



## The Effectiveness of Fire Safety Education in Enhancing the Knowledge of SMAN 1 Gebog Students

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<b>ABSTRACT</b> Fire safety is crucial in protecting lives and property. This study aims to evaluate the effectiveness of fire safety education in enhancing the knowledge of students at SMAN 1 Gebog. The introduction explains that schools are potential environments for fires, necessitating interventions to enhance awareness and preparedness. The research employed a quasi-experimental design with pretest-posttest on 40 eleventh-grade students, who received education through presentations and simulations over 2 hours. The analysis showed a significant increase in students' knowledge after the intervention, with the average pretest score of 5.5 rising to 9.0 in the posttest. Statistical tests (t-test) confirmed that this improvement was statistically significant ( $t = 12.41$ , $p < 0.001$ ). The study concludes that the education was effective in enhancing students' knowledge of fire safety in schools. To ensure sustainability, it is recommended to develop training for teachers as trainers in the future, thereby enabling the program to continue and sustainably mitigate fire risks in school environments. <b>Keywords:</b> <i>Fire Safety, Increased Awareness, High School (SMA), Fire Response, Disasters</i>			

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## INTRODUCTION

Schools, as places of work and activity, have potential hazards such as fires, physical hazards, chemical hazards, biological hazards, and psychosocial hazards (Mirza:2023). High schools (SMA) use laboratory equipment with electrical machines and chemicals, such as in Lhokseumawe and North Aceh. These learning programs carry a high risk of fire (Sayuti:2022). Meanwhile, SMAN 5 Depok lacks a fire emergency management system and does not have active or passive fire prevention facilities. It is

clear that interventions are needed in these situations because educational environments are vulnerable to fires. Fires can cause casualties and damage to school buildings, disrupting students' learning activities. The aim of this community service activity is to increase the community's knowledge about extinguishing small fires using light fire extinguishers or in Indonesian “*Alat Pemadam Api Ringan*” (APAR) (Putri:2023). Various actions have been taken, such as in Sa’ban's study in Bau Bau City using qualitative methods. The results showed that the Fire and Rescue Service of Baubau City conducted training and education on fire disaster preparedness and response. This activity was divided into two sessions: the first session presented educational material on fire disasters, and the second session focused on fire education and continued with simulations on fire disaster response using basic fire extinguishers, including wet sacks and APAR (Sa’ban 2023). Besides natural factors, human activities also cause disasters. Almost all human actions harm the environment and cause disasters for individuals. In 2019, there were 28 floods, 9 landslides, and 167 fires in Kudus Regency, although only two schools were affected. Therefore, it is essential for students to learn from an early age, especially those who will become future agents capable of reducing harmful actions to the environment (Mirza:2022). Fire is a crucial issue that must be addressed in the environment. Unhandled fires can cause significant losses in terms of both materials and lives. The current curriculum broadly provides substantive formal education in school subjects. There is very little safety education for children in schools, both in formal education (subject matter, teacher explanations, and school facilities) and informal education (extracurricular activities). The only way to protect children from danger is by increasing their knowledge about hazards and teaching them how to deal with them through safety education (Sari:2020). How can the current school curriculum be enhanced to include comprehensive fire safety education for children, both in formal and informal educational settings? The purpose of this research is to provide effective strategies for integrating fire safety education into school programs to better protect children from fire-related hazards.

## **RESEARCH METHODOLOGY**

This study used a quasi-experimental design with a pretest-posttest approach. The subjects were 40 randomly selected eleventh-grade students from SMAN 1 Gebog. Education was conducted in the form of a 2-hour presentation and simulation on fire safety. The material covered included fire prevention, actions to take during a fire, and how to use fire extinguishers. Pretest and posttest data were analyzed descriptively and tested with a paired t-test using statistical software. The paired t-test is a hypothesis testing method used when the data analyzed is paired or related. This often occurs when one individual (research object) receives two different treatments. Although the same individuals are used, researchers still obtain two different data sets: data from the first treatment and data from the second treatment (Montolalu:2018). The results from this study provide valuable insights into the effectiveness of fire safety education,

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demonstrating significant improvements in students' knowledge and preparedness, reinforcing the importance of such programs in school curricula.

