

Situation and Factors Affecting Awareness of Fire Prevention and Rescue Measures among Students: A Case Study in Hanoi

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Abstract: Recent fires and explosions in Vietnam have resulted in significant physical and psychological damage, undermining both safety and social security. This study, conducted during the first semester of the 2024-2025 academic year, analyzes data collected from questionnaires completed by 352 students at a university in Hanoi. The objective was to identify factors influencing students' awareness of fire prevention and rescue skills. The findings reveal that a relatively small number of students possess adequate awareness and practical ability to take appropriate action in the event of a fire. Notably, they are initially unaware of how to use fire prevention and firefighting equipment (13.9%), about the evacuation procedures in the event of a fire (8.5%), and basic first aid for injuries (16.5%). Key factors influencing students' awareness include limited exposure to fire prevention skills, with 55.7% of them reporting only occasional exposure and insufficient opportunities to engage in formal learning and practice, and 52.8% indicating limited opportunities for hands-on training. Based on these results, this study recommends enhancing the systematic delivery of fire prevention and rescue education, and extending the duration of practical fire drills to improve students' preparedness and their response capabilities.

Keywords: Students, fire prevention, rescue, awareness, Hanoi.

Subject classification: Sociology.

1. Introduction

Fires and explosions occurring in workplaces, schools, or residential areas present significant dangers and risks to individuals, property, and society at large. Fire prevention, firefighting, rescue operations, and relief efforts in institutions, educational facilities, and households have become increasingly important in recent years. According to Vietnam Fire and Rescue Police Department, during the first

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half of 2024, there were 2,222 fires nationwide, resulting in 57 fatalities, 45 injuries, and property damage amounting to approximately VND 127.9 billion. Additionally, 125 forest fires affected 529 hectares of forest. When compared to the same period in 2023, the incidents of fires increased by 361 (a 19.4% rise, from 1,861 to 2,222), the number of deaths increased by 14 (a 32.6% increase, from 43 to 57 individuals), while the number of injuries remained unchanged. Property damage, however, decreased by VND 71.9 billion (a 36.1% decrease, from VND 199.89 billion to VND 127.9 billion). These figures highlight the critical need to implement effective fire prevention and control measures to reduce the occurrence of workplace fires and explosions, as well as to promptly detect and address incidents to minimize property damage (Nguyen Duy Chuc, 2024).

Vietnam Fire and Rescue Police Department (2024) revealed that most fires occurred in urban areas, with 1,343 incidents (60.4%), compared to 879 incidents in rural areas (39.6%). Among these, fires in residential buildings accounted for the highest proportion, with 37% (823 incidents), while fires in warehouses, production, and business establishments represented 12.2% (271 incidents). Of the 1,299 fires out of 2,222 where the causes have been determined, 72.9% (948 incidents) were attributed to the electrical system and equipment failures, and 18.3% (238 incidents) were caused by the careless use of fire or heat sources. Other causes accounted for less than 10% of the total. Eighteen major fires were reported, primarily occurring in production and service establishments, as well as in houses combining residential and business functions in major cities. Although these large fires did not result in fatalities, they caused property damage amounting to VND 72.1 billion. Elsewhere, a study by Fan, Wei, & Pang (2024) regarding the issue of fires in a number of building complexes in China concluded that 28 outbreaks resulted in significant human loss, including 14 in single-family homes, six in houses combined with production and business, and eight in other types of fires. These incidents led to 57 deaths and 13 injuries, underscoring the importance of strengthening fire safety awareness and implementing comprehensive fire prevention measures (Fan, Wei & Pang, 2024).

In Vietnam, the conditions for firefighting are rapidly evolving, and the demand for firefighting services is anticipated to increase significantly (Jun-Yang Park & Yong-Taek Han, 2021). According to updated population statistics from the General Statistics Office, the population of Hanoi in 2023 was approximately 8.5 million, making it the second-largest city in the country (General Statistics Office, 2024). It also has the second-highest population density among the 63 provinces and centrally governed cities, with 2,398 people per square kilometer - 8.2 times greater than the national average (General Statistics Office, 2024). Hanoi is also home to numerous universities and colleges, housing a large student population.

