Nanggroe : Jurnal Pengabdian Cendikia
Volume 3, Nomor 9, Desember 2024, Halaman 5-9

ISSN: 2986-7002
DOI: https://doi.org/10.5281/zenodo.14635871

Enhancing Student Preparedness Through Disaster Simulation On Campus

Andi Saputra[1*], Vera Novalia[2], Wheny Utariningsih[3], Noviana Zara[4]

[1]Anatomy Department, Medical Faculty of Malikussaleh University
[2]Histology Department, Medical Faculty of Malikussaleh University
[3]Medical Faculty of Malikussaleh University
[4]Family Medicine Department, Medical Faculty of Malikussaleh University
[*]correspondence email: andisaputra@unimal.ac.id

ABSTRACT
This community service program aims to enhance student preparedness in facing disasters through the implementation of disaster simulations on campus. In an era marked by the increasing frequency and intensity of natural disasters, it is crucial for students as the younger generation to possess adequate knowledge and skills related to disaster mitigation and response. The methods used in this program include theoretical education, practical training, and disaster simulation involving realistic scenarios. The results of the program indicate a significant improvement in students' knowledge, skills, and awareness regarding disasters. The simulation also strengthens coordination among students, faculty, and other stakeholders in handling emergency situations. Thus, this program makes a tangible contribution to creating a disaster-resilient campus environment.
Keywords: preparedness, disaster simulation, students, disaster mitigation, disaster-resilient campus

Article Info
Received date: 30 November 2024 Revised date: 20 December 2024 Accepted date: 25 December 2024

INTRODUCTION

Indonesia is a country prone to various natural disasters, including earthquakes, tsunamis, volcanic eruptions, and floods (Stanton-Geddes & Vun, 2019). Positioned along the Pacific Ring of Fire, Indonesia experiences frequent geological and hydrometeorological events that pose significant risks to its population (*Indonesia Assistance Overview, September 2023*, 2024). The high vulnerability to disasters necessitates robust preparedness across all sectors, including education. Universities, as centers of knowledge and innovation, play a critical role in fostering a culture of disaster resilience among students (Cazabat et al., 2023). However, studies indicate that many students lack adequate awareness and practical skills to respond effectively to disasters, highlighting an urgent need for targeted interventions (JICA, 2004)·(Suprapto et al., 2015).

In recent years, the concept of disaster-resilient campuses has gained traction as an essential component of broader disaster management strategies (Şen, 2021). A disaster-resilient campus integrates disaster preparedness into its policies, infrastructure, and community activities, ensuring the safety and well-being of students and staff (Disaster Resilient Universities Network, 2016). Simulation-based training has emerged as an effective approach to achieving this goal (FEMA, 2003). By immersing participants in realistic disaster scenarios, simulations provide hands-on experience that bridges the gap between theoretical knowledge and practical application (Koliou et al., 2020)·(Kapucu & Khosa, 2013).

Disaster simulation offers numerous benefits, including improved situational awareness, enhanced decision-making skills, and strengthened teamwork (Mirza & KM, 2023). For students, these simulations serve as valuable learning experiences that prepare them to act confidently and effectively in real emergencies (Mirza & KM, 2023)·(Fifolt et al., 2023). Furthermore, simulations help identify gaps in existing emergency response plans, enabling institutions to refine their strategies and allocate

resources more efficiently. In this context, disaster simulations are not merely educational tools but also critical components of institutional preparedness (Kristi L. Stringer, Bulent Turan, Lisa McCormick, Modupeoluwa Durojaiye, Laura Nyblade, Mirjam-Colette Kempf, Bronwen Lichtenstein, 2017)(Doumi et al., 2024)(Disaster Resilient Universities Network, 2016).

Despite the evident advantages of disaster simulations, their implementation on campuses remains limited(Patel et al., 2023). Many universities face challenges such as limited resources, lack of expertise, and low prioritization of disaster preparedness activities. Addressing these barriers requires a collaborative effort involving educators, policymakers, and disaster management professionals. By prioritizing disaster preparedness in academic settings, universities can empower students to become proactive contributors to community resilience (Ryan et al., 2020).

This article reports on a community service program designed to enhance student preparedness through disaster simulations conducted at Malikussaleh University. The program aims to equip students with the knowledge and skills necessary to navigate complex emergency situations while fostering a culture of preparedness within the campus community. The initiative underscores the importance of integrating disaster education into higher education curricula and highlights the transformative potential of simulation-based training.

Through theoretical education, practical workshops, and realistic simulations, the program seeks to address the specific needs and challenges faced by students. By involving multiple stakeholders, including faculty, staff, and external disaster management experts, the program ensures a comprehensive approach to preparedness. The outcomes of this initiative provide valuable insights into the effectiveness of disaster simulations as a pedagogical tool and a mechanism for enhancing campus resilience.

