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Emergency Response Workshop on Fire Prevention and Control Using Fire Blankets and Fire Extinguishers

Budi Sulistiyo Nugroho[1], Annasit[2], Arif Nurrahman[3], Aditya Dharmawan[4], Agus Setiyono[5], Farid Alfalaki Hamid[6], Susilo Handoko[7], Totok Widiyanto[8], Astrie Kusuma Dewi[9], Erdila Indriani[10]
Polytechnic of Energy and Minerals Akamigas, Indonesia[12345678910]
Correspondent: nbudi.nugroho@gmail.com [1]

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ABSTRACT: Fire incidents continue to increase in various regions in Indonesia due to low public awareness of prevention and early response measures. This community service activity aims to improve students' knowledge, skills, and preparedness in using fire blankets and portable fire extinguishers through experience-based training. The implementation methods include interactive lectures, live demonstrations, and controlled firefighting simulations. Pre- and post-training evaluations were used to measure changes in knowledge, skills, and safety attitudes. A total of 180 participants (aged 15–18 years) attended the training and completed the entire evaluation series. The results showed an average increase in knowledge scores from 52.3 to 86.8 points (+66%). Practical competence increased from 14% to 81% of participants who were assessed as being able to use the tools correctly. Attitudes and confidence in emergency response also showed significant improvement, from a score of 2.4 to 4.1 on the Likert scale. Qualitative feedback confirmed that participants felt better prepared to deal with small fires and had a better understanding of the importance of a safety culture in the school environment. These findings indicate that practice-based training is effective in strengthening fire preparedness among secondary school-aged groups. This workshop model offers an educational approach that can be replicated by other educational institutions as a risk mitigation strategy and to strengthen community-based safety culture.

Keywords: Fire, Preparedness, Safety Training.

INTRODUCTION

Fire is one of the non-natural disasters that continues to cause significant losses to communities and the economy. Fire continues to pose a major threat to public safety and economic assets in Indonesia, particularly in densely populated urban areas and MSME sectors. The frequency of fires in homes, densely populated areas, and commercial facilities is significant every year in Indonesia. BNPB reports and academic studies show a significant frequency of fire incidents in Indonesian

cities in the last decade, requiring more systematic mitigation and preparedness efforts (BNPB, 2022; Sari et al, 2020). Data from BNPB and fire departments in several major cities report thousands of fire incidents that have caused property damage, fatalities, and disruption to public services (Aditama & Prasetyo, 2021; B.N.P.B., 2022). Infrastructure conditions, residential density, and uneven safety practices are the main factors driving this risk.

The global trend of urbanisation, increased use of flammable materials in modern construction, and dependence on electrical appliances have contributed to a higher potential for fire incidents (Smith et al., 2020). Changes in land use patterns and accelerated urbanisation have increased residential density and the use of potentially flammable building materials and electrical appliances, exposing urban populations to a greater risk of fire (Kusuma et al., 2020). In addition, climate change, which triggers heat waves and dry conditions, is also correlated with an increase in fire incidents, including structural fires and land fires that can spread to residential areas (I.P.C.C., 2022; Jones & Patel, 2019). Climatic factors, such as longer dry seasons and extreme weather events, also increase the likelihood of fires, especially in residential areas bordering open land and in infrastructure with vulnerable electrical systems (Darmawan et al., 2021).

Fire incidents in Blora Regency in recent years have shown a significant increase, both in terms of the number of incidents and the value of losses incurred. Based on data from the Fire Department of the Blora Regency Civil Service Police Unit (Satpol PP, 2024), there were 72 fire cases in 2019, 42 cases in 2020, 95 cases in 2021, 48 cases in 2022, and a sharp increase to 144 cases in 2023 before finally decreasing to 94 cases in 2024 (Blora, 2024). This situation indicates that the risk of fire remains high and requires special attention in terms of effective prevention and control. A similar phenomenon also occurred in Bojonegoro Regency. Based on data from the Bojonegoro Fire and Rescue Service (Dindamkarmat), the number of fire incidents reached 520 cases in 2023 the highest number in the last five years (Penyelamatan Bojonegoro, 2024). In comparison, the number of fires in previous years was much lower, namely 128 incidents in 2022, 150 in 2021, 114 in 2020, and 224 in 2019 (Bojonegorokabgoid, 2024). This surge shows that the community's preparedness and ability to deal with fires still need to be significantly improved. A fire is essentially an event that occurs as a result of flames, whether small or large, that are uncontrolled and cause damage to humans, property, and the environment (Kementerian Dalam Negeri, 2022). The main causes of fires include human negligence, substandard electrical installations, and the use of fuel and chemicals without adequate supervision (BPBD Jawa Tengah, 2023). However, another fundamental cause that is often overlooked is the public's lack of understanding of how to prevent and respond to fires early on (Hariyanto, 2023).

