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System Factors Influencing Fire Emergency Preparedness Among Healthcare Workers in Selected Hospitals in Botswana

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Abstract

Hospitals are among the most complicated building structures, and their infrastructure can easily contribute to hazardous and sometimes fatal incidents if strict fire safety procedures are not in place. Despite global efforts to improve hospital safety, thousands of fire incidents happen every year, putting patients and healthcare workers at risk. With an emphasis on understanding the system factors influencing preparedness, this study assessed healthcare workers' fire emergency preparedness in selected hospitals in Botswana. Safety, Health, and Environment officers from seven hospitals participated in key informant interviews, while semi-structured questionnaires and observational checklists were used as part of an analytical cross-sectional design. The association between the variable was assessed using binary logistic regression. The results showed that hospital systems significantly influence preparedness levels. Only 34.3% of healthcare workers had received fire safety training, and only 18.5% had taken part in fire drills in the previous year, indicating significant gaps in institutional initiatives. Gaps were noted between system-provided resources and actual operational competence, 79.5% of healthcare workers knew the location of fire extinguishers, while 40.5% understood how to use them correctly. Inadequate funding for fire safety implementation was cited by 75.1% of respondents, and institutional compliance with safety standards varied greatly among Hospitals (47.2%–100%), indicating system-level weaknesses. Binary logistic regression analysis showed that organizational culture barriers and budget adequacy (aOR= 0.400, p=0.025; aOR=0.411, p=0.030, respectively) were system determinants of fire preparedness, with both characteristics reducing rather than increasing the odds of preparedness. Overall, only 27% of healthcare workers were adequately prepared, and 87.7% were unsure of their emergency responsibilities, highlighting systematic gaps in policy enforcement, communication, and training. These results demonstrate that system factors, specifically resource allocation, organized training programs, regular drills, and institutional policy oversight, are essential determinants of fire emergency preparedness in Botswana's hospitals.

Keywords: *Fire emergency preparedness; System factors; Hospital fire safety; Healthcare workers; Fire safety training; Fire drills; Botswana*

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1. Introduction

Within healthcare facilities, fire emergency preparedness includes systems, structures, and coordinated activities designed to prevent, identify, and handle fire incidents (NFPA, 2023). Fire safety in high-risk, high-occupancy hospitals with advanced technology, vulnerable patients, and extensive electrical and mechanical infrastructure depends not only on individual awareness. It also depends on robust institutional systems, such as emergency planning, communication channels, resource allocation, and policies (CDC, 2024; Osha et al., 2025). Strong safety systems are crucial, as demonstrated by the recurring hospital fire incidents in developed countries. Approximately 5,700 healthcare facility fires occur in the US each year, accounting for almost half of all recorded institutional fires. These fires result in fatalities, injuries, and costly service disruptions (USFA, 2020; Spellman, 2023). Over 1,372 fires were reported in National Health Service (NHS) hospitals in the United Kingdom in 2022–2023. This increase was attributed to aged infrastructure and system-level deficiencies in safety compliance and maintenance (Hoey, 2024). These patterns show that when systemic controls like regular inspections, equipment maintenance, and emergency planning are inadequate, even well-resourced health institutions face fire risks.

Hospital fire incidents are also common in developing countries and are frequently worsened by substandard infrastructure, weaker institutional systems, and inadequate fire safety spending. There have been numerous hospital fire outbreaks in India, with government hospitals accounting for more than half of the reported cases. A number of fatalities have been linked to electrical system failures, insufficient equipment, and lax enforcement of safety regulations (Juyal et al., 2023; Malviya et al., 2022). Over 21,000 fires were reported in Bangladesh in 2020 alone. An assessment of Dhaka's medical facilities found that approximately 98% were unsafe, indicating significant systemic gaps in resource provision, regulatory monitoring, and enforcement of compliance (Hosen et al., 2021). These incidents highlight those systemic failures, rather than individual employees' behavior, play a major role in hospital fire emergencies in developing countries.