Due to a combination of subjective and objective factors, student accommodation is often unstable and frequently lacks adequate fire prevention and safety measures. "In fire incidents, community centers are considered high-risk facilities that could lead to significant loss of life and property damage. Therefore,

studying the causes of fires is essential for ensuring effective prevention and safe operations” (Hassanain, M. & Albugami, Z., 2023).

On May 11, 2022, the Minister of Education and Training issued Circular No.06/2022/TT-BGDDT, which provides guidance on delivering fire prevention, firefighting, and rescue knowledge and skills to students in educational institutions. This circular, effective from June 26, 2022, mandates that educational institutions ensure the availability of sufficient materials and equipment for teaching and practicing fire prevention and safety. This highlights the importance of addressing fire safety within educational settings. As noted by Tokpah (2023), “the key to preventing fire mishaps is raising people’s understanding of fire safety.” Therefore, “understanding how individuals behave in fire situations and during evacuations is crucial for implementing appropriate fire safety measures that align with the needs of residents in the event of an incident” (Lương Khắc Vọng, 2019). Given that “most fires are extinguished without the intervention of professional first responders” (Linde, M. & Thielsch, M. T., 2024), this study aims to explore the level of awareness regarding fire prevention among students at a university in Hanoi. The research was conducted in the second half of 2024 using a questionnaire administered to 352 participants.

2. Literature review

2.1. The concept of awareness

Awareness is defined as “knowing something; knowing that something exists and is important” (Oxford Learner Dictionary, 2024), referring to the reflection of relationships, connections, and attributes of objects and phenomena in the external world. In daily life, individuals must perceive their experiences, express their attitudes, and take action, thereby reflecting the surrounding objective reality. Awareness develops in accordance with the laws of natural processes and reality, from which corresponding opinions, attitudes, and actions emerge. It serves as a psychological mechanism that precedes conscious and purposeful behavior, facilitating the selection of actions and shaping individuals’ positivity, worldview, and beliefs.

Thus, awareness can be understood as the process by which humans actively, consciously, and creatively reflect the objective world within their minds. This process is grounded in practice and aims to generate new knowledge about the external world.

2.2. The concept of fire prevention and rescue skills

The Law on Fire Prevention, Fire Fighting, and Rescue (2024) defines fire

prevention as a combination of strategies and measures designed to ensure safety and minimize the risks of fire, while also reducing the consequences when a fire occurs. Firefighting involves the deployment and mobilization of resources, organizing evacuation, rescuing individuals and property, preventing fire spread, extinguishing fires, and undertaking other activities aimed at minimizing fire-related damage. As noted by Tokpah (2023), “the protection of life, the preservation of property, and the reduction of devastation caused by fire accidents all depend on fire safety and prevention.” This perspective is echoed by Nguyen Duy Chuc (2024), who assert that “fire prevention and effective risk management contribute to ensuring social security, promoting the sustainable development of industries and the economy, safeguarding the living environment, and fostering societal prosperity.”

Rescue activities refer to the efforts made to save individuals from danger that threatens their health and life, encompassing medical consultation, initial first aid, and other necessary actions to transfer victims to medical facilities or safe locations. Rescue also includes actions to protect vehicles and property from risks caused by fires, incidents, or accidents. Therefore, students’ awareness of fire prevention and rescue skills education is understood as their comprehension, recognition, and evaluation of the significance of acquiring skills related to fire prevention and rescue. These include:

Knowledge: Students’ understanding of fire prevention regulations, procedures, and measures, along with their ability to perform rescue operations in emergency situations.

Skills: Competence in applying fire prevention methods, firefighting techniques, and implementing effective rescue measures.

Attitude: A positive evaluation of the necessity and importance of acquiring these skills for both personal and academic life. This attitude may influence students’ participation in related courses, training sessions, or practical activities.

Behavior: Active engagement in applying and sharing knowledge and skills with others, such as participating in community fire prevention and rescue initiatives.

Such awareness is critical in enhancing students’ capacity to respond to hazardous situations, thereby ensuring their own safety and that of the wider community. As Tokpah (2023) observes, “risk analyzes, the installation and maintenance of fire detection and suppression systems, adherence to fire safety standards, and fire safety education are just a few of the numerous procedures that constitute fire safety and prevention.”