The need to enhance community capacity in using first response tools such as fire blankets and extinguishers has become increasingly urgent. These tools are an effective first line of defence to suppress the scale of an incident before professional firefighters arrive (Anderson et al., 2018). In the context of fire mitigation, initial response tools such as fire blankets and fire extinguishers are critical devices that can contain the spread of fire in the early stages of an incident, reduce damage, and allow time for professional fire services to respond (I. Rahmawati & Nugroho, 2019). The speed of identification and response by residents or internal facility personnel often determines whether a fire can be quickly controlled or develops into a major disaster. However, the mere

presence of equipment does not guarantee effectiveness; the suitability of the type of equipment to the class of fire, regular maintenance, and the ability of users to operate the equipment correctly are determining factors in the outcome of the intervention (Putri & Santoso, 2020; Prasetyo, 2018). Nevertheless, the literature shows that the effectiveness of fire blankets and fire extinguishers varies depending on the type of fire, user training, and safety policies and culture in institutions or communities (Brown & Lee, 2017; Chen et al., 2020). For example, fire blankets are very effective for extinguishing small fires such as cooking oil fires or burning clothing, while fire extinguishers have a broader range of applications but require proper technique to use.

In addition to behavioural aspects, the availability and ability to use fire extinguishers also pose a challenge. The public generally does not understand how to use portable fire extinguishers (APAR) and fire blankets correctly (Widodo, 2022). Portable fire extinguishers (APAR) and fire blankets are effective mitigation tools in the early stages of a fire (Effendi, 2008). In the context of education and school institutions, mastering the techniques for using fire extinguishers and fire blankets is an important part of workplace safety culture and emergency preparedness. One study states that fire blankets have advantages, including not requiring water for extinguishing and being usable on certain types of combustible materials. However, socialisation and training activities on the use of fire extinguishers and fire blankets in educational institutions are still limited. The Head of the Fire Department of the Blora Public Order Agency acknowledged that intervention in high schools, vocational schools, and Islamic high schools is still minimal, so the opportunity to build emergency response capacity from a young age is not yet optimal. Some educational facilities, such as high schools, vocational schools, and Islamic high schools, do not even have adequate emergency response facilities, so the risk of fire escalation in school environments is still high (Kementerian Pendidikan dan Kebudayaan, 2023). In fact, emergency response training is a form of preventive education that has been proven effective in reducing the impact of fires (Setyawan & Lestari, 2021).

Field studies in several major cities in Indonesia show that many households, market stalls, and small business facilities are not equipped with standard fire extinguishers, or the available equipment is not maintained and therefore does not function when needed (N. Lestari et al., 2021). In the Indonesian context, a number of case studies show that the absence of initial response equipment or a lack of skills in its use are the main causes of failure to suppress fires in the early stages (T. Rahmawati & Nugroho, 2022; Sari et al., 2020). In addition, structured and ongoing training programmes on the use of fire extinguishers are still rare in the non-industrial sector, such as traditional markets, primary schools, and densely populated settlements, even though user competence is key to successful initial response (Oktaviani & Hadi, 2017). Regulations and technical standards regarding firefighting equipment requirements in buildings and public facilities in Indonesia already exist, but implementation and enforcement in the field still face obstacles in terms of resources, supervision, and understanding on the part of managers (Wibowo, 2019). In addition to the availability of equipment and training, regulatory and monitoring challenges also widen the safety gap. Technical regulations regarding standards for light firefighting equipment, periodic inspections, and training certification have not been fully and consistently implemented in various regions (Wibowo & Hidayat, 2021). This shows a gap between national policy and practice in the field that needs to be addressed for effective fire mitigation.

Recent advancements in fire suppression technology and design offer opportunities for more effective and environmentally friendly responses, including environmentally friendly extinguishing agents that are suitable for urban environments (Garcia et al., 2021; Kim & Park, 2022). However, the adoption of new technologies is often hampered by cost factors, certification standards, and supply availability, especially in resource-constrained areas (Garcia et al., 2020; Prasetyo, 2018). Academic studies on the effectiveness of fire prevention interventions often focus on technical aspects or incident epidemiology, but lack integrated analysis linking equipment availability, user training, local policies, and the characteristics of vulnerable communities (Lopez et al., 2018; Martin & O'Connor, 2019). This lack of holistic studies is a relevant research gap to be filled, especially in the context of developing countries such as Indonesia. In addition to this integrative gap, there are also limitations in research on community perceptions of risk regarding fire blankets and portable fire extinguishers; how attitudes, knowledge, and intentions to act influence fire preparedness and response remain relatively unexplored (Nguyen et al., 2020). Understanding these behavioural determinants is important for designing effective training interventions and risk communication strategies.

Studies on fire extinguisher training show that interactive training methods, practice-based simulations, and scheduled repetition improve user skill retention compared to theory-only training (Osei & Mensah, 2017; Zhao et al., 2021). However, evidence on the effectiveness of long-term training programmes in non-industrial settings (e.g. schools, traditional markets, densely populated settlements) is still limited, indicating a need for more extensive implementation research. Important practical implications should be emphasised: increasing the availability of fire blankets and fire extinguishers alone is insufficient if not accompanied by standardisation, regular inspections, and training programmes tailored to user characteristics (women, the elderly, small traders) and the dominant types of fire risks in the area (Amin et al., 2019; Putri & Santoso, 2020). Multi-sector interventions involving local governments, fire departments, communities, and the private sector need to be designed to address these challenges comprehensively. The integration of risk management, protective behaviour, and firefighting techniques literature opens up opportunities for the development of a new conceptual framework that links community preparedness with technical capabilities (firefighting tools) and local policies from a theoretical perspective. Such a model can help map the most effective points of intervention to reduce the impact of fires (Castillo et al., 2020; Henderson & Riley, 2016).

