Original Article / Araştırma Makalesi

EVALUATION OF KNOWLEDGE LEVEL OF NURSING STUDENTS RECEIVING DISASTER AND FIRST AID TRAINING ON TRIAGE PRACTICES DURING DISASTER: A QUASI-EXPERIMENTAL STUDY

Afet ve İlk Yardım Eğitimi Alan Hemşirelik Öğrencilerinin Afet Sırasındaki Triyaj Uygulamaları Hakkında Bilgi Düzeylerinin Değerlendirilmesi: Yarı Deneysel Bir Çalışma

Sinan ASLAN[1]   *İlknur YEŞİLÇINAR[2]*   *Eda ŞAHİN[3]*

[1]*Batman University, School of Health Science, Batman*
[2]*İzmir Katip Çelebi University, Health Science Faculty, İzmir*
[3]*Giresun University, Health Science Faculty, Giresun*

ABSTRACT

This research was planned as a quasi-experimental to evaluate the effect of first aid training received by nursing students on their knowledge level of triage practices. This quasi-experimental study used a pretest-posttest design. The sample of the research consisted of 53 nursing students. The data was collected between October and December 2019 and the "Student Introduction Form" and "Information Form on the Three-Category Triage System" were used. A pre-test was administered to the students before receiving first aid training, and it was administered again after receiving disaster and first aid training for 6 weeks. The average age of the students was 21.41±1.24 years, 66% were female, and 56.6% of the students stated that they were Anatolian high school graduates. While the first aid and disaster knowledge score of nursing students before the training was 3.81 ± 1.50, this score was 5.39 ± 1.30 after the training. The difference between the students' average triage knowledge scores before and after the first aid course was found to be statistically significant ($p=0.001$). According to this research, it was determined that the theoretical and practical training given to nursing students during their undergraduate education positively affected the students' first aid and disaster management knowledge levels.

Keywords: Knowledge, Student, Nurse, Triage.

ÖZ

Bu araştırma, hemşirelik öğrencilerinin almış olduğu ilk yardım eğitiminin triaj uygulamalarına ilişkin bilgi düzeyine etkisini değerlendirmek amacıyla yarı deneysel olarak planlanmıştır. Bu yarı deneysel çalışmada ön test-son test tasarımı kullanılmıştır. Araştırmanın örneklemini 53 hemşirelik öğrencisi oluşturmuştur. Veriler, Ekim-Aralık 2019 tarihleri arasında toplanmış ve "Öğrenci Tanıtım Formu" ve "Üç Kategorili Triyaj Sistemine İlişkin Bilgi Formu" kullanılmıştır. Öğrencilere ilk yardım eğitimi almadan önce ön test uygulanmış, 6 hafta süreyle afet ve ilk yardım eğitimi aldıktan sonra tekrar uygulanmıştır. Öğrencilerin yaş ortalaması 21.41±1.24 yıldır, %66'sı kadın, öğrencilerin %56.6'sı Anadolu lisesi mezunu olduklarını belirtmiştir. Hemşirelik öğrencilerinin eğitim öncesi ilk yardım ve afet bilgi skoru 3.81 ± 1.50 iken eğitim sonrası bu skor 5.39 ± 1.30'dur. Öğrencilerin ilkyardım dersi öncesi ve sonrası triaj bilgi puan ortalamaları arasındaki fark istatistiksel olarak anlamlı bulunmuştur ($p=0.001$). Bu araştırmaya göre hemşirelik öğrencilerine lisans eğitimi sırasında verilen teorik ve uygulamalı eğitimin öğrencilerin ilk yardım ve afet yönetimi bilgi düzeylerini olumlu yönde etkilediği belirlenmiştir.

Anahtar kelimeler: Bilgi, Hemşire, Öğrenci, Triaj.

Sinan ASLAN ✉, sinan44aslan@gmail.com
Batman University, School of Health Science, Batman

INTRODUCTION

Disasters, a global problem, can harm people, nature, other living things, and structures. The impact level of disasters may vary depending on the area of impact and magnitude. In addition, inability to prepare for disaster due to lack of resources, financial incapability, especially in developing countries, as well as factors such as economic and social deficiencies change the level of disaster impact (Disaster Nursing, 2017; Kalanlar, 2018). Appropriate management strategies should be developed and implemented to effectively manage the negative consequences of disasters (Al Thobaity, Virginia & Brett, 2017).

