Vol. 5, No. 12, December 2025
E-ISSN:2723 – 6692
P-ISSN:2723– 6595
http://jiss.publikasiindonesia.id/

The Effect of Practice-Based Fire Education on Community Knowledge in Kelutan Village, Ngronggot District, Nganjuk Regency

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KEYWORDS
Fire Education; Fire prevention and response; Community knowledge

ABSTRACT
Uncontrolled fires can cause significant environmental damage, material losses, and casualties, making community preparedness crucial. In Kelutan Village, Nganjuk Regency, many residents have limited knowledge about fire prevention and management, particularly regarding land fires, which are common due to strong winds and long dry seasons. This study aims to analyze the impact of practice-based fire education on increasing community knowledge. A pre-experimental design with a One Group Pre-test - Post-test approach was used, involving 95 community leaders and village officials from Kelutan Village selected through purposive sampling. The independent variable was practice-based fire education, and the dependent variable was community knowledge. A questionnaire with 20 pre-test and post-test items, tested for validity and reliability, was used as the research instrument. Data analysis was conducted using the Wilcoxon Signed Rank Test with a significance level of $\alpha = 0.05$. The results showed that 72.6% of respondents had a moderate knowledge level before the intervention, which increased to 86.3% in the high category after receiving practice-based education. Statistical analysis revealed a p-value of 0.000 ($p < \alpha$), indicating a significant effect of practice-based fire education on community knowledge. The study concludes that hands-on fire education is more effective than theoretical methods in improving public understanding, which is essential for enhancing fire prevention and management preparedness. Village authorities are encouraged to conduct regular and comprehensive fire education programs to better prepare the community.

INTRODUCTION

Unwanted fires, where fires become uncontrollable and damage the environment, property, and even cause casualties, underscore why people must understand the importance of preparedness in dealing with fires, prioritizing life safety above all. (Yudiantri et al., 2023). Fire is one of the disasters that can cause great losses, both material and in terms of casualties. This situation emphasizes the urgency of anticipation and vigilance from an early age in community efforts to combat fires. Fire prevention and handling efforts are not only the responsibility of the government or firefighters but also require active community participation. (Intaramuean et

al., 2022) In Kelutan Village, an area with strong wind characteristics, frequent long droughts, and a majority population with large rice fields or plantations, many residents still lack knowledge of the correct ways to extinguish fires, especially land fires. This condition can worsen fire incidents due to the community's limited knowledge and skills in effective fire extinguishing (Al-Hajj et al., 2022; Shokouhi et al., 2019; Valentine & Bolaji, 2021).

According to the DKI Jakarta BPBD, 1,810 fire incidents were recorded throughout 2024. Meanwhile, based on information from the East Java BPBD, there were 380 fire cases in East Java from 2024 to 2025. In Nganjuk Regency, a report from the Fire and Rescue Service recorded 215 fire cases in 2023. Based on initial data collection in Kelutan Village, Ngronggot District, Nganjuk Regency from 2020 to 2025, three fire incidents were recorded: land fires, cowsheds, and bamboo yards.

The knowledge of Indonesian people about fire handling remains relatively minimal and uneven. Many individuals understand fire response theory, such as using light fire extinguishers (APAR), evacuation procedures, and disconnecting power sources (Amri et al., 2024). However, their practical ability to apply this knowledge during incidents is still low. Panic and uncontrolled initial responses are common, exacerbating the situation and delaying handling. Fires are unpredictable disasters requiring fast, precise, and coordinated responses (Marindayanti et al., 2024). Most people also lack the technical skills or psychological preparedness for such emergencies.

Public knowledge data from various studies support this research. For instance, a study by (Hasna et al., 2023) in Penggilingan Village, East Jakarta, showed that although 79.03% of residents were categorized as "ready" to face fires based on the preparedness index, mobilization capabilities and early warning systems remained relatively weak. Meanwhile, another study by (Damayanti & Sofyan, 2022) in Sumberan Hamlet, Bantul, Yogyakarta, found that 33% of residents had low knowledge, 36% had sufficient knowledge, and only 31% had good knowledge. Education level and hands-on fire experience are the main factors influencing knowledge levels.

The lack of public knowledge about fire extinguishers stems from low availability of facilities and infrastructure (Nugraha et al., 2024), making Light Fire Extinguishers (APAR) crucial for small fires in early stages before they spread. A fire extinguisher is a portable device designed to extinguish small, controllable fires. Using Light Fire Extinguishers (APAR) allows communities to halt fire spread and prevent greater damage; however, for locations like land or cowsheds, specialized procedures are needed.