The problems are much more severe in Sub-Saharan Africa, where recurring fire risks include inadequate fire detection systems, poorly maintained infrastructure, low fire safety budgets, and poor policy implementation. Following a major fire, the Charlotte Maxeke Johannesburg Academic Hospital in South Africa sustained significant damage, exposing deficiencies in facility upkeep and emergency planning (Magome, 2021). Evidence from Namibia, Tanzania, and Nigeria further demonstrates that poor fire preparedness among healthcare workers is caused by institutional weaknesses, particularly the lack of drills, insufficient fire equipment, irregular training, and weak monitoring structures (Johannes & Koray, 2024; Simon et al., 2022). These regional trends show that system characteristics play a major role in determining the preparedness of African health facilities.

Hospital fire safety in Botswana is not well-documented, and systemic issues are still poorly understood. Although national Occupational Safety and Health (OSH) policies serve as a guide for hospitals, research shows that there are still gaps in fire prevention systems, such as poor

equipment maintenance, few training programs, irregular emergency drills, and unclear reporting or communication structures (Ministry of Labour, Botswana, 2025; Meki, 2018). Furthermore, the few studies available indicate that healthcare workers lack clarity on fire preparedness.

1.1 Problem statement

Fire events continue to occur in healthcare facilities worldwide, highlighting serious deficiencies in system-level preparedness. An average of 5,750 building fires in healthcare facilities occur in the US each year, leading to fatalities and injuries that highlight systemic weaknesses (Wu et al., 2025). Similar to this, 27 major hospital fires in India between 2020 and 2023 resulted in 112 fatalities, illustrating the effects of inadequate oversight and safety systems (Sahu et al., 2025). Due to structural and procedural gaps in facility management, the annual probability of hospital fire incidence in China is 0.017, indicating that approximately 1.7% of hospitals experience fire incidents annually (Liu et al., 2022). In Sub-Saharan Africa, these concerns are much more pronounced, where systemic gaps, including weak healthcare infrastructure, inadequate resource allocation, poor leadership, and a lack of transparency, seriously impair fire preparedness (Farah, 2023). Socioeconomic limitations and persistent underfunding exacerbate this issue by preventing developing countries from implementing efficient fire safety strategies (Pandey et al., 2023). During 2023/2024, four hospital fire incidents were reported in Botswana, three of which were linked to electrical faults (Incident reports, Ministry of Health, 2023/2024). A January 2024 fire at Nyangabwe Referral Hospital led to the closure of an operating theatre, forcing emergency surgical referrals to Mahalapye District Hospital, 237 km away, and significantly disrupting service delivery at both hospitals. These results highlight a global crisis in healthcare facilities' system-level fire preparedness, exposing structural deficiencies that call for immediate strengthening of institutional capacity, regulatory systems, and resource allocation mechanisms to protect patients and healthcare workers. The global trends also highlight the need to critically assess how system-level factors influence healthcare workers' fire preparedness in Botswana.

1.2 Research Objective

To determine system factors affecting fire emergency preparedness among healthcare workers in selected hospitals in Botswana.

2. Literature review

2.1 System factors and fire preparedness among healthcare workers

Healthcare facility fires can result in large numbers of fatalities, property damage, and interruptions to health services, making them a major global problem. Electrical sparks, smoking, cooking, garbage fires, and flammable objects, including clothing and curtains, are common causes of these fires (Omidvari et al., 2020). In developed countries, the foundation of hospital fire preparedness comprises advanced infrastructure, regulatory oversight, and extensive fire safety systems. Hospitals can identify fire risks, implement mitigation measures, and remain prepared for emergencies through regular inspections, risk assessments, and adherence to national guidelines, all of which are standard components of fire prevention (Kaushal, 2023; Dingli et al., 2023). To ensure staff are ready to act promptly in the event of an emergency, the UK, for example, requires annual multidisciplinary fire safety training, regular equipment inspections, and well-defined evacuation procedures (Mirakbari et al.,

2021). However, evidence from 2021-2022 European studies shows that hospital fires and related evacuations continue to expose gaps in preparedness, staff training, and emergency coordination even within well-resourced health systems (Sahebi et al., 2021; Söderin et al., 2022; Khorram-Manesh, 2022). Effective fire preparedness in well-resourced healthcare facilities is largely determined by these system-level elements, which include equipment, policies, communication channels, and training.

