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Building Fire Preparedness Among Elementary Students Through School-Based Evacuation Drills at SDN 004 Teritip, Balikpapan

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ABSTRACT

Fires are among the most common emergencies that may occur in school environments and pose significant risks to students and school personnel if appropriate preparedness measures are not in place. Fire safety education and evacuation simulations play an important role in developing students' knowledge, emergency response skills, and safety awareness from an early age. This community service program aimed to improve the fire safety knowledge and emergency preparedness of sixth-grade students at SDN 004 Teritip, East Balikpapan, through interactive education and practical evacuation simulations. The program involved 45 students and consisted of fire safety education, question-and-answer sessions, a fire evacuation simulation, a four-question quiz, and an educational game. Data were collected through direct observation, quiz results, and photographic documentation and analyzed descriptively. The findings indicated that students actively participated in all activities and demonstrated a better understanding of fire hazards, evacuation procedures, and the function of assembly points. During the simulation, students were able to follow evacuation instructions in an orderly manner and showed increased confidence in responding to emergency situations. These results suggest that integrating interactive education with hands-on evacuation simulations is an effective approach to strengthening fire safety awareness and emergency preparedness among elementary school students. Therefore, regular implementation of fire safety education and evacuation drills is recommended to foster a sustainable culture of safety in schools..

Keyword: *fire safety education; evacuation simulation; emergency preparedness; elementary school students; community service.*

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INTRODUCTION

Fires are among the most common emergencies that may occur in school environments and pose significant risks to students, teachers, and school personnel. Without adequate preparedness, fire incidents can lead to injuries, fatalities, property damage, and disruption of educational activities. Because elementary school students have limited experience in recognizing hazards and responding appropriately during emergencies, schools play a crucial role in equipping children with the knowledge and practical skills needed to respond safely to fire incidents while fostering a culture of disaster preparedness from an early age (Safari et al., 2025; Iskandar et al., 2026).

Fire safety education has become an essential component of school disaster risk reduction because it helps students recognize fire hazards, understand emergency procedures, and develop appropriate safety behaviors. Compared with conventional classroom instruction, interactive learning approaches that integrate discussions, demonstrations, educational games, and practical exercises provide more meaningful learning experiences by actively engaging students in the learning process. Such approaches not only improve students' understanding of fire safety concepts but also increase their confidence and readiness to respond during emergency situations (Jang & Kong, 2023; Iskandar et al., 2026).

Among various educational strategies, evacuation simulation is considered one of the most effective methods for strengthening students' emergency preparedness. By directly experiencing emergency scenarios, students learn how to recognize alarm signals, follow designated evacuation routes, remain calm, and gather safely at assembly points. These practical experiences reinforce procedural knowledge and enable students to apply appropriate responses more effectively than through theoretical instruction alone. Furthermore, repeated simulation activities help establish routine safety behaviors that can minimize panic and improve evacuation performance during actual emergencies (Safari et al., 2025).

Evidence from international studies further supports the effectiveness of simulation-based fire safety education. Safari et al. (2025) demonstrated that elementary school students with limited evacuation experience required longer evacuation times during simulated fire emergencies, highlighting the importance of conducting regular evacuation drills to improve evacuation efficiency and school preparedness. Likewise, Jang and Kong (2023) reported that a fire safety education program using fire extinguisher simulators significantly enhanced elementary school students' fire safety knowledge, self-efficacy, and practical emergency response skills through experience-based learning.

Similar outcomes have also been reported in Indonesia. Community service activities introducing evacuation routes and assembly points successfully improved elementary school students' understanding of fire hazards, evacuation procedures, and emergency preparedness while promoting a stronger safety culture within the school environment (Wibowo et al., 2026). In addition, occupational safety and health education implemented in elementary schools demonstrated that interactive educational activities effectively increased students' awareness of potential hazards and encouraged the adoption of safer behaviors in daily school activities (Iskandar et al., 2026). These findings indicate that integrating educational materials with practical activities provides an effective approach for strengthening children's preparedness for emergency situations.