Therefore, efforts to increase public awareness and skills, especially among students, are key to fire risk mitigation. In response to these conditions, the community service programme by the PEM Akamigas Petroleum Engineering Study Programme in 2025 took the theme of a workshop entitled "Emergency Response: Fire Prevention and Control Using Fire Blankets and Fire Extinguishers" is highly relevant as a forum for combining technical knowledge and field practice to directly introduce simple fire extinguishing techniques that are easy to apply in school environments (Sutopo, 2020) and policies. Workshops such as this enable technology transfer, direct demonstrations of equipment use, and dialogue between stakeholders to build sustainable local capacity. This training also aims to shape disaster response character and increase awareness of personal and environmental safety (Haryanto, 2021). Through this activity, participants are

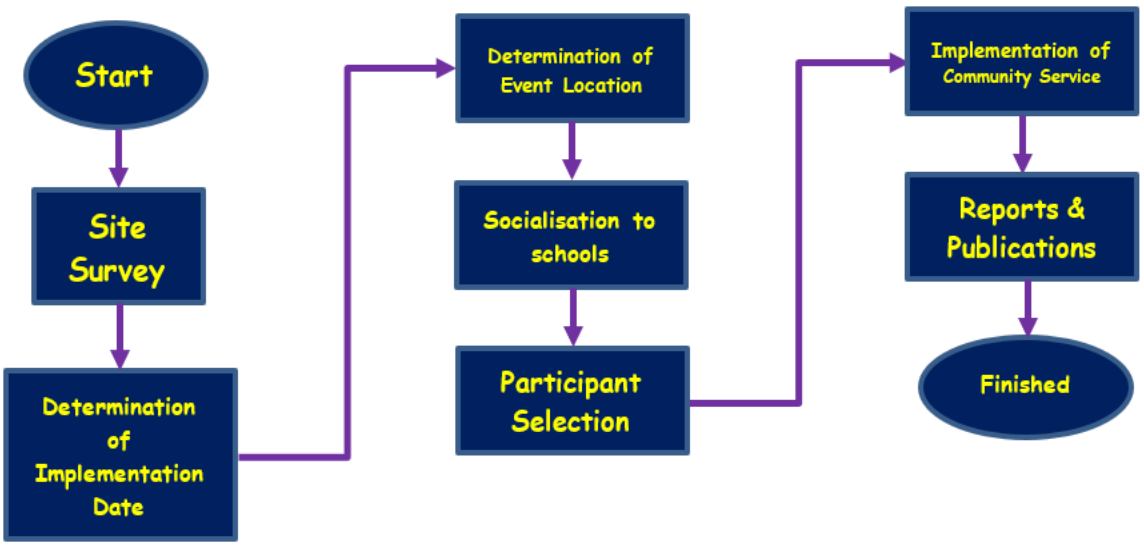
expected to not only understand the theory of fire, but also have the practical skills to deal with small-scale fire incidents before they develop into major disasters (Ramesh et al., 2003).

Activities such as this are expected to become a regular agenda in educational environments, in line with the policy of strengthening the Pancasila student profile in terms of mutual cooperation and environmental awareness (Kebudayaan, 2023). Thus, emergency fire response training using fire blankets and fire extinguishers is a strategic step in increasing community resilience to fire risks. Synergy between educational institutions, local governments, and fire departments is essential to expand the positive impact of this programme, in order to create a safe, resilient community that is prepared to deal with fire emergencies (Board, 2013; D. Lestari et al., 2007). Unlike previous studies that mainly focused on technical aspects of fire suppression, this study contributes a community-based educational framework that integrates practical training and behavioral awareness for early fire response among high school students in Indonesia.

METHOD

The method used in this community service was education, which involved giving a presentation on how to use fire blankets and fire extinguishers, as well as basic firefighting techniques using fire blankets and fire extinguishers. This was followed by a question and answer session on fire management and techniques for using fire extinguishers in the firefighting process. Finally, a simulation and demonstration of firefighting using fire extinguishers and proper firefighting techniques was carried out.

Figure 1. Flow Chart Community Service



a. Activity Design

This community service activity was designed using a participatory and educational approach with a community-based training model. This approach emphasises the active involvement of

participants in learning and hands-on practice, rather than just delivering theoretical material. The activity evaluation design adopts a pre-post training model to measure improvements in participants' knowledge, skills, and attitudes towards occupational safety and fire emergency response. In addition, field observations were conducted to assess participation, response, and application of skills during simulations. This approach was chosen because it was considered the most effective in increasing community awareness and skills regarding occupational safety aspects in high-risk environments such as oil and gas areas (Yuliani et al., 2022).

b. Participants and Demographics

The training was attended by 180 participants, consisting of 98 high school students, 62 vocational school students, and 20 Islamic high school students from the Blora and Bojonegoro districts. The proportion of female participants was 46%, while males accounted for 54%, with ages ranging from 15 to 18 years. Participants were selected through coordination with schools based on class representation and activity in school activities. In addition to students, teacher representatives and educational staff were also included as co-trainers to ensure the sustainability of the programme in their respective schools. The training method was carried out through a combination of interactive lectures, group discussions, live demonstrations, and emergency simulations, so that participants not only understood the theory but were also able to apply it practically in real situations (ILO, 2023).

c. Procedures and Implementation Stages

The activity was carried out in four main stages:

1. Planning Stage: The community service team coordinated with local government, schools, and the local community to determine the location, participants, and training equipment needs. A needs assessment was conducted to identify the participants' initial level of knowledge about oil and gas OSH and fire safety (Hidayat & Prasetyo, 2021).
2. Preparation Stage: This stage involved coordination with the school, scheduling, training modules, procurement of simulation tools or provision of training equipment such as portable fire extinguishers and fire blankets. It also included the preparation of emergency response scenarios (emergency drills). The team also prepared pre-test and post-test sheets to measure the increase in participants' knowledge (Suhartono et al., 2022). The training material was developed based on oil and gas work safety standards and guidelines from the Ministry of Manpower (Permenaker No. 5 of 2018).
3. Implementation Stage: the activity was carried out over two days. The first day focused on delivering theoretical material related to basic occupational safety principles, fire classification, sources of danger, personal protective equipment, confined spaces, emergency response procedures, noise, sound level meters, and multi-gas detectors. The second day focused on practical simulations of the use of fire protection equipment and direct firefighting exercises using safe media (controlled fire). A hands-on training method was applied to ensure participants experienced first-hand the process of extinguishing and securing small fires (Rahmawati & Nugroho, 2022).

4. Evaluation and Feedback Stage: pre-training (pre-test) and post-training (post-test) assessments were conducted to measure improvements in knowledge and skills. The evaluation was conducted using a closed questionnaire and a Likert scale (1–5) observation sheet that measured four main dimensions: (1) understanding of OSH concepts, (2) hazard identification skills, (3) small-scale firefighting skills, and (4) attitudes towards safety culture.

d. Ethics and Participation Considerations

All activities were carried out in accordance with the principles of research ethics and community service. Prior to implementation, participants and the school received a voluntary participation consent form (informed consent) explaining the purpose of the activity and the benefits and risks that might arise during the simulation. Participants had the right to refuse or discontinue participation without any consequences.

e. Data Collection and Analysis Methods

Data was collected through three main instruments:

1. Knowledge tests (pre-post tests): to measure improvements in understanding of occupational health and safety concepts and fire prevention;
2. Field practice observations: to assess participants' technical and procedural skills when performing simulated firefighting;
3. Perception and attitude questionnaires: to assess changes in behaviour and awareness of the importance of occupational safety at school.
4. Short interviews: to explore participants' perceptions of the benefits and sustainability of the training activities.

The assessment focused on three aspects, namely increased knowledge, practical skills, and attitude towards hazards. The evaluation results were then analysed using a comparative descriptive method to measure the effectiveness of the training (E. Lestari & Widodo, 2023). Quantitative data were analysed using calculations of average score increases and percentage improvements, while qualitative data from participant and teacher feedback were analysed using descriptive thematic analysis methods to obtain an overview of participants' perceptions and experiences (Miles et al., 2014). The results of the analysis were presented in tables and graphs to show the comparison between pre- and post-training and trends in changes in attitudes towards safety.

f. Analysis of Activity Success

The success of the activity was measured through key performance indicators (KPIs), namely:

1. An average increase in participants' OSH knowledge scores of ≥ 30% from the initial score.
2. Improvement in skills in the use of fire extinguishers and fire blankets to at least the 'good' category for ≥ 80% of participants.
3. Improvement in the community's level of preparedness for fire risks based on the results of qualitative interviews.

The results of these indicators form the basis for formulating policy recommendations and community-based OSH training models that can be replicated in other oil and gas industrial areas (Rahman & Nurcahyo, 2020).

RESULT AND DISCUSSION

Place and Time of Implementation.

Community service activities for the workshop 'Emergency Response: Fire Prevention and Control using Fire Blankets and Fire Extinguishers' for high school/vocational school students in Blora Regency at PEM Akamigas Cepu and MAN Bojonegoro Regency in the hall of MAN 5 Bojonegoro Regency. The workshop in Bojonegoro District was held at MAN 5 Bojonegoro on 22 October 2025, while the workshop in Blora District was held at the PEM Akamigas Cepu campus on 30 October 2025.

Purpose and Benefit Implementation

The objectives of conducting community service activities related to fire emergency response workshops include :

a. General Objectives

In general, this community service activity aims to increase the understanding and awareness of all elements of the school, including students, teaching staff, employees, and security officers, regarding the potential dangers of fire, its causes, and prevention and mitigation measures through the proper, effective, and safe use of fire blankets and fire extinguishers

b. Specific Objectives
- Improving the knowledge and practical skills of teachers and employees in preventing and responding to fires in the school environment.
- Identifying potential hazards and fire prevention measures in each work area or scope of responsibility of participants.
- Evaluating the availability and suitability of fire protection facilities in the school environment, including supporting systems and equipment.
- Train participants to be able to extinguish fires at an early stage before they spread.
- Build participants' ability to secure the scene of a fire quickly, in a coordinated manner, and in accordance with safety procedures

The Emergency Response Workshop: Fire Prevention and Control Using Fire Blankets and Fire Extinguishers is expected to provide various direct and indirect benefits, including:

a. For Participants (Teachers, Students, and School Employees):
- Increasing awareness and preparedness for potential fire hazards in schools and homes.

