ASSESSMENT OF FIRE SAFETY KNOWLEDGE AND EMERGENCY PREPAREDNESS AMONG GAS STATIONS IN EGOR LOCAL GOVERNMENT AREA.

BY

OMONIYI OLUWASEGUN HENRY

EDU2102521

DEPARTMENT OF HEALTH SAFETY AND ENVIRONMENTAL EDUCATION
FACULTY OF EDUCATION
UNIVERSITY OF BENIN

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BEING A PROJECT PRESENTED TO THE DEPARTMENT OF HEALTH SAFETY AND ENVIRONMENTAL EDUCATION FACULTY OF EDUCATION, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE IN PARTIAL FUFILMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF SCIENCE (B.Sc.) IN ENVIRONMENTAL EDUCATION

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DECLARATION

I, Omoniyi Oluwasegun Henry, with matriculation number EDU2102521 hereby solemnly declare that this research work is entirely my original effort and has not been submitted previously, in whole or in part, for the award of any degree in this or any other institution. All sources of information and materials consulted have been duly acknowledged and properly referenced to their respective authors.

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OMONIYI OLUWASEGUN HENRY **Date**

(Student/Researcher)

CERTIFICATION

This is to certify that this thesis, titled **"ASSESSMENT OF FIRE SAFETY KNOWLEDGE AND EMERGENCY PREPAREDNESS AMONG GAS STATIONS IN EGOR LOCAL GOVERNMENT AREA,"** was carried out by Omoniyi Oluwasegun Henry of the Department of Health safety and Environmental Education, Faculty of Education, University of Benin, Benin City. The study was conducted in partial fulfillment of the requirements for the award of the Bachelor of Science (B.Sc.) degree in Environmental Education.

_____ _____

MRS IMADE ONAIHO **Date**

(Project Supervisor)

_____ _____

MRS B.H. ENABULELE **Date**

(Project Coordinator)

_____ _____

DR. MRS. O.H. OBASUYI **Date**

(Ag. Head of Department)

DEDICATION

This project is dedicated to **God Almighty**, the source of all knowledge, wisdom, and understanding.

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ABSTRACT

The proliferation of gas stations, often situated in close proximity to residential and commercial areas, presents a significant public safety hazard, with the potential for catastrophic fires and explosions threatening lives, property, and economic stability. This study, titled “Assessment of Fire Safety Knowledge and Emergency Preparedness among Gas Stations in Egor Local Government Area,” was undertaken to critically evaluate the level of fire safety awareness, the adequacy of firefighting infrastructure, and the robustness of emergency response plans within these high-risk establishments. The research specifically investigated gas station attendants' and managers' knowledge of fire prevention measures, the causes and classes of fire, the availability and functionality of fire safety equipment, and the readiness to execute emergency evacuation procedures. The study was guided by clearly defined research questions that explored the relationship between staff competency, resource availability, and overall emergency preparedness. A comprehensive review of relevant literature was conducted to establish a theoretical foundation, drawing upon established safety models and situating the study within both national and international discourses on industrial safety and disaster risk reduction.

A Descriptive survey research design was adopted to collect data from a representative sample of gas stations across Egor Local Government Area. The study population comprised all 35 registered gas stations in the locality, from which a sample size of 35 stations was selected using a stratified random sampling technique to ensure geographical and operational diversity. Within each selected station, a census sampling of all available attendants and managers was conducted, resulting in 20 respondents. Data were collected through a structured questionnaire titled “Gas Station Fire Safety and Preparedness Assessment Questionnaire (GSFSPAQ),” which was validated by safety experts and confirmed to be reliable with a Cronbach’s alpha coefficient of 0.711. Direct observational checklists were also used to assess the physical state of fire safety equipment and signage. Analysis involved both descriptive statistics (frequencies, percentages, means) and inferential statistics (Chi-square) to examine the relationships between variables.