Although various fire safety education programs have been implemented, similar activities have not yet been routinely conducted at SDN 004 Teritip, Balikpapan. Consequently, many students had limited opportunities to learn appropriate fire response procedures through direct practice. Therefore, this community service program was designed to provide fire safety education integrated with a fire evacuation simulation for sixth-grade students. The program aimed to improve students' knowledge of fire hazards,

strengthen their practical evacuation skills, and foster a sustainable culture of safety within the school community.

METHOD

Time and Place of Activity

The fire safety education and evacuation simulation program was conducted on Thursday, November 27, 2025, at SDN 004 Teritip, East Balikpapan District, Balikpapan City, East Kalimantan, Indonesia.

Participants

The participants of this community service program were sixth-grade students of SDN 004 Teritip. These students were selected because they possess sufficient cognitive and physical abilities to understand fire safety concepts, follow evacuation instructions, and actively participate in the emergency evacuation simulation.

Implementation of the Activity

The program consisted of an interactive fire safety education session followed by a practical fire evacuation simulation. The educational session introduced students to the causes and potential hazards of fire, early warning signs, appropriate emergency responses, the importance of remaining calm during emergencies, self-evacuation procedures, evacuation routes, and the function of assembly points. The materials were delivered using PowerPoint presentations, visual illustrations, and interactive discussions to encourage students' active participation.

The implementation of the community service activity comprised several stages. First, the team prepared educational materials, presentation media, and supporting equipment required for the activity. Second, fire safety education was delivered through an interactive presentation accompanied by demonstrations of proper evacuation procedures. Third, a question-and-answer session was conducted to reinforce students' understanding of the material. Fourth, students completed a short quiz consisting of four questions to evaluate their comprehension of the fire safety concepts presented. Fifth, students participated in an educational *Snack Scramble* game designed to reinforce key fire safety messages in an enjoyable and engaging manner. Sixth, snacks were distributed to all participants as appreciation for their active participation. Finally, the activity concluded with a group photo session involving the students, teachers, and community service team.

Data Analysis

The community service program employed both quantitative and qualitative approaches to evaluate its implementation. Quantitative data were obtained from the number of student participants involved in the activity and the results of the four-question quiz administered at the end of the educational session to assess students' understanding of the fire safety materials. Qualitative data were collected through direct observations of students' participation, responses, engagement during the educational session, and their performance throughout the fire evacuation simulation. In addition, photographic documentation was used as supporting evidence to document the implementation process and participants' involvement during the activity. The collected data were analyzed descriptively to evaluate the effectiveness of the fire safety education and evacuation simulation program.

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RESULTS AND DISCUSSION

The fire safety education and evacuation simulation program at SDN 004 Teritip was successfully implemented with the participation of 45 sixth-grade students. The activity consisted of an interactive educational session, a fire evacuation simulation, a four-question quiz, and an educational game. Based on direct observations, students demonstrated active participation throughout the activity and were able to follow evacuation instructions in an orderly manner. The post-activity quiz also indicated that most students understood the basic concepts of fire hazards, evacuation procedures, and the function of assembly points.

Table 1. Observation Results

Indicator	Observation Results
Knowledge improvement	Most students correctly identified fire hazards, early warning signs, evacuation procedures, and the function of assembly points during the quiz and discussion.
Enthusiasm and active participation	Students actively answered questions, participated in discussions, and showed enthusiasm throughout the educational session.
Evacuation performance	Students followed evacuation instructions calmly, moved through the designated evacuation route, and gathered at the assembly point in an orderly manner.

One important outcome of this community service program was the improvement in students' understanding of fire emergency procedures and their ability to implement appropriate self-evacuation measures during the simulation. Based on the post-activity quiz and direct observations, most students were able to identify fire hazards, explain the function of assembly points, and describe the correct sequence of evacuation procedures after participating in the educational session. During the simulation, students followed evacuation instructions in an orderly manner, moved along the designated evacuation route, and assembled safely at the predetermined gathering point. These findings indicate that combining interactive fire safety education with practical evacuation drills effectively reinforces both conceptual understanding and procedural skills among elementary school students.

