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Analysis Of The Relationship Between Vendors' Characteristics, Knowledge, And Attitudes Towards Preparedness For Fire Hazards In Karangayu Market Semarang

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ABSTRACT

Markets as public facilities with high activity have potential fire hazard risks due to electrical installations, flammable materials, and building and visitor density. This study aims to analyze the relationship between characteristics, knowledge, and attitudes with the preparedness of traditional market traders to potential fire hazard risks. This study was conducted from October 2025 to February 2026 using an observational analytical design with a cross-sectional approach on 95 Karangayu market traders determined by the Slovin formula and accidental sampling techniques. Data were collected using questionnaires and observations, then analyzed univariately and bivariately using Spearman's Rank and Eta Association. The results show that respondents were predominantly female (72.6%), with an average age of 49 years and 16 years of trading experience. Statistical results showed a relationship between length of service (p=0.042), knowledge (p=0.001), and attitude (p=0.001) with preparedness, while gender (p=0.961), age (p=0.405), education level (p=0.847), and fire experience (p=0.591) were not related. In conclusion, vendor preparedness is influenced by length of service, knowledge, and attitude. It is recommended that market managers improve fire protection facilities and vendors increase their awareness of potential fire risks.

Introduction

Traditional markets play a vital role in the Indonesian economy as hubs for basic necessities and a source of livelihood for millions of small and medium-sized traders. According to data from the Central Statistics Agency (BPS) in the 2024 People's Market Directory, there are 19,330 markets in Indonesia, with 2,248 in Central Java Province [1]. Despite their vital role, markets also face potential risks, including fire. According to calculations by the Indonesian Market Traders Association (IKAPPI), an average of 10 fires occur in traditional markets across Indonesia each month, with an average of 39 kiosks burned down each day [2]. IKAPPI obtained these figures from the trend of fire cases after calculating

the annual number of market fires, which consistently exceeds 120, with a total of over 10,000 kiosks burned down [3].

Around the beginning of 2024, a fire case hit the Ngawen Blora market which burned down 800 stalls, 150 stalls, 60 kiosks and 71 kiosks with moderate to light damage with estimated losses reaching IDR 30.69 billion [4]. The most recent fire incident also hit the Taman Puring market in Jakarta which burned down 552 kiosks, triggered by an electrical short circuit [5]. These incidents demonstrate that traditional markets are highly vulnerable to severe fire hazard impacts. Furthermore, the lack of disaster preparedness among traders is a key contributing factor to fire incidents in markets.

Preparedness for disaster emergencies can be influenced by various factors, particularly individual characteristics such as age, gender, education level, and length of service. Older adults tend to be slower to respond to emergency situations [6]. On the other hand, men are considered more prepared to face disasters [7]. Similarly, education level influences the ability to receive disaster information [8]. Individuals with longer tenure tend to have greater experience in the workplace [9]. Furthermore, individuals with direct experience are more vigilant in anticipating similar incidents [10]. In addition to characteristics, knowledge and attitude are also key factors in preparedness. Good knowledge of preparedness tends to be more prepared for emergency situations [11]. Furthermore, if traders have a positive attitude towards the importance of safety, they will be more alert when facing danger signs [12].

Karangayu Market in Semarang is known as a large, high-activity traditional market with a potentially serious fire risk. Observations indicate potential hazards such as semi-permanent kiosk structures, merchandise layout that restricts access, electrical installations that are not arranged according to standards, and the presence of flammable materials such as plastic, cardboard, clothing, and dry foods. These conditions are factors that require attention in efforts to improve vendor preparedness for fire risks. Preventive measures among vendors at Karangayu Market are still suboptimal, as evidenced by a lack of understanding of fire causes, initial handling procedures, fire preparedness, and rapid and coordinated response during emergencies. Furthermore, there is still a lack of awareness of fire triggers within the market environment, highlighting the need to strengthen vendor preparedness, as those most vulnerable to direct impacts.

