Knowledge of Disaster Response among Nurses in Emergency Departments and Intensive Care Units: A Comparative Study

Cut Husna [1,2], Teuku Tahlil [3], Hajjul Kamil [4], Mustanir [5], Nilla Afiatni [6]

[1]*Department of Medical and Surgical Nursing, Faculty of Nursing, Syiah Kuala University, Banda Aceh, Indonesia*
[2]*Doctoral Program of Mathematic and Applied Scienc, Syiah Kuala University, Banda Aceh, Indonesia*
[3]*Department of Community Health Nursing, Faculty of Nursing, Syiah Kuala University, Banda Aceh, Indonesia*
[4]*Department of Nursing Management, Faculty of Nursing, Syiah Kuala University, Banda Aceh, Indonesia*
[5]*Deaprtment of Chemistry, Faculty of Science, Syiah Kuala University, Banda Aceh, Indonesia*
[6]*Undergraduate Program of Nursing Science, Faculty of Nursing, Syiah Kuala University, Banda Aceh, Indonesia*

Keywords: Disaster, Hospital, Knowledge, Nurses, Response

Abstract: Aceh is one of disaster-prone and high-risk areas in Indonesia. Disasters such as earthquakes, tsunamis, landslides, floods, fires, and tornadoes occurred periodically in Aceh. However, an unwell-managed disaster response might endanger the victims. Nurse is a health professional with the biggest number of personnel involved in disaster response. Therefore, nurses require adequate disaster competencies related to critical thinking, triage, first aid, and disease management. The aim of this study is to examine the difference of knowledge about disaster response among nurses working in the Emergency Department (ED) and Intensive Care Units (ICUs). This comparative study involved 185 nurses in EDs (n = 57) and ICUs (n = 128) using total sampling technique. Data collection employed a questionnaire with dichotomous scale consisting of 40 items and analyzed by independent sample t-test. The questionnaire shows a reliable Cronbach's alpha coefficient (0.981) and valid value (r = 0.934) in measuring the knowledge of nurses. The results showed the average value of nurses' knowledge in disaster response was 71.01 (SD = 9.54) among nurses in EDs, and 66.41 (SD = 8.76) among nurses in ICUs, with p-value 0.003 (p <0.05). There was a significant difference between the knowledge about disaster response among nurses in EDs and ICUs. This study emphasized that is needed to increase knowledge among nurses at ICUs regarding critical thinking, triage, and first aid in disaster response.

1 INTRODUCTION

Indonesia is one of the most vulnerable countries to be attacked by disasters in the world such as floods, earthquakes, tsunamis, volcanic eruptions, tornadoes, droughts and natural disasters such as social conflict and terrorism. Disasters occur regularly every year, but disaster anticipation and response to date has not been well prepared (IDEP, 2007; Husna, 2012). According to disaster regulation of Indonesia No. 24 (2007) mentioned that disaster is a series of events that threaten and disrupt the life caused by natural factors, non-natural factors and human factors resulting in human casualties, environmental damage, property losses, and psychological impacts.

Aceh Disaster Management Agency reported that in the past 8 months several disasters have occurred in Aceh, consisting of 22 incidents of flooding, 37 incidents of fire, 1 earthquake, 7 landslides and 2 tornadoes (Piko, 2017; Luwi, 2017). Natural disasters disrupt human health and well-being in providing affordable health care which is one of the main factors affecting survival, increasing morbidity and mortality (Pourvakhshoori, Norouzi, Ahmadi, Hosseini, Khankeh, & Hamidreza, 2017).

Nurses are health workers who are involved in the care of disaster victims, who need preparedness through comprehensive competencies to be able to treat patients optimally (Tzeng, Feng, Cheng, Lin, Chiang, Pai, & Lee, 2016). The hospital is a health referral center for victims of disasters and emergency conditions that have the responsibility to provide services for emergency and disaster victims (Rifai & Harnanto, 2016,). Therefore, hospital services are needed to deal with these conditions, both in terms of health personnel resources, and equipment that supports victims.

