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# Impact of Fire Safety Awareness on Fire Safety Management Performance at International Airports in Kenya

**Philip Otieno[1], Charles Muiruri Mburu[2], Benson Karanja[3]**

[1]Philip Otieno, Student, Institute of Energy and Environmental Technology, Jomo Kenyatta University of Agriculture and Technology, Kenya

[2]Dr. Charles Muiruri Mburu, Senior Research Fellow, Institute of Energy and Environmental Technology, Jomo Kenyatta University of Agriculture and Technology, Kenya

[3]Dr. Benson Karanja, Senior Research Fellow, Institute of Energy and Environmental Technology, Jomo Kenyatta University of Agriculture, Kenya

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## Abstract

**Purpose:** Fire outbreaks are global hazard with a potential to cause injuries, loss of life and damage to properties. To mitigate against these fires, fire safety awareness which encompasses educating personnel on fire causes, prevention strategies, proper use of firefighting equipment, and evacuation procedures should be provided to employees and management during the design and construction phases of a building. This study assessed fire safety awareness among management and employees and examined the extent to which fire safety awareness influenced the overall performance of fire safety management at international airports in Kenya.

**Materials and Methods:** The study adopted a cross-sectional descriptive survey, involving 310 employees and 169 Management respectively at International airports in Kenya. It involved use of questionnaires and observation to collect data from respondents, analysis and presentation of the data in a descriptive and inferential statistics.

**Findings:** Linear regression coefficients showed strong negative relationship between fire safety awareness and obstacle to implementation of fire safety management. The prediction factor was -0.67, $p<0.05$; showing that a unit increase in fire safety awareness predicted a decrease of 0.67 units of hindrance in fire safety management implementation. The null hypothesis, failed in favour of the alternative hypothesis.

**Unique Contribution to Theory, Practice and Policy:** This study was supported by Knowledge Attitude Practice (KAP) model which demonstrates that increased awareness directly influences attitudes and behaviours which improves fire safety management performance. In addition, the study contributes to High Reliability Organization (HRO) theory by highlighting the role of continuous learning and situational awareness in maintaining resilience in complex, safety-critical operations areas such as airports. The study concluded that lack of fire safety awareness among employees and management had impact on the performance of fire safety management in the study areas and recommended training of employees and management on fire safety to enhance their knowledge on use and operations of fire protection systems, fire hazard identification and evacuation procedures, inclusion of fire safety training in the induction program for the newly employed as well as regular fire safety refresher training for all.

**Keyword**: *Impact, Fire Safety Awareness, Fire Safety Management Performance, International Airports, Kenya*

**JEL Code:** ***K32:*** *Energy, Environmental, Health and Safety Laws*

## INTRODUCTION

Fire safety is concerned with prevention of fire outbreaks and mitigation of their consequences through appropriate building design, construction, and operational management. It encompasses occupant training, provision of adequate and reliable fire protection equipment, adequate and unobstructed means of escape, routine and timely maintenance of fire protection systems, and promotion of fire safety awareness among occupants (Onyekwere, 2022; Kodur *et al.,* 2020). Effective fire safety measures must align with the facility's intended use and occupancy characteristics (Glasgow Caledonian University, 2020) and depend on understanding of fire protection system functionality, inspection, testing, and maintenance requirements (Zhang *et al.,* 2022).

Fire safety awareness refers to the extent to which individuals recognize fire hazards, understand associated risks, and respond appropriately within their work environment (Lawal *et al.,* 2023). This includes knowledge of emergency procedures, competence in the use of firefighting equipment, and the ability to take timely and appropriate action during fire incidents (Zhang *et al.,* 2022). Fire safety management performance, in contrast, reflects the effectiveness of organizational fire safety arrangements, including planning, implementation, monitoring, system maintenance, regulatory compliance, and emergency response capability (FEMA, 2019). While both concepts are integral to safety outcomes, their interaction remains underexplored in complex, high-risk operational environments such as airports.