Method

This research is an analytical observational quantitative with a Cross Sectional study design that aims to analyze the relationship between characteristics (age, gender, education level, length of service, experience facing fires in the workplace), knowledge and attitudes of traders with traders' preparedness to face fire risks. This research was conducted at Karangayu Market Semarang in October 2025 - April 2026, 95 out of 1,721 traders were selected using the Slovin formula using proportional accidental sampling techniques (kiosks, stalls, open bases, and ground displays) to ensure that the sample was relevant and representative of others. Data were collected through questionnaires, processed through the stages of: editing, coding, scoring, data entry, cleaning, and tabulating. Data were then analyzed univariately in the form of frequency distribution tables and bivariately using the Rank-Spearman test and Eta Association.

Results

A. Univariate Analysis

1. Characteristics of Respondents

The following are the characteristics of respondents consisting of gender, age, education level, length of service, and experience in dealing with fires.

Table 1. Characteristics Of Respondents

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	26	27.4
	Female	69	72.6
Age	Maximum	75	79.0
	Minimum	19	21.0
Education Level	Elementary school	30	31.6
	Junior high school	12	12.6
	High school	46	48.4
	Diploma	1	1.1
	Bachelor’s degree	6	6.3
	Master’s degree	0	0
	Doctoral degree	0	0
Work Period	Maximum	50	98.9
	Minimum	1	1.1
Experience in dealing with fires	Yes	2	2.1
	No	93	97.9

Source : Primary Data 2026

Based on the frequency distribution of 95 trader respondents at Karangayu market, the majority were female with a proportion of 72.6%, frequency distribution of age from 95 respondents, the average age was 49 years, with an age range between 19 and 75 years, distribution of respondents' education levels, the majority had a high school education (48.4%), followed by elementary school (31.6%), junior high school (12.6%), bachelor's

degree (6.3%), and diploma (1.1%), distribution of work period of 95 respondents, the average length of selling experience was 16 years, with a range of 1 to 50 years, distribution of experiences from 95 respondents, as many as 97.9% of traders had never experienced in dealing with fires

2. Knowledge

Table 2. Distribution of Respondents' Knowledge of Fire Risk

No.	Question	Correct		Incorrect	
		f	%	f	%
1.	Fire occurs due to the presence of fuel, air (oxygen) and a heat source.	95	100.0	0	0
2.	Fire can occur if there is only a fuel element	1	1.1	94	98.9
3.	Fires can occur due to electrical equipment, cigarettes, friction, sparks and overheated materials	94	98.9	1	1.1
4.	The fire was not caused by human negligence	14	14.7	81	85.3
5.	Storing fuel (gas oil, petrol, diesel, etc.) exposed to the sun can trigger an explosion or fire	92	96.8	3	3.2
6.	It is safe to turn on the stove near electrical cables	9	9.5	86	90.5
7.	Using excessive electrical equipment for a long time does not pose a risk of causing a fire	17	17.9	78	82.1
8.	Smoking in sales areas or enclosed spaces can cause fires	69	72.6	26	27.4
9.	For small fires, such as fires from stoves, they can be extinguished by covering the source of the fire with a wet cloth	95	100.0	0	0
10.	Unplugging electrical equipment when not in use is important to prevent fires	86	90.5	9	9.5
11.	Each kiosk/stall does not need to be equipped with a fuse or electrical safety device	7	7.4	88	92.6
12.	There needs to be an evacuation route and assembly point to save yourself	95	100.0	0	0
13.	Emergency doors must be easily accessible in the event of a fire	93	97.9	2	2.1
14.	The APAR installation must be easy to reach and equipped with an installation sign	95	100.0	0	0
15.	Hydrants need to be placed in open spaces and must be protected with safety covers	95	100.0	0	0
16.	Fire can cause an explosion	89	93.7	6	6.3
17.	The presence of dangerous gases can cause shortness of breath	95	100.0	0	0
18.	Thick smoke from fires does not affect health	1	1.1	94	98.9

Source : Primary Data 2026

Based on the distribution of the knowledge variable, 90.5% of respondents had good knowledge, including knowledge of precautions such as unplugging electrical equipment when not in use.