Competency is used to describe knowledge that allows a practitioner to carry out activities consistently and safety, which is the main determinant of performance. According to the International Council of Nurses (2009), competence means knowledge, skills and attitudes, which are needed in taking safe actions within the scope of nursing practice. Related to cognitive of disasters nursing, Ministry of Health(2007); HIPGABI (2012); Stanley (2005) and Wisniewski(2004) described that there are several characteristics related to knowledge of disaster nursing, including: (1) critical thinking, (2) triage, (3) first aid, (4) disease management, (5) communication, and (6) legal ethics. However, this research is limited and only focuses on assessing differences in knowledge of nurses in disaster response consisting of (1) critical thinking, (2) triage, (3) first aid, (4) disease management at the emergency department (EDs) and intensive care (IC) wards because of those places are responsibility to take care critical patients in disaster responses. EDs and IC are workplace settings that result in immediate respond with serious and sometimes fatal consequences during disaster attacked.

Nurses are health workers who have an important role during a disaster, therefore nurses must have adequate knowledge in responding to disasters. Indonesia has at least 962 thousand nurses with a growth of 1 million graduates of the nursing academy each year, but only 10% of them have emergency disaster competencies. Not only requires readiness in health services, but hospitals must also be able to manage and overcome disaster victims who aim to save the lives of victims and avoid other major complications (Ministry of Health, 2007).

Dr.Zainoel Abidin General Hospital in Banda Aceh is a provincial hospital located in the city center. The hospital currently has 686 nurses, 167 medical specialists, and 65 doctors. The hospital has medical services consisting of emergency departments, ambulatory, inpatient care, NICU, PICU, ICU, ICCU and HCU (RSUD dr. Zainoel Abidin, 2016).

Medical health care in this hospital is in adequate services, however there is no data on disaster preparedness from the emergency department (EDs) and intensive care (IC) related to disaster response both in terms of the readiness of nurses, doctors and staff in hospitals. The results of research conducted by Husna (2012) found that disaster preparedness in Emergency Department at dr. Zainoel Abidin Hospital in Banda Aceh, which was carried out by 25 nurses (83.3%) was generally included in the good category. This means that nurses already know and understand in terms of preparation for disaster. Meanwhile, there has been no research on the readiness of nurses in the event of a disaster for the intensive care wards. Both workplaces (EDs and IC) are important and critical places for the rescue and care of critical patients during disasters.

2 METHODS

The research is quantitative descriptive research with cross sectional design. Data collection used a questionnaire with dichotomous scale consisting of 40 items and has passed the validity and reliability test. The content validity test employed three experts from Faculty of Nursing, Syiah Kuala University Banda Aceh, and tested for reliability using Cronbach alpha with score = 0.934, and = 0.981 respectively. The study was conducted at a provincial hospital of dr. Zainoel Abidin of Banda Aceh, Indonesia. The total sample was 185 nurses who work in EDs (N = 57) and IC (N = 128) by using total sampling technique. The data was analyzed using Independent sample t-test. The study has passed an ethical test from the ethical clearance committee of the Faculty of Nursing, Syiah Kuala University, Banda Aceh, Indonesia.

Data was collected on April-Mei, 2018 at EDs and ICUs of the provincial hospital of Banda Aceh. The exclusion criterion was the nurses who have been undergoing furlough, training and education will be excluded in the study.

The study is described in four sub variable the knowledge of disaster response among nurses in Emergency Department and Intensive Care: critical thinking, triage, first aid, and disease management.

3 RESULTS

3.1 Demographic Data

The demographic data consisted of age, sex, educational background, marital status, length of work and attending emergency disaster/emergency training. The table 1 shows that the majority of the respondents were female, graduated from diploma nursing, married, had worked for 1 – 5 years, and not attended any training.

Table 1: Demographic Data of Nurses in Emergency Department and Intensive Care (N=185).