Hospital fire safety is frequently jeopardized by systemic issues in developing countries. For instance, research conducted in India shows that, despite knowledge of fire hazards, routine inspections, quick evacuation protocols, and maintenance of firefighting equipment, these measures are frequently insufficient, especially in high-density urban hospitals, leading to higher casualty rates (Raman & Sruti, 2024; Mirakbari et al., 2021). Similar deficiencies are observed in North Indian healthcare facilities, where proactive emergency teams are infrequently formed and fire safety regulations are inconsistently enforced (Sachdeva et al., 2022). In Nigeria, due to systemic gaps in planning, training, and resource allocation, only 9% of healthcare workers reported having received fire safety training (Ukegbu et al., 2022). Indonesian hospitals likewise emphasize emergency lights, multiple evacuation routes, and fire scenario practice to reduce hazards during power outages or high-occupancy events, these efforts are undermined by a lack of established fire management polices (Sachdeva et al., 2022). Collectively, these results show that institutional weaknesses, rather than individual knowledge alone, often constrain preparation in developing nations.

Sub-Saharan African hospitals are more susceptible to fire incidents due to significant systemic issues. According to Selam et al. (2020), more than half of Ethiopia's public hospitals were unprepared for possible fire events and lacked fire extinguishers. The implementation of fire preventive measures, training programs, and emergency drills is severely hampered by factors such as inadequate funding, poor managerial oversight, understaffing, and a lack of organizational commitment to safety (Smith et al., 2020; Liu et al., 2020). Inadequate risk assessment and monitoring systems jeopardize the institutional capacity to respond effectively to fires, while logistical issues, such as managing limited resources, organizing health care workers for drills, and maintaining equipment, further reduce preparedness levels (Nnaji et al., 2021). These systemic gaps underscore the importance of resource allocation, policy enforcement, and leadership to the region's hospital fire preparedness.

Evidence indicates that systemic constraints also limit hospital fire preparedness in Botswana. Despite completing training, studies conducted in Gaborone medical laboratories, show that healthcare workers still exhibit knowledge gaps about fire safety (Meki, 2018). Staff preparedness is compromised by a lack of firefighting equipment, irregular emergency drills, and poor reporting procedures. Additionally, organizational regulations and monitoring procedures are not effectively implemented to guarantee a coordinated institutional response. The urgent need for Botswana hospitals to improve institutional systems, resource allocation, and management practices to increase healthcare workers' fire preparedness is highlighted by the absence of a strong system to support prevention, training, and emergency response.

In summary, the literature consistently shows that system-level elements, including policies, resource availability, equipment availability, leadership supervision, and regular training, are the main determinants of hospital fire preparedness, even though healthcare workers' knowledge and awareness are still important. Gaps in these systems directly jeopardize

healthcare workers' capacity to respond to fire emergencies in both developed and developing countries, including Sub-Saharan Africa and Botswana. This underscores the necessity of focused institutional interventions to improve safety and resilience in healthcare facilities.