3. Attitude

Table 3. Distribution of Respondents' Attitudes Towards Fire Risk

No.	Statement	Strongly agree		Agree		Don't agree		Strongly Disagree	
		f	%	f	%	f	%	f	%
1.	I prioritize my safety in the event of a fire	19	20.0	74	77.9	2	2.1	0	0

No.	Statement	Strongly agree		Agree		Don't agree		Strongly Disagree	
		f	%	f	%	f	%	f	%
2.	It is important to know the activities that pose a risk of causing a fire	1	1.1	92	96.8	2	2.1	0	0
3.	It is important to report any conditions or equipment that could cause a fire	1	1.1	94	98.9	0	0	0	0
4.	I feel that messy electrical wiring does not pose a fire risk	0	0	20	21.1	75	78.9	0	0
5.	In my opinion, it is important to check the environmental conditions related to the safety of electrical installations to avoid potential fires	12	12.6	81	85.3	2	2.1	0	0
6.	I don't feel the need to know fire control procedures	0	0	7	7.4	88	92.6	0	0
7.	I feel it is important to learn how to use fire protection equipment	1	1.1	92	96.8	2	2.1	0	0
8.	I support the formation of a fire emergency response team in the market area	0	0	95	100.0	0	0	0	0
9.	I am willing to assist officers in extinguishing fires when a fire occurs if it is safe to do so	0	0	94	98.9	1	1.1	0	0
10.	In my opinion, it is necessary to help officers in providing first aid to victims when a fire occurs	0	0	92	96.8	3	3.2	0	0
11.	In my opinion, it is okay to pile up merchandise on the evacuation route	0	0	7	7.4	88	92.6	0	0
12.	In my opinion, the potential for fire in this market is not a serious problem and there is no need to worry too much	0	0	5	5.3	88	92.6	2	2.1
13.	I support the implementation of strict fire safety systems and procedures in market environments	1	1.1	93	97.9	1	1.1	0	0

No.	Statement	Strongly agree		Agree		Don't agree		Strongly Disagree	
		f	%	f	%	f	%	f	%
14	I remain calm and prioritize safety during a fire emergency	0	0	95	100.0	0	0	0	0
15.	I comply with fire safety regulations as a shared responsibility in the market	0	0	95	100.0	0	0	0	0
16.	I believe that cooperation between traders can minimize the impact of fires	1	1.1	94	98.9	0	0	0	0

Source : Primary Data 2026

Based on the distribution of attitude variables, 97.9% of respondents supported the implementation of fire safety systems and procedures and the formation of emergency response teams, and 98.9% of respondents considered it important to immediately report potential fire hazards.

4. Preparedness

Table 4. Distribution of Respondents' Preparedness for Fire Risk

No.	Question	Appropriate		Not Appropriate	
		f	%	f	%
1.	To prevent electrical short circuits, I will check the condition of the cables and plugs regularly or use the cables even if they are damaged as long as they can still be used	95	100.0	0	0
2.	I place flammable items such as plastic and cloth away from heat and electricity sources or near electrical outlets so they are easier to reach	95	100.0	0	0
3.	My merchandise often blocks the exit route to the kiosk, so I will leave it as it is because the kiosk space is limited or rearrange it so that the evacuation route remains open	93	97.9	2	2.1
4.	In managing the electricity source when selling, I prefer to use an independent electricity source so that there is no buildup of plugs or join with other traders to save more even though the plugs are piled up	88	92.6	7	7.4
5.	When choosing electrical equipment such as power outlets for kiosks, I choose products with safety standards (SNI) or choose the cheapest product, without considering safety standards	94	98.9	1	1.1
6.	I know where the light fire extinguisher (APAR) is in the market area, yes, I know where it is or I don't know where it is	57	60.0	38	40.0
7.	If a fire occurs in the market, I will immediately exit through a safe evacuation route or stay in the stall to secure the merchandise	94	98.9	1	1.1
8.	After leaving the fire area, I will head to a safe assembly point or stand around the location to assess the situation	93	97.9	2	2.1