The World Health Organization (WHO) recommends that healthcare professionals workers in all countries be trained on how to handle disasters, regardless of the frequency of these events in their country (World Health Organization Emergency and disaster risk management for health; 2013). Nursing is a profession that is based on human beings and focuses on protecting and promoting human health ("Nursing Definitions | ICN - International Council of Nurses," n.d.). Nurses have significant responsibilities and play an important role in disasters because they constitute the majority of health care personnel (Unver et al., 2018). The International Council of Nurses (ICN) describes the value of nurses' involvement in disasters as follows: "Nurses, with their technical skills and knowledge of epidemiology, physiology, pharmacology, cultural-familial structures, and psychosocial issues, can assist in disaster preparedness programs, as well as during disasters. Nurses, as team members, can play a strategic role cooperating with health and social disciplines, government bodies, community groups, and non-governmental agencies, including humanitarian organizations" (International Council of Nurses ICN; 2006). Therefore, nurses should have the necessary knowledge and skills for actions to be taken in the case of a disaster (Loke & Fung, 2014). Nurses are required to have the appropriate skills and adequate educational level to fulfil responsibilities in the case of a disaster. In the studies on nurses, it has been found that nurses are not ready enough for disasters (Alzahrani & Kyratsis, 2017; Labrague et al., 2018; Labrague, Yboa, Mcenroe-Petitte, Lobrino & Brennan, 2016). In the study by Labrague et al. (2016), disaster preparedness of 80% of nurses were evaluated to be insufficient. On the other hand, it was reported in the study by Alzahrani and Kyratsis (2017) that nurses were aware of their roles during a disaster; however, their knowledge levels were insufficient. For this reason, nurses should be educated about the roles and responsibilities of nurses during a disaster in the undergraduate education period (Alim, Kawabata, & Nakazawa, 2015; Unver et al., 2018). This training provided in undergraduate programs should include basic knowledge and skill training for disaster nursing.

It is also thought that supporting education with case discussions, disaster scenarios and drills will have positive effects on the preparedness of nursing students for disasters (Jose & Dufrene, 2014; Unver et al., 2018). The aim of this quasi-experimental study was to evaluate the effects of the disaster and first aid training given to nursing students on their knowledge level on triage practices during a disaster drill.

MATERIAL AND METHOD

Research Design

In this quasi-experimental study, we used a pretest-posttest design. Pretest was administered to students before receiving disaster and first aid training, and posttest was performed after 6 weeks of disaster and first aid training during triage practice.

Participants

The study was conducted on the third-year students of the Nursing Department of B University, School of Health in the fall semester of 2018-2019 academic year in Türkiye. 56 nursing students were enrolled in the training program. In the study, an attempt was made to reach the entire population without calculating the sample, and three students did not attend the education program courses. The sample of the study consisted of 53 third-grade nursing students who accepted to participate in the study.

Instruments

The data of the study were collected between October and December 2018. The study data were collected using "Student Identification Form" (Annex 1) and "Information Form on 3-Level Triage System" (Annex 2).

Student Identification Form: Personal characteristics of nursing students were obtained using the "Student Identification Form". The "Student Identification Form" includes questions about age, gender, last graduated school, whether they received first aid (emergency care) course, and performed first aid.

Information Form on 3-Level Triage System: This form was created by the researchers in order to determine the level of knowledge of nursing students on triage categories according to the priority of the cases within the scope of triage practices. This form included a total of 9 cases (3 red, 3 yellow, 3 green zones). For each case, responses were formed such as Category I: Very Urgent, Category II: Urgent, and Category III: Not Urgent in the form of 3-point Likert-

type scale. Responses to each emergency case sample were evaluated as "True" and "False". Each correct answer was awarded "1" point and each "incorrect" answer "0". The lowest score to be obtained from the form was determined as 0 and the highest score as 9.