Demographic Data	EDs F(%)	IC F(%)
Gender		
Male	33(57.9)	39(30.5)
Female	24(42.1)	89(69.5)
Age, mean(SD)	30.1(4.5)	31.5(5.6)
Educational level		
Diploma	34(59.6)	67(52.3)
Bachelor	23(40.3)	60(46.9)
Master's degree	-	1(0.8)
Marital status		
Marriage	35(61.4)	93(72.7)
No	22(38.6)	35(27.3)
Length of work (year)		
1-5	38(66.7)	79(61.7)
6-10	11(19.3)	23(18.0)
11-15	8(14)	22(17.2)
16-20	-	3(2.3)
21-25	-	1(0.8)
Attended training		
No	36(63.2)	95(74.2)
Disaster drill	9(15.8)	-
DASIPENA	1(1.8)	3(2.3)
BTCLS	8(14.0)	10(7.8)
Triage	1(1.8)	-
First aid	1(1.8)	-
BLS	-	7(5.5)
Fire management	-	7(5.5)
Disaster management	-	2(1.6)
ATCLS	-	1(0.8)
CPR	-	3(2.3)
BTCLS, PPGD	1(1.8)	-

3.2 Differences in Knowledge about Critical Thinking among Nurses in Disaster Response

The differences of knowledge scores about critical thinking between nurses in the emergency department and intensive care are described in Table 2. There was a significant difference in knowledge scores for nurses in the emergency department (mean = 71.27) and intensive care (mean = 62.30) about critical thinking in disaster response (p-value = 0.000).

3.3 Differences in Knowledge about Triage among Nurses in Disaster Response

The difference of knowledge scores about triage between nurses in the emergency department and intensive care are described in Table 2. There was a significant difference in knowledge scores for nurses in the emergency department (mean = 68.42) and intensive care (mean = 57.23) about their triage in disaster response (p-value = 0.000).

Table 2: The Mean Scores of Knowledge about Critical Thinking, Triage, First Aid, and Disease Management in Disaster Response among Nurses the Emergency Department (ED) and Intensive Care (IC).

Type of Knowledge	Type of Wards				p-value
	EDs (n=57)		IC (n=128)		
	Mean	SD	Mean	SD	
Critical Thinking	71.27	15.84	62.30	13.85	0.000
Triage	68,42	16,88	57,23	15,65	0,000
First Aid	68.42	13.54	63.38	12.85	0.019
Disease Management	60.09	15.02	69.53	15.02	0.000

3.4 Differences in Knowledge about First Aid among Nurses in Disaster Response

The difference of knowledge scores about first aid between nurses in the emergency department and intensive care are described in Table 2. There was a significant difference in knowledge scores for nurses in the emergency department (mean = 68.42) and intensive care (mean = 63.38) about first aid in disaster response (p-value = 0.019).

3.5 Differences in Nurses' Knowledge about Diseases Management in Disaster Response

The difference of knowledge scores about diseases management between nurses in the emergency department and intensive care are described in Table 2. There was a significant difference in knowledge scores for nurses in the emergency department (mean = 60.09) and intensive care (mean = 69.53) about diseases management in disaster response (p-value = 0.000).

4 DISCUSSIONS

Statistical test results in this study obtained the average knowledge of nurses about critical thinking in EDs was 71.27 with a standard deviation of 15.84, while in the IC was 62.30 with a standard deviation of 13.85 and p value = 0.000. Therefore, it can be concluded there was significant difference knowledge about critical thinking among nurses in EDs and IC. Bulson (2011) mentioned critical thinking is a skill that can be learned directly from the steps of the nursing process. Nurses who have critical thinking skills will be able to respond to

disasters because critical thinking is the main thing needed in a disaster situation. In addition, critical thinking is a goal directed through mass victims, so nurses are needed to be critical thinkers.

