

Effectiveness of Indoor and Outdoor Preparedness Simulation in Improving First Aid Competency in Emergency Response Phase Among Trained Lay People in Surakarta Municipality

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Keywords: Simulation, First aid competence, Emergency response phase, Trained lay person.

Abstract: The capacity of national emergency preparedness and response requires the support of all elements of the community. Trained lay people are ordinary people who have received first aid training and disaster preparedness individually or in groups. Trained lay people have an interest in getting involved in first aid and preparedness. The aim of this study is to analyse the differences in the effectiveness of indoor and outdoor disaster preparedness simulations to improve the competence of first aid in emergency response phase among trained lay people in Surakarta Municipality. This study used a quasi-experimental study with pre-posttest with control group design with real treatment of respondents who get action in the form of simulation. Sampling technique in this study is the total sampling of all trained lay people assisted Surakarta Health Polytechnic with number of 120 people. The t test results showed that the value $t = 10.393 > t$ table (0.05, df 39) = 8.750 with a confidence level of 95% indicates $\alpha = 0.00 < 0.05$. It can be concluded that there is a significant difference in effectiveness between the simulation of indoor and outdoor disaster preparedness in improving the competence of first aid in the emergency response among trained lay people in Surakarta Municipality. Outdoor simulation is more effective than indoor simulation in improving the competence of first aid in the emergency response among trained lay people in Surakarta Municipality.

1 BACKGROUND

Law of the Republic of Indonesia Number 24 Year of 2007 explains that the territory of the Republic of Indonesia has geographical, geological, hydrological and demographic conditions which enable the occurrence of disasters, whether caused by natural factors, non-natural factors or human factors causing human casualties, environmental damage, objects, and psychological impacts that in certain circumstances can inhibit national development. Disaster preparedness is a series of activities undertaken to anticipate disasters through organizing as well as through appropriate and efficient measures. Disaster emergency response is a series of immediate activities in the event of a disaster to deal with adverse impacts, including rescue and evacuation of victims, property, basic needs, protection, refugee management, rescue, and recovery of facilities and infrastructure (Law of the Republic of Indonesia Number 24 Year of 2007).

Trained lay people are ordinary people who have received first aid training and disaster preparedness individually or in groups. Trained lay people have an interest in getting involved in first aid and preparedness. One of the capabilities possessed by trained lay people in the emergency response phase is the ability to carry out first aid. With a good first aid ability is expected to improve services with indicators of decreased mortality and morbidity. Based on the results of interviews with Scout members and Surakarta Voluntary Corps trained by of Surakarta Health Polytechnic, they informed that they have understood and have the ability in the first aid field in emergency conditions. They also stated that they often perform first-aid simulations in the emergency response phase of both indoor simulation with props of cards containing case images and outdoor simulations with victim and survivor models. Indoor simulations have already begun to be developed on the basis of more effective use of time and cost.

The aim of this study is to analyse the differences in the effectiveness of indoor and outdoor disaster preparedness simulations to improve the competence of first aid in emergency response phase among trained lay people in Surakarta Municipality.

2 METHODS

This study was conducted in August 2016 located at Surakarta. This type of study is comparative experimental study with pretest-post test with control group design with real treatment to respondents who get action in the form of simulation. The population in this study were all members of trained lay people coordinated by Health Polytechnic of Surakarta with total of 120 people. Sampling technique in this study was total sampling.

The research instrument consisted of a questionnaire on first aids for assessing knowledge, a skill assessment form for assessing skills, and a Group Discussion Forum Guideline for more in-depth review of data. These research instruments were developed based on emergency nursing department and disaster preparedness of Nursing Department of Surakarta Health Polytechnic and conducted expert validity test. The questions in this study were consulted in advance to two of emergency nursing practitioners and nursing academics.

Respondents were invited to attend the Surakarta Health Polytechnic campus for data collection. Respondents were divided into 2 groups at random by the even and odd numbering method of drawing at the time of filling the attendance list. Data collection starts from pre-test. Then a disaster preparedness simulation was conducted. The first group performs the simulation with indoor method and the second group is guided to carry out the outdoor method simulation. After completion of the simulation, post-test was directly conducted. At the end of the session, focus group discussions were conducted to obtain more in-depth data with the question of "whether the advantages and disadvantages of simulating using indoor or outdoor methods."

Data analysis using computer tool program SPSS for windows version 16. The test of bivariate statistic used is t test to test the difference of effectiveness of two treatment groups and descriptive analysis used to examine the FGD results.

3 RESULTS

Table 1: Frequency Distribution of Pretest and Posttest Value.