Personnel training is consistently identified as a critical determinant of fire safety management performance. Continuous and structured training enhances hazard recognition, preventive behavior, and effective emergency response (Alao *et al.,* 2021; Omunagbe & Kaseem, 2023). Conversely, training deficiencies manifested through inadequate drills, limited system familiarity, and weak procedural knowledge have been linked to delayed response, operational errors, and ineffective use of fire protection systems in aviation environments (ICAO Annex 14 volume 1, 2022). Such shortcomings weaken individual fire safety awareness and, by extension, compromise organizational fire safety management performance.

This study is grounded on Reason's Swiss Cheese Model of Accident Causation (Reason, 1997), which conceptualizes accidents as the result of aligned latent organizational weaknesses and active human failures. In airport contexts, inadequate fire safety awareness among personnel represents a latent vulnerability. When combined with systemic deficiencies such as poorly maintained or unserviceable fire protection systems; the likelihood of failure in fire safety management performance increases, heightening the risk of severe fire outcomes.

Airports are inherently high-risk fire environments due to numerous potential hazards which include mixed use and occupancies, uneven distribution of occupant density, high fuel load and a considerable number of passengers with different mental and physical abilities almost every day irrespective of time, carrying combustible loads in the form of luggage (O' Connor, 2020). These inherent hazards are compounded by operational challenges such as delayed evacuation, weak emergency coordination, and limited familiarity with firefighting systems, all of which undermine effective fire safety management (Apostolopoulos *et al.,* 2020).

Globally, airports have not been exempt from fire disasters. In Europe, for instance, fires at Dusseldorf Airport in 1996 claimed 17 lives and injured 62 people, with other notable incidents occurring at Fiumicino Airport (2015), Alicante Airport (2020), and Catania Airport (2023) (Szeto, 2022). Similarly, in Asia, Hong Kong International Airport experienced fires at its air cargo terminal in November 2017 and at Terminal 1 in December 2017 (Szeto, 2022). These major fire incidences demonstrate the persistent vulnerability of airport infrastructure to fire

events and the potential for extensive operational disruption (Szeto, 2022). In Kenya, similar risks have materialized in significant property damage and prolonged airport closures. Between 2014 and 2022, fire-related losses were estimated at approximately USD 600,000, with major incidents reported at Jomo Kenyatta International Airport and Moi International Airport (Ongoro & Muiya, 2023; Berre, 2023). These incidents highlight persistent gaps in fire safety preparedness and the need for performance-oriented fire safety management systems aligned with international aviation standards.

Accordingly, this study examines the relationship between fire safety awareness and fire safety management performance in airport environments, with a specific focus on Kenyan international airports. By linking individual-level knowledge and behavior to organizational safety outcomes, the study seeks to provide evidence to support targeted training interventions, improved system maintenance, and strengthened operational protocols aimed at enhancing airport fire safety and regulatory compliance.

**Statement of the Problem**

Fire safety is a critical component of aviation safety, encompassing the design, installation, and maintenance of fire protection systems, personnel training, emergency preparedness, and regulatory compliance (Onyekwere, 2022; Kodur *et al.*, 2020). The Kenyan Government and the International Civil Aviation Organization (ICAO), through the Fire Risk Reduction Rules (FRRR, 2007) and ICAO Annex 14 Volume 1(2022), mandate that occupiers establish and maintain high standards of fire safety in workplaces, including airport facilities. These frameworks prescribe requirements for fire protection systems, emergency planning, and the promotion of fire safety awareness among personnel, aiming to safeguard life, infrastructure, and continuity of airport operations. Despite these regulations, fire incidents continue to occur, and hazards such as unevenly distributed fire loads, high fuel densities persist, often due to non-compliance by occupiers, including inadequate provision or untimely maintenance of fire protection systems, as well as insufficient fire safety awareness among building occupants (O'Connor, 2020; Lehna *et al*., 2024).

Documented compliance gaps in Kenyan airports include inadequate integration of safety practices and emergency mechanisms at Jomo Kenyatta International Airport (Wambugu, 2016), limited policy frameworks and poor inter-agency coordination at Wilson Airport (Nambuya, 2021), and constrained safety oversight due to weak regulatory enforcement and limited stakeholder engagement at Jomo Kenyatta International Airport (Kinyua, 2020).

