



Study on Understanding the Use of Light Fire Extinguishers in Airport Terminals

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Abstract: Emergencies and conditions can occur at any time. Preventive measures are necessary to reduce accidents and emergencies. This research, which measures the level of understanding of tenant employees regarding the use of light fire extinguishers in airport terminals, is of significant importance. The study used a mixed methods research approach with a sample of 77 people and obtained measurable values for tenant employees' understanding of light fire extinguishers. The results included 87% of tenant employees understanding emergencies, 81.8% knowing the meaning of light fire extinguishers, 55.8% knowing how to use light fire extinguishers, 58.4% who have never participated in socialization on light fire extinguishers use, and 83.1% who did not have a certificate/license for using light fire extinguishers, provide a crucial basis for further policy-making. In the form of preventive actions, these policies will be carried out by aircraft rescue and fire fighting in the form of fire prevention outreach/training through educational innovations in using light fire extinguishers via videos accessed by all tenant employees. The success of these actions will be measured through pre/post-test results before and after the material intervention, with certificates issued to participants who meet the assessment scoring. As part of the airport community, active participation in these initiatives is not just crucial but also a responsibility and a testament to the ownership of the safety of all airport users.

Keywords: airport terminal, light fire extinguishers, study of understanding

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INTRODUCTION

Air transport has several advantages, making it a popular choice in some situations. Some benefits include (1) Speed: Air transport is generally faster than other modes, such as land or sea. Aircraft can reach high speeds, allowing long-distance journeys to be completed quickly; (2) Global Reach: Aircraft can reach almost every place, allowing global connectivity and accessibility. This is crucial for international travel and global trade; (3) Flexibility and Availability: With diverse flight schedules, air transport allows passengers and cargo companies to choose the time that suits their needs; (4) Logistics Efficiency: With diverse flight schedules, air transport allows passengers and cargo companies to choose the time that suits their needs; (5) Comfort and Connectivity: Commercial flights provide comfort for passengers with facilities such as adjustable seats, onboard entertainment, and food service. In addition, aircraft are generally equipped with modern communication technology, providing connectivity during the flight; (6) Emergency Rescue: Air transport seeks quick assistance in emergencies like natural disasters or accidents. Airports are an essential component of air transport services. The increasing number of passengers, cargo, and aircraft movements at airports require further attention to be studied. This relates to the ability of an airport to serve the needs of service users, including providing safety assurance for all air transport users (Subekti, 2019). As the center of business activities, the airport also includes many activities that are carried out and can potentially cause danger, one of which is the danger of fire. Every public service, such as airports, should have safety facilities for service users, including fire hazard prevention equipment. Risk Control is an action taken to save the company from losses by determining the best way to deal with risks (Gani et al., 2023). One of the hazards that can occur in this work area is a fire or explosion caused by the activity of machine tools and humans as operators. So, fire emergency response equipment is needed as a form of preparedness in dealing with emergency conditions when a fire occurs (Marenda et al., 2023; Rosmalia et al., 2021). There is a possibility of potential fire risks at the airport because there are potentials that cause fires, such as the activities of tenants who produce food ingredients. One of the light fire extinguishers that must be available to every tenant is a dry chemical fire extinguisher. A lightweight fire extinguisher is one of the active fire protection systems used to extinguish fires that are still small and used in emergencies to prevent fires from being more extensive, which causes losses and even casualties (Pane & Putra, 2023; Sutriningsih et al., 2021; Yuniati & Wahyuningsi, 2022). The availability of fire extinguishers is necessary to prevent fires because not all places can reach water quickly and have enough water to extinguish fires (Nasution et al., 2021; Rizal et al., 2023). Nowadays, the transport industry is experiencing rapid development. This development is caused by competition for modes of transport to meet everyone's mobility needs. One way that is highly favored by the public is by traveling by plane. Compared to other methods of transport, aircraft

have a high level of safety and do not require much time to travel between regions, islands, and countries. Air transport systems play an essential role in the economic, social, and cultural fields, especially in the era of global modernization, and contribute to the progress of society. Civil aviation's technical and operational procedures are set out in Standard and Recommended Practices (SARPs).