3. Materials and Methods

This study used an analytical cross-sectional design. To provide a varied setting for assessing the operational and organizational determinants of preparedness, the study was conducted in a sample of public and private hospitals representing the quaternary, tertiary, district, and primary levels of care. A total of 1,775 healthcare workers comprised the study population, from which a sample of 359 was selected, and 7 Safety, Health, and Environment (SHE) officers served as key informants to provide background information on hospital fire safety practices and policies. A multi-stage sampling was used, starting with hospital stratification by service level. Next, seven hospitals were randomly selected from a national frame of 37 hospitals, and healthcare workers in the selected hospitals were sampled using systematic random sampling stratified by staff size and professional cadre. Key informants were purposively sampled. A mixed-methods technique was used to collect the data. A semi-structured questionnaire and observational checklist were used to collect quantitative data, which included indicators of individual preparedness such as familiarity with fire safety equipment and knowledge of fire response procedures, whereas the dependent variable was fire emergency preparedness. Using SPSS version 26, quantitative data were examined. Binary logistic regression was used to identify significant predictors of fire preparedness, chi-square tests were used to assess associations between variables, and descriptive statistics were used to summarize the distributions of system components and preparedness levels. The quantitative findings were complemented and contextualized by thematic analysis of the qualitative data. Confidentiality and anonymity were preserved throughout the study; informed consent was obtained from each participant, and ethical approval was obtained from the appropriate institutional review boards.

4. Results

4.1 Descriptive Analysis

Four key domains, being resource adequacy, organizational culture and communication, operational constraints, and external coordination, were shown to influence healthcare workers' fire preparedness after system-level variables were assessed. Together, these areas show how institutional and structural gaps affect healthcare workers' fire preparedness and the general resilience of hospital fire safety systems.

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4.1.1 Organizational culture and fire safety responsibility

Table 1: System factors towards fire preparedness

Sn	Statement	Yes n(%)	No n(%)	I don't Know n(%)
1	Is there enough budget for the implementation of fire safety measures in hospitals?	33(9.7)	256 (75.1)	52 (15.2)
2	Are there enough resources for the implementation of fire safety measures in your unit in case of a fire outbreak?	101 (29.6)	86 (25.2)	154 (45.2)
3	Are there organizational culture barriers that exist in your unit/department that might keep you from actively practising fire safety?	29 (8.5)	184 (54.0)	128 (37.5)
4	Are there any difficulties in making sure that you are aware of your obligations in the event of a fire?	42 (12.3)	205 (60.1)	94 (27.6)
5	Are there challenges to fitting fire safety training into your hectic schedules?	79 (23.2)	181(53.1)	81 (23.8)

Note: n denotes frequency; values in parentheses are percentages.

The findings show a clear deficit in materials and financial resources required for successful fire safety implementation. Less than one in ten respondents (9.7%) thought financing was adequate for fire safety measures, whereas three-quarters of respondents (75.1%) said hospital funds were insufficient. This significant budget disparity points to a structural undervaluation of fire safety in institutional planning. Only 29.6% of healthcare workers at the unit level thought their work areas had enough resources for fire emergencies, while 45.2% were unsure, indicating uneven and poorly communicated resource distribution across departments. Healthcare workers might not be ready to locate or access vital equipment in an emergency; this uncertainty itself is a risk factor. Additionally, 27.6% of respondents said they were unclear about their roles during a fire, and 60.1% said they had trouble understanding their roles. This widespread lack of role definition indicates weaknesses in the reinforcement of safety protocols, induction procedures, and communication channels. Ineffective communication and lax institutional safety standards can impede healthcare workers' preparedness and reduce confidence during emergencies, even in the absence of clear cultural resistance.

These inadequacies were further contextualized by qualitative findings, where key informants described how insufficient financing limited training frequency, caused equipment servicing delays, and interfered with fire drills. *"Lack of funds affects training and servicing of firefighting equipment,"* according to KI 4. These stories demonstrate how budgetary limitations lead to operational weaknesses, supporting the quantitative evidence of insufficient and inconsistent fire safety funding. Key informants further noted that *"Poor housekeeping leads to clutter, which blocks exits"* KI 6 and that *"Staff sometimes do not respond to alarms because they are used to them not working"* KI 2. These results collectively imply that, even in

the absence of clear cultural resistance, poor communication and low implementation of safety procedures may compromise preparedness.