Group	Pre-test	Post-test	Difference
Indoor	54.56	63.31	8.75
Outdoor	51.75	77.08333	25.33333

Table 2: Average Difference in Increment of Pre-test And Post-test Value.

Indoor		Outdoor
8.75	<	25.33333

Table 3: t-test.

t	t table	P		Sign
10.393	8.750	0,00	<	0,05

All of 120 respondents invited in this study attended the data assessment activity. As shown in Table 1, in the indoor simulation group, the average pre-test score was 54.56 and the post-test score was 63.31. There was an increase between pre-test and post-test with an average increase of 8.75. In the outdoor simulation group, the average pretest score was 54.56 and the posttest score was 63.31. There was an increase between pretest and posttest with an average increase of 8.75.

Based on table 2, outdoor groups showed an increase in value of 25.33 higher than the indoor group showing an increase of 8.75. Table 3 shows the results of t test that the value of $t = 10,393 > t_{table} (0,05, df 39) = 8,750$ with 95% confidence level with $\alpha = 0,00 < 0,05$. Based on this result, it can be concluded that there is a significant difference of effectiveness between the simulation of disaster preparedness indoors and outdoors in improving the capability of first aids phase of emergency. Outdoor simulation is more effective than indoor simulation.

After the respondents completed the pretest, simulation and posttest, Focus Group Discussion (FGD) was conducted. Respondents were grouped into 12 groups with an average member of 10 people in each group. Group members were not mixed between indoor simulation and outdoor simulation groups. The discussion was guided by FGD Guide that have been prepared by researchers such as "whether the advantages and disadvantages of simulation implementation by indoor or outdoor method".

The conclusion of the FGD results is that 60 respondents (100%) in the indoor simulation group argue that indoor simulation is very helpful in achieving knowledge related to the completion of disaster preparedness case scenario. Respondents are very helpful because the data in written scenarios in detail and coherent. According to 50 respondents (83.3%) in the indoor simulation group stated that the simulation is not good for improving clinical skills but very helpful in improving critical thinking skills. 60 respondents (100%) in the outdoor simulation group argued that they were greatly assisted in improving skills or skills in relief. Respondents in this group also felt that they were actually helping victims or victims of disaster so as to touch aspects of affective and critical thinking.

4 DISCUSSION

Based on the results, this study indicates that the simulation activities performed very effectively show good results. Learning method is one of the teaching methods that can be used in group learning. The learning process that uses the simulation is not an actual object or activity, an important pretend to teach activities. Simulation activities can be done by students in high grade in elementary school. In learning, students will be fostered their abilities related to the skills of interacting and communicating in groups. In addition, in the simulation method students are invited to play the role of some behaviors that require according to the learning objectives (Sa'ud, 2005).

The Tawalbeh, & Tubaishat (2013) study shows that the current study adds positive evidence that simulation methods greatly affect students' knowledge and confidence in applying Advance Cardiac Life Support (ACLS) knowledge. Other studies showing similar results were Alinier, Hunt, & Gordon, (2004), Feingold, Calaluca, & Kallen (2004), Goldenberg, et al. (2005), Mole & McLaffery (2004) who stated that the simulation method has a positive effect in improving knowledge, confidence and clinical skills. In addition, the simulation method also enhances critical thinking skills for nursing students in the learning of Cardio Pulmonary Resuscitation (Ackermann, 2009; Bruce et al., 2009; Kim & Jang, 2011; Long, 2005).

Members of trained lay people coordinated by Health Polytechnic of Surakarta are prepared to be reliable first responder who are equipped with soft skills of volunteer activities. Therefore, the

debriefing activity through the simulation method is very appropriate because it is very effective in improving knowledge, skills, confidence and critical thinking ability. In addition, this method can be used in context-based learning, one example of learning materials can be lifted from social life, social values as well as actual and past social problems for the future. Disaster preparedness is an aspect of social life that must be familiarized to the community, especially for the trained lay people including voluntary corps who must guard the community in the face of disaster.

Both groups of respondents showed an increase in the value of first-aid emergency cases in the disaster response phase. This fact shows that both simulation method (indoor and outdoor) can stimulate the improvement of respondent ability. The increase in the value of the outdoor simulation group is more significant than the indoor simulation group. This situation illustrates that outdoor simulations performed using roleplay techniques by implementing actual demonstration skills can further improve the competence of respondents.

Most respondents from all groups argue that it is advisable that at every disaster preparedness training program always combine indoor and outdoor methods. The indoor method is carried out at the beginning of the exercise while the outdoor method is carried out at the end of the training.