Fire is a small or large flame in a place we do not want and can be detrimental if the fire is difficult to control. Lately, the mass media has often reported fire cases, either due to natural factors or due to technical negligence such as electrical short circuits, gas stove explosions, carelessly throwing cigarette butts, and so on. Therefore, as a form of concern for the surrounding situation, from the above problems, a socialization of how to use light fire extinguishers is held as a form of occupational safety and health (Mubarak et al., 2023; Rizal et al., 2023). Fire disasters have become a severe problem and have attracted worldwide attention. One of the most frequent disasters is the fires that occur in Indonesia. In Indonesia, there were 865 cases of fire disasters. Students who are vulnerable to disasters need knowledge and preparedness to reduce the impact of fire disasters (Ruspandi & Nurrohmah, 2022). Fire is one of the disasters caused by humans. It endangers lives at the expense of property and people. Fire management training is one of the ways to deal with fires (Akbar et al., 2021; Dewi et al., 2022). According to Rahmawati (2018), under specific temperature and fuel-to-oxygen ratio conditions, a fire can occur when three elements, oxygen and an igniter or heat source or flame, collaborate. Based on the regulation of the Director General of Civil Aviation Number: PR 30 of 2022, every airport operator and business entity must provide aviation accident assistance and fire extinguishing services by technical service standards, operational service standards, and airport category. The duties and functions of the airport's rescue fire fighting unit are to save lives and property from events or accidents (incidents) involving aircraft and other places. They protect people and goods threatened by fire in airport facilities by preventing, controlling, and extinguishing fires.

When equipped with the appropriate tools and used correctly, most fires can be put out when they are still small. However, prompt and accurate action is essential because it can take only a few minutes from the start of a fire to potentially serious consequences (Lovreglio et al., 2021; Tumram et al., 2018). Since fire extinguishers are pressure devices, regular maintenance is necessary to ensure proper operation during a fire (Garcia-Martin et al., 2019). Everyday fire danger can be significantly reduced with the help of fire safety and training (Moisanu et al., 2023; Nwoba & Moheimani, 2022; Wicaksono, 2020). If we can find the fire early and alert the firefighters as soon as feasible, the harm from the fire can be minimized (Khan, 2023). People's comprehension of this tool's operation has been lacking until now due to its perceived insignificance despite the idea that someone needs to be prepared for a fire at some point (Yunanto et al., 2020). The research results show increased public understanding of using light fire extinguishers before and after intervention in the form of training in light fire extinguisher use (Ruliyanta & Setyadi, 2022). This research was conducted to measure the level of understanding of tenant employees at SMB II Palembang Airport and find the best solution to achieve an optimal level of understanding for all tenants. There is no valid data on the number of tenant employees who have taken part in training on using light fire extinguishers, so it needs to be monitored correctly. So, it is necessary to re-measure the level of understanding of tenant employees at SMB II Palembang Airport so that it can become a reference for taking the following steps. Ideally, a public service should guarantee the safety of service users and provide them with knowledge about using safety equipment. With high business activity from each tenant at the airport, an innovative solution is needed where each tenant employee continues to gain knowledge about the impact of fire emergency risks and the use of light fire extinguishers as measured by pre-post activity scoring assessments and the publication of e-certificates for training participants who achieve minimum value through educational videos on the use of light fire extinguisher which can be accessed on the gadget of every tenant employee.

Emergencies and conditions can occur at any time. They can occur at the terminal, airside, or in one of the units. Bomb threats, fires, aircraft accidents, and acts of terrorism are commonplace. The company's role and commitment are critical to addressing these. Preventive measures are needed to reduce accidents and emergencies. Policies and tools are in place to implement these precautions to minimize losses. According to Putri and Fakhrudin (2022), the International Airport has implemented a safety management system and is now operational. However, some trauma challenges in terms of human resources have hindered the implementation of the system, which certainly requires evaluation. According to Amri (2022), to ensure the safety of the International Airport, all traffic movements on the airside, officers working on the airside, personnel vehicles and the importance of maintaining flight security and safety, flight regularity and efficiency, and the protection of flight crews, passengers, ground personnel, the public, and agencies at the Airport are significant. It is also essential to comply with national and international aviation regulations (Daud, 2022). According to Nurrasjid (2011), airport security and safety are important issues that should not be disregarded. The airport operator and all units of the organization that make up the airport environment should be able to identify dangers and problems based on events that never transpired to foresee a situation that allows accidents and incidents. The absence of an integrated firefighting control device in the airport terminal room has caused several problems in