The following sections detail the methods, results, and implications of the disaster simulation program. By sharing these findings, this article aims to contribute to the growing body of literature on disaster preparedness and inspire similar initiatives in other educational institutions. Ultimately, the goal is to foster a generation of students who are not only academically proficient but also equipped to address the challenges posed by an increasingly unpredictable world.

METHODS

This community service program was conducted at Malikussaleh University, involving 100 students from various study programs. The implementation methods included:

1. Theoretical Education: Classroom sessions on the basics of disaster management, including mitigation, response, and recovery.
2. Practical Training: Workshops involving the use of emergency response tools such as fire extinguishers, stretchers, and evacuation techniques.
3. Disaster Simulation: Conducting an earthquake scenario simulation involving students, faculty, and campus staff. This simulation was designed realistically to create an emergency atmosphere similar to actual conditions.
4. Evaluation and Discussion: Reflection sessions to evaluate the simulation's implementation and provide feedback for future improvements.

Figure 1 Simullation and Theoretical Education

RESULTS AND DISCUSSION

The disaster simulation program at Malikussaleh University resulted in notable improvements in students' disaster preparedness. Pre-test and post-test assessments revealed a significant increase in knowledge, with average scores rising from 65% to 90%. This improvement demonstrates the effectiveness of combining theoretical education and practical exercises. Students gained a deeper understanding of evacuation procedures, the use of emergency equipment, and effective communication during crises. These outcomes align with prior studies highlighting the role of simulation-based training in enhancing situational awareness and response capabilities.

Table 1 Statistical Analysis of Pre-Test and Post-Test Results in Disaster Simulation Program

Variable	Pre-Test Mean (SD)	Post-Test Mean (SD)	Mean Difference	t-Value	p-Value
Knowledge Scores (%)	65.00 (±12.34)	90.00 (±8.56)	25.00	15.67	<0.001**
Emergency Tool Utilization	3.5 (±0.8)	4.8 (±0.4)	1.3	9.34	<0.001**
Evacuation Route Familiarity	2.8 (±0.7)	4.5 (±0.5)	1.7	12.42	<0.001**

Notes:

- Pre-test and post-test mean scores represent average student performance before and after the disaster simulation program.
- A paired t-test was used for statistical analysis.
- Significant differences are indicated by **$p < 0.05$** (marked with **).

Overall, the statistical analysis confirms the effectiveness of the disaster simulation program in enhancing various aspects of student preparedness. The significant p-values (< 0.001) across all variables indicate that the improvements observed were not due to chance, providing robust evidence for the program's impact.

One key finding of the program was the enhanced coordination among various stakeholders on campus. During the simulation, students collaborated in teams to address specific tasks such as evacuation, first aid, and information dissemination. Faculty and staff played critical roles by providing supervision and facilitating the smooth execution of the exercises. This collaborative approach not only strengthened teamwork but also fostered a sense of shared responsibility among participants, a crucial element in real-world disaster scenarios.

The simulation also uncovered several areas for improvement in the campus's emergency response infrastructure. For instance, the evaluation process revealed that evacuation routes were not clearly marked in some buildings, potentially leading to confusion during emergencies. Additionally, the availability of emergency tools such as fire extinguishers and first aid kits was found to be inadequate. Addressing these gaps is essential to building a safer and more resilient campus environment.

Beyond immediate skill acquisition, the program contributed to cultivating a culture of preparedness among students. Feedback collected during reflection sessions indicated that participants felt more confident in their ability to respond effectively to disasters. Many students also expressed a heightened awareness of the importance of disaster management, extending the program's impact beyond the campus to their broader communities.

These results underscore the value of disaster simulations as a tool for improving preparedness and resilience in academic settings. By addressing both individual competencies and systemic weaknesses, this initiative has laid a strong foundation for long-term disaster readiness. Future programs should build on these achievements by incorporating regular simulations, expanding stakeholder involvement, and integrating lessons learned into institutional policies.

CONCLUSION AND RECOMMENDATIONS

The implementation of disaster simulation on campus has proven effective in enhancing student preparedness. This program not only provides practical knowledge and skills but also strengthens the culture of disaster preparedness within the campus community. For the program's sustainability, it is recommended that disaster simulations be conducted regularly and involve more stakeholders, including local and national disaster management agencies.

This program also opens opportunities for the development of more comprehensive campus disaster preparedness policies, such as providing emergency response equipment, continuous training, and integrating disaster management materials into the curriculum. With these steps, it is hoped that the campus community can serve as a model of disaster preparedness for the wider society.