Disaster and First Aid Course

First aid and triage training for disaster is a 6-week course. Students were ensured to attend all classes for 6 weeks. The training content provided during the course is shown in Figure 1.
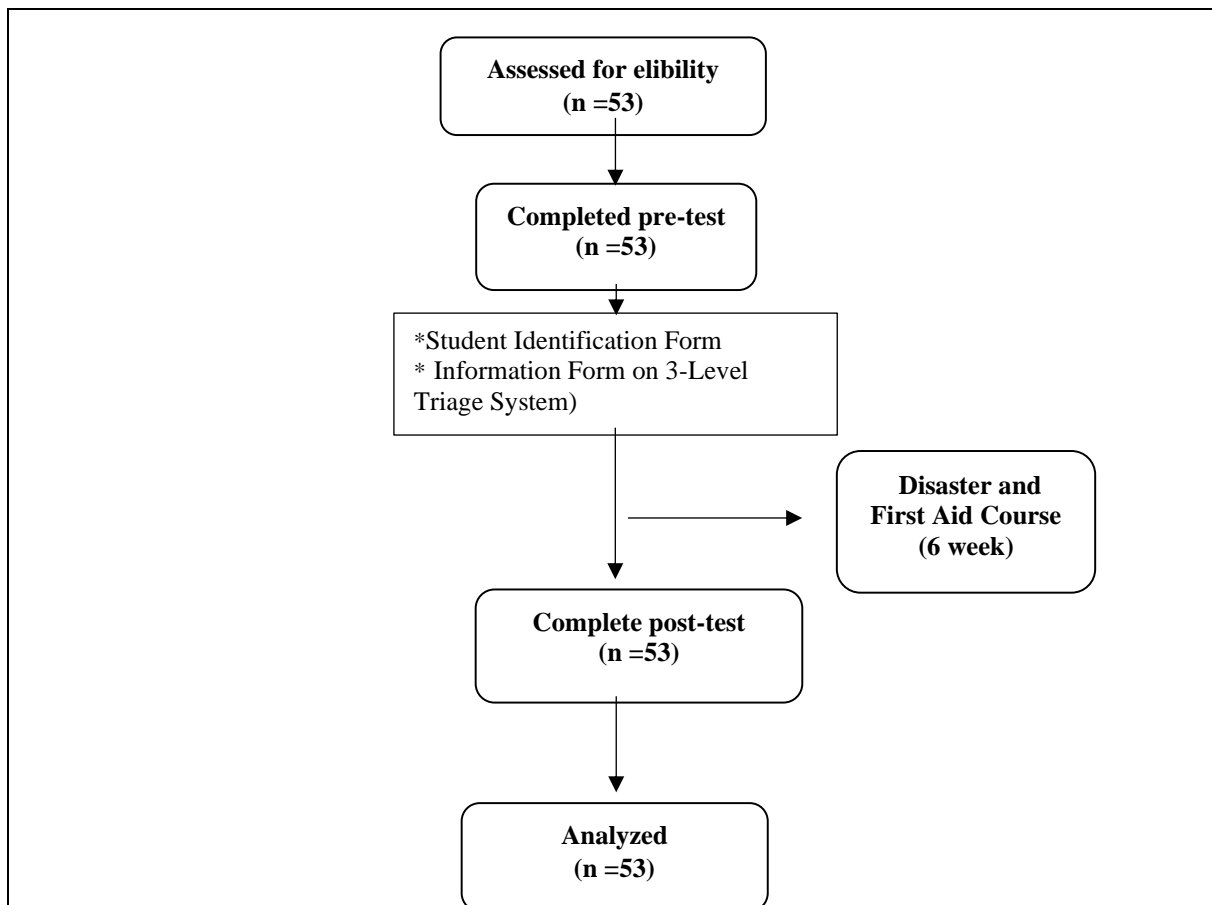

Figure 1. Study flow diagram.

