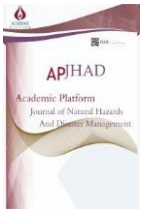

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An Examination of Fire Safety and Awareness in Schools

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Abstract

Fire safety, risk management, and disaster preparedness are fundamental elements in educational institutions. This study aims to evaluate the fire safety awareness level of school personnel working in the Beşikdüzü and Şalpazarı districts of Trabzon, where data was collected from 218 teachers and administrative staff using the standardized Fire Awareness Scale. The quantitative survey study revealed that while participants demonstrated high overall awareness (mean=4.04/5) with particularly strong performance in theoretical dimensions such as risk awareness and the importance of training, significant practical deficiencies were identified in the confidence dimension, which recorded the lowest scores. Statistical analyses using Independent Samples T-Test and ANOVA showed that gender, education level, and professional role created significant differences in awareness levels, whereas age did not show significant impact. The research also highlighted infrastructure-related concerns regarding equipment maintenance and escape route markings in some schools. These findings emphasize the necessity of moving beyond theoretical training to implement regular, practical drills and scenario-based exercises to enhance response confidence. The study provides evidence-based recommendations for policymakers and school administrators to develop targeted training programs and strengthen institutional safety protocols, ultimately contributing to the development of a comprehensive fire safety culture in educational institutions.

Key words: Fire safety awareness, School personnel, Disaster preparedness, Emergency response, Educational institutions

1. Introduction

Educational institutions are critical environments where students spend a significant portion of their time, necessitating the provision of a secure setting that supports not only their academic development but also their physical and psychological well-being. In this context, a fundamental prerequisite for quality education is the establishment of a safe learning environment, protected against all types of risks, including natural disasters and human-induced emergencies. Indeed, UNICEF [1] emphasizes that school safety is of paramount importance at all levels and that management must consistently internalize this responsibility.

However, the current situation in Turkey unfortunately falls short of these ideal conditions. Children and young people, who constitute the future workforce, may face various dangers in the schools where they pursue their education; unhealthy and unsafe conditions in these environments, which host over a million individuals, can lead to accidents, illnesses, and even loss of life [2]. Within this broad spectrum of risks, one of the threats with the most devastating

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potential is undoubtedly the risk of fire.

The severity of the fire hazard is clearly evidenced by historical incidents. School fires, such as those in Shinabad village, Iran, or Ibadan, Nigeria, which claimed the lives of dozens of students and teachers, demonstrate that the problem is borderless and global in nature [3], [4]. An examination of the underlying causes of these tragedies reveals structural factors, such as substandard heating systems and the improper use of flammable materials [5], alongside technical failures.

In fact, the root causes of fires often lie not in technical issues but in human factors. Negligence, lack of knowledge, and inadequate training frequently emerge as the primary, preventable causes of fires in schools. Studies conducted in Turkey support this assertion, highlighting the prevalent role of improper use of heating appliances, unsafe electrical installations, and a lack of routine inspections [6], [7]. A tragic manifestation of these general findings is the 2016 dormitory fire in Aladağ, Adana, which resulted in the deaths of 11 students and one staff member. This incident starkly exposed serious deficiencies in infrastructure and institutional preparedness, including non-functional fire exits, locked doors, and limited fire safety knowledge among personnel [8].

Particularly considering that the target audience consists of children and young people, these risks become even more severe. Students, recognized as one of the most vulnerable groups in society, are at greater risk during emergencies like fires due to their lack of experience and tendency to panic. According to Rezabeigi et al. [9] students under the age of 14 are more susceptible to burn injuries and, consequently, death. Therefore, effective fire safety education and awareness are critically important, as the impact of fire disasters largely depends on the behavior of the building's occupants [10].

What, then, should an effective fire safety system entail? According to Ayonga [11], such a system must include not only physical measures like fire alarms and extinguishing equipment but also regular drills and comprehensive emergency response plans. These measures are not merely a legal obligation [12] but are also crucial for ensuring educational continuity and enhancing community resilience [10]. Crucially, awareness and preparation stand as the most effective non-structural tools for mitigating fire risks. Fire safety education, particularly for school staff who act as first-line responders in such incidents, constitutes a key component of building institutional resilience. Effective training programs should extend beyond the technical use of fire extinguishers and alarms to encompass risk perception, decision-making under pressure, and clear role assignment during evacuation procedures [13]. However, alignment between regulations and implementation cannot always be assumed. Indeed, although the Turkish Ministry of National Education (MoNE) has introduced regulatory measures, including regular fire drills and risk assessment protocols, evidence suggests that the frequency, consistency, and practical effectiveness of these measures vary significantly across regions and institutions [14]. For instance, a study by Özmen et al. [15] revealed that despite millions of students participating in drills annually, knowledge retention and correct behavior in a real emergency remained inadequate.