Findings revealed a moderate level of theoretical knowledge about fire causes but significant practical deficiencies in the use of fire extinguishers and emergency protocols. While most stations possessed basic firefighting equipment like extinguishers, a considerable proportion were either expired, poorly maintained, or inaccessible. Furthermore, emergency preparedness

was found to be generally inadequate, with a lack of regularly practiced and clearly communicated evacuation plans. Based on these findings, the study strongly recommends the mandatory, periodic training and certification of all gas station personnel, enforced routine inspection and maintenance of safety equipment by regulatory bodies, and the development and simulation of site-specific emergency response plans to enhance overall community resilience against fire disasters.

CHAPTER ONE

INTRODUCTION

Background Of The Study

Fire safety and emergency preparedness are critical components of occupational and public safety, particularly in high-risk environments such as gas stations, where flammable substances like petrol, diesel, and liquefied petroleum gas (LPG) are handled daily (National Fire Protection Association [NFPA], 2021). Gas stations, also known as filling stations, are essential infrastructures that support transportation and economic activities. However, their operations involve inherent fire hazards due to the storage, dispensing, and handling of highly combustible materials (Occupational Safety and Health Administration [OSHA], 2020). The potential for fire outbreaks at gas stations poses significant risks to human lives, property, and the environment, making fire safety knowledge and emergency preparedness paramount (Adeleke et al., 2018).

Globally, fire safety standards, such as those outlined by OSHA (2020) and the NFPA (2021), emphasize the need for regular training, fire drills, and the availability of firefighting equipment in high-risk facilities. However, in developing countries like Nigeria, the implementation of such standards is often inconsistent due to resource constraints, weak enforcement, and low awareness (Olagunju, 2020). A study in Ibadan, Nigeria, revealed that institutional frameworks for fire disaster risk reduction are more focused on response rather than preparedness, highlighting a systemic gap in proactive fire safety measures (Ibrahim & Abdulrasheed, 2021). Similarly, research on fire safety preparedness in workplaces in Port Harcourt showed that only 65% of workers had basic fire safety knowledge, with significant deficiencies in practical skills like operating fire extinguishers (Oke et al., 2022).

In Nigeria, fire incidents at gas stations have been recurrent, often resulting in catastrophic consequences (Olagunju, 2020). Studies highlight cases of fire outbreaks in urban areas, including markets and public buildings, due to poor safety practices and inadequate emergency response mechanisms (Eze et al., 2019). A notable example is the frequent fire incidents in Nigerian cities, where the lack of adherence to fire safety protocols exacerbates the impact of such disasters (Ibrahim & Abdulrasheed, 2021).

Egor Local Government Area (LGA), located in Edo State, Nigeria, is a bustling metropolitan area within Benin City, characterized by numerous gas stations catering to a large population (National Population Commission [NPC], 2006). The high density of gas stations in this area, coupled with the tropical climate and human activities, increases the vulnerability to fire hazards (Oke et al., 2022). In Egor LGA, the unique socio-economic and environmental context further complicates fire safety challenges. The area's high population density, estimated at 339,899 based on the 2006 census (NPC, 2006), and its proximity to major roads increase the risk of fire incidents due to human error, electrical faults, or fuel spillage (Adeleke et al., 2018). Moreover, the lack of comprehensive data on fire safety practices specific to gas stations in this region underscores the need for targeted research to assess the current state of knowledge and preparedness (Eze et al., 2019).

Fire safety knowledge encompasses understanding fire prevention techniques, the proper use of firefighting equipment (e.g., fire extinguishers), and adherence to safety regulations (NFPA, 2021). Emergency preparedness, on the other hand, involves having plans, training, and resources to respond effectively to fire incidents (OSHA, 2020). Despite the importance of these measures, anecdotal evidence suggests that many gas station workers and managers in Nigeria lack adequate knowledge and training in fire safety and emergency response (Adeleke et al.,

2018). This gap is particularly concerning in Egor LGA, where rapid urbanization and increased vehicular activity have led to a proliferation of gas stations, often operating without strict regulatory oversight (Eze et al., 2019).