4.1.2 Operational constraints

One significant contextual factor affecting staff participation in fire safety training was operational constraints. Quantitatively, 181 respondents (53.1%) said they had no trouble scheduling fire safety training, whereas 81 respondents (23.8%) and 79 respondents (23.2%) reported varying degrees of difficulty. This distribution indicates that a considerable share of employees face operational challenges that could jeopardize consistent preparedness, even though a small majority believe training is doable.

Qualitative responses revealed a deeper understanding of the nature of these limitations. Many participants stressed that they were unable to attend extended or frequent fire safety lessons due to their heavy workloads and the unpredictable nature of healthcare delivery. Scheduling non-clinical training is particularly difficult due to high-acuity cases, continuous patient flow, and the ongoing potential for emergencies that the staff described. According to KI 6, *"The nature of our work does not allow for prolonged training sessions in terms of workload. We anticipate emergencies at all times and are constantly occupied with our primary duties."*

The experiences of healthcare workers with dual positions have also shown the conflict between clinical duties and safety training. *"As a fire marshal, I have to attend to all fire needs and meetings coupled with shift work and patient care,"* said a fire marshal who also worked as a laboratory technician, describing the cumulative stresses of juggling fire safety tasks with regular clinical duties. He continues to note, "*It takes more time and is really daunting*" KI 3. These viewpoints highlight the operational reality of healthcare environments, where patient needs, staff shortages, and shift rotations frequently take precedence over participation in fire safety initiatives. Despite these limitations, a number of respondents conveyed a deep understanding of the significance of fire preparedness, seeing it as essential to staff and patient safety. One participant highlighted:

"Even though there are limitations, I believe that being prepared for fires should be a top priority because knowing what to do in the event of a fire could mean the difference between survival and death." KI 7

The results also showed that different departments have different operating challenges. Participation in fire preparedness drills appears to be facilitated by strong internal leadership or well-organized safety procedures in some units. One respondent said,

"No limitation, our fire representative in the unit prioritizes fire preparedness measures." KI 5

This variety implies that the existence of proactive safety focal persons, departmental leadership, and local unit culture may mitigate the effects of operational limitations. Overall, the results emphasize the crucial role that departmental organization and leadership play in enabling staff to prioritize fire safety in demanding healthcare contexts, even as workload and competing tasks remain significant challenges.

4.1.3 External coordination

Healthcare workers emphasized the importance of improving cooperation with emergency response organizations. Joint training programs (69.5%), inter-agency fire drills (19.5%), and

guaranteeing quick access to fire services (11%) were among the suggested strategies. Additionally, the respondents suggested integrating fire risk information into community health outreach, providing standby fire trucks, and working with fire departments. These results imply that healthcare workers view fire safety as a multisectoral duty requiring coordinated action beyond the hospital.