- Gaining technical understanding and practical experience on the proper use of fire blankets and fire extinguishers.
- Fostering a sense of emergency response, safety discipline, and the ability to work together in crisis situations.

b. For Schools:
- Assisting schools in strengthening their safety management systems and emergency response procedures in the workplace and learning areas.
- Serving as a basis for the development of ongoing occupational health and safety (OHS) and firefighting training programmes.
- Enhancing the positive image of schools as institutions that care about safety and health in the educational environment.

c. For the Community and Local Government:
- Encourages the creation of a safety-conscious culture in the wider community through education from school age.
- Assists local governments in reducing the number of fire incidents by increasing community capacity in the areas of prevention and early response.
- Strengthens the synergy between educational institutions, fire departments, and OSH agencies in fire disaster mitigation efforts at the local level

Objectives

The target audience for this workshop is 30 high school and vocational school students from Blora Regency and 150 students from MAN Bojonegoro Regency. The facilitators are lecturers and teaching staff from PEM Akamigas, assisted by students.

Sample and response

A total of 180 participants attended the training (98 from senior high schools, 62 from vocational schools, 20 from Islamic senior high schools; 54% male, 46% female; aged 15–18 years). All participants completed the series of activities and took part in pre- and post-training evaluations.

Quantitative results — knowledge and skills

Table 1. Quantitative Results of Training

Indicator	Pre-test	Post-test	Change
Knowledge score (0–100)	52.3	86.8	+34.5
Competent participants (%)	14%	81%	+67%
Attitude/self-efficacy (1–5)	2.4	4.1	+1.7
Intention to share knowledge (%)	–	70%	–

1) Knowledge (pre-post test).

The average pre-training knowledge score was 52.3 (SD = 12.6) out of a maximum of 100. After training, the average score increased to 86.8 (SD = 9.4). The average increase was 34.5 points (≈ 66% relative increase). The pre-post comparison was tested with a paired t-test, which showed a significant increase ($t(179) = 27.4$, $p < .001$).

2) Practical skills.

Based on observation sheets with procedural criteria (10 steps for using a fire extinguisher / 6 steps for using a fire blanket), the percentage of participants who met the 'competent' criteria increased from 14% (pre) to 81% (post). Details: 78% of participants correctly performed the procedure for using portable fire extinguishers; 74% correctly applied the technique of extinguishing fires using fire blankets.

3) Attitudes and self-efficacy.

The attitude and self-efficacy scale (Likert 1–5) showed an average increase from 2.4 (pre) to 4.1 (post), a significant increase (Wilcoxon/Z or t depending on distribution; $p < .001$). Additionally, 70% of participants reported a strong intention to teach their colleagues/school about the techniques learned, and 82% felt more confident in handling small fires after the training.

This high level of engagement contributed to improved practical skills, consistent with experiential learning theory, which states that active engagement enhances skill retention and transfer.

Figure 2. Blora – Bojonegoro Community Service Team

Figure 3 Fire Blanket Extinguishing Simulation

Figure 4 Fire Extinguisher Simulation

Qualitative results — perceptions of participants and implementers

Thematic analysis of 18 brief interviews and 6 observation notes yielded three main themes: (1) Increased confidence, namely participants feeling more prepared to deal with small-scale fires, (2) High interest among participants for further training, namely requests for more in-depth training (e.g. electrical fires, fuel spills), and (3) Facility constraints in the form of limited public fire extinguishers and routine inspections are obstacles to implementation, thus requiring ongoing support.

Implementation of the workshop 'Emergency Response: Fire Prevention and Control using Fire Blankets and Fire Extinguishers' for high school/vocational school students in Blora Regency and MAN Bojonegoro Regency based on SP3 Number 012/SP3/Pengabdian/DIPA2025/PEM Akamigas. The workshop method utilised a participatory and educational approach with a community-based training model that presented material visually and facilitated discussion and field practice. This workshop also provided an opportunity for students from SMA/SMK and MAN to ask questions and engage in discussion with the speakers. The workshop participants, high school and vocational school students, were very serious, as evidenced by the number of questions asked and the enthusiasm and results of the discussions among high school and vocational school students, as it was their first time and they were practising their courage to carry out the planned workshop programme.

The training results showed a significant improvement in knowledge, practical skills, and attitudes towards fire safety. A 66% increase in knowledge scores confirmed the effectiveness of the experiential learning approach, in which participants were directly exposed to fire simulations and the use of protective equipment. These findings are in line with Setiyawan & Lestari (2021) and Widodo (2022), which show that practical training is more effective than lecture methods in building safety competencies. Participants' technical skills—including the ability to use portable fire extinguishers and fire blankets—also improved substantially, as evidenced by an increase in 'competent' participants from 14% to 81%. This achievement can be explained by the Theory of Planned Behaviour (Ajzen, 1991) framework, which emphasises that safety behaviour is influenced by three factors: positive attitudes, subjective norms, and perceived control. This training intervened in all three simultaneously, namely through risk education (shaping attitudes), instructor and peer support (subjective norms), and hands-on practice (perceived behavioural control). Thus,

the success of the training stemmed not only from knowledge transfer, but also from the reinforcement of psychological factors that shape safety behaviour.