The administrative structure in Turkey also reflects the challenges in this area. Work related to disaster and emergency planning is carried out by the Directorate General of Support Services within the MoNE and the Civil Defense units in provincial directorates. However, as noted by Özmen [15], the activities of these units appear to be more focused on occupational health and safety and civil defense, and they are not directly mandated for comprehensive, education-

specific disaster and emergency management.

In conclusion, establishing a safe environment in schools necessitates great emphasis on fire safety, infrastructure improvements, and regular audits. As emphasized by Uçan et al. [16], preventive measures such as establishing emergency plans and providing staff training will not only prevent accidents but also enhance the quality of education, thereby contributing to the safe upbringing of the young people who shape the future of the nation.

While existing literature on fire safety in schools, both in Turkey and internationally, has predominantly focused on structural measures, compliance with regulations, and the technical aspects of fire prevention systems [15], [17] - [18], there remains a significant research gap concerning the human factor specifically, the comprehensive assessment of fire safety awareness among school personnel. Many studies have evaluated physical infrastructure or student-focused drills, but few have employed validated scales to quantitatively measure the multifaceted awareness levels of teachers and administrators, who are the first responders in any school-based emergency. Furthermore, within the Turkish context, research examining how factors such as gender, professional role, and education level correlate with different dimensions of fire awareness (e.g., self-confidence, risk perception, and attitudes towards training) is notably limited. This study aims to address this gap by utilizing the validated 'Fire Awareness Scale' [13] to provide a holistic and nuanced analysis of fire safety awareness among school staff in the Beşikdüzü and Şalpazarı districts, thereby contributing empirical data to inform more targeted and effective training and policy interventions.

Against this background, the present study aims to investigate the level of fire safety awareness among school staff in Beşikdüzü and Şalpazarı districts of Trabzon province, Turkey. Specifically, this research is guided by the following questions:

- What is the overall level of fire safety awareness among school staff, and what are their awareness levels in the specific sub-dimensions of risk awareness, precautionary behavior, and intervention-response awareness?
- To what extent do demographic and professional factors (such as gender, age, marital status, education level, position, and years of experience) influence fire safety awareness levels?
- Does previous participation in fire safety training have a significant effect on the fire safety awareness levels of school staff?

To address these questions, this study employs the validated "Fire Awareness Scale" developed by Çap et al. [14], which assesses three key dimensions: personal risk perception, institutional preparedness, and behavioral response capacity. By highlighting current strengths and gaps, this study aims to inform local policymakers and education authorities about areas where training, investment, or regulatory revision may be required. Furthermore, the study contributes to the growing body of national and international literature on school safety, disaster preparedness, and occupational health in educational settings.

2. Materials and Method

2.1. Research Design

This study used a descriptive quantitative research design to assess the level of fire safety awareness of school staff. The aim was to investigate knowledge, attitudes and behaviors

related to fire safety in educational institutions. The study was designed as a cross-sectional survey in which data was collected using a standardized measurement instrument administered to participants at a single point in time.

2.2. Study Area and Population

The study was conducted in the Beşikdüzü and Şalpazarı districts of Trabzon province, which is located in the eastern Black Sea region of Turkey. These districts were selected for the researchers due to their diverse school infrastructure and accessibility. The study population consisted of teachers and administrators working in public schools in these two districts. A total of 218 participants were included in the sample. Inclusion criteria required that participants be actively employed in a school setting and volunteer to participate. The sample was randomly selected, taking into account logistical and time constraints.

2.3. Sample and Sampling Technique

A total of 218 school staff participated in the study. The sample was selected using a random sampling method, subject to logistical constraints and voluntary participation. With a confidence level of 95% and a margin of error of 5%, this sample size is considered representative of the target population. All participants were actively employed in a school setting and volunteered to take part in the study.