Procedure

During the pretest students were asked to respond to the "Student Identification Form" and "Information Form on 3-Level Triage System". The pretest was administered to the students before receiving first aid training and then, it was readministered after receiving the disaster and first aid training for 6 weeks. Prior to the pretest and posttest, notes indicating health status (vital signs and other important health problems) were attached to the collars of 9 cases scenarioized according to different emergency situations. The scenarists' makeup was done according to their health status and the scenarists played a role in accordance with their present

health status. The students were asked to carefully read the characteristics of each case sample, evaluate their health status, and categorize the urgency of each case according to the "3-level triage system". After evaluating the patients' status, the students were asked to place the patient they consider appropriate in the predetermined "red zone", "yellow zone", and "green zone". The maximum time for students to respond was calculated as 25 minutes. The forms were recollected from the students who completed the questions in the questionnaire and evaluated.

Table 1. Disaster and First Aid Course

Weeks	Topics	Times
Week 1	Terminology in disasters	80 min
	Disaster, emergency aid, emergency concepts and definitions	
	Disaster types and situations requiring triage	
Week 2	Disaster management and coordination	80 min
	Stages of disaster (preparation, reaction, recovery	
Week 3	Disasters related laws and regulations	80 min
	Disaster management systems in Turkey and in other countries	
Week 4	Triage and triage types	80 min
Week 5	Disaster management team, powers and responsibilities of disaster nurse	80 min
	Crisis and the role of health worker in crisis	
Week 6	Evaluation	80 min

Each session; Considering the situation of the students, the training was divided into two 40-minute periods, with a 10-minute rest in between, for a total of 90 minutes. The training program was given by a single educator. The training included only theoretical knowledge.

According to the current scenario;

Beginning of the event:

At 10:30, while most of the employees were working in their offices, a fire broke out in a closed, unused room on the 3rd floor of the Batman University Central Campus Rectorate building. The first person to notice the fire was Mr. Ahmet and he informed the employees of the situation by shouting "there is a fire" and pressing the fire alarm button. At the same time, a presentation is made in the conference hall of the Rectorate building. We have been informed that there is a large audience inside. Due to the great panic and chaos in the hall, two people were injured in various parts and at the same time, a person on the 3rd floor was injured by jumping from the window. The fire brigade was immediately notified. On the other hand, during the roll call at the meeting place, it was noticed that six people were absent. The Rescue (Evacuation) Team went into the building to save six people. A total of nine cases were painted with various make-up and painting methods, and the case information was pasted on the people's foreheads, and the students were asked to place the cases in the red, yellow and green areas.

Case 1: Gas poisoning, light reflex (-), breathing (-), heartbeat (-), unconsciousness, bruising on the face, around the lips and fingers. Students were asked to place this case in the red area.

Case 2: Trauma, left frontal fracture, light reflex (+), breathing (22), heart rate (88), level of consciousness is 3/4/4. Students were asked to place this case in the yellow area.

Case 3: Gas poisoning, light reflex (+), breathing (12), heart rate (148), conscious, slight bruising. Students were asked to take this case to the green area.

Case 4: There is multiple trauma, cervix fracture, lumbar fracture (?) and right femur fracture. Light reflex (+), respiration (15), heart rate (72), and level of consciousness are off. Students were asked to place this case in the red area.

Case 5: Gas poisoning, light reflex (-), breathing (-), heartbeat (-), unconscious, slight bruising. Students were asked to place this case in the red area.

Case 6: There is a 2*3 cm incision on the scalp. Light reflex (+), respiration (22), heart rate (88), and level of consciousness are clear. Students were asked to take this case to the green area.

Case 7: Trauma, left shoulder fracture. Light reflex (+), breathing (22), heart rate (88), consciousness is moderate. Students were asked to place this case in the yellow area.

Case 8: Trauma, 2nd degree burns on the left arm and face. Light reflex (+), breathing (22), heart rate (88), and consciousness are at a moderate level. Students were asked to place this case in the yellow area.

Case 9: Gas poisoning, light reflex (+), breathing (12), heart rate (92), conscious, slight bruising around the lips. Students were asked to take this case to the green area.