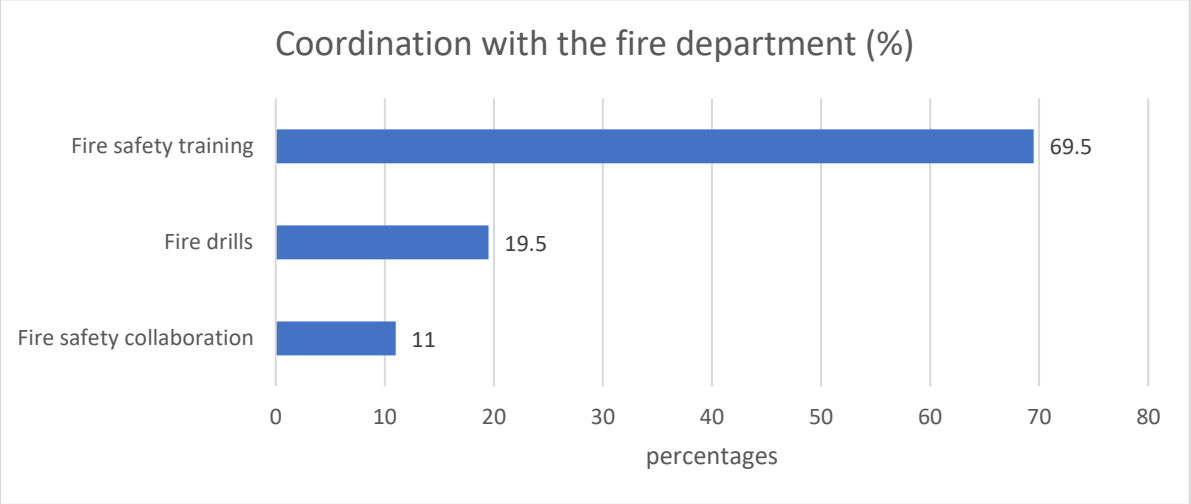

Figure 1: Coordination with the fire department

The key informant interviews indicated a difference in the frequency of fire drills involving external emergency services. Some hospitals' KIs (3) stated that *they performed these drills once a year*, and KI 2 described it as follows: "Gaborone City Council fire brigade joins the team during the drill once a year." Others (2) noted *they were supposed to be done annually according to SOPs but had not been carried out for the past two years,* while some (2) reported that *drills had not been conducted at all*, including a facility that stated, *"Not done in 4 years."*

Possible fire hazards were widely acknowledged to be present within the hospitals. Respondents pointed to risk assessments as the primary mechanism, though practices differed. Some KIs (2) indicated that *assessments were conducted annually or quarterly*, while others (2) reported *monthly and weekly spot checks by fire marshals*. One hospital, KI 4, stated, *"Yes, through risk assessment conducted,"* while another admitted, "The risk assessment is not done regularly, but during the quarterly fire safety audits" KI 5.

KIs also described safety measures in patient care areas such as wards and accident and emergency units. Among these were the elimination of bare wires, proper storage of flammable substances, a ban on smoking and fire, and the installation of fire-extinguishing devices. One of the participants, KI 4 explained, "*There are designated fire marshals for each ward. Fire evacuation procedures are mounted on the walls to guide. Smoke detectors are available to sound an alarm to allow for a quick response."*

Adherence to national and regional fire safety codes was reported inconsistently across facilities. Some KIs (3) indicated *full certification by the National Fire Department*, while others noted *they were not yet certified or only partially compliant*. KI 6 highlighted formal adherence, stating, *"Yes, the hospital adheres to national and regional fire safety codes,*

specifically SANS 10400-T (2011), which governs fire protection as part of South Africa's National Building Regulations."

4.1.4 Policy awareness

More than half of the respondents, 216 (64%), indicated that they were not aware of the existence of fire safety guidelines or policy. In contrast, just over a third (32, 9%) reported being aware of the fire safety policy and having no copy in their departments, while only 93 (27%) confirmed that a copy of the policy was available within their departments (Figure 2).