2.4. Data Collection Instrument

Data was collected using a two-part questionnaire:

- Part 1 - Demographic Information Form: This section, developed by the researchers, contained 17 questions to gather data on participants' gender, age, marital status, education level, school level, position, total professional experience, and prior fire safety training.
- Part 2 - The Fire Awareness Scale: The validated and reliable "Fire Awareness Scale" developed by Çap et al. [14] was used to measure the primary outcomes. The scale consists of 31 items rated on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). It is structured into six sub-dimensions:
    - Fire Risk Awareness (7 items)
    - Self-Confidence (7 items)
    - Perception of Fire Training (4 items)
    - Loss Awareness (4 items)
    - Awareness of Refresher Training and Drills (5 items)
    - Equipment Maintenance-Attitude Awareness (4 items)

  The scale has a reported high internal consistency, with a Cronbach's Alpha value of 0.89 in its original development.

2.5. Data Collection Procedure

Data collection was carried out in January 2024. Following ethical approvals from the Trabzon University Scientific Research and Publication Ethics Board and the Trabzon Provincial Directorate of National Education, the questionnaires were distributed in printed form. Participants were informed about the purpose and voluntary nature of the study, and anonymity and confidentiality were assured. The questionnaires were completed anonymously in teachers' rooms and meeting rooms during working hours.

2.6. Data Analysis

The collected data was analyzed using IBM SPSS Statistics 25.0 software. The analysis involved both descriptive and inferential statistics:

- Descriptive Statistics: Frequencies, percentages, means, and standard deviations were used to summarize the demographic characteristics of the participants and their scores on the Fire Awareness Scale and its sub-dimensions.
- Reliability Analysis: The internal consistency reliability of the Fire Awareness Scale for this specific sample was confirmed by calculating Cronbach's Alpha coefficient.
- Inferential Statistics: To examine the differences in awareness levels based on demographic variables, Independent Samples t-tests were used for binary variables (e.g., gender, marital status), and One-Way Analysis of Variance (ANOVA) was applied for variables with more than two categories (e.g., age groups, position). The normality of the data distribution was assessed prior to these analyses using skewness and kurtosis values, confirming the suitability of parametric tests. A p-value of less than 0.05 ($p < 0.05$) was considered statistically significant for all inferential analyses.

3. Results

The results can be divided into three main categories based on the measurement instruments and methods used. First, the socio-demographic characteristics of the participants (including age, gender, education level and work experience) were analysed. This data contributed to a better understanding of the main findings by outlining the general profile of the participants. Secondly, the results of the tests and questionnaires conducted as part of the study were presented. In these analyses, the effects of the independent variables on the dependent variables were statistically evaluated, focusing on the results that were significant at the $p<0.05$ level. The results were discussed in relation to the theoretical framework. Third and finally, analyses were conducted on the reliability of the measurement instruments used in the study. In this context, internal consistency coefficients such as Cronbach’s alpha were calculated for the questionnaires and tests. The high reliability coefficients obtained are a strong indicator of the validity and generalizability of the results. All in all, these results support the scientific accuracy and reliability of the study.

3.1. Participant Demographics

Of the participants who responded to the scale as part of the study, 50.5% were female and 49.5% were male. Analysis of the age distribution revealed that the majority of participants (68.3%) were 37 years and older, followed by 21.1% between 31 and 36 years, 6.4% between 26 and 30 years, and 4.1% between 21 and 25 years. These results indicate that the participant group consisted predominantly of people in older age cohorts. In terms of marital status, 78.4% of participants were married, while 21.6% were single. In terms of educational background, 84.9% had a bachelor's degree and 15.1% had a master's degree, indicating that the sample consisted predominantly of individuals with higher educational qualifications.

Regarding the school levels in which the participants were employed, 46.3% worked in high schools, 23.9% in middle schools, 19.3% in elementary schools and 10.6% in kindergartens. In terms of institutional role, 85.8% of participants were teachers, 5% were head teachers, 4.6% were deputy head teachers and 4.6% were administrators. An analysis of work experience

revealed that 9.6% of participants had 1–3 years of experience, 4.1% had 4–6 years, 12.8% had 7–9 years, and 73.4% had 10 years or more. These results suggest that a significant proportion of the sample had considerable work experience. The general demographic characteristics of the participants are shown in Table 1.