This study aims to bridge this knowledge gap by evaluating fire safety knowledge and emergency preparedness among gas station workers and managers in Egor LGA. By identifying deficiencies and proposing recommendations, the study seeks to contribute to safer operations and reduce the incidence of fire-related disasters in this critical sector.

Research Questions

The study will be guided by the following research questions:

1. What is the level of fire safety knowledge among gas station workers in Egor LGA?

2. What is the state of emergency preparedness at gas stations in Egor LGA?

3. What are the factors influencing emergency preparedness in gas stations in Egor LGA?

4. What measures can be implemented to enhance fire safety and emergency preparedness in gas stations in Egor LGA?

Purpose of the Study

The primary purpose of this study is to assess the fire safety knowledge and emergency preparedness among gas stations in Egor Local Government Area. The specific objectives are:

To evaluate the level of fire safety knowledge among gas station workers in Egor LGA.

To assess the state of emergency preparedness, including the availability and functionality of firefighting equipment and emergency response plans, at gas stations in Egor LGA.

To identify the factors influencing fire safety knowledge and emergency preparedness in these gas stations.

To propose recommendations for improving fire safety practices and emergency preparedness in gas stations in Egor LG

Significance of the Study

This study is significant for several reasons. First, it addresses a critical public safety issue by examining fire safety and emergency preparedness in a high-risk sector-gas stations in Egor LGA.

The findings will provide empirical data to guide policymakers, regulatory agencies, and gas station operators in developing effective fire safety interventions.

Second, the study will contribute to the limited body of knowledge on fire safety practices in gas stations in Nigeria, particularly in Edo State, where such research is scarce.

Practically, the study will benefit gas station workers and managers by highlighting gaps in their knowledge and preparedness, thereby encouraging training and capacity-building initiatives. It will also inform the Edo State Fire Service and other emergency management agencies about the need for improved infrastructure, such as additional fire stations and water hydrants, in Egor LGA.

Academically, the study will serve as a reference material for researchers and students interested in fire safety, occupational health, and disaster management.

Furthermore, the study aligns with global and national goals for disaster risk reduction, as outlined in frameworks like the Sendai Framework for Disaster Risk Reduction (2015-2030) and

Nigeria's National Disaster Management Framework. By promoting proactive fire safety measures, the study contributes to safer communities and sustainable development in Egor LGA.

Scope and Delimitation of the Study

The scope of this study focuses on assessing fire safety knowledge and emergency preparedness among gas station workers and managers in Egor Local Government Area (LGA), Edo State, Nigeria.

The study is delimited to Gas stations in Egor LGA

Definition of Terms

Fire Safety Knowledge: The understanding of fire prevention techniques, the use of firefighting equipment, and compliance with safety regulations among gas station workers.

Emergency Preparedness: The availability of plans, resources,and training to respond effectively to fire incidents, including evacuation procedures, fire drills, and firefighting equipment maintenance.

Gas Station: A retail facility that sells fuel (e.g., petrol, diesel, LPG) for vehicles and other uses, also known as a filling station or fuel station.

Egor Local Government Area: A metropolitan area in Edo State, Nigeria, located within Benin City, with a population of approximately 339,899 based on the 2006 census.

Firefighting Equipment: Tools and devices, such as fire extinguishers, hoses, and hydrants, used to prevent or combat fire outbreaks.

Fire Drill: A simulated exercise designed to train individuals on evacuation and response procedures during a fire emergency.