The results support the previous study which states that the direct simulation method with a scenario has a positive impact on the improvement of its main capability in the psychomotor domain. A big classroom teaching framed in a natural disaster simulation method is acceptable and highly effective for medical students to develop non-technical skills, cooperation, negotiation and communication that are important for teamwork. The simulation design can be an added value in medical schools in disaster prone areas, including in developing countries and as a viable intervention to learn non-technical skills needed for patient safety (Jorm, Roberts, Lim, Roper, Skinner, Robertson, Gentilcore and Osomanski, 2016).

The meta analysis conducted by Kim, Park & Shin (2016) shows that simulation-based nursing education has a strong effect on education. Very large effects are seen in the psychomotor domain. In addition, the effect of simulation-based nursing education is not proportional to the level of loyalty. Therefore, it is important to use all the appropriate simulation levels to meet all educational objectives and outcomes.

The medical institute reports that simulations are identified as a method to improve safety in the medical field, such as flight simulations used to improve the safety of the aviation industry. However, while there is evidence that simulations can improve task performance, there is little evidence that simulations actually increase output to patients (Kaji, Bair, Okuda, Kobayashi, Khare, & Vozenilek, 2008).

Study conducted by Ambarika (2016) shows the result that education and simulation of disaster management as one of the best media to prepare students to be disaster volunteer because through the learning process by educating and simulating disaster can increase knowledge and skill and ability of student to become disaster volunteer so will increase volunteer preparedness. Disaster education and training are needed to be implemented at the institution so that all students have the preparedness to become disaster volunteers because disaster can come at any time and it requires disaster volunteers. Nurudin and Widaryati (2015) conducted a research with the result that there is an effect of training on earthquake disaster relief on the readiness of grade VII students at SMP N 1 Imogiri Bantul Yogyakarta in 2015. Hence, it is concluded that the simulation is very effective against the increase of preparedness as a measure of the affective domain.

Study of Syuaib (2014) concludes that there are significant differences in the effect of different learning strategies on preparedness learning outcomes about natural disasters, with students learning by strategy role play is more accommodative than simulated learning.

5 CONCLUSIONS

Based on the results of research on 120 respondents can be drawn conclusion that outdoor simulation is more effective than indoor simulation but these two methods can equally improve the ability of first aid. It would be better, if a combination of these two methods of training is done in training of trained lay people.

REFERENCES

Ahmadi, A. 2005. Strategi Belajar Mengajar. Pustaka Setia. Bandung.
Ackermann, A.D., Kenny, G., & Walker, C. 2007. Simulator programs for new nurses' orientation:

A retention strategy. *Journal for Nurses in Staff Development*, 23, 136-139.
Ahayalimudin, N. A., Ismail, A., & Saiboon, I. N. 2012. Disaster management: a study on knowledge, attitude and practice of emergency nurse and community health nurse. *BMC Public Health*, 12 (Suppl 2): A3 doi:10.1186/1471-2458-12-S2-A3.
Alinier, G., Hunt, W. B., & Gordon, R. 2004. Determining the value of simulation in nurse education: Study design and initial results. *Nurse Education in Practice*, 4, 200-207.
Ambarika, R. 2016. Efektivitas Edukasi Dan Simulasi Manajemen Bencana Terhadap Kesiapsiagaan Menjadi Relawan Bencana. *J.K.Mesencephalon*, Vol.2 No.4, Oktober 2016, Hlm 245-250.
Arikunto, S. (2006). *Prosedur Penelitian Suatu Pendekatan Praktek*. Edisi Revisi VI. Jakarta : Rineka Cipta.
Blank, S.C. 1985. Effectiveness Of Role Playing, Case Studies, and Simulation Games in Teaching Agricultural Economics. *Western Journal of Agricultural Economics*, 10(1): 55-62.
Dahlan, M. Sopiudin. (2009). *Statistik untuk Kedokteran dan Kesehatan*. Jakarta: Salemba Medika
Departemen Kesehatan R.I. (2008). *Keputusan Menteri Kesehatan RI Nomor 406/Menkes/SK/IV/2008 tanggal 25 April 2008 tentang Pembentukan Pemuda Siaga Peduli Bencana (DASIPENA)*. Provided on: www.depkes.go.id.
Feingold, C.E., Calaluce, M., & Kallen, M.A. 2004. Computerized patient model and simulated clinical experiences: Evaluation with baccalaureate nursing students. *Journal of Nursing Education*, 43, 156-163.
Goldenberg, D., Andrusyszyn, M.A., & Iwasiw, C. 2005. The effect of classroom simulation on nursing students' self-efficiency related to health teaching. *Journal of Nursing Education*, 44, 310-314.
Jorm, C., Roberts, C., Lim, R., Roper, J., Skinner, C., Robertson, J., Gentilcore, S., and Osomanski, A. 2016. Large-scale mass casualty simulation to develop the non-technical skills medical students require for collaborative teamwork. *Jorm et al. BMC Medical Education*. Pp. 16:83.
Kaji, A. H., Bair, A., Okuda, Y., Kobayashi, L., Khare, R., & Vozenilek, J. 2008. Defining Systems Expertise: Effective Simulation at the Organizational Level—Implications for Patient Safety, Disaster Surge Capacity, and Facilitating the Systems Interface. *The Society for Academic Emergency Medicine*. Pp. 1,098-1,103.
[Kaji, A. H.](#), [Langford, V.](#), & [Lewis, R. J.](#) (2008). Assessing hospital disaster preparedness: a comparison of an on-site survey, directly observed drill performance, and video analysis of teamwork. [Ann Emerg Med](#). 2008 Sep;52(3):195-201, 201.e1-12.