It is in this background, that this research was undertaken to investigates the relationship between fire safety awareness and fire safety management performance at Kenyan international airports to provide evidence-based insights into how individual-level awareness and organizational practices influence operational readiness, emergency response, and regulatory compliance and to publish the findings as a contribution to the existing body of knowledge while also providing practical guidance for stakeholders in aviation safety management.

**Research Gaps**

Fire safety awareness is widely recognized as a critical factor influencing preparedness, decision-making, and effectiveness of fire safety management (Alao *et al.*, 2021). However, a review of current studies in Kenya reveals several gaps to justify the need for this research.

Most studies, however, have focused on educational institutions, healthcare facilities, or industrial workplaces (Alao *et al.*, 2021; Omunagbe & Kaseem, 2023), with few examining airport environments. Airports present unique challenges, including high passenger volumes, high-risk infrastructure, and complex operational systems (O' Connor, 2020; Apostolopoulos

*et al.*, 2020). This lack of empirical research on aviation fire safety awareness in Kenyan international airports represents a critical knowledge gap, limiting understanding of how personnel awareness affects fire safety management performance.

Existing research at Kenyan airports further highlights persistent deficiencies. Wambugu (2016) reported inadequate integration of safety practices and insufficient mechanisms to mitigate potential fire disasters at Jomo Kenyatta International Airport. Nambuya (2021) found that while Wilson Airport conducted drills and equipment maintenance, inadequate policy frameworks and poor inter-agency coordination constrained effective emergency preparedness. Kinyua (2020) emphasized that training and communication supported safety oversight at Jomo Kenyatta International Airport, while weak regulatory enforcement and limited stakeholder engagement constrained overall performance.

Although these studies documented that some fire safety measures are in place, they do not empirically assess fire safety awareness among airport personnel or examine the influence of fire safety awareness on fire safety management performance. This situation has resulted in knowledge gaps which this research attempted to fill using Kenyan International airports.

## MATERIALS AND METHODS

### Study Design

The study was a cross-sectional descriptive research design involving eight (8) international airports in Kenya. Stratified and simple random sampling was applied to determine airport employees and management to be included in the study.

Likert-scaled questions in the form of positive statements were used to obtain scored response from respondents where they were asked to indicate their level of agreement with each of the listed statements in a scale of 1-5 where (*5-Strongly agree; 4-Agree; 3-Neutral; 2-Disagree; 1-Strongly disagree).* For each of the statements, the respondents were requested to indicate the extent to which in their own opinion each of the practices affected implementation of fire safety management at their airport, using the scale of 1-5; where *(1-Very small extent, 2-Small extent, 3-Moderate extent, 4-Large Extent, 5-Very large extent).*

A pilot study was conducted and the result was used to compute Cronbach's alpha in assessing the validity of the tools and consistency of the instruments in achieving the study objectives. Checklists and photography were used to record observations at the airports. The data collected was coded, tabulated and analyzed. T-test was used to test research null hypothesis.