The active participation observed throughout the program also suggests that experience-based learning enhances students' confidence in responding to emergency situations. By directly practicing evacuation procedures, students gained meaningful learning experiences that encouraged them to remain calm, cooperate with their peers, and respond appropriately to evacuation instructions. Similar findings were reported by Jang and Kong (2023), who found that simulation-based fire safety education significantly improved elementary school students' fire safety knowledge, self-efficacy, and practical response skills. Likewise, Safari et al. (2025) emphasized that regular evacuation drills familiarize students with emergency procedures and contribute to more efficient evacuation performance during fire incidents. Comparable results have also been documented in Indonesia, where community-based fire safety education successfully enhanced students' understanding of evacuation routes, assembly points, and emergency preparedness, thereby promoting a stronger culture of safety within the school environment (Wibowo et al., 2026).

Table 2. Components of Program Implementation and Evaluation

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No.	Component	Indicator
1	Educational materials	Fire hazards, early signs of fire, emergency response, evacuation procedures, and assembly point functions
2	Delivery methods	PowerPoint presentation, interactive discussion, question-and-answer session, evacuation simulation, quiz, and educational game
3	Success indicators	Improved understanding of fire safety concepts, active participation, orderly evacuation behavior, and the ability to explain emergency response procedures
4	Evaluation purpose	To assess the effectiveness of the educational program and students' ability to apply fire safety knowledge during the evacuation simulation

Overall, the implementation of fire safety education integrated with a hands-on evacuation simulation provided a meaningful learning experience for elementary school students. The combination of interactive presentations, question-and-answer sessions, educational games, quizzes, and practical evacuation exercises encouraged students to actively participate throughout the program while reinforcing their understanding of fire hazards and appropriate emergency response procedures. Based on the observation results and post-activity quiz, students demonstrated a better understanding of evacuation routes, assembly points, and the importance of remaining calm and following instructions during emergency situations. In addition, the simulation allowed students to translate theoretical knowledge into practical actions by directly practicing the evacuation procedures in a school setting. Such experiential learning not only improves students' conceptual understanding but also helps build confidence, cooperation, and orderly behavior during emergency responses. These findings are consistent with previous studies demonstrating that simulation-based fire safety education effectively strengthens students' safety knowledge, practical evacuation skills, and emergency preparedness by providing realistic learning experiences that are difficult to achieve through classroom instruction alone (Jang & Kong, 2023; Safari et al., 2025). Similar outcomes have also been reported in Indonesian community service programs, where integrating fire safety education with evacuation practice successfully promoted students' awareness of fire hazards and contributed to the development of a sustainable safety culture within the school environment (Wibowo et al., 2026). Therefore, incorporating regular fire safety education and evacuation simulations into school activities can serve as an effective strategy for enhancing disaster preparedness and fostering a proactive safety culture among elementary school students.



Picture 1 Opening and Delivery of Material Through a Presentation



Picture 2 Asking Questions And Doing Practice



Picture 3 Closing, Group Photo

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CONCLUSION

The fire safety education and evacuation simulation program at SDN 004 Teritip was successfully implemented and demonstrated positive outcomes in enhancing elementary school students' awareness and preparedness for fire emergencies. Based on the observation results and post-activity quiz, students showed good understanding of fire hazards, evacuation procedures, and the function of assembly points, as well as active participation throughout the simulation activities. The integration of interactive educational sessions and hands-on evacuation practice provided meaningful learning experiences that strengthened students' confidence and emergency response skills. Therefore, regular implementation of fire safety education and evacuation simulations is recommended as part of school disaster preparedness programs to foster a sustainable culture of safety and improve students' readiness to respond appropriately during fire emergencies.

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