Previous research by (Abdullah et al., 2023) showed increased knowledge after education, along with enhanced public preparedness and awareness in dealing with fires. This awareness is essential to reduce fire risks and minimize disaster losses. Simulations and hands-on training provide practical experience that builds mental readiness and skills for fire situations. Given the problems described, the proposed solution is fire extinguishing education and training for Kelutan Village residents, enabling them to respond correctly and quickly as the first step in fire incidents. Therefore, the researcher is interested in conducting a study entitled *The Effect of Practice-Based Fire Education on Community Knowledge in Kelutan Village, Ngronggot District, Nganjuk Regency*.

This study aims to analyze the effect of practice-based fire education on improving community knowledge in Kelutan Village, Ngronggot District, Nganjuk Regency, particularly in prevention, initial handling, and emergency response to fires. The research benefits are expected to contribute practically by enhancing preparedness and awareness of fire risks, as well as promoting more responsive and appropriate behavior in emergencies.

METHOD

This research employed a quantitative approach using a pre-experimental design with a one-group pretest-posttest approach. The population consisted of community leaders in Kelutan Village, Ngronggot District, Nganjuk Regency, totaling 125 individuals. The sample comprised 95 respondents selected via purposive sampling. The research was conducted at the Kelutan Village Hall, Ngronggot District, Nganjuk Regency. Data collection occurred at the end of July 2025. Pre-test and post-test questionnaires measured community knowledge levels, consisting of 20 statements related to the independent variable (practice-based fire education).

This study utilized validity and reliability tests for the questionnaires. Data collection involved the researcher delivering fire education followed by practical fire training, after which respondents completed pre-test and post-test questionnaires in paper form. Data analysis entailed a systematic process applied to the collected data to determine the influence between variables. The collected data were analyzed using the Wilcoxon Signed Rank Test, with a significance level of $\alpha = 0.05$. This research underwent an ethics review and received approval from the research ethics committee of Nahdlatul Ulama University Surabaya.

RESULTS AND DISCUSSIONS

General Data

a) Frequency distribution of respondents by gender

Table 1. Frequency distribution of respondents by gender

Gender	Frequency	Percentage (%)
Male Male	68	71,6
Women	27	28,4
Quantity	95	100

Source: Primary Data, 2025

Based on table 1, it shows that most (71.6%) as many as 68 respondents are male.

b) Distribution of respondent frequencies by age

Table 2. Distribution of respondent frequencies by age

Year	Frequency	Percentage (%)
20-30	8	8,4
31-40	34	35,8
41-50	39	41,1
51-55	14	14,7
Quantity	95	100

Source: Primary Data, 2025

Based on table 2, it shows that almost half of the respondents (41.1%) as many as 39 respondents are 41-50 years old.

Custom Data

a) Distribution of respondent frequencies based on public knowledge of fires before being given fire education and practice

Table 3. Distribution of respondent frequencies based on public knowledge of fires before being given fire education and practice

Fire Knowledge	Frequency	Percentage (%)
Height	17	17,9
Medium	69	72,6
Low	9	9,5
Quantity	95	100

Source: Primary Data, 2025

Based on table 3, it shows that almost all respondents (72.6%) as many as 69 respondents have knowledge of fire.

b) The distribution of respondent frequencies was based on public knowledge about fires after being given fire education and practice.

Table 4. Distribution of respondent frequencies based on public knowledge about fires after being given fire education and practice

Fire Knowledge	Frequency	Percentage (%)
Height	82	86,3
Medium	13	13,7
Low	0	0
Quantity	95	100

Source: Primary Data, 2025

Based on table 4, it shows that almost all respondents (86.3%) as many as 82 respondents have high knowledge of fire.

c) Analysis of the influence of practice-based fire education on public knowledge

Table 5. Distribution of respondent frequencies based on public knowledge of fires before and after being provided with fire education and practices

Fire Knowledge	Before		After		P *Value*
	Frequency	Percentage (%)	Frequency	Percentage (%)	
Height	18	18,9	82	86,3	0,00
Medium	73	76,8	13	13,7	
Low	4	4,2	0	0	

Source: Primary Data, 2025

Based on the results of the Wilcoxon Signed Rank Test, there were changes before and after being given fire education and training. From the results of the analysis based on the Wilcoxon Signed Rank Test with a significance value of $\alpha = 0.05$ obtained $p = 0.000$ which means $p < \alpha$, it can be concluded that H0 is rejected which means that there is an influence of practice-based fire education on public knowledge.