airport services. In addition, firefighters have handled firefighting (Kustori, 2017). Fire is a disaster that can harm both companies and workers. Fire victims can stem from a lack of knowledge and preparedness (Pertiwani & Ariastuti, 2022). According to Sudjana et al. (2021), there is a relationship between the variables of fire knowledge and fire preparedness. Knowledge about fire prevention and suppression is also essential to improve knowledge, insights, and skills in fire management (Sidharta et al., 2022). According to Ramdani (2022), adequate mitigation measures are required when emergency fires occur. Fire preparedness is an essential component in dealing with emergency fires. Research is needed to determine whether employees have a sufficient level of preparedness because many factors affect the level of preparedness. The study by Diannita (2020) shows that respondents have sufficient knowledge about the implementation of fire prevention systems, or they have sufficient knowledge. Fire prevention system facilities include light fire extinguishers, fire alarms, smoke detectors, evacuation routes, and exit signs.

Fire risk protection training with the introduction and use of a fire extinguisher. The training aims to make the community more aware and understand how to overcome a fire disaster (Santosa et al., 2021). Fire prevention training can provide knowledge about the causes of fires and preventive measures to minimize the occurrence of fires and encourage community awareness of the importance of preventive measures to avoid fires. It was concluded that the training could provide knowledge about the causes of fires and preventive measures to minimize the occurrence of fires and encourage awareness of fire prevention in the neighborhood community (Marfuah et al., 2020). Firefighters have difficulty conducting emergency response evacuations when fires occur in North Minahasa Regency. Therefore, using light fire extinguishers should be optimized as an initial strategy to prevent fires (Emor, 2022). A light fire extinguisher is a device to extinguish or control a fire. A fire extinguisher is one piece of equipment that helps firefighters start the initial extinguishing process (Susilo, 2020). Fire extinguishers are essential for dealing with small or minor fires (Kodratillah et al., 2022). Since not all places can reach water, the standard equipment required for building safety is a light fire extinguisher (Huda & Khoiruddin, 2022). Fire is one of the disasters caused by human actions. Fires that occur have an impact on life in the form of both property and casualties. Most cases of fire are usually caused by short-circuiting electricity, gas stoves, and so on (Akbar et al., 2021). Fire handling can be done in various ways, including using simple objects around us, such as sand or gunny sacks. Therefore, it is necessary that this fire handling training is given to increase knowledge and apply how to handle fires with light fire extinguishers by authorized units such as light fire extinguisher units at airports.

The research aims to measure the level of understanding of tenant employees regarding the use of light fire extinguishers in airport terminals, which will later become the basis for further policy-making in the form of preventive actions carried out by aircraft rescue and fire fighting in the form of fire prevention socialization/training through educational innovations in the use of light fire extinguisher through videos that all tenant employees can access. Indicators of success are obtained through the results of the pre/post-test before and after the material intervention. A certificate will be issued if the participant's score meets the assessment scoring. This research contributes to efforts to increase safety through emergency preparedness measures to prevent and reduce the impact of accidents and emergencies at airports through the results of tenant employees' measurable understanding of the use of light fire extinguishers at airports.

METHODS

This study used a mixed research method. This method combines two types of research methods, namely quantitative and qualitative, in one unit. Applying this research method not only enables the phenomenon of the problem to be revealed in general but can also answer the problem in more depth (Iskandar et al., 2021; Khairunnisa, 2021). Mixed methods research is developing and becoming an exciting issue and trend in education (Hendrayadi et al., 2023; Yam, 2022). Mixed methods allow for a broader range of research areas, with multiple perspectives, different assumptions, and different types of data collection and data analysis to suit the purpose of the research (Indrawan & Jalilah, 2021). This study uses a mixed method research, namely a combination of qualitative and quantitative descriptive research with a survey approach. Data collection techniques through observation, interviews, and distribution of questionnaires or questionnaires through Google Form media. The location of this research is Sultan Mahmud Badaruddin II International Airport. In quantitative data analysis, respondents in this study were tenant employees who worked in the Sultan Mahmud Badaruddin II International Airport terminal building area with a total population of 95. The population and sample sizes are crucial components of research that need to be decided upon upfront (Syafnidawati, 2020). Therefore, the research sample was drawn using probability sampling techniques. A simple random sampling technique was used. The number and characteristics of the population comprise the sample (Amin et al., 2023). Because the population in this study is known, the author uses Slovin and a margin of error of 5% when taking the number of samples. The rounding-up was done because it was based on the sample size table and the error limit for the 10% research leeway level (Amirin, 2017; Fian, 2020). When calculating with the formula, the minimum