Critical thinking and decision-making ability are essential part for nurses' emergency professional competence. Critical thinking is needed in clinical decision making in caring patient in critical situation on disaster such as at EDs. Because of the EDs is potentially very stressful, unpredictable, quick diagnosis and communication with interdisciplinary team to maintaining lifesaving and treatment patients are vital in these units (Heidari & Ebrahimi, 2016). The workload in EDs is uncontrolled, unpredictable and punctuated by intermittent time is needed critical thinking activities including knowledge. Transferring of patients is unscheduled and there are irregular peaks and troughs in the number of patients and acuity levels of illness and injury in disaster response (Chisholm & Nelson, 2000).

The results of this study in accordance with the findings of research that was conducted by Ludin (2017) shows that nurses' critical thinking skills in decisions making is in high category with a percentage of 71.5% and according to the study, age and work experience strongly impact on clinical decision-making skills during emergency response. Age and length of work greatly affect critical thinking abilities, the more experience handling patients and disaster victims in various cases and conditions will provide better critical thinking decisions.

According to Gurney and Faen (2015) critical thinking is the way in which nurses prioritize patients using the triage system and find out the severity caused to victims when a mass disaster occurs. Nurses are asked to use critical thinking, clinical judgment, formulate problems, and make appropriate decisions. Another study conducted by Pieterse,

Lawrence, and Friedrich-nel (2015) in emergency nurses in South Africa showed that most nurses only had minimal critical thinking skills.

The results of this study obtained average nurses' knowledge about triage in EDs was 68.42 with a standard deviation of 16.88, while the average nurses' knowledge in IC about triage was 57.23 with a standard deviation of 15.65, and p-value = 0,000. Therefore, it can be concluded that there was a significant difference in nurses' knowledge about triage in the EDs and IC. Proper triage at EDs is a complex decision-making process, which includes evaluation of the patient and other factors of the treatment system with time limited in disaster responses (Heidari & Ebrahimi, 2016). The results of this study in accordance with the findings of research that has been done by Nurhasim (2015) at Karanganyar General Hospital, shows that triage is a grouping based on patients and is a process of classifying patients based on type and level of critical condition. Triage is also applied in the event of a disaster or mass casualty incident which is the responsibility of the nurse in the EDs.

This research is in line with the research conducted by Foronda, Shubeck, Swoboda, Hudson, Budhathoki, Sullivan, and Hu (2016) on American nurses which showed that 85.7% of nurses were able to identify disaster victims using triage and focus on the concept of disaster management. In contrast to research conducted by Russo, Galante, Jacoby, and Shatz (2015) in 149 medical personnel in California which showed a lack of critical knowledge about the basic principles of triage and only 24% of medical personnel who recognized the correct color when asked about the code of certain colors used in triage.

Rolston (2015) mentioned that the hospital must be ready to identify patients who need immediate responses using triage colored based on the urgency of treatment, such as black categorized as dead victims, red for victims who need immediate action, yellow for critical victims but actions can be delayed, and green for victims with minimal injuries. The results of the study showed 66.7% of respondents have working experience at EDs for 1-5 years and 35.2% attended in emergency and disaster trainings. The results study supported by Fathoni, Sangchan and Songwathana (2013) pointed that there were significantly positive correlations between triage skill and working experience ($r = .27$, $p < .01$), training experience ($r = .37$, $p < .01$), and triage knowledge ($r = .38$, $p < .01$).

On the other hand, study conducted by Husna, Hatthakit and Chaowalit (2011) on 78 nurses from the provincial hospital in Banda Aceh regarding knowledge and clinical experience had a special role in perceived clinical skills during the treatment of victims of the 2004 tsunami in Aceh. The perceived clinical skills for tsunami care were at a moderate level with a total average score of 3.41. In addition, nurses' skills related to the use of the triage system studied showed that the results were in the medium category with an average score of 3.57. Furthermore, study by Afaya, Azongo, and Yakong (2017) founded that 62.6% of the respondents were knowledgeable about triage. Majority of nurses (96%) in the Emergency Departments of the various hospitals had a very good perception about the importance of triage to the patient.