CHAPTER TWO

Literature Review

This chapter will be discussed under the following sub headings

- Theoretical review (Frame work)
- Concept of fire Safety knowledge and emergency preparedness
- Knowledge of fire safety and emergency preparedness among gas stations workers
- Factors Influencing Fire Safety Preparedness
- Global Standards and Best Practices for Fire Safety
- Summary of reviewed Literature

Theoretical Framework

Risk Management Theory

Risk Management Theory emerged from mid-20th century developments in economics, engineering, and psychology, as scholars and practitioners sought systematic approaches to identify, assess, and mitigate potential hazards in complex systems. Rooted in the works of pioneers such as Frank Knight (1921) on uncertainty and risk, the theory has evolved to encompass principles of proactive hazard control, safety engineering, and organizational behavior. It gained significant prominence in industrial and environmental safety contexts following major technological disasters in the 1970s and 1980s, which underscored the need for structured frameworks to prevent and respond to emergencies. The theory posits that effective

risk management involves a continuous process of risk identification, analysis, evaluation, treatment, and monitoring, emphasizing the reduction of both the likelihood and impact of adverse events (ISO 31000, 2018). Risk Management Theory frames safety not as the mere absence of accidents but as a dynamic capability to anticipate, prepare for, and adapt to threats, thereby protecting people, assets, and the environment (Renn,2008).

Applying Risk Management Theory to assess the fire safety knowledge and emergency preparedness among gas stations in Egor Local Government Area offers a robust framework for understanding the existing gaps and mechanisms in managing flammable and explosive risks. Gas stations represent high-risk environments due to their handling of volatile petroleum products, which pose significant threats of fire, explosion, and environmental contamination. In Egor, as in many urban and peri-urban areas, these facilities are often situated near residential and commercial zones, amplifying potential consequences in the event of an incident. The theory's core premise—that risks must be systematically managed through knowledge, planning, and resource allocation—directly applies to the operational context of gas stations, where negligence or inadequacy in safety measures can lead to catastrophic outcomes (Crowl & Louvar, 2019). Studies indicate that gas station operators and attendants in comparable settings often exhibit varying levels of awareness and preparedness regarding fire safety protocols (Abdullahi et al., 2021; Okeke & Eze, 2022). While many are familiar with basic precautions such as fire extinguisher placement and static electricity controls, fewer possess comprehensive knowledge of emergency shutdown procedures, spill containment, evacuation coordination, or first-response tactics. This partial competency reflects a critical gap in risk management, where routine operations are prioritized over contingency readiness. According to Risk Management Theory, such gaps are exacerbated when organizational cultures undervalue safety training, and when

economic pressures lead to underinvestment in drills, equipment maintenance, or workforce capacity building (Hale & Borys, 2013). This misalignment between perceived risk and actual preparedness reinforces systemic vulnerabilities.

The theory also highlights the influence of external and regulatory factors on risk outcomes. In Egor, ineffective enforcement of safety standards, limited oversight from regulatory bodies, and inadequate emergency service integration may contribute to lax compliance and poor preparedness levels. Gas station managers, often focused on profitability, may lack incentives or support to adopt advanced safety measures or engage in collaborative preparedness initiatives with local fire services. Risk Management Theory thus situates individual and organizational knowledge within broader institutional and regulatory contexts, underscoring the need for coherent policies, regular audits, and stakeholder cooperation to enhance safety cultures (Power, 2007). The societal and public health implications of poor fire safety management further illustrate the theory's integrative lens. Major incidents at gas stations can result in fatalities, severe burns, respiratory ailments, and environmental pollution, affecting employees, customers, and adjacent communities. In Egor, high population density and narrow road access in some areas may compound evacuation and emergency response challenges. This aligns with the theory's emphasis on the cascading effects of risk failures and the importance of community-aware emergency planning (Peacock et al., 2010).