No.	Question	Appropriate		Not Appropriate	
		f	%	f	%
9.	If the power cord in the kiosk is damaged, I will still use it because it still works or immediately replace it with a new cord	90	94.7	5	5.3
10.	Before leaving the kiosk, I will ensure that all electrical equipment is in a safe condition and has been unplugged or immediately leave the kiosk without checking the condition of the electricity	93	97.9	2	2.1

Source : Primary Data 2026

Based on these results, as many as 97.9% of traders knew the correct action by heading to a gathering point or safe location after leaving the fire area.

B. Bivariate Analysis

Table 5. Bivariate Analysis Results

Independent Variable	Dependent Variable	Significance Value	Eta Value and Correlation Coefficient	Conclusion
Gender	Preparedness	0.961	0.005	Not Related
Age	Preparedness	0.405	-0.086	Not Related
Education level	Preparedness	0.847	-0.020	Not Related
Work Period	Preparedness	0.042	-0.209*	Significant
Experience in dealing with fires	Preparedness	0.591	0.056	Not Related
Knowledge	Preparedness	0.001	0.524**	Significant
Attitude	Preparedness	0.001	0.401**	Significant

Source : Primary Data 2026

From the results of the statistical tests above, it shows that the variables of gender (p=0.961; η + 0.005), age (p=0.405; r=-0.086), education level (p=0.847; r=-0.020), and experience in dealing with fires (p=0.591; r=0.056) do not have a significant relationship with traders' preparedness in facing potential fire risks in the Karangayu market, with a very weak to weak correlation strength. In contrast, work period (p=0.042; r=-0.209) has a significant but weak and negative direction. The variables of knowledge (p=0.0011; r=0.524**) and attitude (p=0.0011; r=0.401**) show a significant relationship with a positive direction and moderate correlation strength, so that both contribute sufficiently to increasing traders' preparedness, although they are still influenced by other factors.

Discussion

The Relationship Between Gender and Preparedness for Potential Fire Hazards. Gender can be a factor influencing preparedness for potential fire risks. However, the results of this study indicate that gender does not have a significant relationship with vendors' preparedness for fire risks. This indicates that the level of preparedness is not determined by biological factors, but rather by an individual's knowledge, experience, and skills. Theoretically, disaster

preparedness is formed through learning, training, and experience, thus being related to social and environmental factors rather than gender. These results also align with previous research by Natasha Amanda, Wiwik Eko Pertiwi, and Henny Kurniati in 2025, which stated that there was no significant relationship between gender and fire emergency preparedness [13]. Therefore, improving preparedness needs to be carried out comprehensively for all vendors, regardless of gender, to optimize their ability to face fire risks.

Next, the Relationship Between Age and Preparedness in Facing Potential Fire Hazards. Age can affect the level of preparedness in facing potential fire hazards. However, the results of the study showed that age has no relationship with preparedness in facing fires. This is in line with research by Yasmita Anis Astari et al. which stated that age does not affect preparedness in facing fires [14]. Although there is another study by I Nyoman Arya A.W in 2020 which shows that there is a significant relationship between older age tends to be more prepared in facing fire emergency situations [15]. As well as research by Shamima Akter in 2025 which shows that there is a significant relationship between age and preparedness in facing fire hazards [16]. With increasing age, a person tends to have the ability to assess danger more realistically and make more appropriate decisions in emergency situations.

The Relationship Between Education Level and Preparedness in Facing Potential Fire Hazards. Education level is believed to play a role in shaping preparedness in facing potential fire hazards. However, the results of the study showed no relationship between education level and fire preparedness. This is in line with research conducted by Mamatha N. and Ajai Chandran CK. They concluded that there is no significant relationship between education and preparedness, and formal education does not always improve preparedness or the ability to act quickly in emergencies [17]. However, this contrasts with research by Lalita Vania Kinasih et al. in 2025, which showed that higher education levels improve preparedness due to increased ability to understand safety information, think critically, and receive instruction and training [18]. Thus, the effect of education on preparedness can still vary depending on field conditions and other supporting factors.