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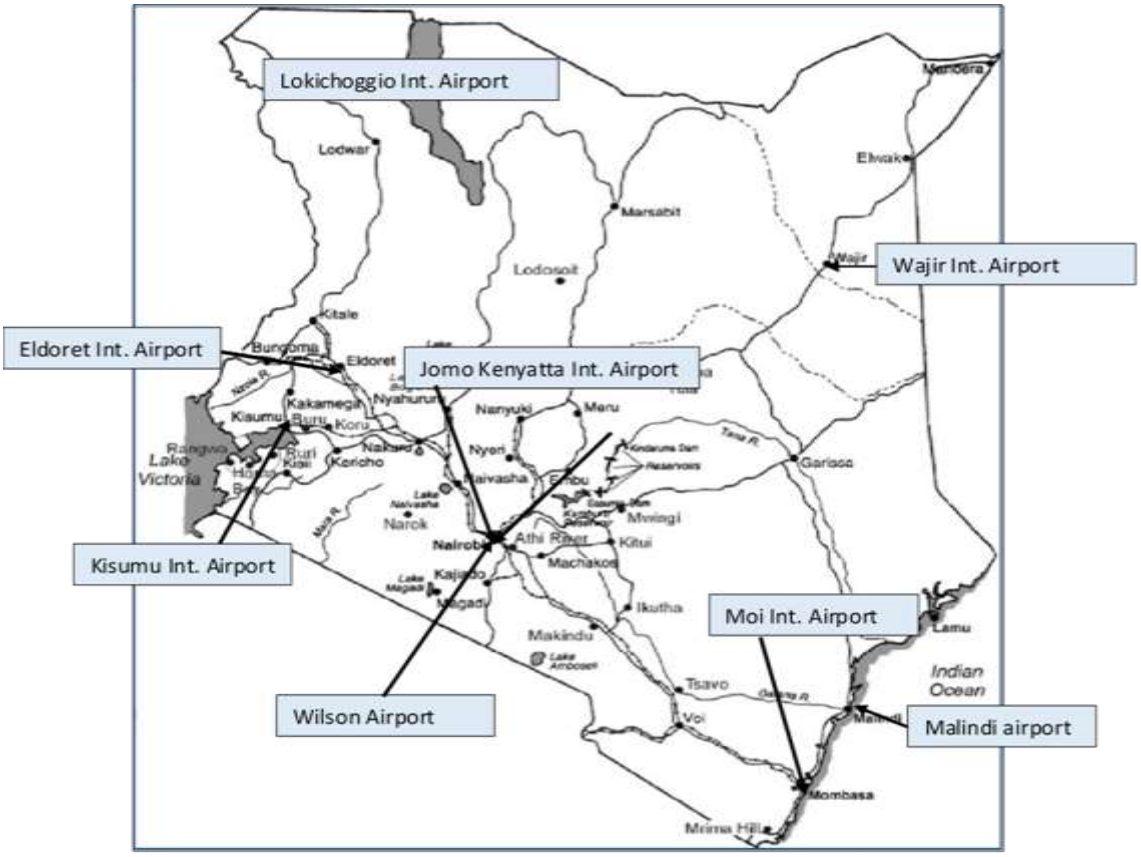


*Figure 1: Map Showing Study Areas*

*Source: https://www.google.com/*

**Sample and Sampling Techniques**

To ensure that sample size is distributed proportionately between the employees and management of Kenya Airports Authority, the study used stratified and simple random sampling in selecting respondents.

**Sample Size Determination**

To calculate the sample size Krejcie and Morgan (1970) formula was used.

$s= X^2NP(1-P) \div d^2(N-1) + X^2P(1-P)$ …….. (i)

s= required sample size.

$X^2$ = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841) = [1.96x 1.96]

$N$ = the population size (1600). The population of airport employees.

$P$ = the population proportion (assumed to be 0.5 since this would provide the maximum sample size).

$d$ = the degree of accuracy expressed as a proportion (0.05).

Therefore

$s= X^2NP(1-P) \div d^2(N-1) + X^2P(1-P)$

$s=3.841 \times 1600 \times 0.5(1-0.5)/ [0.05^2 (1600-1) + 3.841 \times 0.5 (1-0.5)]$

s=1536.4 / 4.95775= 310

**To Get the Sample Size of Each Study Area Use**

**n1=** $X_n/N*n$ …….. (ii)

Where n = desired sample size in the whole population

$X_n$= the number of the targeted population in the category

N= the total study population in the study area

In determining the sample size of the management population (300), Krejcie and Morgan (1970) formula was used.

$s= X^2NP(1-P) \div d^2(N-1) + X^2P(1-P)$

s= required sample size.

$X^2$ = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841) = [1.96x 1.96]

$N$ = the population size (300).

$P$ = the population proportion (assumed to be 0.5 since this would provide the maximum sample size).

$d$ = the degree of accuracy expressed as a proportion (0.05).