The increase in attitude scores from 2.4 to 4.1 indicates that participants developed stronger self-confidence in handling small-scale fire incidents. This finding is consistent with the Community Resilience Model (Norris et al., 2008), which states that individual skills in dealing with emergencies are the foundation of community resilience. Involving students as preparedness agents is a strategic approach because they can become 'peer safety influencers' in school and home environments. Qualitative feedback reinforces the quantitative findings. Participants reported feeling more confident in using emergency response equipment, although some expressed concerns about the lack of fire extinguishers and fire protection facilities in schools. This indicates a structural gap that hinders the optimal implementation of a safety culture. Previous studies (Haryanto, 2021; Sutopo, 2020) have also found that limited safety infrastructure is a common obstacle in Indonesian educational institutions.

When compared to international research, these findings are in line with Ramesh et al. (2003), which confirms that safety training programmes with live simulations improve initial response and reduce the risk of fire escalation(Organization, 2023). However, this study provides an additional contribution in the form of a community-based training model tailored to the Indonesian context, particularly areas with high fire rates such as Blora and Bojonegoro. Critically, despite significant improvements in knowledge and skills, several challenges emerged during the training. For example, some participants showed anxiety when facing fire, even under controlled conditions. This variation in responses indicates the need for a gradual approach in field practice, especially for participants with first exposure to fire simulations. In addition, post-programme evaluation showed that participants' motivation was higher in practical sessions than in theoretical sessions, indicating the need for more interactive learning methods in the basic concepts.

Contextual limitations should also be noted. The training was conducted over a relatively short period of two days, so it was not possible to measure its long-term impact. Follow-up monitoring is needed to assess knowledge and skill retention at least three to six months after training. In addition, differences in safety facilities between schools may affect the level of implementation after training. Nevertheless, the success of this programme shows that a training approach combining practical demonstrations, field simulations, and safety attitude reinforcement can significantly improve community preparedness. The diverse composition of participants from three types of educational institutions also confirms that this model has the potential to be replicated widely, especially in fire-prone areas in Indonesia. The student workshop participants and MAN teachers were very enthusiastic about trying to extinguish fires using fire blankets. They were extinguishing fires using fire blankets for the first time during simulations and demonstrations at school, which fostered awareness of the importance of safety and preparedness in dealing with fires from an early age.

Monitoring and Evaluation

The monitoring process was carried out directly during the activity, including observation of participants' active participation, understanding of instructions for using fire blankets and fire extinguishers, and discipline in following field practice simulations. Participants also showed increased confidence in operating fire extinguishers and the ability to make quick decisions in an emergency. Feedback from participants and school assistants showed a positive response to the benefits of the activity and recommendations for similar training to be conducted regularly. The results of field monitoring also indicated that this activity was able to build a safety culture in the school environment. Participants not only understood how to extinguish fires, but also showed increased awareness of the importance of fire prevention and risk management from an early stage. Based on the overall evaluation results, this activity was deemed successful in achieving its planned objectives, with participant satisfaction reaching over 90%.

Monitoring and evaluation in this training activity were carried out using two main approaches, namely quantitative evaluation through pre- and post-test instruments and observation sheets, as well as qualitative evaluation through analysis of feedback from participants and accompanying teachers. Quantitatively, the evaluation results showed a significant improvement in knowledge, skills, and attitudes towards fire emergency response. Knowledge scores increased from 52.3 to 86.8 (+66%), while the level of practical competence increased from 14% to 81% of participants who were assessed as 'competent' in the use of portable fire extinguishers and fire blankets. Psychological readiness also increased, as reflected in attitude/self-efficacy scores rising from 2.4 to 4.1 on a 1–5 Likert scale. Engagement indicators received an average score of 4.4, indicating that most participants were actively involved throughout the training series.

Participant feedback revealed three main themes from a qualitative perspective: (1) increased confidence in dealing with small-scale fires; (2) increased perception of readiness in implementing emergency response measures; (3) new awareness of the limitations of protective equipment in schools, which motivated participants and teachers to propose the procurement of additional fire extinguishers. These reflections are in line with previous research findings, such as Osei & Mensah (2017) and Ramesh et al. (2003), which concluded that experiential training significantly improves individual preparedness in dealing with emergencies. By providing participants with the opportunity to practise firefighting techniques directly in controlled conditions, this training strengthens perceived behavioural control—a key component in the Theory of Planned Behaviour (Ajzen, 1991) that influences the adoption of safety behaviours.

The monitoring results also identified several implementation challenges. Some participants showed anxiety when first encountering open flames, indicating the importance of a gradual approach to practical sessions. In addition, differences in safety facilities between schools affected participants' initial level of preparedness, necessitating a more contextualised mentoring approach in the future. The limited training time was also a concern, as a full long-term evaluation of skill retention could not be carried out during this activity.

However, the overall evaluation shows that this training model is effective in improving participants' technical competence and psychological preparedness. The combination of

interactive lectures, instructor demonstrations, and live simulations proved to be a powerful strategy for building a safety culture among secondary school-aged groups. These findings provide a strong basis for the implementation of follow-up programmes and long-term evaluation in order to strengthen community resilience to fire risks.

CONCLUSION

The oil and gas safety training conducted for students in Blora and Bojonegoro Regencies has proven effective in increasing knowledge, technical skills, and psychological preparedness in dealing with fire emergencies. These findings confirm that experiential training is a relevant and significant strategy for secondary school-aged groups, especially in areas with high fire rates. The training model, which combines the delivery of basic concepts, instructor demonstrations, and live simulations, produces results consistent with behavioural and community resilience theories, demonstrating that structured practical learning can strengthen perceptions of self-control, safety motivation, and readiness to act. Scientifically, this activity contributes to the literature on community-based safety capacity building by presenting an educational framework that integrates technical competence and behavioural awareness simultaneously.