Then, the Relationship Between Length of Service and Preparedness in Facing Potential Fire Hazards. Length of service or the length of time a person has worked can influence the level of preparedness in facing potential fire hazards. The results of the study showed that length of service was significantly related to traders' preparedness in facing fire risks. Traders with longer service periods tended to have better preparedness because they gained more

experience in recognizing danger signs, understanding safety procedures, and taking preventive and initial fire response measures. This finding is in line with research by Jamal et al. in 2025 which stated that there was a significant relationship between length of service and preparedness and that longer service periods increased understanding and ability in facing potential fires [19].

Meanwhile, the Relationship Between Experience and Preparedness in Facing Potential Fire Hazards. Experience is one factor that plays a role in increasing preparedness in facing potential fire risks. However, this study found no significant relationship between experience dealing with fires in the workplace and preparedness. Although theoretically, experience can improve the ability to recognize hazards, understand evacuation, and accelerate preventative measures. This finding is in line with research by Sahrani et al. in 2024, which also showed no relationship between disaster experience and knowledge of disaster preparedness [20]. It is also in line with research by Arkhat Omarbek et al. in 2026, which concluded that there was no significant relationship between experience and readiness to respond to emergency situations [21]. However, this study is inconsistent with research by Diita Eli Wulandari et al., which concluded that there is a relationship between experience and preparedness in facing fire emergencies [22]. Thus, experience is not always a determining factor in preparedness in facing fire risks.

then, the Relationship Between Knowledge and Preparedness in Facing Potential Fire Hazards. The research results indicate a significant relationship between knowledge and preparedness for fire risks among traders at the Karangayu traditional market. This relationship is positive, meaning the higher the traders' knowledge regarding potential fires and fire prevention efforts, the better their preparedness. This finding aligns with previous research conducted by Diana Fauzial Anwar, Sudiono, and Saleh Budi Santoso in 2022, which also found that knowledge is significantly related to preparedness for fire prevention efforts [23]. Therefore, preparedness can be improved by increasing knowledge and information related to fire prevention and response efforts.

Finally, the relationship between attitudes and preparedness for potential fire hazards. Statistical tests showed a significant relationship between traders' attitudes and preparedness for fire risks ($p = 0.001$). This finding aligns with previous research conducted by Dwi Nur Amalia et al. in 2025, which found that the more positive the community's attitude, the higher their preparedness for fire disasters [24]. Theoretically, attitude is an individual's tendency to

act which is still predisposing, so supporting factors are needed such as the availability of facilities and infrastructure as well as support from the surrounding environment so that it can be realized into real preparedness actions.

Conclusion

Based on the results of research on 95 traders in Karangayu Market, Semarang, respondents were predominantly female (72.6%), with an average age of 49 years, 16 years of trading experience, most of whom had a high school/senior high school education (48.4%), and almost all of them had no fire experience (97.9%). Knowledge was classified as good (90.5%) because traders understood fire prevention efforts, attitudes were also positive (98.9%) because they showed high concern for safety, cooperation, hazard reporting, and preparedness for emergencies. Preparedness was also good, indicated by readiness to go to the assembly point during a fire (97.9%). The results of the bivariate test showed a relationship between work period ($p = 0.042$), knowledge ($p = 0.001$), and attitude ($p = 0.001$) with preparedness, while gender ($p = 0.961$), age ($p = 0.405$), education level ($p = 0.847$), and experience in dealing with fires ($p = 0.591$) were not related.

Recommendations

Market managers are expected to immediately improve fire preparedness and infrastructure improvements, such as providing adequate gathering points, installing market plans, and optimizing evacuation routes and emergency stairs. Traders are also expected to increase their vigilance and expand their knowledge of fire prevention. Furthermore, future researchers are expected to expand this study by expanding the scope of the study, using different research methods, and adding other variables for a more comprehensive and in-depth analysis.

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