Therefore

$s= X^2NP(1-P) \div d^2(N-1) + X^2P(1-P)$

$s=3.841 \times 300 \times 0.5(1-0.5)/ [0.05^2 (300-1) + 3.841 \times 0.5 (1-0.5)]$

s=288.075 / 1.70775= 169

## FINDINGS

**Table 1: Fire Safety Awareness among Employees**

| | Statements | 5 | 4 | 3 | 2 | 1 | Mean | SD |
|---|---|---|---|---|---|---|---|---|
| A | I have received basic fire safety training including type & use of fire extinguishers | 21 | 45 | 34 | 84 | 86 | 2.37 | 0.839 |
| B | Information on fire safety are adequately communicated to all at the airport | 32 | 30 | 38 | 83 | 87 | 2.39 | 0.871 |
| C | I am aware of actions to take during fire emergency situation at the airport | 27 | 44 | 34 | 78 | 87 | 2.43 | 0.864 |
| D | Regular recurrent fire safety training are conducted to all employees | 30 | 42 | 28 | 89 | 81 | 2.44 | 0.863 |
| E | Every staff has access to fire safety policy | 24 | 45 | 40 | 72 | 89 | 2.42 | 0.855 |
| F | I am aware of the emergency number to call in the event of fire outbreak at the airport | 36 | 30 | 42 | 70 | 92 | 2.44 | 0.889 |
| G | I am clearly understand fire hazards at the airport | 38 | 36 | 30 | 70 | 96 | 2.44 | 0.915 |
| H | I am aware of the evacuation procedure at the airport | 36 | 48 | 34 | 54 | 98 | 2.32 | 0.968 |
| | **Aggregate** | | | | | | **2.41** | **0.883** |

*(1=Strongly Disagree; 2= Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree)*

From Table 1 above, the aggregate mean of fire safety awareness among employees was 2.41 (48.2%). The range of deviation of each statement (item) mean from the aggregate mean was between -0.09 and +0.03, with awareness of evacuation procedure at the airport among the respondents recording the lowest mean, 2.32 (46.4%). Regular recurrent fire safety training, awareness of emergency number to call and knowledge of fire hazards at the airport recorded the highest mean, 2.44 (48.8%). The aggregate standard deviation was 0.883 with deviation ranging between -0.04 and +0.09, a good agreement indicator among respondents.

**Table 2: Fire Safety Awareness among Management**

| | Statements | 5 | 4 | 3 | 2 | 1 | Mean | SD |
|---|---|---|---|---|---|---|---|---|
| A | I have received basic fire safety training including type and use of fire extinguishers | 10 | 18 | 10 | 46 | 36 | 2.33 | 0.834 |
| B | Information on fire safety are adequately communicated at the airport | 14 | 10 | 16 | 42 | 38 | 2.33 | 0.859 |
| C | I am aware of actions to take during fire emergency situation at the airport | 17 | 11 | 9 | 48 | 35 | 2.39 | 0.881 |
| D | Regular refresher fire safety training are conducted to all | 12 | 16 | 14 | 38 | 40 | 2.35 | 0.866 |
| E | I am aware of the emergency numbers to call during fire outbreak at the airport | 16 | 12 | 8 | 40 | 44 | 2.30 | 0.919 |
| F | I clearly understand fire hazards at the airport | 10 | 24 | 8 | 32 | 46 | 2.33 | 0.899 |
| G | I am are aware of the evacuation procedure at the airport | 18 | 15 | 6 | 37 | 44 | 2.38 | 0.943 |
| | **Aggregate** | | | | | | **2.34** | **0.886** |

*(1=Strongly Disagree; 2= Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree)*

From Table 2 above, the aggregate mean of fire safety awareness among management was 2.34 (46.8%) while the aggregate standard deviation was 0.886 with deviations ranging between =0.05 and +0.06 hence indicating a good agreement among the respondents. Awareness of emergency number to call during emergency recorded the lowest mean, 2.30 (46%) while awareness of actions to take during emergency had the highest mean, 2.39 (47.8%). The respondents' highest agreement was on basic fire safety training that included use and types of portable fire extinguishers (SD= 0.834), while their lowest agreement was on awareness on evacuation procedures at the airport (SD= 0.943).