- Kim, J., Park, J. H., and Shin, S. 2016. Effectiveness of simulation-based nursing education depending on fidelity: a metaanalysis. *Kim et al. BMC Medical Education*, pp 16:152.
- Kim, Y. H., & Jang, K. S. 2011. Effect of a simulation-based education on cardio-pulmonary emergency care knowledge, clinical performance ability and problem solving process in new nurses. *Journal of Korean Academy of Nursing*, 41, 245-255. doi:10.4040/jkan.2011.41.2.245.
- Moabi, R. M. 2008. *Knowledge, Attitudes And Practices Of Health Care Workers Regarding Disaster Preparedness At Johannesburg Hospital In Gauteng Province, South Africa*. Johannesburg: University of the Witwatersrand.
- Mole, L. J., & McLaffery, I. H. 2004. Evaluating a simulated ward exercise for third year student nurses. *Nurse Education in Practice*, 4, 91-99.
- Notoatmodjo, S. 2005. *Metodologi Penelitian Kesehatan*. Jakarta : PT. Rineka Cipta.
- Nursalam. 2008. *Konsep dan Penerapan Metodologi Penelitian Ilmu Keperawatan*. Edisi 2. Jakarta : Salemba Medika.
- Nurudin dan Widaryati. 2015. Pengaruh Pelatihan Penanggulangan Bencana Gempa Bumi Terhadap Kesiapsiagaan Siswa Kelas VII Di Smp Negeri 1 Imogiri Bantul Yogyakarta. Yogyakarta: PSIK Sekolah Tinggi Ilmu Kesehatan 'Aisiyah.
- Peraturan Kepala BNPB Nomer 4 Tahun 2008 Tentang Pedoman Penyusunan Rencana penanggulangan Bencana.
- Peraturan Menteri Kesehatan Republik Indonesi Nomor:1949/Menkes/Per/IX/2011 Tentang Pedoman Teknis Geladi Penanggulangan Krisis Kesehatan.
- Peraturan Pemerintah Nomer 21 Tahun 2008 Tentang Penyelenggaraan Penanggungan Bencana.
- Pusat Penanganan Krisis Kesehatan, (2010). *Pedoman Gladi Kesiagaan Bencana*. Jakarta: PPK Kesehatan Kemenkes RI.
- Sa'ud, U.S. 2005. *Perencanaan Pendidikan Pendekatan Komprehensif*. Bandung: PT Remaja Rosdakarya.
- Spain, K.M., Clements, P.T., DeRanieri, J.T. BCECR, & Holt, K. 2012. Emergency Preparedness for Nurse Practitioners. *Journal for Nurse Practitioners*. 2012; 8(1): 38-44.
- Spieler, S.S., Singer, M.P., & Cummings, L. (2008). *Emergency Preparedness in Public Hospitals: Complete Findings of the 2006–2007 Emergency Preparedness Study*. National Association of Public Hospitals and Health.
- Syuaib, M.Z. 2014. Pengaruh Strategi Pembelajaran Simulasi Vs Bermain Peran dan Sikap Siswa terhadap Pengetahuan dan Kesiapsiagaan tentang Bencana Alam. *Jurnal Pendidikan Humaniora*. 2014;1(2)177-189
- Tawalbeh, L.I. & Tubaishat, A. 2013. Effect of Simulation on Knowledge of Advanced Cardiac Life Support, Knowledge Retention, and Confidence of Nursing Students in Jordan. *Journal of Nursing Education*, 52, Pp. 1-7.
- Undang-Undang Nomor 24 Tahun 2007 tentang Penanggulangan Bencana.
- Valdez, C.D., & Nichols, T.W. 2013. Motivating Healthcare Workers to Work During a Crisis: A Literature Review. *Journal of Management Policy and Practice*. Vol. 14(4). P.43-51.
- WHO. 2008. *Nursing Disaster Competencies Handbook*. Geneva: ICN & WHO.