transferred to hospitals by 112-ambulance staff.	66	45.2	96	70.1
In triage, the color code of patients with extremely low chances of survival is green.	29	19.9	88	64.2
In disaster management, risk management is substituted for crisis management.	37	25.3	87	63.5
Tasks and responsibilities given to nurses begin with rescue efforts after the event.	49	33.6	82	59.9
In the regulations on family medicine, there is a statement that a nurse performs emergency planning, develops protocols and creates teams where necessary.	47	32.2	79	57.7
Tasks, roles and responsibilities given to nurses should be clearly defined in regulations.	27	18.5	71	51.8
One cause of mortality after a disaster is cardiac arrhythmias.	95	65.1	69	50.4
The purpose of decontamination is to protect personnel and medical services from contamination.	50	34.2	55	40.1
In disasters, limited and insufficient responsibilities are given to nurses.	23	15.8	64	46.7
There is a disaster management system in which a nurse actively and effectively participates.	10	6.8	50	36.5
The system used in disasters is generally the START system.	15	10.3	37	27
IV fluids which are provided during interventions performed after a disaster should contain potassium.	23	15.8	29	21.2

This study determined that the participating students' disaster nursing knowledge scores generally varied between 5 and 95, and their arithmetic mean was found to be 50.49 ± 19.77. Students' disaster nursing knowledge scores varied by their universities, whether they had received education on disasters and disaster nursing, and their genders (Table 5).

Table 5 Comparison of nursing students' characteristics and their disaster nursing knowledge levels

Disaster Nursing Knowledge Scores: 50.49 ± 19.77	**X ± SS**	**t**	**df**	**p**
University				
A University	39.18 ± 15.13	-12.316	281	0
B University	62.56 ± 16.79			
Gender				
Female	51.63 ± 19.89	2.371	281	0.018
Male	43.78 ± 17.78			
Effected Disaster Events Before				
Yes	51.07 ± 19.86	0.519	281	0.604
No	49.85 ± 19.72			
Taking Disaster Training Before				
Yes	52.75 ± 19.59	3.405	281	0.001
No	43.64 ± 18.80			
Taking Disaster Nursing Training Before				
Yes	63.79 ± 15.80	10.042	281	0.00
No	42.77 ± 17.63			
Worked as a Volunteer at any Disaster				
Yes	42.50 ± 21.15	-1.001	281	0.317
No	50.67 ± 19.74			
Want to Work as a Disaster Nurse				
Yes	51.13 ± 19.67	0.698	281	0.486
No	49.43 ± 19.98			
Need for Disaster Nursing Training				
Yes	50.49 ± 19.47	-0.009	281	0.993
No	50.56 ± 28.98			

DISCUSSION

Turkey is a country that very frequently experiences disasters due to its geologic, morphologic, and climatic characteristics, predominantly earthquake, flood, and avalanche [9-13]. This study showed that more than half of the students had experienced a disaster once before (University A 52.7%, University B 52.6%) and that almost all disasters experienced were earthquakes (University A 91.5%, University B 93.4%). Similarly, in a study by Ulas and Uncu in 2015, 55.6% (n=880) of 1267 adults reported that they had directly suffered from a disaster.

According to the data of the disaster awareness and preparedness to disasters research study conducted in Turkey, 23% of Turkey's population had directly experienced a disaster, and 65% of this study's participants reported that the disaster they experienced had an effect on their disaster awareness [10-29]. Similarly, in the study by Ulas and Uncu in 2015, the rate of disaster exposure was found to be higher than in the Turkey Disaster Research study. It was thought that the difference was because the participants may have lived in earthquake zones. In this study, 67.8% of University A nursing students and 83.2% of University B nursing students reported that they had received education about disasters. A statistically significant difference was found between those who had education about disasters by universities ($p<0.05$). According to the Turkey Disaster Research study results, 33.5% people think they have disaster awareness [15-29]. Based on the fact that disaster awareness is low in society, it can be stated that health professionals play a key role in increasing social awareness and consciousness, and that it is highly important for them to gain the necessary knowledge and experience during their undergraduate education. Concerning disaster nursing, only 6.8% of University A students reported that they had received education, while 68.6% of students studying in University B had received disaster nursing education. This study's findings showed that there was a statistically significant difference ($p<0.05$) by universities between those who had received disaster nursing education and knowledge scores by universities. In the literature, it has been stated that nurses have knowledge gaps on disaster management and a great majority of nurses have inadequate preparedness for disaster events [8,14,15]. A study by Hisar and Yurdakul in 2015 determined that of 440 nursing students, 24.6% had received education for disaster and emergencies, and 21.1% had received education before, after and during disaster and emergencies. The study also found that nurses had inadequate knowledge on issues on which they are expected to give service during disasters such as triage, decontamination, field hospitals in the aftermath of disaster, and materials needed after disasters [16].

According to this study, the number of University A nursing students who received education about disaster nursing was extremely low (6.8%). Disaster nursing education is given in some universities without a standard terminology or a common curriculum, demonstrating continuing need in this area. This necessity for education on disaster nursing has also been indicated in foreign literature. A study in Hong Kong examined nurses' disaster preparedness (n=164) and showed that almost all participants (97%) did not feel adequately prepared for disasters and that all participants were in agreement on the fact that nurses should receive courses for disaster preparedness [8]. In this study, the disaster nursing need rate was found to be 97.1%, showing that students, including those who had received prior education, needed more comprehensive education. Another remarkable finding of this study was that the those who regarded themselves as being "less effective" was 30.7% in University B nursing students, where 68.6% of participating students had already received disaster nursing education, and 19.2% in University A nursing students where 6.8% of participating students had previously received disaster nursing education. The lower rate of students, who had not received prior education, on regarding themselves as being "less effective", led researchers to conclude that students did not have sufficient awareness about disaster nursing.