**Basic Fire Safety and Re-Current Training among Employees and Management**

From the results in Table 1, 7.8% (n=21) of the employees strongly agreed to have received basic fire safety training, including types and use of portable fire extinguishers. Conversely, 31.9% strongly disagreed with this statement. Additionally, 16.7% of the respondents agreed, while 31.1% disagreed to have received the training. Basic fire safety training among employees recorded a mean of 47.4% (2.37), suggesting that the level of basic fire safety training among employees was below average. Furthermore, regular recurrent fire safety training posted a mean of 48.8% (2.44).

Among the management, Table 2, reveals similarly low levels of training. The mean response for basic fire safety training, including knowledge on the types and use of fire extinguishers was 46.6% (2.33), while recurrent training had a slightly higher mean of47.0% (2.35). These figures suggest that safety training among management was also below average.

Additionally, from Table 2, only 8.3% (n=10) of the management strongly agreed to having received basic fire safety training including types and use of portable fire extinguishers whereas 30.0% strongly disagreed. The respondents who agreed and disagreed to have received similar training constituted 15.0% and 38.3% respectively. According to these results, the performance

level of this fire safety element was 46.6% (mean=2.33) with a standard deviation of 0.834. Physical inspection and document review further revealed absence/lack of documented training records for both basic and recurrent fire safety training among the management.

These findings highlight a critical gap in fire safety preparedness, especially in training and documentation. The FRRR (2007) require occupiers to ensure that workers are trained and instructed on safe use of firefighting appliances. These results were in consistent with the conclusions of Adedayo (2021) who found that training and functionality of infrastructures were correlated. In other words, provision of adequate and modern firefighting facilities without skilled and qualified personnel to operate them; then firefighting facilities cannot achieve optimal levels of their functionality. Alao *et al. (*2021). Similarly emphasized that modern firefighting equipment is ineffective without adequately trained personnel to operate them, and that proper training imparts essential knowledge and skills for safe use.

Shokouhi *et al*. (2019) found out that inadequate training on fire safety coupled with poor attitude to fire safety affected safety related efforts and activities in any occupancy.

**Communication of Fire Safety Information among Employees and Management**

As shown in Table 1 above, 11.9% (n=32) of the employees strongly agreed that fire safety information was adequately communicated to all at the airport, whereas 32.2% strongly disagreed. Additionally, 11.1% agreed and 30.7% disagreed with the statement. From the results, communication of fire safety information recorded a mean and a standard deviation of 47.8% (2.39) and 0.871respectively.

According to Table 2, the management also reported low levels of fire safety communication, with a mean of 46.6% (2.33). Among management respondents, 11.7% (n=14) strongly agreed that fire safety information was adequately communicated, while 31.7% strongly disagreed. A further 8.3% agreed and 35% disagreed with the adequacy of fire safety information dissemination.

On-site inspection on the airports revealed that although some fire safety information was visibly displayed in the airport premises, certain directional signage was misleading or unclear.

According to the FRRR (2007), occupiers are required to provide suitable and known means of communication to alert occupants in the event of fire emergency. These findings align with previous studies. For instance, Chen *et al.* (2019), concluded that there is a direct relationship between the number of passengers and the available unobstructed emergency exit doors, noting that an increase in the number of passengers necessitates a corresponding increase in accessible exits. Similarly, Jasztal *et al.* (2022) affirmed that the distribution of occupants in a building significantly affected evacuation time and procedures. Omunagbe and Kaseem (2023), alluded that effective fire safety communication and information enhances occupants' knowledge and confidence, thereby improving their preparedness in the event of a fire outbreak.

**Actions to take during Fire Emergency among Employees and Management**

From the results in Table 1, 10.0% (n=27) of the employees strongly agreed that they are aware of the appropriate actions to take during a fire emergency at the airport, while 32.2% strongly disagreed. An additional 16.3% agreed and 28.9% disagreed. From the results, awareness of actions to take during emergency recorded a mean and a standard deviation of 48.6% (2.43) and 0.864 respectively, indicating a moderate level of agreement among the respondents.