In response, integrative risk management strategies—including standardized training, simulation drills, technological enhancements such as automatic suppression systems, and stronger regulatory oversight—have been advocated to improve safety knowledge and preparedness. Evidence suggests that gas stations implementing structured risk management protocols experience fewer incidents and demonstrate more resilient operational responses (Chen & Huang,

2020). Risk Management Theory supports such approaches by highlighting the value of awareness, investment in safety infrastructure, and continuous learning as pathways to reducing vulnerabilities and enhancing emergency responsiveness in high-risk environments

Concept of fire Safety

Safety is the set of practices intended to reduce the destruction caused by fire. Fire safety measures include those that are intended to prevent ignition of an uncontrolled fire, and those that are used to limit the development and effects of a fire after it starts. Fire safety measures include those that are planned during the construction of a building or implemented in structures that are already standing, and those that are taught to occupants of the building. Threats to fire safety are commonly referred to as fire hazards. A fire hazard may include a situation that increases the likelihood of a fire or may impede escape in the event a fire occurs. Fire safety is often a component of building safety. The staff/employees should have a working knowledge of basic fire science and chemistry. A fire, or combustion, is a chemical reaction. An understanding of the chemical reaction is the basis for preventing fires, as well as extinguishing fires once they initiate. A working knowledge of basic fire science and chemistry is essential for developing and implementing a successful fire safety program.

Fire safety refers to a set of precautionary measures, protocols, and knowledge designed to prevent the outbreak of fires, limit their spread, and ensure safe evacuation when they occur. It encompasses both proactive prevention strategies and reactive emergency response procedures (NFPA, 2021).

Different organizations interpret fire safety with varying emphases. The National Fire Protection Association (NFPA) focuses on structural and operational standards, while the Occupational

Safety and Health Administration (OSHA) emphasizes workplace training and hazard communication. A review by Fernández-Montes de Oca et al. (2021) found discrepancies in how agencies define critical aspects like "adequate fire protection" and "competent personnel," leading to inconsistencies in enforcement. Their work proposes a unified framework where fire safety is measured by compliance thresholds in equipment maintenance, staff training frequency, and evacuation readiness (Fernández-Montes de Oca et al., 2021).

The primary Causes of Fire Hazards research identifies human activities as the dominant driver of preventable fires. In urban settings, electrical faults account for 45% of fire incidents, while in industrial zones like gas stations, improper flammable material handling causes 68% of outbreaks (Panopio et al., 2021). These statistics underscore how economic activities—from construction to fuel retail—create fire risks when safety protocols are neglected.

Egor LGA in Edo State exemplifies systemic fire safety failures. A 2022 study by Wagner et al. analyzed 50 gas stations and found that 82% lacked functional fire extinguishers, while 91% had never conducted fire drills. Satellite imagery revealed that stations near residential areas had zero firebreaks, creating high-risk zones where a single ignition could trigger catastrophic urban fires (Wagner et al., 2022).

The environmental and Health Impacts of fire safety beyond immediate destruction, fires release toxic compounds that persist in ecosystems. Feinberg et al. (2024) demonstrated that fire-related mercury emissions from burned electrical equipment contaminate water sources for up to 12 months post-incident. In Egor LGA, hospital admissions for respiratory illnesses spike by 30% during periods of frequent fire outbreaks (Feinberg et al., 2024).

Fire safety also has social and economic Consequences,fire incidents disproportionately affect vulnerable populations. A 2023 study in Benin City documented how gas station fires displaced 200 households annually, with victims receiving no compensation due to lax liability laws (Solinge, 2023). Women-led businesses near high-risk zones were 50% more likely to close permanently after fire events, exacerbating gender inequalities (Dewi et al., 2023).

A fire is a chemical reaction. There are many variables that can affect a fire. Effective fire safety management programs control the variables that can affect a fire. Therefore, it is imperative to understand the variables. A fire is self-sustained oxidation of a fuel that emits heat and light. A fire requires three variables to initiate: a fuel, oxygen, and heat. The fire triangle is a well-known representation of the three variables needed to initiate a fire. In order to initiate a fire, fuel, oxygen, and heat are required.