2.3. Previous studies

In recent years, numerous studies have been conducted both domestically

and internationally to enhance students' awareness and skills in fire prevention and firefighting. These studies examine students' knowledge of fire safety and the various factors influencing it. For example, Agyekum and Ayarkwa (2016) conducted a survey involving students and dormitory fire safety managers at Kwame Nkrumah University of Science and Technology in Ghana (West Africa). Similarly, Noh and Park (2022) surveyed 321 students at a university in South Korea and found that fire safety knowledge, awareness of fire incidents, and disaster response capacities could be improved through targeted education and training in fire prevention and firefighting. In another study, Fan, Wei, and Pang (2024) investigated real-world engineering cases, proposing specific fire protection measures related to fire rescue, fire control zones, evacuation design, and fire systems in a number of buildings in China. They concluded that the lack of firefighting infrastructure and fire prevention measures, including the awareness of fire prevention, significantly increases the risk of fire incidents.

Further research by Gautam and Shapkota (2024) identified negligence, a signal of lack of awareness, as a primary driver of fire incidents. Nocete, R. and Enteria, O. C. (2020) found that respondents who had insufficient awareness of fire prevention exhibited poor practices, such as infrequent follow ups of annual property wiring inspections, inadequate securing of building permits, and the absence of structured routines for electrical fire prevention. Tokpah (2023) explored the importance of fire safety legislation, education, and other key fire prevention components, emphasizing that proactive fire prevention practices and raising awareness can significantly reduce the risks associated with fires, and protect lives, property, and the environment. However, Nocete, R. and Enteria, O. C. (2020) noted that respondents were generally unaware of important technical details, such as the correct amperage rating of fuses and circuit breakers, or the appropriate size and type of electrical wiring for various applications.

In Vietnam, several studies have also addressed fire safety awareness. Lương Khắc Vọng (2019) emphasized that the most crucial aspect of building fire security is the ability to safely evacuate from danger. He highlighted that urban residents' awareness of fire prevention and safety has been insufficiently addressed. In a more recent study, Manh Vu and Su-Yun Lin (2024) examined fire safety facilities and management in high-rise residential buildings in Vietnam, focusing on residents' knowledge and awareness of fire safety. Through a survey of 96 respondents from 32 different high-rise buildings, they found that residents' behavior before and during a fire is critical to ensuring fire safety. The study suggested that enhancing residents' knowledge and awareness about fire safety could reduce the risk of fire incidents. Descriptive statistics from the survey indicated that over 50% of respondents lacked the habit of turning off electrical devices, and there was a need for greater awareness and preparedness for fire accidents. The study also highlighted the importance of residents' understanding of fire safety, the availability of fire safety amenities, and the effectiveness of fire safety management in these buildings (Manh Vu & Su-Yun Lin, 2024).

3. Research design and methodology

This study employed a questionnaire survey method to evaluate students' understanding and awareness of fire prevention, firefighting, and rescue and disaster relief education, with data collection taking place in the second half of 2024. The university is a state-run educational institution in social sciences in an urban area of Hanoi. The university does not have any major on fire fighting and prevention. Direct questionnaires were distributed to 352 full-time students at the university, which they filled in by themselves. The questions were specifically designed to assess students' comprehension and awareness of fire safety issues, as well as to identify factors influencing their knowledge and attitudes, with the aim of proposing strategies to enhance awareness. A random sampling technique was used and the data was subsequently analyzed using descriptive statistical methods, providing insights into their understanding and awareness of fire prevention, firefighting, and disaster relief education.

Characteristics of students on fire prevention, firefighting and rescue skills education

Table 1: Characteristics of the Participants

	Main information	Number	Percentage
Gender	Female	230	65.3
	Male	122	34.7
Time of learning	Freshmen	83	23.6
	Sophomore	150	42.6
	Junior	95	27.0
	Senior	24	6.8
Place of living before studying at the university	North	204	58
	Central	76	21.6
	South	72	20.5

Source: Author, 2024.

4. Results

4.1. Results of students' self-assessing on issues of fire prevention awareness

The results from the survey of these 352 students indicated that they generally have a high level of awareness regarding the importance of fire prevention, firefighting skills, and rescue education. Specifically, 98% recognized

the significance of this issue, with 62.2% rating it as “very important” and 35.8% as “important.” This highlights the students’ strong emphasis on acquiring the knowledge and skills necessary for effective response in emergency situations. However, a small proportion of them did not prioritize this issue, with 0.6% selecting “not important”.