## **RESULT AND DISCUSSION**

Essentially, all student activities, especially those conducted in high-risk environments like campuses, must be supervised and monitored by competent and authorized mentors (Mirza:2023). Therefore, this research, conducted on July 13, 2024, at SMAN 1 Gebog, was accompanied by lecturers from the DIV Occupational Safety and Health study program at Politeknik Rukun Abdi Luhur.



Figure 1. Fire safety education



Figure 2. Fire extinguishing practice

Descriptive analysis of pretest and posttest data showed a significant increase in posttest scores compared to pretest scores. The average pretest score was 5.5, while the average posttest score was 9.0. The pretest median was 6.0, while the posttest median was 9.0. The most frequent pretest score (mode) was 5, while the most frequent posttest score was 9. The pretest score range was 7, with a maximum score of 8 and a minimum score of 1, whereas the posttest score range was 4, with a maximum score of 10 and a minimum score of 6. The training provided proved effective in improving respondents' learning outcomes. The posttest score distribution was narrower than the pretest distribution, indicated by a lower variance (0.82 compared to 2.36 in the pretest) and a lower standard

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deviation (0.91 compared to 1.54 in the pretest). This indicates that the training results were more consistent among participants, with posttest scores more centered around a higher average score. Overall, the data showed that the training effectively improved participants' abilities. Statistical analysis showed that the average pretest score was 5.5, while the average posttest score increased to 9.0. The paired t-test showed a highly significant result, with a t-statistic of 12.41 and a p-value of  $4.00 \times 10^{-15}$ . This indicates that the score increase after training did not occur by chance but was due to the training's effectiveness. Therefore, it can be concluded that the training effectively improved participants' abilities significantly. This is consistent with Hasibuan's research, which showed that participants' understanding increased from 50.6 to 89.4, categorized as ready and very ready, after receiving education on early fire response (Hasibuan:2023). Other studies also showed an increase in students' knowledge about fire response, recommending continuous fire education in schools (Situngkir:2024). The program's sustainability is not yet optimal as it only involves students in training. It should also engage teachers as trainers in the future, as studied by Kasmianto, which analyzed training and simulation programs to improve teachers' knowledge and skills (Kasmianto:2022). Post-test scores are usually better than pre-test scores because students read, discuss, and practice. Reading, speaking, and practicing are three things that help children learn. Children will gain information and basic knowledge through reading. Discussions with others help them understand more deeply and develop their thoughts. Practice helps them understand more and develop good habits. Therefore, learning involving reading, discussion, and practice will be more effective than learning involving only reading (Mirza:2023). Disaster simulation in schools is a crucial investment in improving student preparedness. Its benefits include increased student understanding, risk identification, reduced fear, and engagement. Despite some challenges in implementing these programs, disaster simulation is an important step in ensuring safety and preparedness in schools. In the context of education, disaster simulation efforts should be continuously improved to ensure schools become safe and prepared environments for various disasters. Student preparedness is an investment for a safer and better future. By effectively implementing disaster simulations, we can help students be more prepared to face emergency situations, protect themselves, and potentially save lives during disasters (Mirza:2023). Integrating comprehensive fire safety education and expanding disaster simulation programs, including active involvement of both students and teachers, are crucial steps toward enhancing preparedness and safety in schools, ensuring that all participants are well-equipped to respond effectively in emergency situations.

## **CONCLUSION**

Fire safety education effectively enhances students' knowledge about fire prevention and response actions. Data analysis showed that students' average knowledge scores significantly increased after attending the education. To ensure the program's sustainable effectiveness, it is recommended to develop special training for teachers as trainers in the future. This aims to involve teachers actively in delivering fire safety materials to students

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continuously, thereby increasing fire hazard awareness and preparedness in schools. Consequently, schools can become safer environments and be ready to face emergency situations.

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