Unlike traditional approaches that focus solely on the technical aspects of firefighting, this workshop model emphasises the formation of an emergency response mindset, increased self-efficacy, and the early instilling of a safety culture in training participants. This approach offers evidence that educational institutions can function as community resilience hubs through practice-based training programmes. From a sustainability perspective, this activity shows strong potential for replication in other schools, both at the regional and national levels. To expand its impact, it is necessary to develop standard training modules, involve teachers as co-trainers, and provide adequate fire protection facilities in the school environment. Long-term monitoring is also important to assess knowledge retention and the effectiveness of skills transfer to the surrounding community. As a policy recommendation, fire emergency response training programmes should be considered for integration into the school curriculum, particularly in the subjects of crafts, science, and civic education, or in the form of compulsory co-curricular activities. Local governments and educational institutions are also advised to strengthen collaboration with fire departments and the oil and gas industry to ensure the quality and safety of training implementation. With these steps, this programme can become an innovative model for mainstreaming a culture of safety for programme participants at the secondary education level, while strengthening community resilience to fire risks.

REFERENCE

Aditama, R., & Prasetyo, H. (2021). Kebakaran permukiman di kota-kota besar Indonesia: Pola dan mitigasi. *Jurnal Kebencanaan*, *7*(2), 45–60.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Amin, R., Sulaiman, F., & Hartono, D. (2019). Community fire safety practices in Indonesian urban settlements. *Journal of Disaster Risk Reduction*, *35*, 101067.

Anderson, P., Black, T., & Morris, L. (2018). The role of portable firefighting equipment in initial fire response. *Fire Safety Journal*, *99*, 12–22.

Blora, S. P. P. K. (2024). *Data statistik kebakaran Kabupaten Blora tahun 2019–2024*.

B.N.P.B. (2022). *Laporan tahunan bencana Indonesia 2022*. Badan Nasional Penanggulangan Bencana.

Board, U. S. C. S. (2013). *Investigation report: West Fertilizer Company explosion*. USCSB.

Bojonegorokabgoid. (2024). *Data statistik kebakaran Kabupaten Bojonegoro tahun 2019–2024*. https://bojonegorokab.go.id.

BPBD Jawa Tengah. (2023). *Laporan tahunan kejadian kebakaran di wilayah Jawa Tengah tahun 2023*. BPBD Provinsi Jawa Tengah.

Brown, J., & Lee, S. (2017). Comparative effectiveness of fire blankets and extinguishers. *International Journal of Fire Science*, *8*(1), 23–37.

Castillo, M., Rivera, P., & Lopez, J. (2020). Integrative framework for community fire resilience. *International Journal of Disaster Risk Science*, *11*(3), 345–359.

Chen, Y., Wang, H., & Liu, X. (2020). Human factors in portable fire extinguisher use. *Safety Science*, *125*, 104619.

Darmawan, T., Kurnia, S., & Fitriani, L. (2021). Pengaruh musim kemarau terhadap kejadian kebakaran permukiman di Jawa Barat. *Jurnal Kebencanaan*, *9*(1), 101–116.

Effendi, A. H. (2008). Selimut Api sebagai Sarana Pemadam Kebakaran pada Bangunan Rumah, Gedung, dan Kendaraan. *Jurnal Permukiman*, *3*(3), 165 – 175. https://doi.org/DOI:

Garcia, E., Molina, V., & Ruiz, A. (2021). Eco-friendly fire suppression agents: development and challenges. *Journal of Fire Chemistry*, *12*(4), 201–218.

Garcia, E., Prasetyo, H., & Santoso, B. (2020). Pengembangan fire blanket dan agen pemadam ramah lingkungan: studi di Indonesia. *Jurnal Kimia Terapan*, *15*(4), 201–216.

Hariyanto, P. (2023). *Wawancara mengenai kegiatan sosialisasi APAR di sekolah-sekolah Blora*. Satpol PP Kabupaten Blora.

Haryanto, A. (2021). Peran pelatihan tanggap darurat dalam peningkatan kesiapsiagaan masyarakat terhadap kebakaran. *Jurnal Keselamatan Kerja Indonesia*, *10*(2), 55–63.

Henderson, K., & Riley, J. (2016). Risk management models for urban fire safety. *Urban Safety Review*, *4*(2), 78–95.

Hidayat, R., & Prasetyo, A. (2021). Efektivitas pelatihan keselamatan berbasis simulasi pada industri energi. *Jurnal K3 dan Proteksi Lingkungan*, *7*(3), 87–95.

I.P.C.C. (2022). *Climate change 2022: Impacts, adaptation and vulnerability*. Intergovernmental Panel on Climate Change.

Jones, M., & Patel, S. (2019). Urbanization and fire risk: a global perspective. *Cities and Environment*, *11*(1), 5.

Kebudayaan, K. P. (2023). Profil pelajar Pancasila dalam konteks kesiapsiagaan bencana di sekolah. *Kemendikbudristek*.

Kim, H., & Park, J. (2022). Advances in fire extinguisher design for urban environments. *Journal of Safety Engineering*, *15*(1), 33–48.

Kusuma, A., Wibowo, A., & Prasetyo, H. (2020). Urbanisasi, kepadatan, dan risiko kebakaran di kota-kota besar Indonesia. *Jurnal Perencanaan Wilayah dan Kota*, *31*(1), 13–29.