Table 2: Results of Students’ Self-assessing on Awareness of Performance of Fire Prevention and Rescue

Criteria Details	Being able to perform		Partially able to perform		Nearly unable to perform	
	Numb er	Perce ntage	Percent age	Perce ntage	Numb er	Perce ntage
Four-on-the- spot motto	76	21.6	196	55.7	80	22.7
Know how to use fire extinguishers and firefighting aids	132	37.5	194	55.1	26	7.4
Escape skills	139	39.5	196	55.7	17	4.8
Firefighting on site	124	35.2	204	58	24	6.8
Basic rescue measures	187	53.1	159	45.2	6	1.7
Basic fire prevention and fighting measures	208	59.1	137	38.9	7	2
How to detect and handle a fire	178	50.6	153	43.5	21	6
Use fire prevention equipment (fire extinguishers, fire alarm systems, etc.)	142	40.3	161	45.7	49	13.9
Fire Evacuation Procedures	164	46.6	158	44.9	30	8.5
Basic knowledge of first aid techniques in emergency situations	118	33.5	176	50	58	16.5

Source: Author, 2024.

The survey results on students’ understanding of fire prevention, firefighting, and rescue skills indicate that their awareness and proficiency in these areas are limited, primarily reflecting an understanding rather than a comprehensive mastery of the concepts. Specifically, only a small proportion (21.6%) of students demonstrated a full understanding of the four on-the-spot principles, while the majority (55.7%) showed partial understanding. This may relate to the limited amount of exposure to practicing in reality, where the students are trained how to react in case of fire. This is why “know how to do” is more important than just knowledge of the issue, as it is easier said than done. Additionally, 22.7% of respondents indicated they had no knowledge at all about these principles, equivalent to the number of students who do not often pay attention to training drills at their institution.

Regarding the use of fire extinguishers and firefighting support equipment, although a greater number of students demonstrated awareness compared to the four-on-the-spot-motto, the majority (55.1%) still had incomplete knowledge. In-depth interviews show that most of them pay attention to instructions, but they cannot perform well due to limited actual practice time. The same findings applied to 37.5% of students who displayed a high level of awareness, and 7.4% reported no knowledge of the proper use of firefighting equipment. In terms of skills needed to escape during a fire, 39.5% of students claimed to have mastered this skill, more than half (55.7%) had partial knowledge, while 4.8% had no knowledge at all. This is really alarming, because one of the most important goals of firefighting and prevention is to get out of the fire zone. Being stuck in a fire area means a heightened expectation of loss; therefore, more should be done to raise awareness among students.

The survey results suggest that while students possess some knowledge of fire prevention, firefighting, and rescue skills, their awareness is generally incomplete. The most common response, for both knowledge and skills, was “understanding but not fully,” with more than 50% of students selecting this option for all questions.

4.2. Student information access sources

The diversity and quality of information sources play a crucial role in shaping and developing students’ awareness of fire prevention, firefighting, and rescue skills.

Survey results from the question, “Where do you access information about fire prevention, firefighting, and rescue?” reveal that social networks are the primary source of information, accounting for the highest proportion (91.2%) among all sources providing knowledge about these topics. This finding is consistent with the ongoing digital transformation in society, highlighting the ease and speed with which students can access information via social media platforms. The results also reflect the increasing reliance on online platforms by students. The second most important source of information is formal education in schools, with 274 votes (77.8%), emphasizing the critical role of educational institutions in raising awareness about fire prevention and fire safety. The media (television, newspapers, and magazines) accounted for a similar proportion of votes, with 271 (77%), indicating that alongside formal education, mass media plays a significant role in disseminating fire safety knowledge to students.

The family emerged as another key source of information, receiving 194 votes (55.1%), which underscores the influence of the family environment in shaping an individual’s awareness of safety measures and the protection of property and life. This highlights the importance of familial education in fostering an understanding of fire prevention, firefighting, and rescue skills, particularly in

students' homes. Families play a dominant role in forming students' habits and attitudes toward fire safety. Additionally, organizing dissemination and training activities contributes to raising students' community awareness of fire prevention. This factor was selected by 203 students (57.7%), indicating its importance in fostering a broader understanding of fire safety. Although extracurricular courses received fewer votes (123 votes, or 34.9%), they still play a vital role in equipping students with essential knowledge and skills related to fire prevention and rescue.