Table 2. Comparisons Among the Status of Performing First Aid İntervention Previously and Triage Knowledge Levels Mean Scores of The Students in The Pre-Test

Status of receiving first aid training previously	Triage knowledge levels	
	Mean ± SD	Test, p value
Yes	4.04 ± 1.26	t= 1.012*
No	3.62 ± 1.67	p= 0.316

Independent t test

Comparisons among the status of performing first aid intervention previously and triage knowledge levels mean scores of the students in the pretest included in this study are shown in Tables 2. Our findings suggest that there were, no statistically significant differences between the status of performing first aid intervention previously of students and triage knowledge levels mean scores of the students in the pretest ($p > 0.05$) (Table 2).

Statistical Analysis

Statistical analyses were performed using SPSS v. 22.0 (SPSS, Inc., Chicago, IL, USA) for Windows. Categorical variables were expressed as frequencies and percentages. Continuous variables were presented as mean ± standard deviation (SD). Differences between continuous and categorical variables were assessed using paired sample t-test. The p value of <0.05 was accepted as statistically significant.

Ethical Considerations

In order to conduct the study, the ethical committee approval dated 02.05.2019 and numbered 2019/3-1 was obtained from the Ethics Committee of B University in Türkiye. Study participants completed an informed consent form before participating in the study.

RESULTS

The mean age of the students was 21.41±1.24 years and 30.2% of the students, 66% of whom were female, 56.6% of the students stated that they graduated from Anatolian high school. Of the students, 45.3% had previously taken first aid course, and 83.4% of these stated that they had taken it in their course curriculum and 20.8% of the students stated that they had done first aid intervention before this drill. Of those who performed first aid, 45.4% stated that they intervened in the state of fainting and shock (Table 3).

Table 3. Socio-Demographic Characteristics of Nursing Students

Characteristics	n	%
Gender		
Female	35	66.0
Male	18	34.0
Type of graduated school		
General high school	16	30.2
Anatolian High School	30	56.6
Science High School	1	1.9
Vocational High School	6	11.4
Status of receiving first aid training previously		
Yes	24	45.3
No	29	54.7
Place of first aid training		
Driving License Course	4	16.6
Course curriculum	20	83.4
Status of performing first aid intervention previously		
Yes	11	20.8
No	42	79.2
First aid intervention performed		
Fracture, displacement, sprain	1	9.1
Drowning	2	18.2
Fainting and shock	5	45.4
Toxicity	1	9.1

Foreign body penetration	2	18.2

Table 4 presents the findings of the comparison of triage knowledge levels and true answer percentages of the students before and after the disaster and first aid course. Accordingly, there was a statistically significant difference between pre and post-training true answer percentages of the students on cases 2, 5, 8 and 9 (p<0.05). There was no statistically significant difference between the evaluations of the students for cases 1, 3, 4, 6, 7 before and after training (p> 0.05). In our study, no difference was found between the evaluations of the students answers for cases 1, 3, 4, 6 before and after training. Cases 1, 4 and 5 were patients who required to be transferred to red zone, cases 3, 6 and 9 to green zone, and cases 2, 7 and 8 to yellow zone. Accordingly, it was found that the students were mostly incompetent in evaluating red and green zones. The students were found to be more successful in evaluating cases 2, 8 of yellow zone, case 5 of red zone, and case 9 of green zone. Accordingly, it was determined that the students identified the patients who needed to be transferred to the yellow zone more accurately. While the first aid and disaster knowledge score of nursing students before the training was 3.81 ± 1.50, this score was 5.39 ± 1.30 after the training. There was a statistically significant difference between the total knowledge score average of the students before and after the disaster and first aid course (t=-6.087, p=0.001). The knowledge level of the students increased after disaster and first aid training (Table 4).