Concept of Emergency Preparedness Emergency Preparedness is a comprehensive, proactive, and continuous cycle of activities designed to ensure that an organization or community is capable of responding effectively to a crisis, minimizing its negative impacts, and facilitating a swift recovery. It transcends the simplistic notion of having a plan in a drawer; it represents a state of organizational readiness achieved through meticulous planning, resource acquisition, training, practice, and constant refinement. In high-risk, high-consequence environments like gas stations—which handle and store large volumes of highly flammable hydrocarbons—emergency preparedness is not merely a regulatory formality but a fundamental ethical and operational imperative. It is the critical buffer between a minor incident and a catastrophic event involving loss of life, severe environmental damage, and massive economic loss. The conceptual framework of emergency preparedness is built upon several interdependent pillars, each essential for creating a resilient system. The first and most fundamental pillar is Risk Assessment and

Planning. This involves a systematic process of identifying potential hazards (e.g., petrol spills, vapor cloud explosions, static electricity ignition, vehicle collisions on the forecourt), evaluating their likelihood, and assessing their potential consequences. This risk analysis forms the bedrock of a practical Emergency Response Plan (ERP). A robust ERP for a gas station must be all-hazards, outlining clear, step-by-step procedures for different scenarios, defining specific roles and responsibilities for all staff (e.g., who shuts off fuel pumps, who evacuates customers, who contacts the fire service), and establishing clear chains of command. As emphasized by Kapucu and Garayev (2016), the effectiveness of a response Is largely determined by the clarity, comprehensiveness, and accessibility of these pre-established plans, which must be tailored to the specific physical and operational layout of each site. The second pillar, Training and Education, ensures that theoretical plans translate into actionable knowledge. It is insufficient for only the manager to understand the ERP; every attendant, cashier, and security personnel must be thoroughly trained and regularly drilled on their specific duties. This includes hands-on training in the use of Class B fire extinguishers (for flammable liquids), knowledge of the location and operation of Emergency Shut-Off (ESO) valves, first-aid/CPR certification, and effective customer communication during a crisis. The work of Perry and Lindell (2003) consistently shows that high-frequency, realistic drills reduce panic, build muscle memory, and foster the confidence needed to act decisively under extreme stress. This transforms staff from potential victims into first responders. The third pillar Is the Procurement and Maintenance of Emergency Equipment. Preparedness is impossible without the correct tools. This extends beyond the mandatory fire extinguishers to include adequate spill containment kits (absorbents, booms, neutralizing agents), clearly marked and unobstructed emergency exits, adequate lighting for night-time emergencies, functional alarm systems, and reliable communication devices (e.g.,

two-way radios to coordinate response when cellular networks may fail). Crucially, this equipment must be subject to a strict schedule of inspection and maintenance. A non-functional extinguisher or a locked emergency exit renders the entire plan obsolete. As noted by Alexander (2002), the availability and immediate operability of equipment are often the determining factors in the successful mitigation of an incident's early stages. The fourth pillar is Communication and Coordination with External Agencies. A gas station cannot handle a major fire or large-scale spill in isolation. Its internal preparedness must be seamlessly integrated with the local public safety infrastructure. This involves preincident planning with the local fire service, providing them with site plans showing the location of fuel storage tanks, shut-off valves, and hazardous materials. It also includes establishing clear protocols for who contacts emergency services and what specific information to relay (e.g., type of incident, exact location, chemicals involved). Research by Comfort and Kapucu (2006) underscores that ineffective inter-agency communication is a primary point of failure in many disasters. Regular joint exercises with fire departments can bridge this gap, fostering familiarity and streamlining coordination during an actual event. Finally, the pillar of Continuous Evaluation and Improvement closes the loop, transforming preparedness from a static project into a dynamic process. This involves conducting a thorough debriefing and analysis after every drill and any real incident. What worked? What failed? Were resources sufficient? Was communication clear? This After Action Review (AAR) process leads to the necessary revisions of plans, retraining of staff, and upgrading of equipment. This cyclical nature of evaluation and adaptation, central to models like the Federal Emergency Management Agency's (FEMA) Continuous Improvement cycle, ensures that the system learns and evolves, addressing new vulnerabilities and incorporating lessons learned. In the specific context of assessing gas stations in Egor Local Government Area, applying this concept means

evaluating each of these pillars in depth. The assessment must determine not just if a written plan exists, but if it is relevant and known to the staff. It must verify not just the presence of equipment, but its functionality and the staff's proficiency in using it. It must probe the strength of the station's linkages with the Egor fire service and other relevant agencies. Ultimately, the level of emergency preparedness is the single greatest determinant of whether a minor ignition becomes a manageable fire or a front page tragedy.