number obtained is 77 responses. This instrument sheet is a questionnaire with several research questions using a Likert scale. The Likert Scale measures the attitudes, opinions, and perceptions of a person or group of people (Santika et al., 2023). Questionnaires were distributed in the form of research questions that support the problem. Measurable data results were obtained and supported by open questions to strengthen the data results through interviews. In this research, qualitative data processing was also carried out through interviews with informants appointed in the research, a total of 13 respondents with a purposive sampling technique where the research sample was considered to represent all research respondents, who were considered to represent all research respondents. The research instrument is the researcher himself (author) directly involved in the research. As the main instrument, researchers are researchers who plan, collect, and interpret data. Determining informants in this research uses a purposive technique, where only certain people or parties will be targeted by researchers as sources of information (Sugiyono, 2007).

RESULT AND DISCUSSION

In measuring the level of understanding of tenant employees at Sultan Mahmud Badaruddin II Airport Palembang on using light extinguishers to prevent fire hazards at the airport. Five indicators are measured and become research questions, among others, emergency knowledge. Specific management strategies are needed to manage emergency knowledge (Zhang et al., 2020). The emergency community needs preparedness knowledge to respond positively to prevention efforts (Munthali et al., 2024). Based on this graph, the results show that 87% of 77 respondents know about emergencies, and 13% do not. Most employees know about emergencies. The following is an explanation from several respondents regarding emergencies.

Table 1. Respondents' Responses on Emergencies

NAME	EXPLANATION
Respondent A	A short circuit
Respondent B	Building vibration occurs
Respondent C	Circumstances that keep us on our toes
Respondent D	Fire or electrical short circuit
Respondent E	Fire
Respondent F	An electrical spark or short circuit resulting in a fire
Respondent G	Fire, Electrical short circuit
Respondent H	A situation in which we are asked to take appropriate and measurable action.
Respondent I	Electrical fire, electrical short circuit
Respondent J	Signs of fire

From the table above, most respondents responded that an emergency is a situation in which an electrical short circuit and fire occur. The second indicator is knowledge of light fire extinguishers. Educational institutions can implement initial activity initiation indicators for emergency response system implementation in the following ways: creating an emergency response team with clear responsibilities, creating emergency response standard operational procedures for schools, training and simulating disaster mitigation, creating evacuation maps, putting up evacuation instructions, identifying gathering places, putting up emergency response signs, installing emergency response facilities (at the very least, a light fire extinguisher with usage instructions), and creating a network of cooperation with relevant parties (Widowati et al., 2023). The graph above shows that 81.8% of the respondents understand about the light fire extinguisher, and 18.2% do not know about light fire extinguisher. The following is an explanation from several respondents regarding the light fire extinguisher.

Table 2. Respondents' responses about fire extinguishers

NAME	EXPLANATION
Respondent A	Fire extinguisher
Respondent B	To put out the fire
Respondent C	Portable fire extinguisher, easy to carry, fast and effective to start a fire.
Respondent D	A fire extinguisher is a device used to extinguish or control small fires. A light fire extinguisher usually consists of a tube filled with a high-pressure fire extinguishing agent.
Respondent E	A light fire extinguisher is a tool to extinguish fire.
Respondent F	Light fire extinguisher
Respondent G	Fire sprayer
Respondent H	Tools for extinguishing small fires
Respondent I	Tools used to extinguish the initial fire
Respondent J	Initial fire extinguisher

Based on the table above, the respondents stated that a light fire extinguisher is a valuable tool for extinguishing fires; some respondents added that a light fire extinguisher is used when the fire is still small or at the beginning. The third indicator is that knowledge of the type of light fire extinguishers becomes a determining part of further fire prevention efforts. It is necessary to know the types of light fire extinguishers well (Maria et al., 2022; Dewi et al., 2022). A light fire extinguisher is a tool that is light and easy to use by one person to extinguish a fire from the start (Sofian et al., 2023). Knowledge is required to use it (Setiawan, 2023). Knowledge interviews regarding types of light fire extinguishers were conducted with informants to explore measurable values and evaluation for improvements.