Table 4. Comparison of Knowledge Levels and True Answer Percentages of Students Before and After Disaster and First Aid Training

Tests	Pre training True n (%)	Post-training True n (%)	Significance*
Case 1** Red zone	53 (100.0)	52 (0.98)	X^2=1.000 p= 0.32
Case 2 Yellow zone	24 (45.3)	35 (66.0)	**X^2=4.440; p=0.05**
Case 3 Green zone	22 (41.5)	23 (43.4)	X^2= .207 p= 0.83
Case 4 Red zone	37 (69.8)	32 (60.4)	X^2= 1.04 p= 0.40
Case 5 Red zone	13 (24.5)	43 (81.1)	**X^2=23.36; p=0.01**
Case 6 Green zone	15 (28.3)	21 (39.6)	X^2= 1.210 p= 0.40
Case 7 Yellow zone	31 (58.5)	34 (64.2)	X^2= 0.594 p= 0.69
Case 8 Yellow zone	2 (2.8)	21 (39.6)	**X^2=45.302; p=0.01**
Case 9 Green zone	5 (9.4)	25 (47.2)	**X^2=34.887; p=0.01**
Total	3.81 ± 1.50	5.39 ± 1.30	**t= -6.087*** p= 0.01**

*Chi-Square test

** True answer percentages was compared.
***Dependent t test

DISCUSSION

Triage practice is important for the rapid assessment of health status of patients. Proper implementation of triage provides both effective use of time and ability to give appropriate intervention to the patient (Tarhan & Akın, 2018). First aid training at undergraduate level increases the theoretical knowledge level of students; however, problems may arise in putting the information learned into practice, especially in emergencies such as disaster (Baack & Alfred, 2013). In this study, the evaluation of the theoretical education provided to the students was made with a disaster scenario.

It was found that about half of the students who participated in the study had had first and emergency aid training before; however, it was determined that the majority of students had not performed first aid or emergency aid before. It is thought that this practice will be effective in increasing the students' experiences and will guide them recognize their deficiencies during the drill. Likewise, in a study conducted in the literature evaluating preparedness of students for disaster, it was indicated that the majority of students had never performed disaster drill before (Unver et al., 2018).

It is important that triage training is given to undergraduate students to increase their knowledge level of practice and to ensure that students start nursing profession ready. In the literature, there are studies evaluating the level of knowledge of emergency nurses and their readiness for disasters (Küçükoğlu, Köse, Aytekin & Kılıç, 2017; Labrague et al., 2016; Loke & Fung, 2014). In most of the studies, the majority of nurses stated that they find their knowledge of disaster and triage insufficient (Al Khalaileh, Bond & Alasad, 2012; Küçükoğlu et al., 2017; Labrague et al., 2016). According to these data, it can be said that disaster and triage training given at undergraduate level is insufficient. Therefore, in addition to theoretical education, it is important to make practice in order to increase the knowledge level of students and carry out learning. In this study, the knowledge levels of the students after the disaster and first aid training and drill were found to be statistically higher than their level of knowledge before the training. In similar studies, students' level of knowledge before training was found to be higher after training (Alim et al., 2015; Unver et al., 2018; Tarhan & Akın, 2018; Kalanlar, 2018; Köse et al., 2020). It is seen that the theoretical and practical training provided to students in this direction is quite effective.

It was found that the students were mostly insufficient in assessing red and green zones before and after training. It was determined that the students identified the patients who needed to be transferred to the yellow zone more accurately. It can be said that the students assessed red and green zones more difficult. For this reason, it is necessary to provide more detailed training to students about the health status and evaluation of patients to be taken to red and green zones.

Limitations

In this study, 53 students receiving disaster and first aid nursing training were evaluated.

Conclusion And Recommendations

According to this study, it was determined that theoretical and practical education given to nursing students during undergraduate education had a positive effect on students' knowledge level. In addition, it was found that students had difficulty in taking patients to red and green zones. In this respect, it was determined that the students needed more detailed training for green and red zones. In order to evaluate the reflection of the training given on professional practice, it is recommended that the students who received the training also be evaluated when they start the profession. It is thought that the training and drill sample provided to the students in this study will be guiding.

REFERENCES

Al Thobaity, A., Virginia, P., Brett, W. (2017). What are the most common domains of the core competencies of disaster nursing? A scoping review. *International Emergency Nursing*, 31, 64-71. https://doi.org/10.1016/j.ienj.2016.10.003.