Interestingly, while friendships are an integral part of students' social networks, only one student (0.3%) identified friends as a source of information about fire prevention and rescue. This suggests that students predominantly rely on official sources and institutions for acquiring knowledge and skills, rather than learning from their peer relationships.

5. Factors affecting students' awareness of fire prevention, firefighting and rescue skills education

Based on the responses of the students, the author analyzes factors that affect the awareness of students regarding fire prevention. The survey examining factors influencing students' awareness of fire prevention, firefighting, and rescue skills reveals that several key factors affect their understanding of these issues. The most significant factor identified is the "lack of opportunity to participate in learning and practical exercises," which accounts for 52.8%. This underscores the importance of structured, formal education in shaping students' awareness. Without opportunities to attend courses or engage in hands-on practice, students face difficulties in both comprehending and applying fire safety knowledge. Essential skills, such as using fire extinguishers, providing first aid, and other rescue operations, require practical experience in addition to theoretical learning for students to fully grasp and retain the information.

The frequency of information access also plays a critical role in keeping students updated on evolving fire safety regulations, techniques, and practices. Regular exposure to information directly influences students' awareness and behavioral responses. Students who access information regularly develop a habit of continuous learning, which in turn enhances their practical application of fire safety skills in real-life scenarios. According to the survey, 39.8% of students reported that they regularly access information related to fire prevention and safety, indicating a substantial interest in safety measures and preparedness for emergency situations. The majority (55.7%) access this information occasionally, reflecting that while most students engage with fire safety content, it is not a regular part of their routine. A small percentage (3.7%) rarely access information, possibly due to a lack of prior emergency experience, leading to a diminished sense of urgency or awareness regarding fire safety. Additionally, a small group of students (0.9%) reported having never accessed any information about fire safety, suggesting a concerning gap in

awareness, despite the low percentage.

The social environment - comprising family, friends, and the wider community - also significantly impacts students' awareness, with 51.1% of respondents indicating its influence. Students tend to ask one another about procedures for escaping a fire and how to use firefighting tools before attending any training drills. The more interactions they have with their friends, the better the outcome. The combined effect of formal education and family guidance plays a pivotal role in shaping students' awareness. Family education, in particular, helps students understand the importance of fire safety and encourages proactive participation in safety-related training and awareness programs. Without sufficient family involvement in fire prevention education, students may lack a full understanding of the significance of these skills in daily life.

Mass media (49.1%) and university's educational programs (48.9%) were also identified as influential factors. Proper training through educational institutions, alongside information from the mass media (television, radio, newspapers), helps to increase students' awareness of fire safety. Public campaigns and educational sessions were highlighted by 46.6% of students as critical in raising awareness. In today's digital age, information shared on social media platforms can effectively capture students' attention. However, the risk of encountering misinformation on these platforms must also be acknowledged, as it can lead to misconceptions and reduce the effectiveness of formal fire safety training.

In addition, personal experience (45.5%) and self-awareness (44.3%) are key factors in the development of awareness. Students who have experienced an emergency situation, such as a fire or having a relative affected by one, tend to recognize the importance of fire safety knowledge. Self-awareness is equally critical; those who are more attuned to the importance of safety are more likely to seek out information and actively improve their knowledge and skills. Students' motivation to learn about fire safety can stem from various sources, such as career interests, genuine concern for safety, or a heightened sense of personal responsibility. However, some students may possess a more passive attitude, driven by the misconception that fire incidents are unlikely to occur, leading to a lack of preparedness.

6. Discussion

The survey results indicate that several solutions must be implemented in tandem to effectively improve fire prevention education for students. To achieve this, coordination among schools, authorities, families, and students themselves is essential. The importance of prioritizing fire prevention, accurately identifying potential fire hazards, and implementing risk management strategies is emphasized by Nguyen Duy Chuc (2024). Students in the survey exhibited a strong awareness

of the need to enhance their fire prevention and fighting, rescue, and relief skills. As suggested by Wan-Ching Li et al. (2022), fire safety training should comprehensively cover all duties and responsibilities, enabling mutual support in emergency scenarios. In alignment with Linde, M. and Thielsch, M. T. (2024), it is clear that the motivation to survive is a key driver of people's actions during fires, and training and awareness are essential for equipping individuals with knowledge and ability to respond to emergencies effectively (Tokpah, 2023).