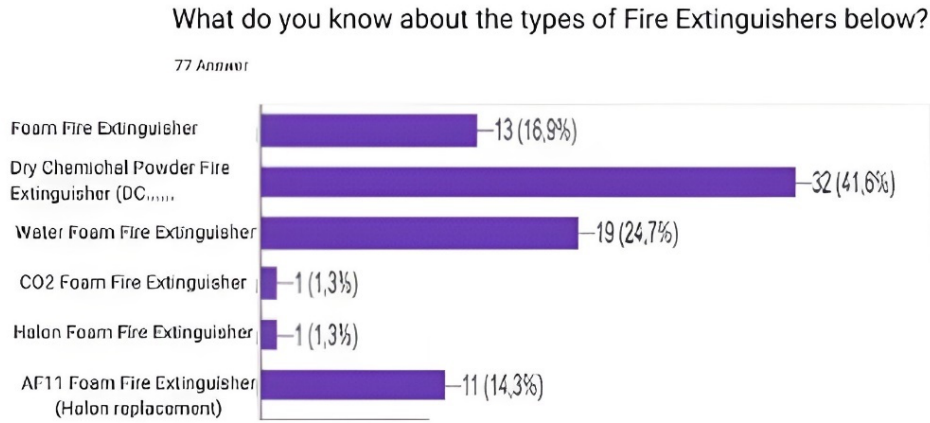


Figure 1. Results of Respondents' Answers to Understanding the Types of Fire Extinguishers

In firefighting, the quality of fire extinguishers has grown to be a delicate and significant matter (Ngo et al., 2024). The diagram above shows that out of 77 total respondents, 41.6% of respondents know about dry chemical powder media extinguishers, 24.7% know about water media extinguishers, 16.9% know about Foam / Foam media extinguishers, 14.3% know about halon replacement media extinguishers, 1.3% know about CO2 and Halon media extinguishers. The following are some respondents' explanations on the types of light fire extinguishers.

Table 3. Respondents' Responses to Knowledge of Types of Fire Extinguishers

NAME	EXPLANATION
Respondent A	Halon substitute (AF11) can be used to extinguish fires such as room fires.
Respondent B	To extinguish plastic fires
Respondent C	To extinguish the fire that broke out around
Respondent D	Extinguish fires that occur in the neighborhood
Respondent E	Using water to put out the fire
Respondent F	Used when there is a fire
Respondent G	To put out the fire
Respondent H	Fire extinguishers that emit water
Respondent I	Useful for extinguishing fire
Respondent J	To put out the fire

The table above shows that respondents do not fully know about the types of fire extinguishers and the uses of each type of fire extinguisher. The respondents also do not know much about the class of fire class and the fire extinguisher media used to extinguish the appropriate class of fire. The fourth indicator is the ability to use a light fire extinguisher. To enhance the quality of the fire protection system on site, fire safety officers need to pay special attention to the fire extinguisher's weight, installation location, and actual effectiveness (Chernov et al., 2024). The graph states that 55.8% of respondents know how to use a light fire extinguisher, while 44.2% do not. The following is an explanation from several respondents about how to use a light fire extinguisher.

Table 4. Respondents' Responses on How to Use Light Fire Extinguisher

NAME	EXPLANATION
Respondent A	Open the seal, aim at the flame, pull the lever
Respondent B	Unseal and spray towards the fire
Respondent C	Check the pressure, open the pin seal, point the nozzle at the fire and press the lever.
Respondent D	Pull out the pin and spray it onto the fire
Respondent E	Press the lever and steer
Respondent F	Sprayed
Respondent G	First, unplug the coil, then press it, pointing it 1 metre away.
Respondent H	Swirl the flamethrower, pull the pin seal, then spray on the fire
Respondent I	Pulling the pin and pressing the lever
Respondent J	Shake and open the spray valve

According to the table above, the respondents could explain how to use the light fire extinguisher, but from this explanation, many respondents' techniques for using light fire extinguishers were still incomplete and incorrect. The last indicator is received socialization on the use of fire extinguishers. Education fire fighting is a strategy to improve fire disaster management. Firefighters must deal with a significant fire or extinguish all fires as soon as feasible. Because of this, the quality of fire extinguishers becomes crucial and delicate in the fight against fires (Chao et al., 2019). Fire extinguishers significantly influence the value of fire risk (Khafizov et al., 2024). The graph illustrates that 58.4% of the respondents have never received socialization on the use of light fire extinguishers, and only 41.6% have received socialization on the use of light fire extinguishers.