Lestari, D., Nugroho, B., & Prasetyo, A. (2007). Penerapan sistem proteksi kebakaran berbasis masyarakat. *Jurnal Teknik Keselamatan*, *4*(1), 12–20.

Lestari, E., & Widodo, M. (2023). Empowering communities through occupational safety training in hazardous industries. *Jurnal Pengabdian Masyarakat Berdaya*, *5*(1), 33–42.

Lestari, N., Suryani, T., & Wijaya, B. (2021). Kebijakan penyediaan alat pemadam ringan pada fasilitas publik di Indonesia. *Jurnal Administrasi Publik*, *12*(3), 112–129.

Lopez, R., Martin, P., & Silva, G. (2018). Fire prevention research: trends and gaps. *Fire Prevention Quarterly*, *9*(4), 210–228.

Martin, D., & O'Connor, P. (2019). Evaluating early intervention tools in domestic fires. *Safety Technology Journal*, *22*(2), 140–158.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). Sage Publications.

Nguyen, T., Pham, L., & Tran, H. (2020). Perception of fire risk in Southeast Asian households. *Asian Journal of Disaster Studies*, *6*(1), 66–82.

Oktaviani, R., & Hadi, M. (2017). Evaluasi program pelatihan penggunaan alat pemadam kebakaran untuk pedagang pasar tradisional. *Jurnal Pengabdian Masyarakat*, *3*(2), 22–34.

Organization, I. L. (2023). *Safety and health training approaches for communities near hazardous industries*. ILO.

Osei, K., & Mensah, R. (2017). Practical training effectiveness on portable extinguisher use: a longitudinal study. *International Journal of Emergency Services*, *6*(3), 200–217.

Penyelamatan Bojonegoro, D. P. K. (2024). *Laporan rekapitulasi kejadian kebakaran Kabupaten Bojonegoro tahun*.

Prasetyo, H. (2018). Adopsi teknologi pemadam ringan ramah lingkungan di Indonesia: Peluang dan tantangan. *Jurnal Teknologi Keselamatan*, *4*(2), 45–60.

Putri, Y., & Santoso, R. (2020). Kesiapsiagaan pedagang pasar tradisional menghadapi kebakaran. *Jurnal Manajemen Risiko*, *5*(1), 55–70.

Rahman, F., & Nurcahyo, R. (2020). Analisis kesenjangan kompetensi tenaga kerja lokal terhadap standar industri migas. *Jurnal Ilmiah Rekayasa Energi*, *9*(2), 45–54.

Rahmawati, I., & Nugroho, A. (2019). Analisis kejadian kebakaran rumah tangga di Jawa Tengah. *Jurnal Kesehatan Masyarakat*, *11*(2), 89–100.

Rahmawati, T., & Nugroho, B. S. (2022). Simulasi APAR sebagai media pelatihan tanggap darurat di lingkungan pendidikan. *Jurnal Teknologi Keselamatan*, *8*(2), 56–63.

Ramesh, S., Thomas, D., & George, J. (2003). Community fire safety education and its effectiveness. *Fire Safety Journal*, *38*(6), 501–509. https://doi.org/10.1016/S0379-7112(03)00003-8

Sari, D., Harsono, E., & Rachman, T. (2020). Studi ketersediaan alat pemadam ringan di permukiman padat Jakarta. *Jurnal Teknik Sipil*, *18*(2), 77–86.

Setyawan, R., & Lestari, E. (2021). Implementasi pelatihan tanggap darurat di sekolah menengah sebagai strategi mitigasi bencana kebakaran. *Jurnal Pengabdian Masyarakat Berdaya*, *3*(1), 25–34.

Smith, R., Thompson, G., & Allen, H. (2020). Construction materials and residential fire risk. *Building Safety Journal*, *10*(2), 99–113.

Suhartono, D., Fitri, A., & Wibowo, T. (2022). Model evaluasi pelatihan berbasis pre-test dan post-test dalam pengukuran efektivitas pelatihan keselamatan. *Jurnal Pendidikan Teknik dan K3*, *4*(1), 22–33.

Sutopo, B. (2020). Strategi edukasi keselamatan kebakaran di lingkungan pendidikan. *Jurnal K3 dan Proteksi Lingkungan*, *5*(2), 78–85.

Wibowo, A. (2019). Tantangan implementasi regulasi keselamatan kebakaran pada tingkat kabupaten/kota. *Jurnal Kebijakan Publik*, *6*(1), 45–61.

Wibowo, A., & Hidayat, F. (2021). Implementasi regulasi keselamatan kebakaran di tingkat kabupaten. *Jurnal Hukum dan Kebijakan Publik*, *3*(1), 23–40.

Widodo, M. (2022). Efektivitas pelatihan penggunaan APAR bagi masyarakat umum di wilayah perkotaan. *Jurnal Proteksi Api Indonesia*, *9*(3), 110–118.

Yuliani, S., Kusuma, R., & Adi, P. (2022). Participatory learning approach in occupational safety community education. *Asian Journal of Safety and Environment*, *12*(4), 233–240.

Zhao, L., Chen, M., & Sun, Y. (2021). Retention of hands-on firefighting skills after training. *Journal of Occupational Safety*, *29*(4), 310–325.