Table 1. Demographic Data

Variable	Categories	Frequency	Percentage (%)
Gender	Male	108	49.5
	Female	110	50.5
Age	21–25	9	4.1
	26–30	14	6.4
	31–36	46	21.1
	37+	149	68.3
Marital Status	Married	171	78.4
	Single	47	21.6
Educational Level	Bachelor's Degree	185	84.9
	Master's Degree	33	15.1
School Level	Preschool	23	10.6
	Primary School	42	19.3
	Middle School	52	23.9
	High School	101	46.3
Position	Principal	11	5.0
	Vice Principal	10	4.6
	Teacher	187	85.8
	Civil Servant	10	4.6
Total Professional Experience	1–3 years	21	9.6
	4–6 years	9	4.1
	7–9 years	28	12.8
	10 years or more	160	73.4

An analysis of the participants' level of knowledge and awareness of fire safety revealed several significant trends. The vast majority of participants (97.2%) agreed that every student should know what actions should and should not be taken in a fire emergency. Similarly, 98.2% indicated that students should be trained to monitor fire safety measures. These results indicate a high level of awareness among participants of the need for fire safety education. However, lower awareness was found in areas requiring practical or technical knowledge. Only 57.3% of participants reported being familiar with fire safety instructions recommended by a national or international authority, indicating a lack of awareness of official fire safety protocols and documents.

In addition, 50.0% of respondents reported familiarity with the fire triangle and its components, indicating an even split between those who have this basic fire safety knowledge and those who lack it. While 73.4% of participants said they knew about different types of fire, 78.4% said they knew about fire extinguishers. These results suggest that while participants have a relatively high level of knowledge regarding fire types and firefighting equipment, there are significant gaps in their understanding of basic fire safety concepts and standard operating procedures. These results are shown in Table 2.

Table 2. Participants' Knowledge Levels

Variable	Categories	Frequency	Percentage (%)
Every student should know what to do and what not to do during a fire	Yes	212	97.2
	No	6	2.8
Every student should be trained in monitoring fire prevention measures	Yes	214	98.2
	No	4	1.8
Do you know any fire instruction recommended by a national or international institution?	Yes	125	57.3
	No	93	42.7
Do you know the fire triangle and its components?	Yes	109	50.0
	No	109	50.0
Do you have any knowledge about fire types?	Yes	160	73.4
	No	58	26.6
Do you have knowledge about fire extinguishers?	Yes	171	78.4
	No	47	21.6

3.2. Findings on Fire Awareness Levels

The Fire Awareness Scale is a multidimensional instrument that can be used to assess participants' knowledge, attitudes and behavior with regard to fire safety. The scale comprises six sub-dimensions: Self-Confidence, Awareness of Refresher Training and Drills, Awareness of Equipment Maintenance, Awareness of Fire Risks, Awareness of Fire Safety Education and Awareness of Accidents. These dimensions provide a comprehensive assessment of individual fire safety awareness. In this study, participants' mean scores for each sub-dimension of the fire safety awareness scale were analyzed. The results showed that the sub-dimensions "awareness of fire safety education" and "awareness of refresher training and drills" had higher mean scores compared to the other dimensions. This indicates that the participants attach great importance to fire safety education and have a high awareness of the need for refresher training and practical exercises. In contrast, the sub-dimension "self-confidence" achieved the lowest average score among the participants.

This finding indicates that people rate their self-efficacy in responding to fire disasters as relatively low, which underscores the need for targeted training aimed at boosting self-confidence in fire-related emergency situations. Overall, the data suggests that while certain aspects of fire awareness are well understood, there is a clear need to improve awareness of individual response skills. This underscores the importance of integrating not only theoretical knowledge but also practical application and confidence-building components into disaster and emergency training programs. These results are presented in Table 3.

Table 3. Average Values of Subgroups of Fire Awareness Scale

Subgroup	N	Mean	Standard Deviation
Fire Risk Awareness	218	3.69	0.63
Self-confidence	218	3.47	0.67
View on Fire Training	218	4.55	0.52
Awareness of Loss	218	4.43	0.57
Awareness of Training Refreshment and Drills	218	4.49	0.48
Equipment Maintenance-Attitude Awareness	218	4.21	0.59

Participants' views on fire awareness showed a high level of awareness in different sub-dimensions. In terms of fire risk Awareness, participants showed a strong awareness of the likelihood of fires in occupational and everyday contexts, while they showed a lower awareness of less common causes such as terrorist attacks. In terms of Self-Confidence, participants reported high confidence in ensuring their own personal safety, but showed lower awareness of the adequacy of training and their willingness to take an active role in firefighting teams. In the

perception of fire safety education sub-dimension, participants clearly recognised the importance of fire safety education. A high level of awareness of the cost-effectiveness of preventive measures before fires break out was also noted in the awareness of accidents dimension.