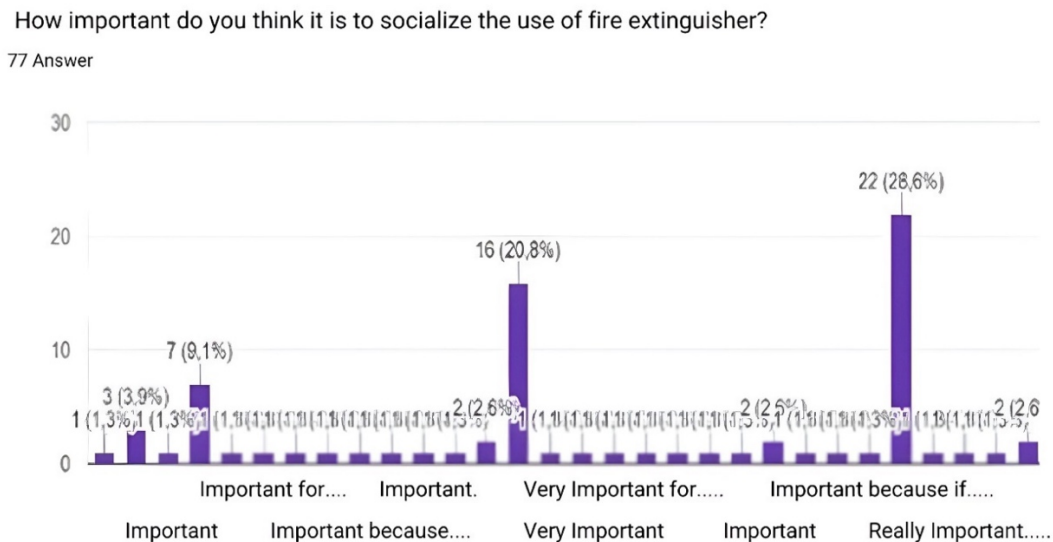
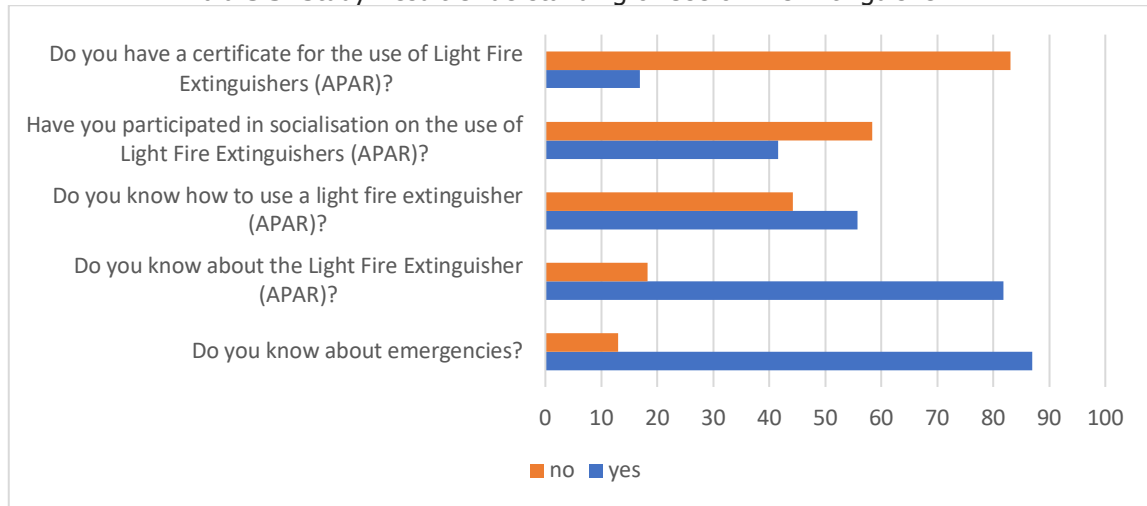


Figure 2. Employee distribution results on the importance of socialization

From these statistics, 28.6% of respondents considered socialization regarding using light fire extinguishers very important, 20.8% responded that it was necessary, and 50.6% responded that socialization was significant, with various responses submitted. It can be concluded that respondents have the desire to follow socialization regarding the use of light fire extinguishers. Employees will be distributed with certificates of use for light fire extinguishers. The data above shows that 83.1% of the respondents do not have a certificate for a light fire extinguisher. Meanwhile, 16.9% of respondents already have a certificate for light fire extinguishers. It can be concluded that many tenant employees at Sultan Mahmud Badaruddin II International Airport still do not have a certificate for a light fire extinguisher. The observations and questionnaire assessment results were given to tenant employees at the Sultan Mahmud Badaruddin II International Airport terminal, with 77 respondents. The results showed that the employees' understanding of the light fire extinguisher is insufficient. Therefore, each tenant needs to play a role in solving this problem. Many employees still have not mastered or understood the light fire extinguisher and have not received socialization about the light fire extinguisher. The following are the study results, which aim to understand the use of light fire extinguishers by tenant employees at Sultan Mahmud Baharuddin II International Airport Palembang.