Community fire knowledge before being given fire education and training

Based on the data results in Table 5.3, it is known that before being given fire education and training, as many as 17 respondents (17.9%) had a high level of knowledge, 69 respondents (72.6%) were in the medium category, and 9 respondents (9.5%) had low knowledge. This data shows that most of the people of Kelutan Village have a basic understanding of fires, even though they have not participated in formal interventions in the form of education and practice-based training.

Respondents who had a Medium knowledge category (72.6%) before the intervention could be influenced through several factors. First, the people in Kelutan Village have a long life experience, especially in dealing with fire-prone environmental conditions such as agricultural land, bamboo yards, and livestock pens. These experiences indirectly shape practical knowledge gained from everyday events, community discussions, or informal information circulating in the neighborhood. Such knowledge is not yet structured, but it is sufficient to form a basic understanding of the risks and initial actions in the event of a fire.

Second, the influence of age is an important factor in shaping the level of public knowledge. Based on the data in Table 2, as many as 39 respondents (41.1%) were in the age range of 41–50 years. This age belongs to the category of mature adults, who psychologically and socially have a tendency to better understand risks and be responsible for environmental safety. A study (Yeremia Rante Ada & Rena Ayu Wulandari, 2023) in the Journal of Applied Agriculture, Health, and Technology explains that a person's knowledge increases with age because age presents more life experiences. The early adult age group tends to be more stable and adaptable to new situations, so it has the potential for better fire control behavior. This is in line with research (Diana Fauziatul Anwar et al., 2023), which states that older age is positively correlated with increased knowledge and preparedness for fires.

Research conducted (Maulida et al., 2025) at PT Trans Dana Profitri, Banda Aceh, shows that there is a significant relationship between age and knowledge level regarding fire preparedness. Respondents who are over 40 years old have a higher proportion of good knowledge compared to the age group under 40 years old. This is associated with longer experiences as well as emotional and intellectual maturity which improves risk perception and preparedness for emergency situations.

Research by (Siagian et al., 2024) also supports that individuals who are around the age of 45 have a higher tendency to fire control behaviors. That age is considered emotionally and cognitively stable, making it easier to accept new information and adjust to changing situations. The results of another study (Maulida et al., 2025) at IBS RS PKU Muhammadiyah Gamping can also strengthen the results of research in the field by showing a positive relationship between the level of knowledge and fire disaster preparedness, where age is one of the important factors that affect the preparedness.

Third, other influences may be that some people have obtained information from other sources such as mass media, work experience, or previous general counseling activities. This information can form partial knowledge that is not yet in-depth, but it is enough to place them in the category of moderate knowledge. This knowledge does not yet include technical skills such as the use of fire extinguishers or evacuation strategies, but it already includes a basic understanding of fire hazards and simple preventive measures.

In addition, with 17 respondents (17.9%) having high-category knowledge prior to the intervention most likely to have hands-on experience in fire management, either through employment, informal training, or active involvement in community activities. They may also have a higher education background, so they are able to understand technical information and apply it in a real-world context. Community leaders or village officials who often interact with related agencies also have the potential to have better access to information.

On the other hand, 9 respondents (9.5%) who were in the low category before the intervention may have never experienced or witnessed a fire incident firsthand, so they did not have the urgency to understand how to handle it. Other factors such as low levels of education, younger age, or lack of social involvement can also affect their low level of knowledge. Individuals who are not accustomed to accessing media or are not active in community activities tend to have limited information and insight regarding fires.

Thus, the category of moderate knowledge before intervention does not mean that the community does not know at all, but rather that they have an initial understanding, but are not equipped with the technical skills necessary in fire management. The variation in high and low scores shows that the level of knowledge of the community is greatly influenced by the individual's background, experience, and access to information. Therefore, practice-based fire education is important to increase this knowledge to a higher and more equitable level, so that the entire community has optimal preparedness in dealing with fire risks.

Community fire knowledge after being given fire education and training

Based on table 4, it shows that almost all respondents (86.3%) as many as 82 respondents in fire education and training have a high level of knowledge, the rest are in the medium category (13.7%), and none of the respondents are in the low category (0%). This indicates that a practice-based education approach is very effective in increasing public understanding of fire prevention and handling.

This research is in line with research conducted by (Yudiantri et al., 2023), which shows that fire education is directly able to increase the knowledge of community leaders in fire management. In the study, the provision of health education through SAP (Counseling Event Unit) resulted in a significant increase in post-test scores compared to pre-tests, with a p-value of 0.000.

In addition, there was training conducted by (Marfuah et al., 2021) in East Jakarta which also supported the results of this study. The training involves hands-on practice and evaluation of results, which have been shown to increase public awareness of the causes of fires and their prevention measures. The results of his research stated that training can encourage public awareness in avoiding fire risks.