Conversely, lower awareness was reported in the dimension of awareness of refresher training and drills, particularly in relation to the importance of conducting fire drills. While overall awareness of equipment maintenance was rated high, the results suggest that more attention should be paid to regular maintenance of firefighting equipment and conducting fire drills. In general, the results suggest that participants have a high level of awareness of fire risks and training, but there is room for improvement in areas such as continuity of training and participation in practical exercises.

Statistical analyses revealed significant differences between participants' gender and the sub-dimensions of self-confidence, perception of fire safety education and awareness of equipment maintenance at a level of $p \leq 0.05$. These results indicate that gender has a statistically significant influence on these specific sub-dimensions. However, no significant differences were found between gender and the sub-dimensions awareness of fire risks, awareness of accidents or awareness of refresher training and exercises. These results suggest that gender influences certain aspects of fire safety awareness, but not all dimensions. These results are presented in Table 4.

Table 4. Findings Related to Sub-Factors and Gender

Sub-Factor	Statement	Gender	N	Mean	p
Self-Confidence	I can stay calm in case of a fire	Female	110	3.15	0.001
		Male	108	3.88	
	I can ensure my own safety in a fire	Female	110	3.47	0.001
		Male	108	4.04	
	I can assist others calmly in a fire	Female	110	3.35	0.001
		Male	108	3.85	
	I can escape from my working area blindly	Female	110	3.26	0.001
		Male	108	3.80	
Fire Training Perception	The training I received is sufficient for fire fighting	Female	110	2.75	0.001
		Male	108	3.26	
	I can use portable fire extinguishers correctly	Female	110	3.20	0.001
		Male	108	3.99	
	Fire training makes it easier to intervene in a fire	Female	110	4.52	0.014
		Male	108	4.71	
	Fire training prevents possible loss of life	Female	110	4.50	0.005
		Male	108	4.72	
	Fire training reduces potential material damage	Female	110	4.46	0.013
		Male	108	4.67	
Equipment Maintenance-Attitude Awareness	Fire equipment in my workplace is regularly checked	Female	110	3.97	0.025
		Male	108	4.23	
	Marking signs on escape routes in my workplace are continuously checked	Female	110	3.74	0.012
		Male	108	4.06	

The analyses revealed significant gender differences in relation to certain items within the sub-dimensions. In particular, female participants reported lower levels of awareness for the statement "I can stay calm in a fire" compared to male participants Female participants also showed lower levels of confidence for the statement "The training I have received is sufficient to deal with a fire". These results suggest that female participants have a lower level of awareness and perceived self-efficacy in relation to fire-related training and personal safety during fire disasters. In contrast, the male participants showed a higher level of awareness in

the sub-dimension perception of fire safety education. This suggests that male participants are more aware of the importance of fire safety education and are more likely to believe that such education contributes to effective firefighting. Overall, these results highlight the influence of gender on fire safety awareness and show clear differences between male and female participants in certain areas.

Statistical analyses revealed a significant difference between participants' marital status and the perception of fire safety education sub-dimension at a level of $p \leq 0.05$. In particular, married participants showed a higher level of awareness in relation to the statements "All employees in my workplace should receive fire safety training"," "Fire safety training can prevent loss of life" and "Fire safety training can reduce potential property damage" These results suggest that married individuals have a greater awareness of the importance of fire safety training and are more likely to view it as an effective preventative measure to reduce personal injury and property damage. These results are shown in Table 5.

Table 5. Findings Related to Sub-Factors and Marital Status

Sub-Factor	Statement	Marital Status	N	Mean	p
Fire Training Perception	All employees in my workplace should receive fire training	Married	171	4.47	0.016
		Single	47	4.19	
	Fire training prevents possible loss of life	Married	171	4.68	0.006
		Single	47	4.36	
	Fire training reduces potential material damage	Married	171	4.61	0.043
		Single	47	4.38	

Statistical analyses revealed a significant difference between participants' marital status and the perception of fire safety education sub-dimension at a level of $p \leq 0.05$. In particular, married participants showed a higher level of awareness in relation to the statements "All employees in my workplace should receive fire safety training"," "Fire safety training can prevent loss of life" and "Fire safety training can reduce potential property damage" These results suggest that married individuals have a greater awareness of the importance of fire safety training and are more likely to view it as an effective preventative measure to reduce personal injury and property damage. These results are shown in Table 5.