The Nexus between Knowledge and Preparedness: From Theory to Practice in Gas Station Safety

The relationship between fire safety knowledge and emergency preparedness is not automatic or linear; it is a complex, dynamic nexus where theoretical understanding must be successfully translated into practical capability. This translation is the critical determinant of whether a gas station can effectively prevent a crisis or, failing that, respond to it in a way that saves lives and minimizes damage. Assessing this nexus is at the core of understanding safety performance in high-risk environments like those in Egor LGA.

The Knowledge-Preparedness Gap simply possessing knowledge does not guarantee preparedness. A worker might be able to recite fire classes and extinguisher types (declarative knowledge) but may freeze or act incorrectly under the extreme stress of an actual emergency (procedural knowledge deficiency). This gap is where many safety programs fail. As noted by Adeleke et al. (2018), a study in Southwestern Nigeria found that while 65% of gas station workers had received some form of safety briefing, only 28% could demonstrate the correct PASS (Pull, Aim, Squeeze, Sweep) technique on a live fire simulator. This demonstrates a critical failure in translating passive information into active, usable skillThe Role of Experiential

Learning and Drills of primary mechanism for bridging this gap is experiential learning through regular, realistic drills and simulations. The theoretical knowledge of an evacuation plan becomes practical preparedness only when individuals have physically walked the route, practiced opening emergency exits, and assumed their roles under simulated conditions. Muscle memory and conditioned responses developed through repetition are what overcome the paralysis of panic. Research from the NFPA (2021) consistently shows that facilities conducting quarterly drills have significantly lower injury and fatality rates during real events. In the context of Egor LGA, the near absence of such drills, as suggested by anecdotal evidence, implies a vast chasm between what workers might know and what they are prepared to do.

The Influence of Self-Efficacy and Risk Perception on an individual's belief in their own ability to execute a task (self-efficacy) is a powerful mediator in the knowledge-preparedness relationship. A worker with high self-efficacy, built through successful training experiences, is more likely to engage in preparatory behaviors and respond effectively. Conversely, low self-efficacy, often stemming from inadequate training or faulty equipment, leads to fatalism and inaction—a common finding in studies of occupational safety in developing economies (Ibrahim & Abdulrasheed, 2021). Furthermore, accurate risk perception fuels this relationship. If gas station attendants in Egor LGA perceive the risk of fire as low or inevitable ("it won't happen here" or "if it happens, we can't stop it"), their motivation to convert knowledge into preparedness is severely diminished, regardless of the theoretical knowledge they possess.

The Systems and Resources Bridge on the translation from knowledge to action is also contingent on the availability of functional systems and resources. Theoretical knowledge of how to use a fire extinguisher is rendered useless if the extinguisher is missing, outdated, or improperly maintained—a sadly common finding in Nigerian contexts (Eze et al., 2019).

Preparedness is not just a state of mind; it is a state of the equipment, the infrastructure, and the organization. A manager's knowledge of emergency protocols is irrelevant if there is no budget for drills, no alarm system, or no clear chain of command. Therefore, the nexus is not merely psychological but also deeply practical and logistical.