Triage knowledge among nurses is one of the key elements of standardized supervision in emergency department particularly in labelling patients' condition during disaster response. It is needed carried out at standard level to find the outcomes of clinical care of patients and efficiency (Ali *et al.*, 2013).

The results of this study explain that EDs is the first entry point for disaster victims who are referred to identify the level of emergency and action by using triage, patient identification, initial assessment, and immediate treatment. Whereas in IC, nurses do not identify the level of emergency, but focus only on monitoring and maintaining intensive and critical conditions of the patient. Therefore, this explains that the level of knowledge of nurses working in EDs was generally higher than nurses who were working in IC.

Findings of this study also shows that the average nurses' knowledge about first aid in EDs was 68.42 with standard deviation 13.54, while the average nurses' knowledge in IC about first aid was 63.38 with a standard deviation of 12.85 and p-value = 0,019. Therefore, it can be concluded that there was a significant difference in nurse' knowledge about first aid in EDs and IC.

Based on the result of the study showed that 15.8% of respondents at EDs have attended in disaster drill training that conducted to first aids to the patients in the emergency also in that training. This result was support by Kano, Siegel & Bourque (2005) mentioned that first-aid training, particularly recent training, was associated with greater perceived first-aid knowledge and skills, as well as with increased expected and actual employment of those competencies. With the appropriate training and knowledge and skill retention, lay members of nurses can potentially contribute to disaster medical response.

The results of this study in accordance with the findings of research that has been done by Mawu, Bidjuni, and Hamel (2016) at Prof. Dr. D. Kandou Manado General Hospital confirmed that emergency events during a disaster require immediate help because the situation can be life threatening or cause permanent disability. The results of this study indicated that the average value of both wards in conducting first aid interventions in emergency or disaster incidents was classified in the fewer categories. Nurses are part of health workers who must improve professionalism and knowledge in carrying out care. In addition, nurses are officers who are highly prioritized in first aid care in a disaster situation or during a mass accident.

According to Ministry of Health (2007), first aid service is delivered by volunteers, firefighters, police, and personnel from special units, emergency medical teams and trained emergency nurses. First aid is provided at the disaster site, before the victim is referred to the nearest hospital for further treatment. When the victim has been referred to the hospital, the victim needs more treatment and care.

Furthermore, a research conducted by Dulandas and Brysiewicz (2018) on emergency nurses in the United States of Durban and South Africa about first aid nurses' competencies shows that there were 48% of nurses who had a value less than the average score. This shows the low level of nurse competence. Most nurses (67%) considered themselves highly competent in basic skills such as assessing breathing, managing oxygen, and assessing circulation. Less than half of nurses (45%) considered themselves highly competent in intermediate skills such as controlling bleeding, helping endotracheal intubation, and managing shock.

Based on the answers from the questionnaire obtained from the sub variables, there were 127 nurses who chose the correct answer that the nurse did the first aid for infusion using crystalloid fluids and blood transfusion in patients with heavy bleeding, if there were 1500-2000 ml of blood loss. The results of this study showed that average value of nurses' knowledge about first aid was 68.42 in EDs and 63.38 in IC.

Another study conducted by Suryanto, Plummer and Boyle (2018) involving 465 participants from 45 health care services in Malang was conducted to investigate the perceived knowledge, attitude, and practice of ambulance nurses. The results obtained that nurses' knowledge was in low category while the attitude and practice were in moderate category. This is influenced by clinical emergencies that have been experienced and attended in emergency or disaster

training. A research conducted by Sonneborn, Miller, Head, and Cross (2018) also showed that the knowledge of Australian nurses about disaster-related nursing was at a low level with an average value of 1.79. These results greatly influence nurses in handling victim care during the disaster response phase.