Organizing skill-enhancement courses within educational institutions is a critical solution, as indicated by students' responses, with 85.1% (298 votes) supporting the importance of such courses. These not only provide theoretical knowledge but also offer practical experience, allowing students to apply what they have learned in realistic scenarios. This aligns with findings of Nocete, R. and Enteria, O. C. (2020), who noted that many individuals exhibit inconsistent behaviors regarding electrical fire prevention and do not consistently seek additional knowledge.

Universities should implement regular practice drills, as these have been identified as the second most important factor, with 74.6% of students (261 votes) supporting this measure. These drills offer students the opportunity to experience emergency situations, improving their response capabilities, skill in using firefighting and rescue equipment, and proficiency in providing basic first aid. This is consistent with the conclusions of Wan-Ching Li et al. (2022), who argued that training programs should focus on increasing practice time to raise participants' awareness of fire prevention and emergency response.

Furthermore, regular awareness campaigns, with 72.3% of students (253 votes) endorsing them, should be organized to further increase their awareness of fire prevention and safety. Such campaigns, which may involve mass media outlets like television, newspapers, and social networks, help foster a deeper understanding of the risks and encourage students to actively seek fire safety knowledge. Universities could also collaborate with experts, such as firefighters, to conduct practical sessions that actively engage students.

The development of guidance documents, which 58% of students (203 votes) identified as an important solution, is another effective measure. These documents would provide clear, accessible information on fire prevention, firefighting, and rescue procedures, offering a structured and comprehensive resource for students. Policies, regulations, and detailed documents from educational institutions could further enhance the focus and relevance of training programs, ensuring they address practical and applicable fire safety issues. As emphasized by Manh Vu and Su-Yun Lin (2024), the enforcement of fire safety regulations in buildings is critical for minimizing fire risks.

Although family involvement was ranked lower (0.9% of students), it remains a factor in shaping students' safety awareness and habits. Family education and care contribute to establishing a strong foundation for students' understanding

of fire safety issues. The low family involvement may result from the fact that most of the students do not live with their family during their university years.

Ultimately, to effectively raise awareness and improve fire prevention education, a coordinated effort from multiple stakeholders - families, schools, and communities, is necessary. Overcoming existing challenges requires concerted action at all levels to equip students with the necessary safety skills. As Nguyen Duy Chuc (2024) suggest, fostering a culture of fire prevention, adhering to legal regulations, and developing fire prevention plans will significantly reduce the likelihood and impact of fire-related incidents. This approach aligns with findings by Tokpah (2023) and Nan Li et al. (2024), who emphasize the critical role human factors play in enhancing situational awareness. The results of other studies, that “education, gender, living environment, and participation in fire drills significantly influence students’ awareness levels” (Manh Vu & Su-Yun Lin, 2024), and that better awareness translates into improved self-efficacy and more effective responses to emergencies (Wan-Ching Li et al., 2022) should also be paid attention to.

7. Conclusion

The study highlights the urgent and essential need to raise students’ awareness and skills in fire prevention, firefighting, rescue, and disaster response, particularly in the current context. As Tokpah (2023) suggest, the successful implementation of fire safety and prevention measures requires collaboration among a range of stakeholders, including governmental organizations, fire departments, building owners, facility managers, and individuals.

A comprehensive understanding of the role fire prevention education plays is critical for students, enabling them to ensure their own safety and contribute to the safety of the wider community, thereby supporting social stability. In essence, enhancing students’ awareness and skills in fire prevention, firefighting, and rescue is not solely the responsibility of educational institutions but is also a collective societal obligation. Effective coordination between families, schools, authorities, and social organizations in establishing a safe learning and practice environment is key to fostering proactive and confident student participation in safeguarding their own and the community’s safety. To address these challenges, this study advocates for enhancing community engagement, increasing financial and technical support, and integrating fire management more explicitly into national policies, as recommended by Jeetendra Gautam and Jun Shapkota (2024).

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