ACKNOWLEDGMENTS

The authors express gratitude to Malikussaleh University for the support and facilities provided during this program. Special thanks are also extended to the students, faculty, and staff who participated in the disaster simulation.

REFERENCES

Cazabat, C., Anzellini, V., Fung, V., Housset, T., O'Connor, A., & Ponserre, S. (2023). Disaster Displacement: Indonesia country briefing. *The Internal Displacement Monitoring Centre*, 1–28. https://www.adb.org/sites/default/files/publication/857601/disaster-displacement-indonesia-country-briefing.pdf

Disaster Resilient Universities Network. (2016). *Disaster Resilient Universities (DRU) overview*. *May*, 1–5. http://www.iaem.com/committees/College/index.htm

Doumi, R., Alassaf, W., Aljahany, M., Binsaleh, Y., Ibrahim, S. F., Aldobeaban, S., & Mirghani, H. A. (2024). The Effectiveness and Benefits of Disaster Simulation Training for Undergraduate Medical Students in Saudi Arabia. *Advances in Medical Education and Practice*, *15*, 707–714. https://doi.org/10.2147/AMEP.S453879

FEMA. (2003). Building a disaster resistant university. *Federal Emergency Management Agency*, *August*. http://www.fema.gov/media-library-data/20130726-1457-20490-1338/dru_report.pdf

Fifolt, M., Brown, M., Kidd, E., Nabavi, M., Lee, H., & McCormick, L. C. (2023). Using Interprofessional Simulation to Enhance Student Knowledge and Promote Collaborative Practice in Disaster Management. *Pedagogy in Health Promotion*, *9*(1), 64–71. https://doi.org/10.1177/2373379920987576

Indonesia Assistance Overview, September 2023. (2024). *October*.

JICA. (2004). Country Report Indonesia: Natural Disaster Risk Assessment and Area Business Continuity Plan Formulation for Industrial Agglomerated Areas in the ASEAN Region. *Japan International Cooperation Agency OYO International Corp. Mitsubishi Research Institute, Inc. CTI Engineering International Co., Ltd.*, *March*, 70–74. http://data.worldbank.org

Kapucu, N., & Khosa, S. (2013). Disaster Resiliency and Culture of Preparedness for University and College Campuses. In *Administration and Society* (Vol. 45, Issue 1). https://doi.org/10.1177/0095399712471626

Koliou, M., van de Lindt, J. W., McAllister, T. P., Ellingwood, B. R., Dillard, M., & Cutler, H. (2020). State of the research in community resilience: progress and challenges. *Sustainable and Resilient Infrastructure*, *5*(3), 131–151. https://doi.org/10.1080/23789689.2017.1418547

Kristi L. Stringer, Bulent Turan, Lisa McCormick, Modupeoluwa Durojaiye, Laura Nyblade, Mirjam-Colette Kempf, Bronwen Lichtenstein, and J. M. T. (2017). 乳鼠心肌提取 HHS Public Access. *Physiology & Behavior*, *176*(3), 139–148. https://doi.org/10.1002/hep.30150.Ductular

Mirza, M. N., & KM, S. (2023). Enhancing Student Preparedness and School Safety Through Disaster Simulation: A Comprehensive Analysis and Policy Implications. *... Journal of Educational ...*, *1*(3), 183–194. https://penerbitjurnalinternasional.com/index.php/IJETR/article/view/33%0Ahttps://penerbitjurnalinternasional.com/index.php/IJETR/article/download/33/30

Patel, R. K., Pamidimukkala, A., Kermanshachi, S., & Etminani-Ghasrodashti, R. (2023). Disaster Preparedness and Awareness among University Students: A Structural Equation Analysis. *International Journal of Environmental Research and Public Health*, *20*(5). https://doi.org/10.3390/ijerph20054447

Ryan, B., Johnston, K. A., Taylor, M., & McAndrew, R. (2020). Community engagement for disaster preparedness: A systematic literature review. *International Journal of Disaster Risk Reduction*, *49*(May), 101655. https://doi.org/10.1016/j.ijdrr.2020.101655

Şen, G. (2021). An overview of disaster resilience. *Turkish Journal of Health Science and Life.*, *4*(3), 106–115.

Stanton-Geddes, Z., & Vun, Y. J. (2019). Strengthening the Disaster Resilience of Indonesian Cities. *Time to ACT: Realizing Indonesia's Urban Potential*, *September*, 161–171. https://doi.org/10.1596/978-1-4648-1389-4_spotlight1

Suprapto, Yanuarto, T., Nurmasari, R., & Prabowo, I. (2015). *Population Exposed to Natural Hazards: a Study Based on the 2010 Population Census*. 1–11.