The average nurses' knowledge about disease management in ED was 60.09 with standard deviation of 15.02. While the average nurses' knowledge in IC about disease management was 69.53 with a standard deviation of 15.02. Statistical test results obtained p value = 0.000, at alpha 0.05. Therefore, it can be concluded that there was a significant difference in nurse' knowledge about disease management in EDs and IC.

According to Tumenggung (2017), infectious diseases are a very worrying problem, given the potential for the emergence of contagious diseases in the large post-disaster period as a result of the large number of possible risk factors for transmission. Infectious disease problems are caused by damage to environmental pollution, the availability of clean water which is often insufficient in quantity and quality, and transmission among people who are at high risk, such as toddlers, pregnant women, and elderly.

The results of this study in accordance with the results of research conducted by Simatupang (2017) at Gatot Soebroto Hospital about the pandemic disaster that caused many victims and very easily spread in some areas. In the event of a disaster the victim must be immediately evacuated to the nearest health facility that could handle mass casualties. Hospitals are one of the important facilities that have a role during a disaster and demand professional health workers such as nurses. Nurses are asked to be vigilant in handling disaster conditions by having knowledge related to disease management and prevention and eradication of infectious diseases.

A research conducted by Baduge, Moss and Morphet (2017) on 13 Australian emergency nurses to identify the disease management and nurse preparedness in the treatment of Ebola viral diseases showed that most of nurses had a moderate readiness in handling patients both in terms of decisions making about patient care and balancing the threat for nurses, families, and their professional commitment as nurses.

The results of the study also supported study by O'Sullivan et al., (2008) indicated that nurses in EDs feel unprepared to respond to large scale disasters/attacks. The sense of preparedness varied according to the outbreak/disaster with nurses feeling

least prepared to respond to disaster event. Approximately 40% of respondents were unaware if the hospital had an emergency plan for a large-scale outbreak, so it could influence the knowledge of disease management among nurses. Other studies conducted by Jansson, Syrjälä, Talman, Meriläinen and Ala-kokko (2018) involving 120 intensive care nurses, showed that most of them had competent disease management so that the nurses always carry out strict care and monitoring of patients.

The results of this study explain that the knowledge of nurse in IC was higher than EDs, because the nurses in IC are required to perform treatments such as monitoring, evaluating and providing comprehensive and continuous health services and are responsible to caring the patients. Because of critical patients in IC need strict care, monitoring, and observation, therefore the average score of disease management knowledge on nurses in IC was higher than EDs as the results of the study.

5 CONCLUSIONS

Based on the results of the study, showed that there was a significant difference between knowledge about disaster response among nurses in EDs and IC (p-value = 0.003). The sub variable of the study showed there were a significant difference between knowledge about critical thinking (p-value 0.000), triage (p-value = 0.000), first aid (p-value 0.019), and diseases management (p-value 0.000) among nurses at EDs and IC in disaster response.

ACKNOWLEGEMENTS

REFERENCES

Afaya, A., Azongo, T. B. & Yakong, V. N. 2017 Perceptions and Knowledge on Triage of Nurses Workingin Emergency Departments of Hospitals in the Tamale Metropolis, Ghana. *IOSR Journal of Nursing and Health Science*, 06(03), 59–65.

Ali, S., Taverner, B. C. B., Ghani, M., Kussor, Z., Naz, S. 2013. Knowledge of Triage among Nurses in Emergency Units, 29, 240–243.

Baduge, M., Moss, C., & Morphet, J. 2017. preparedness for an ebola outbreak : A qualitative descriptive study. *Australasian Emergency Nursing Journal*, 1–6. https://doi.org/10.1016/j.aenj.2017.02.003

Bulson, J. A. 2011. Nursing process and critical thinking linked to disaster preparedness. *Journal of Emergency Nursing*, *37*(5), 477–483.

Chisholm, C. D. and Nelson, D. R. 2000 'Emergency Department Workplace Interruptions:Are Emergency Physicians "'Interrupt-driven'"and "'Multitasking'"?', *Academic Emergency Medicine*, 7(11), pp. 1239–1243.