Among the management, Table 2, awareness of actions to take during fire emergency at the airport posted a mean of 47.8% (2.39) and a standard deviation of 0.881. 14.2% (n=17) of the respondents strongly agreed that they knew the correct actions to take during fire emergency

at the airport, while 29.2% strongly disagreed. The respondents who agreed and disagreed to be knowing actions to take during fire emergency at the airport were 9.2% and 40.0% respectively.

On-site inspection on the airports confirmed that fire action notices were conspicuously displayed in several areas of the airport. The GOK-FRRR (2007) requires occupier to provide appropriate instructions to workers on emergency procedures in the workplace. These findings are consistent with Suparto and Erwandi (2024), who concluded that human behavior and action during emergency are significantly influenced by knowledge and experience to act appropriately during emergency.

**Knowledge of Emergency Numbers to Call during Fire Emergency and Evacuation Procedures at the Airport among Employees and Management**

From the results in Table 1, 13.3% (n=36) of the employees strongly agreed that they aware of emergency numbers to call during a fire emergency, while 34.1% strongly disagreed. The respondents who agreed and disagreed to be aware of emergency numbers to call during fire emergency were 11.1% and 25.9% respectively. Awareness of emergency contact numbers to call among employees recorded a mean of 48.8% (2.44), indicating below average awareness. In terms of evacuation procedures, 13.3% (n=36) of the employees strongly agreed that they were familiar with evacuation procedures at the airport, while 36.3% strongly disagreed. A further 17.8% agreed and 20.0% disagreed. Awareness of evacuation procedures among employees recorded a mean of 46.4% (2.32) and a standard deviation of 0.968, also reflecting below average awareness.

GOK- FRRR (2007) requires occupier to inform all occupants on the contents of fire safety policy including evacuation procedures and map of evacuation routes prominently displayed in the workplace. These findings were in agreement with Li and Zhang (2020), who identified lack of guidance, panic, confusion, adequate unobstructed exits as factors that hindered evacuation.

Akashah *et al.* (2020) also noted that physical and mental capabilities of occupants influenced evacuation success in a workplace and can be improved through training the occupants on what to do when and how. Chang *et al.* (2023) concluded that evacuation maps, when clearly posted in corridors leading to emergency exits, significantly reduces evacuation time. Further, Menzemer *et al.* (2024) concluded that effectiveness of evacuation training or fire drills are often undermined by lack of perceived seriousness and urgency of the simulated scenarios among occupants.

From the results in Table 2, 13.3% (n=16) of the management strongly agreed to be aware of emergency numbers to call during fire emergency, while 36.7% strongly disagreed. The respondents who agreed and disagreed to be aware of emergency numbers to call during fire emergency were 10.0% and 33.3% respectively. Awareness of emergency numbers to call among management recorded a mean of 46.0% (2.30) an indicator that this awareness among management was below average.

Regarding evacuation procedures (Table 2), 15.0% (n=18) of the management strongly agreed to be aware of evacuation procedures at the airport, while 36.7% strongly disagreed. The respondents who agreed and disagreed to be aware of evacuation procedures were 12.5% and 30.8% respectively. Awareness of evacuation procedures among management recorded a mean of 47.6% (2.38) an indicator that this awareness among management team was below average.

These findings were in agreement with the previous studies. Chen *et al.* (2019) concluded that there is a direct relationship between the number of passengers and available unobstructed

emergency exit doors; if the number of passengers increases, more emergency exit doors will be required. Jasztal *et al.* (2022) affirmed that distribution and number of occupants in a building affected the overall estimated evacuation time and procedure. Ukegbu *et al.* (2022) highlighted that poor knowledge of emergency contacts to call in cases of fire emergency was the reason for poor response at Nigeria's healthcare facilities.