Another study was also conducted by (Nuur et al., 2023) in Bagak Village, Boyolali, also strengthening the effectiveness of the practical approach. Disaster response training involving simulated fire extinguishing and providing materials that successfully improve community preparedness and create a culture of awareness of potential fire hazards.

Based on the 3 studies, it is emphasized that the practice-based education approach not only increases knowledge theoretically, but also shapes the skills and preparedness of the community in dealing with fire situations. The educational methods used such as lectures,

discussions, and direct demonstrations succeeded in providing a comprehensive and applicable understanding. Fire extinguishing simulations and demonstrations of the use of light fire extinguishers (APAR) provide real experiences that strengthen people's memory and skills.

However, the presence of 13 respondents (13.7%) who were still in the medium category showed that not all individuals responded to the intervention with the same level of understanding. Some factors that can affect this include differences in cognitive abilities and educational background, the influence of age and physical condition, and limited training time. Respondents with lower levels of education may take longer to understand technical material or follow practices optimally. In addition, training conducted in one session is not enough to accommodate different learning styles or strengthen understanding of fire.

Taking these factors into account, it can be concluded that although practice-based education approaches are generally effective, additional strategies such as repetitive training, individual mentoring, or the provision of visual and interactive materials are still needed to reach the entire community equally. Therefore, this practice-based education method is very relevant to be applied sustainably in communities with a high fire risk such as Kelutan Village, to ensure optimal preparedness for the entire community.

Analysis of the Influence of Practice-Based Fire Education on Community Knowledge

Based on the results of statistical analysis, a value of $p = 0.000$ ($p < 0.05$) was obtained, which shows that there is a significant influence between practice-based fire education on improving community knowledge in Kelutan Village. Before the intervention, most of the respondents were in the medium knowledge category, but after being given education and training, the majority of respondents moved to the high knowledge category.

Theoretically, practice-based approaches/education have advantages in conveying information in a concrete and applicable manner. Methods such as fire suppression simulations and demonstrations of the use of light fire extinguishers (APARs) provide hands-on experiences that strengthen participants' memory and skills. Compared to the passive lecture method, hands-on practice allows the community to understand the context of fire risk in a more in-depth and realistic way.

The effectiveness of this approach is supported by various previous studies. One of them is research by (Yudiantri et al., 2023) showing that fire education through SAP and practice simulation is able to significantly increase the knowledge of community leaders, as evidenced by the increase in post-test scores. Another study conducted by (Hasna et al., 2023) in East Jakarta also revealed that the variables of knowledge, attitudes, early warning systems, emergency response plans, and resource mobilization capabilities have a meaningful relationship with the level of community preparedness for fires.

Using the LIPI-UNESCO/ISDR preparedness index, the communities in the study were in the "ready" category with a score of 79.03, although there is still room for improvement in the aspects of the warning system and resource mobilization. In addition, research by Nizaruddin Sholeh (Sociology et al., 2021) in Siju Village states that the role of village governments is very important in preventing land fires through continuous training and communication systems as well as disaster vulnerability maps. Practice-based training and

education are an important foundation in increasing community capacity to effectively prevent and address fires.

Another study from (Ambarwati et al., 2025) in Cerme Lor Village, Gresik Regency, shows that socialization and simulation of fire management are effective in increasing the knowledge and skills of the community, especially PKK women, in carrying out fire prevention and early handling. This increase can be seen from the significant post-test value after training involving firefighting practices and the introduction of fire safety signs.

Based on these findings and theories, researchers argue that practice-based fire education not only increases knowledge theoretically, but also shapes real skills and preparedness. The change in knowledge categories from medium to high reflects the success of this approach in reaching the community at large. However, the researchers also observed that individual characteristics such as age, educational background, and previous experience also influenced the effectiveness of the intervention. Some respondents may need additional approaches such as repetitive training in order to achieve optimal understanding.

Thus, it can be concluded that practice-based fire education is an effective approach in improving public knowledge. This method is very relevant to be applied sustainably, especially in communities with a high fire risk such as Kelutan Village, in order to establish a culture of vigilance and preparedness that is evenly distributed throughout the community.

CONCLUSION

This research concluded that practice-based fire education significantly enhanced community knowledge in Kelutan Village, Ngronggot District, Nganjuk Regency, where most respondents shifted from moderate pre-intervention levels to high post-intervention levels, demonstrating the superior effectiveness of hands-on approaches over theoretical methods in fire prevention and management. This underscores the need to expand such programs to build community capacity against fire risks. For future research, longitudinal studies could assess the long-term retention of knowledge and behavioral changes, while comparative analyses across diverse rural settings in Indonesia would strengthen generalizability.

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