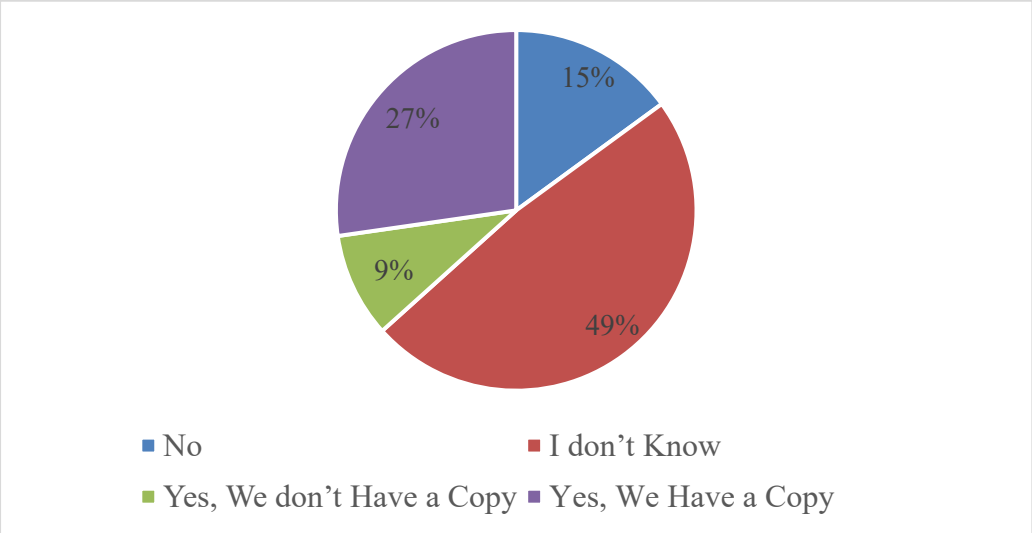

Figure 2: Policy Awareness

4.2 Predictive analysis of system factors

The model was statistically significant in binary logistic regression (LR $\chi^2(5) = 19.09$, $p = 0.0018$; pseudo-$R^2 = 0.0428$) on 341 respondents, indicating that system-level variables significantly predict fire preparedness among healthcare workers. Organizational culture barriers and budget availability were two factors that had statistically significant relationships with preparedness (Table 3).

First, there was a negative correlation between organizational culture barriers and preparedness (OR = 0.411, p = 0.030). A healthcare worker's chance of being fire-prepared decreases as cultural barriers rise, with an odds ratio less than 1. In particular, individuals who encounter organizational culture barriers have a 59% lower chance of being prepared for emergencies (1 – 0.411 = 0.589). This suggests that resistance to safety norms, poor attitudes toward compliance, and weak institutional support networks substantially reduce preparedness.

Second, there was a negative association between preparedness and budget availability (OR = 0.400, 95% CI: 0.179–0.893, p = 0.025). Healthcare workers were 60% less likely to be prepared for fire emergencies at hospitals with inadequate funding (1 – 0.400 = 0.600). The acquisition of equipment, training, safety infrastructure, and emergency drills, all essential to operational preparedness, is likely constrained by limited funding. On the other hand, scheduling difficulties (OR = 0.645, p = 0.114), awareness of commitments (OR = 1.184, p = 0.647), and resource availability (OR = 0.646, p = 0.101) were not statistically significant predictors. None of these effects attained statistical significance within the model, despite their

directions suggesting that limited time schedules and insufficient resources may decrease preparedness, and increased duty awareness may increase it. Therefore, at the current threshold, they cannot be regarded as trustworthy determinants.

Table 2: Multivariate logistic regression predicting fire preparedness

Variable	Odds Ratio	95% CI	P-value
Organizational culture barriers	0.411	0.185–0.916	0.030
Budget availability	0.400	0.179–0.893	0.025
Resource availability	0.646	0.383–1.089	0.101
Awareness of obligations	1.184	0.576–2.434	0.647
Scheduling challenges	0.645	0.374–1.111	0.114

4.3 Discussion

The study's findings highlight the importance of system-level factors in determining hospital fire preparedness. The majority of respondents reported inadequate budgets and expressed uncertainty about the availability of necessary fire safety equipment in their work units, making resource shortages a significant problem. This is consistent with earlier research highlighting the importance of financial resources for institutional preparedness, especially in low- and middle-income nations, where financial limitations seriously impede disaster preparedness (Khankeh et al., 2017; Alabdullah & Karwowski, 2021). The unequal distribution and visibility of resources imply that operational management of these assets is just as crucial for effective preparedness as allocation.