**Understanding of Fire Hazards among Employees and Management at the Airport**

From the results in Table 1, 14.1% (n=38) of the employees strongly agreed that they understood fire hazards at the airport, while 35.6% strongly disagreed. A further 13.3% agreed and 25.9% disagreed. From the results, knowledge of fire hazards at the airport among employees recorded a mean and a standard deviation of 48.8% (2.44) and 0.915 respectively which, is an indicator of good agreement of the results among the respondents.

For the management, Table 2, knowledge of fire hazards at the airport posted a mean of 46.6% (2.33) and a standard deviation of 0.899. Only 8.3% (n=10) of the respondents strongly agreed that they understood fire hazards at the airport, while 38.3% strongly disagreed. An additional 20% agreed and, 26.7% disagreed.

KCARS (2013) requires airport operators to establish and maintain fire prevention program with preventive measures against possible fire and designated fire safety personnel knowledgeable on risk assessment and fire hazard identification.

According to Kodur *et al.* (2020), the program if effectively implemented will ensure availability and reliability of fire protection system through identification of hidden failures. These findings were in agreement with the previous studies. Alwaqfi *et al.* (2022), who concluded that awareness of fire hazards, associated risk factors and their consequences prompts occupier to pay more attention and efforts in reducing potential fire risks through fire risk assessment and implementation of fire safety measures. According to Omar (2023) also emphasized that training on fire hazards fosters a positive safety culture and reduces fire risks.

**Linear Regression Analysis**

Simple linear regression results confirmed existence of a direct and positive relationship between fire safety awareness among employees and management and performance of fire safety management. The prediction factors were 0.69, $p < 0.05$ for fire safety awareness among employees and 0.30, $p < 0.05$ for fire safety awareness among management. These factors indicated fairly strong positive relationships hence good predictors of fire safety implementation. This showed that a unit increase in fire safety awareness among employees and management resulted in an increase of 0.69 units and 0.30 units respectively in the implementation of fire safety management.

Equally, the results also showed existence of a direct and negative relationship between fire safety awareness among employees and management and obstacle in the implementation of fire safety management with a prediction factors of -0.67, $p < 0.05$ and -0.30, $p < 0.05$ respectively. This implied that a unit increase in fire safety awareness among employees and management resulted in a decrease of 0.67 units and 0.30 units of hindrance in the implementation of fire safety management respectively.

**Hypothesis Testing**

The null hypothesis ($H_o$), fire safety management performance at international airports in Kenya is not affected by fire safety awareness among employees and management ($H_0$: $\mu - 2.5 = 0$), failed in favour of the alternative hypothesis ($HA$: $\mu - 2.5 \neq 0$). The result of the computed

*t*-statistic was 1.667 and 2.025 compared to 1.645 at $\alpha = 0.05$; these were more than right-tailed critical value of the *t*-distribution.

## CONCLUSION AND RECOMMENDATIONS

### Conclusion

Lack of fire safety awareness among employees and management affected implementation of fire safety management at International airports in Kenya. The Aggregate mean for fire safety awareness among employees and management were 2.41 and 2.34 representing 48.2% and 48.2% on level of fire safety awareness.

Majority of management personnel had not received basic fire safety training, including instructions on the types and use of fire extinguishers. No documented records of re-current training existed for management and their knowledge of fire hazards and evacuation procedures was below average. Conversely, employees had moderate exposure to fire safety training and recurrent training that included instructions on types and use of fire extinguishers. Both employees and management awareness on emergency contact numbers to call was below average. Some visibly display fire safety information including directional signage are misleading.

Statistical analysis confirmed that awareness significantly influenced fire safety management performance.

The null hypothesis "Fire safety management performance is not affected by fire safety awareness among employees and management" failed in favour of the alternative hypothesis.

### Recommendations

The airport management should: -

i. Implement mandatory and comprehensive fire safety induction for all management and employees, including practical sessions on use and operations of fire protection systems, fire hazard identification and evacuation procedures
ii. Establish regular refresher training programs including instructions on types and use of fire extinguishers for all management and employees and maintain documented records to ensure continuous competency and awareness.
iii. Disseminate and display correct fire safety information to all in the workplace

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### Conflicts of Interest Declaration.

None

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