Al Khalaileh, M. A., Bond, E., ve Alasad, J. A. (2012). Jordanian nurses' perceptions of their preparedness for disaster management. *International Emergency Nursing*, *20*(1), 14–23. https://doi.org/10.1016/j.ienj.2011.01.001

Alim, S., Kawabata, M., ve Nakazawa, M. (2015). Evaluation of disaster preparedness training and disaster drill for nursing students. *Nurse Education Today*, *35*(1), 25–31. https://doi.org/10.1016/j.nedt.2014.04.016

Alzahrani, F., ve Kyratsis, Y. (2017). Emergency nurse disaster preparedness during mass gatherings: A cross-sectional survey of emergency nurses' perceptions in hospitals in Mecca, Saudi Arabia. *BMJ Open*, *7*(4). https://doi.org/10.1136/bmjopen-2016-013563

Baack, S., ve Alfred, D. (2013). Nurses' preparedness and perceived competence in managing disasters. *Journal of Nursing Scholarship*, *45*(3), 281–287. https://doi.org/10.1111/jnu.12029.

Disaster Nursing. (2017). Retrieved from https://www.icn.ch/sites/default/files/inline-files/ICNP_Catalogue_Disaster_Nursing.pdf

Jose, M. M., ve Dufrene, C. (2014). Educational competencies and technologies for disaster preparedness in undergraduate nursing education: An integrative review. *Nurse Education Today*, *34*(4), 543–551. https://doi.org/10.1016/j.nedt.2013.07.021.

Kalanlar, B. (2018). Effects of disaster nursing education on nursing students' knowledge and preparedness for disasters. *International Journal of Disaster Risk Reduction*, 28, 475-480. https://doi.org/10.1016/j.ijdrr.2017.12.008.

Kose, G., Unver, V., Tastan, S., Ayhan, H., Demirtas, A., Kok, G., Guvenc, G., Basak, T., Bagcivan, G., Gokay Kurtoglu, P., Acavut, G., Gezginci, E., ve Iyigun, E. (2020, October). Embedded participants insimulation-based disaster education: Experiences of nursing students. *Clinical Simulation in Nursing*, 47(C), 9-15 https://doi.org/10.1016/j.ecns.2020.06.011.

Küçükoğlu, S., Köse, S., Aytekin, A., & Kılıç, T. (2017). Evaluation of the Knowledge of Triage among Nurses Working in Emergency Departments. *Turkish Journal of Pediatric Emergency and Intensive Care Medicine*, 116–122. https://doi.org/10.4274/cayd.42714

Labrague, L. J., Hammad, K., Gloe, D. S., McEnroe-Petitte, D. M., Fronda, D. C., Obeidat, A. A., … Mirafuentes, E. C. (2018). Disaster preparedness among nurses: a systematic review of literature. *International Nursing Review*, 65(1), 41–53. https://doi.org/10.1111/inr.12369

Labrague, L. J., Yboa, B. C., Mcenroe-Petitte, D. M., Lobrino, L. R., ve Brennan, M. G. B. (2016). Disaster Preparedness in Philippine Nurses. *Journal of Nursing Scholarship*, 48(1), 98–105. https://doi.org/10.1111/jnu.12186

Loke, A. Y., ve Fung, O. W. M. (2014). Nurses' competencies in disaster nursing: Implications for curriculum development and public health. *International Journal of Environmental Research and Public Health*, 11(3), 3289–3303. https://doi.org/10.3390/ijerph110303289

Nursing Definitions | *ICN - International Council of Nurses. (n.d.)*. Retrieved May 27, 2019, from https://www.icn.ch/nursing-policy/nursing-definitions

Tarhan M., ve Akın S. (2018) Evaluation of Nursing Students ' Level of Knowledge about Triage. *Health and Society*;28 (4):53-64.

Unver, V., Basak, T., Tastan, S., Kok, G., Guvenc, G., Demirtas, A., … ve Tosune, N. (2018). Analysis of the effects of high-fidelity simulation on nursing students' perceptions of their preparedness for disasters. *International Emergency Nursing*, 38(February), 3–9. https://doi.org/10.1016/j.ienj.2018.03.002