The results of preparedness were also greatly impacted by organizational culture. Uncertainty about individual obligations and coworkers' roles during fire emergencies reveals a gap between policy and practice, even though the majority of healthcare workers did not explicitly mention culture as a barrier. According to studies conducted largely in high-income countries, particularly the United States and European healthcare systems (Alabdullah & Karwowski, 2024; Smith et al., 2020), an effective emergency response is predicated on a robust safety culture characterized by clear role definition, effective communication, and shared accountability. Even well-equipped hospitals might not be able to properly mobilize staff during emergencies if roles and communication channels are unclear. These findings are consistent with research demonstrating that organizational culture plays a crucial role in converting safety policy into routine practice. Hospital safety-culture studies in Kenya and validation work in Ethiopia's primary healthcare system have both shown how the adoption of safety practices is hampered by weak or unclear organizational norms and communication (Liu et al., 2022; Nthumba et al., 2024).

Participation in fire safety training and drills is further limited by operational constraints like high patient loads, staff shortages, and conflicting duties. This is consistent with research from Nigeria and comparable low-resource settings in Sub-Saharan Africa, where workload

pressures limit opportunities for preparedness activities (Hi Palanro et al., 2024; Ukegbu et al., 2022). To address these operational problems, participants suggested implementing blended training modalities, appointing departmental safety focal persons, and integrating fire safety into regular procedures. These strategies align with institutional safety management best practices that support the regular incorporation of emergency preparedness into hospital operations (Kulliyyah et al., 2021).

Additionally, the significance of external coordination with emergency services was emphasized. In addition to improving operational preparedness, effective cooperation with fire departments, standby vehicles, and community-based initiatives guarantees that hospitals are not isolated in their response operations (Magome, 2021; Hosen et al., 2021). These results corroborate the growing understanding that hospital fire preparedness is a multi-level duty that requires strong collaboration between internal systems and external stakeholders to enhance response capability (Pandey et al., 2023).

Finally, the multivariate analysis showed that the only significant predictors of fire preparedness were organizational culture barriers and budget adequacy, supporting the notion that systemic factors, rather than individual knowledge alone, determine preparedness (Alabdullah & Karwowski, 2024; Khankeh et al., 2017). Although scheduling constraints, resource availability, and awareness of responsibilities all contribute to operational effectiveness, they were not statistically significant, indicating that institutional commitment and strategic resource allocation are more important determinants of preparedness than discrete operational factors.

5. Conclusion

The results of the study show that healthcare workers' preparedness for fire emergencies in Botswana's hospitals is significantly influenced by system-level factors. The most important determinants of preparedness were organizational culture and budget adequacy, underscoring the need for a supportive safety culture and sufficient funding for fire prevention programs. There are still gaps in knowledge and operational capacity, especially regarding equipment use, evacuation procedures, and participation in fire drills, even though resource availability, awareness of fire-related obligations, and scheduling flexibility were not statistically significant predictors. The findings demonstrate that institutional commitment, policy enforcement, and operational assistance significantly impact preparation, which is not determined solely by individual knowledge or training. Hospitals are essentially better positioned to guarantee healthcare workers' preparedness and patient safety during fire emergencies when they have clear safety leadership, defined duties, and adequate resources.

6. Recommendations

Healthcare facilities should focus on both healthcare workers' training and system-level actions to improve fire emergency preparedness. It is necessary for the Ministry of Health and hospital management to make sure that fire safety measures, including equipment purchases, fire alarm and extinguisher maintenance, and support for continuing training programs, are adequately funded. Hospitals should establish active safety committees, appoint departmental safety focal persons, and include fire safety duties in regular performance objectives to foster a proactive safety culture. To accommodate staff schedules and ensure that all healthcare workers are knowledgeable about emergency protocols, hospitals should conduct frequent, hands-on fire

drills and use blended learning strategies. Visible signage, well-defined reporting procedures, and open lines of communication can all help to increase healthcare workers' awareness and accountability. To sustain ongoing involvement and institutionalize preparedness procedures, the Ministry of Health and hospital management can also include fire safety in induction programs and in-service lectures. Healthcare institutions may provide resilient settings where employees can efficiently respond to fire emergencies, protecting patients, coworkers, and infrastructure, by addressing both cultural and operational constraints.

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