Dulandas, R., & Brysiewicz, P. 2018. African Journal of Emergency Medicine Original Article a description of the self-perceived educational needs of emergency nurses in Durban, KwaZulu-Natal, South Africa. *African Journal of Emergency Medicine*, 8(3), 84-88.

Fathoni, M., Sangchan, H. and Songwathana, P. 2013 'Relationships between Triage Knowledge , Training , Working Experiences and Triage Skills among Emergency Nurses in East Java , Indonesia', *Nurse Media Journal of Nursing*, 3(1), pp. 511–525.

Foronda, C. L., Shubeck, K., Swoboda, S. M., Hudson, K. W., Budhathoki, C., Sullivan, N., & Hu, X. 2016. Impact of Virtual Simulation to Teach Concepts of Disaster Triage. *Clinical Simulation in Nursing*, *12*(4), 137–144. https://doi.org/10.1016/j.ecns.2016.02.004

Gurney, D., Rn, M. S., & Faen, C. E. N. 2015. Critical Thinking at Triage: Ask the Question! *YMEN*, *41*(4), 362–363.

Himpunan Perawat Gawat Darurat dan Bencana Indonesia (HIPGABI). 2012. *Draft Kompetensi Perawat Bencana. Direktorat Keperawatan*. PPNI

Heidari, M. and Ebrahimi, P. 2016. Examining the relationship between critical-thinking skills and decision-making ability of emergency medicine students. *Indian Journal of Critical Care Medicine*, 20(10):581-586.

Husna, C. 2012. Influencing Factors on Disaster Preparedness in RSUDZA Banda Aceh. *Idea Nursing Journal*, 3 (2), 10–19.

Husna, C., Hatthakit, U., & Chaowalit, A. 2011. Do knowledge and clinical experience have specific roles in perceived clinical skills for tsunami care among nurses in Banda Aceh, Indonesia ? *Australasian Emergency Nursing Journal*, *14*(2), 95–102.

IDEP, Y. 2007. *Panduan Umum Penanggulangan Bencana Berbasis Masyarakat*.

ICN, & WHO. 2009. *ICN Framework of Disaster Nursing Competencies*.

Indonesia Disaster Regulation No. 24. (2007). Penanggulangan Bencana (Disaster Management)

Jansson, M. M., Syrjälä, H. P., Talman, K., Meriläinen, M. H., & Ala-kokko, T. I. 2018. Critical care nurses' knowledge of, adherence to, and barriers toward institution-specific ventilator bundle. *AJIC - American Journal of Infection Control*, 1–6.

Kano, M., Siegel, J. M. and Bourque, L. B. 2005 'First-Aid

Training and Capabilities of the Lay Public: A Potential Alternative Source of Emergency Medical Assistance Following a Natural Disaster', *Disasters*, 29(1), 58–74.

Ludin, S. M. 2017. Does good critical thinking equal effective decision-making among critical care nurses? A cross-sectional survey. *Intensive & Critical Care Nursing*. Retrived from https://doi.org/10.1016/j.iccn.2017.06.002

Luwi, A. (2017). Sebanyak 67.181 Korban Banjir Terdampak di Aceh dalam 8 Bulan Terakhir. BPBA. Retrieved from https://bpba.acehprov.go.id/index.php/news/read/2017/08/25/11/sebanyak-67181-korban-banjir-terdampak-di-aceh-dalam-8-bulan-terakhir

Mawu, D. P., Bidjuni, H., & Hamel, R. 2016. Hubungan Karakteristik Perawat dengan Penanganan Pertama pada Pasien Kegawatan Muskuloskeletal di RSUP Prof. Dr. R. D. Kandou Manado, *Vol. 4 No.*, 1–8.