Table 5. Study Result Understanding of Use of Fire Extinguisher

Emergency knowledge was measured to show that 87% of the 77 respondents understood emergencies, and 13% did not. A measurable 81.8% were familiar with light fire extinguishers, and 18.2% were unfamiliar with light fire extinguishers. 55.8% of the respondents knew how to use fire extinguishers, while 44.2% did not know how to use fire extinguishers. 58.4% of the respondents have never received socialization on fire extinguishers, and only 41.6% have received socialization on using fire extinguishers. 16.9% have a certificate of socialization on the use of fire extinguishers, and the remaining 83.1% do not have a certificate of socialization. Sultan Mahmud Badaruddin II International Airport has fulfilled the aircraft rescue and fire fighting unit's requirement to conduct socialization and education on fire risk prevention and emergency procedures two times a year. PERMEN PU No. 20/PRT/M/2009 stipulates that every building environment must conduct socialization and education on fire risk prevention and emergency procedures at least twice a year. The aircraft rescue and fire fighting have the authority to conduct socialization and education activities for tenants and all units. There needs to be a particular policy from each tenant to its employees regarding the implementation of socialization/education so that every employee is always ready in an emergency. A new way or innovation is needed from the aircraft rescue and fire fighting unit to increase the interest of tenant employees in participating in socialization/counseling, such as an educational video that each tenant employee can share without leaving or interrupting their activities, after which participants are required to fill in the pre and post-test links so that their level of understanding is measured if the score meets it will automatically get a certificate, if not then the participant is required to retake the education. This innovation is expected to answer the existing problems while still fulfilling the rules of preventive action by the aircraft rescue and fire fighting unit, with flexible activities and reducing costs as low as possible.

Airports must ensure flight safety (Zeng et al., 2023). Identifies emerging issues in airline safety and challenges for aviation safety research (Oster et al., 2013). For any safety management strategy to succeed, all aviation safety system professionals must get safety training and instruction (Georgiev, 2021; Ray et al., 2023). This research considered the enormous potential for fire accidents that occur anywhere. The airport as a service in the field of air transportation is also supported by several other core businesses to support the needs of transportation service users, such as the availability of tenant tenants at the airport. Each tenant has production activities inside by using fuel. This activity is one of the potential triggers of fire hazards at the airport (Okine et al., 2024). Understanding the use of light fire extinguishers is needed for safety education (McCaffrey, 2004). The airport rescue and fire fighting unit's main task is to provide fire prevention through light fire extinguishers at the airport. Being a firefighter is a very physically and mentally taxing job that takes many resources to train employees (Bulgakov et al., 2019; Williams-Bell et al., 2015). Currently, tenant employees who have participated in socialization or training on using light fire extinguishers, as evidenced by the ownership of certificates, have attended the training. With dynamic changes, it is necessary to recollect the level of understanding of tenant employees on the use of light fire extinguishers for future data improvement. This research contributes to fulfilling aviation safety through efforts to prevent further hazards (Koopmans et al., 2022) from potential small fires using lightweight fire extinguishers.

CONCLUSION

Preventive measures are needed to prevent potential emergencies at airports, one of which is the danger of fire by tenant employees at Palembang's Sultan Mahmud Badaruddin II Airport, including conducting outreach

such as in the form of educational videos that can be distributed to every tenant employee without leaving or disrupting their activities. After that, participants must fill in the pre and post-test links to measure their level of understanding. If they meet the score, they will automatically receive an e-certificate. If not, participants are required to retake the education. This is done to overcome the problem that has occurred so far, namely that tenant employees do not have enough time to participate in socialization activities because it takes up time at work, so educational videos are the appropriate media to provide knowledge regarding the use of APARs and pre-post tests are the proper intervention. On implementing education on understanding the use of light fire extinguishers for tenant employees, they will be given the appreciation as proof of having attended the training with the condition of passing a measurable score at the end of the activity. As an award, they will be given an e-certificate provided that the scoring meets the post-test results.

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