A more detailed investigation revealed that participants with a master's degree showed higher awareness in relation to the statements "A student-related fire could occur in my workplace"," "I believe my workplace is at risk of fire" and "Taking preventive measures is easier than putting out a fire" These results suggest that individuals with a graduate degree have a higher awareness of fire risks and potential casualties.

In contrast, a higher awareness of the statements "The fire safety equipment in my workplace is checked regularly" and "The escape route signage in my workplace is routinely checked" was observed among bachelor graduates. In this suggests that participants with a bachelor's degree place more importance on the maintenance and inspection of fire safety equipment and therefore show a higher awareness in this area. These results show that the level of education affects the awareness of fire safety differently in the various sub-dimensions, with awareness varying depending on the academic background of the participants.

In addition, statistically significant differences were found in the sub-dimension equipment maintenance - attitude awareness depending on the position of the participants ($F=3.643$; $p<0.05$). The analysis showed that deputy head teachers ($M=4.62$) had a significantly higher

awareness in this sub-dimension than teachers (M=4.16). This suggests that job role may have an impact on individuals' awareness of fire safety and equipment maintenance. The detailed content is shown in Table 6.

Table 6. Findings Related to Sub-Factors and Education Level

Sub-Factor	Statement	Education Level	N	Mean	p
Loss Awareness	There may be a fire caused by students in my workplace.	Bachelor's	185	3,90	0,010
		Master's	33	4,36	
	I think my workplace is at risk for fire.	Bachelor's	185	2,51	0,011
		Master's	33	3,00	
	It is easier to take fire prevention measures than to extinguish a fire.	Bachelor's	185	4,51	0,017
		Master's	33	4,76	
	The cost of fire prevention measures is lower than the damage a fire can cause.	Bachelor's	185	4,52	0,025
		Master's	33	4,76	
Equipment Maintenance-Attitude Awareness	The fire equipment in my workplace is regularly checked.	Bachelor's	185	4,18	0,001
		Master's	33	3,64	
	If fire equipment in my workplace requires repair or replacement, it is done immediately.	Bachelor's	185	4,11	0,032
		Master's	33	3,70	
	The marking signs on escape routes in my workplace are constantly checked.	Bachelor's	185	3,96	0,021
		Master's	33	3,55	

4. Discussion

The results of this study suggest that school staff in Beşikdüzü and Şalpazarı districts have a relatively high awareness of fire safety, with a mean overall score of 122.76 out of 150. This level of knowledge is promising, especially given that almost 71% of participants had previously received fire safety training. However, the study also revealed critical gaps in practical preparation, particularly for those without training or with fewer years of professional experience.

The high score in the risk awareness sub-dimension (mean = 50.44 out of 60) indicates that participants have a solid theoretical understanding of the dangers posed by fire, such as rapid spread, high temperatures and the risk of fatalities in crowded schools. This finding is in line with previous research by Pooley et al. [13], who found that teachers in Turkey generally have a strong cognitive understanding of disaster risks, especially after high-profile national tragedies such as the Aladağ dormitory fire in 2016.

However, in terms of precautionary behavior and implementation, the study found a slight decrease in scores (mean = 45.65 out of 55). While participants indicated that they were aware of fire extinguishers and evacuation plans, some reported that they were unsure whether these resources were maintained and visible. This finding is consistent with Gönüllüoğlu [17], who emphasized that although fire safety equipment is present in educational institutions, it is often ineffective in emergencies due to a lack of inspections and hands-on training.

One of the most striking results was found in the sub-dimension "Awareness of interventions and reactions". Although the mean score (26.67 out of 35) was still relatively high, it indicated lower confidence in active firefighting. The comparative analysis further scenarios. These results echo the findings of Hassanain [18], whose study of Saudi Arabian schools found that staff were often not trained in evacuation management and emergency communication, despite being aware of the importance of such measuresunderpinned the importance of training.

Participants who had previously received fire safety education performed significantly better

than those who had not, confirming the conclusions of Smith et al. [19] and Çap et al. [14], who emphasized that experiential and repetitive training improves both knowledge retention and behavior in crisis situations. The results also show that work experience plays an important role in preparedness, with respondents with 6–10 years of work experience performing significantly better than their less experienced counterparts. This pattern could be due to more exposure to institutional policies and previous emergency drills over time.