A study by Inal, et al. in 2012 determined that 74% of 291 vocational high school students had received basic education for disaster awareness and 42.5% of them had received this education in school [12]. Celik in 2010 conducted a study with 204 nurses who worked in the Turkish Red Crescent and found that they regarded their basic competence skills at the level of "being able to do with help, and being able to do," and they mostly participated in first-aid (74.0%) and basic life-support (48.5%) courses.

Courses in which nurses wanted to participate for disaster preparedness included mental care after trauma, communication in a state of crisis and disaster, field triage, first-aid, infection control, basic life support, and advanced life support (trauma, children, cardiovascular) courses [6,8].

It is possible to predict the development of disasters and to prevent the losses related to them. Providing necessary support and incentive for taking these precautions are part of nurses' professional responsibilities and nurses have a role of first-aid specialist not only after, but also before disasters. Therefore, it is important for nurses to receive education on issues such as disaster prevention, first-aid during disasters, and rehabilitation after disaster.

Although disaster education has come into prominence in recent years, disaster nursing knowledge is defined as "inadequate" in many countries [17-24]. The disaster knowledge score in this study was found to be 50.49 ± 19.77, while it was 66.3% in the study of Jiang, et al. in 2013. Increase in nursing students' knowledge, attitude and behaviors will enable them to develop disaster awareness and self-sufficiency.

In this study, the statement, "During disasters, triage is done by specialized physicians" was answered correctly by 39% of University A students and by 83.9% of University B students. The meaning of triage is to select and sort, and it is used to group patients according to their needs for emergency and primary treatment in medicine [25]. The important issue here is that nurses should have an ability to determine triage in emergency and primary care situations, such as disaster, where physicians are not available or are insufficient [26]. Only 37.7% of University A and 80.3% of University B nursing students correctly answered the statement, "In disasters, triage is related to the needs of physicians or the institution".

Similarly, the statement, "In triage, the color code of patients with extremely low chances of survival is green," was answered correctly by University B students at higher rates than University A students (University A 19.9%, University B 64.2%). However, it was seen that the rate of nursing students in both universities who correctly responded to the statement, "The system used in disasters is generally the START system," is low (University A 10.3%, University B 27.0%). A study with 260 employees from 112 emergency health services stations reported that among disaster management issues, the one most correctly answered was "coordination/communication/command" (84.6%), and the least correctly answered issue was "triage" (40.0%). According to results of another study which aimed to measure knowledge level of nurses on triage that was conducted with 86 nurses in nine hospitals, 67.6% of participants correctly responded to the question, "What is triage?", and 68% correctly responded to the aims of triage [10].

As most regions in Turkey are located in seismic belts, in all these crisis situations, health care professionals, and even rescue teams should have already been informed about both basic knowledge necessities, such as emergency care services, triage and first-aid, treatment and care of crush syndrome, and acute kidney failure. In addition, it is also important for health professionals to perform their clinical responsibilities properly after patients arrive at health centers [27].

In accidents, including the mine accident in Turkey in 2014 that led to the death of 301 miners, train accidents, huge earthquakes such as the 2015 Nepal earthquake that killed at least 8,000 people and injured 19,000, ongoing wars with death tolls exceeding 220,000 by January 2015, according to United Nations data people face preventable or remediable complications and early medical intervention can be life-saving for many injured people [28].

To minimize health hazards that can occur in disaster situations and life-threatening injury, nurses take roles in health management, assistance, and care provision during disasters [29,30]. Nurses have special knowledge about groups at risk in society because they are health professionals who are in close touch with society. Therefore, they can immediately use this knowledge during disasters and can diagnose the physical and psychosocial effects of disaster on the well-being of individuals, families, and society [31,32]. In disaster situations, nurses support and help individuals to believe in themselves, while experiencing difficult times and restructuring their lives.

CONCLUSION AND RECOMMENDATIONS

This study showed that more than half of the participating students had experienced a disaster, and almost all disasters experienced were earthquakes. There were significant differences between students in both universities in terms of whether they had received education about disasters and disaster nursing, and knowledge scores on disaster nursing. Disaster nursing knowledge scores varied by students' universities, and whether they had received education about disasters and disaster nursing. Disasters affect millions of people's lives in all geographic regions, they cause economic losses, as well as having negative effects on the people's health and quality of life. Improved awareness and consciousness about disasters can be life-saving, and local and national education programs are required to ensure this. The education of health staff is particularly important in regions where disasters are experienced severely and intensely. Thus, health staff who are active and professional in their fields can prevent many mistakes and incorrect health care practices. In Turkey, there is no defined standard for nursing student's education and training, at the same time there are significant differences in courses included in university curricula and in their contents. While in some universities, disaster nursing can be selected as a separate course, it can be discussed in a limited way as part of the community health nursing course in other universities.

It would be effective for teaching nurses, who have full knowledge of the field, are aware of their tasks and responsibilities before, after and during disaster, and who can properly display their professional proficiencies, to organize in-service training programs for healthcare staff. It should also be mandatory for nurses to periodically complete a certain number of hours training, to minimize curricula differences between universities, and to include disaster nursing as a compulsory course in all nursing schools.

DECLARATIONS

Conflict of Interest

The authors have disclosed no potential conflicts of interest, financial or otherwise.

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