Ministry of Health. 2007. Pedoman Teknis Penanggulangan Krisis Kesehatan Akibat Bencana: Panduan bagi Petugas Kesehatan yang Bekerja dalam Penanganan Krisis Kesehatan akibat Bencana di Indonesia. Jakarta: Ministry of Health, Government of Indonesia

Nurhasim, S. 2015. Pengetahuan perawat tentang Response Time dalam Penanganan Gawat Darurat di Ruang Triage RSUD Karanganyar. Retrived from http://www.digilib.stikeskusumahusada.ac.id/download.php?id=1341

O'Sullivan, T. L. *et al.* 2008. Disaster and emergency management: Canadian Nurses' Perceptions of Preparedness on Hospital Front Lines. *Prehospital and disaster medicine*, 23(3), s11-8.

Pieterse, T., Lawrence, H., & Friedrich-nel, H. 2015. ScienceDirect Critical thinking ability of 3rd year radiography students. *Health SA Gesondheid*, *21*, 381–390.

Piko, J. 2017. Prediksi Bencana di Indonesia Tahun 2016. ACT. Retrieved from https://act.id/prediksi-bencana-di-indonesia-tahun-2016

Pourvakhshoori, N., Norouzi, K., Ahmadi, F., Hosseini, M., & Khankeh, H. 2017. Nursing in disasters: A review of existing models. *International Emergency Nursing*, *31*, 58–63.

Rifai, A., & Harnanto, A. M. 2016. Analisis Kapasitas Fungsional Perawat dan Bidan RSUD Kota Surakarta dalam Pengembangan Program Hospital Preparedness for Emergency and Disaster. *Jurnal Terpadu Ilmu Kesehatan*, *5*(1), 69–74. Retrieved from http://jurnal.poltekkes-solo.ac.id/index.php/Int/article/viewFile/174/155

Rolston, D. M. 2015. Telemedicine in the Intensive Care Unit Its Role in Emergencies and Disaster Management, *31*, 239–255.

RSUD dr. Zainoel Abidin. 2016. *Nama Unit Rawat Inap*. Retrieved from http://rsudza.acehprov.go.id/rawat-inap.

RSUDZA. (2017). *Sumber Daya Manusia Handal Dukung Layanan Prima*. Retrieved from http://rsudza.acehprov.go.id/tabloid/2016/06/21/sdm-handal-dukung-layanan-prima/

Russo, R. M., Galante, J. M., Jacoby, R. C., & Shatz, D. V. 2015. Selected Topics : Disaster Medicine. *Journal of Emergency Medicine*, *48*(6), 685–692.

Simatupang, R. B. 2017. Kesiapsiagaan RSPAD Gatot Soebroto Dalam Penanggulangan Bencana Pandemi Influenza Untuk Mengantisipasi Bioterorisme, 3 (2), 49–80.

Sonneborn, O., Miller, C., Head, L., & Cross, R. 2018. Disaster education and preparedness in the acute care setting: A cross sectional survey of operating theatre nurse's disaster jnowledge and education, 1–12.

Stanley. 2005. Nursing clinics. *Disaster Competency Development and Integration in Nursing Education*, *40*, 453–467.

Suryanto, Plummer, V., & Boyle, M. 2018. Australasian Emergency Care Knowledge , attitude , and practice of ambulance nurses in prehospital care in Malang , Indonesia. *Australasian Emergency Care*, *21*(1), 8–12.

Tumenggung, I. 2017. Masalah Gizi dan Penyakit Menular Pasca Bencana. *Health Nutritions Journal*, 3(1), 1–9.

Tzeng, W. C., Feng, H. P., Cheng, W. T., Lin, C. H., Chiang, L. C., Pai, L., & Lee, C. L. (2016). Readiness of hospital nurses for disaster responses in Taiwan: A cross-sectional study. *Nurse Education Today*, *47*, 37–42.

Wisniewski, Rebekka Dennik-champion, G., & Peltier, J. W. 2004. *Emergency Preparedness Competencies*, *34*(10), 475–480.