Interestingly, no significant differences were found in terms of gender or age. This is in line with the findings of Mutiso et al. [20] who reported that demographic variables such as gender were not reliable predictors of fire preparedness in public schools in Kenya. Instead, the frequency of training and institutional enforcement of safety guidelines were the most important factors.

Despite the promising level of awareness, qualitative observations collected during the study raised concerns about blocked emergency exits, irregular drills, and the lack of up-to-date signage in some schools. These issues have been similarly described in the literature, such as in the studies by Kahraman et al. [21], which highlighted that rural schools in Turkey often suffer from infrastructural limitations that affect safety preparedness.

In summary, while the results of this study are encouraging in terms of general awareness, they also highlight critical gaps in applied fire safety measures, particularly in the areas of equipment maintenance, practical training and confidence in emergency leadership. The study confirms that prior training is the most influential factor in improving the preparedness of school staff to effectively manage fire emergencies.

4.1. Study Limitations and Future Research

While this study provides valuable insights into the fire safety awareness of school staff, several limitations should be considered when interpreting its results. The study was conducted with 218 participants from two districts in Trabzon province, and although the sample size is adequate for the analyses performed, the findings may not be fully generalizable to all school staff in Turkey, particularly those in different geographic or socio-economic contexts. This study employed a cross-sectional design, which provides a snapshot of awareness levels at a single point in time but cannot establish causal relationships or track changes in awareness over time, indicating a need for longitudinal studies to observe long-term effects. Furthermore, the data relied on self-reported measures from the Fire Awareness Scale, which, while validated, can be subject to social desirability bias, where participants might overreport their awareness rather than their actual practices. The study also has a theoretical scope that primarily focuses on individual awareness and preparedness, without extensively exploring broader organizational, cultural, or economic factors that may significantly impact overall fire safety in schools. Finally, the method of data collection, which was via paper-based questionnaires in school settings, might have influenced the responses due to the environment and a potential lack of anonymity if participants had concerns.

Future studies could address these limitations by employing a larger and more diverse sample from multiple regions of Turkey to enhance the generalizability of the findings. Furthermore, utilizing a mixed-methods approach that combines surveys with observational data or interviews would help triangulate the self-reported findings, mitigate social desirability bias, and provide deeper qualitative insights. It would also be beneficial to investigate the role of institutional factors such as policies, safety budgets, and leadership in shaping effective fire

safety cultures within schools. Finally, conducting experimental or longitudinal studies would be a valuable next step to measure the causal impact of different training methodologies on the long-term retention of practical skills and staff confidence.

5. Conclusions

This study aimed to evaluate the fire safety awareness levels of school staff in Beşikdüzü and Şalpazarı districts of Trabzon province, focusing on three key dimensions: risk awareness, precautionary behavior, and intervention-response awareness. The findings have shown that school staff in these districts generally have a high awareness of fire safety. While cognitive knowledge of fire hazards was strong among participants, practical aspects (such as confidence in emergency response and familiarity with fire safety equipment) showed moderate differences, especially among those with no prior training or fewer years of experience.

The results confirmed that prior fire safety training has a statistically significant positive effect on levels of awareness, highlighting the need for structured, regular training programs in schools. Furthermore, the significant differences as a function of work experience underscore the importance of institutional exposure and reinforcement over time.

Although gender and age did not emerge as significant differentiators, the study revealed infrastructural and procedural deficiencies that require immediate attention, such as emergency signage, availability of equipment and regular fire drills. These findings suggest that fire safety in schools must not rely solely on individual awareness, but must be institutionalized through planning, training and provision of resources.

In summary, this research provides a valuable insight into the state of fire safety provision in Turkish schools and highlights the need for a multi-layered strategy that includes education, infrastructure, policy enforcement and regular evaluation. Strengthening these components will not only increase the safety of school staff and students, but also the resilience of educational institutions in emergency situations.

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Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Author Contribution

L.O. conceived the study, developed the methodology, and carried out the formal analysis. L.O. also led the project administration and wrote the original draft of the manuscript. L.O. and G.A. contributed to the conceptualization and writing of the manuscript. G.A. and F.Y. participated in drafting and reviewing the manuscript. F.Y. also contributed to the development of methodology.

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