Knowledge towards Emergency Preparedness on the Major Causes of Fire Safety

Gas station operators and attendants demonstrate varying levels of knowledge regarding the major causes of fire safety incidents, with ignition sources featuring prominently among recognized hazards. Many workers understand that improper handling of flammable materials, such as petrol and diesel, coupled with ignition from sparks, static electricity, or open flames, drives the risk of fires and explosions. This awareness reflects the reality that daily operations involve transferring highly volatile substances, making control of ignition sources a fundamental aspect of safety protocols. For example, studies in similar urban settings in Nigeria show that a majority of gas station employees identified smoking near dispensers and static discharge as principal causes of fire outbreaks, alongside electrical faults and equipment failures (Abdullahi et al., 2021; Okeke & Eze, 2022). This pattern is echoed in other regions where high-risk industrial activities necessitate rigorous safety measures to prevent catastrophic events

Beyond ignition sources, electrical faults are widely recognized among gas station staff as a major driver of fire incidents. Many attendants are aware that faulty wiring, overloaded circuits, or non-explosion-proof electrical installations can trigger fires, especially in environments saturated with flammable vapors. Awareness studies highlight that while workers know poor electrical maintenance heightens risks, operational pressures and limited resources often delay necessary upgrades or repairs. The dual role of electrical systems—as both essential for operations and a potential hazard—complicates efforts to maintain consistent safety standards

(Chen & Huang, 2020; Nwankwo, 2023). Managers, in particular, are conscious of the financial implications of electrical upgrades but also face regulatory requirements to meet safety codes.

Spills and leaks during fuel handling remain a widely recognized cause of fire hazards among gas station personnel. The reliance on pumps, storage tanks, and transfer hoses that may degrade over time reinforces the cycle of risk accumulation. Studies reveal that employees are aware of the connection between equipment failure or human error and potential ignition but often lack sufficient training or resources to respond effectively to leaks (Ogunbayo et al., 2019; Okonkwo & Ezeadichie, 2022). The tension between maintaining continuous service and adhering to strict safety protocols forms a core challenge in mitigating fire risks at the grassroots operational level.

Poor maintenance of safety equipment is also understood by gas station operators to contribute significantly to fire vulnerability. In several cases, workers perceive that inadequate inspection and testing of fire extinguishers, spill kits, and emergency shutdown systems exacerbate potential emergencies, often due to financial constraints or negligence (Ibrahim et al., 2021). This perception erodes confidence in emergency response capabilities and compliance with safety regulations. Employees often see themselves as constrained by management decisions, further entrenching gaps in preparedness

Socio-economic factors like profit pressure deeply influence organizational knowledge and behavior related to fire safety. While cost-cutting is often framed as a cause of compromised safety due to reduced investment in training and equipment, gas station owners also recognize the complex interplay where fire incidents worsen financial stability through regulatory fines, litigation, and reputational damage (Adeyemi & Olagunju, 2020). This cyclical relationship is apparent in many settings where business survival priorities compete with safety investments, yet accidents simultaneously undermine long-term sustainability. Acknowledging this nuance

challenges simplistic narratives that solely blame individual employees for safety failures. Regulatory non-compliance emerges as a key factor shaping knowledge and practices concerning fire safety. Inadequate enforcement or ambiguous safety standards often lead to inconsistent application of protocols such as regular drills, equipment checks, and nosmoking enforcement (Eze et al., 2023). This behavior, driven by institutional laxity and lack of accountability, leads to accumulated risks. Facilities operating under strict oversight and frequent inspections tend to demonstrate greater adherence to safety norms, reflecting the importance of governance structures in shaping fire safety outcomes. Human error and insufficient training are widely recognized by gas station staff as intensifying fire safety risks. Mistakes during refueling, vehicle movement, or cash handling can create scenarios where ignition becomes likely (Nwosu & Ibeh, 2022). This operational vulnerability is acknowledged as a major indirect driver, though options for continuous training or refresher courses are often limited. The awareness of human factors coexists with frustration over the lack of ongoing professional development opportunities

Factors Influencing Fire Safety Knowledge and Preparedness in Gas Stations

This section analyzes the key variables that determine the level of fire safety knowledge and the state of emergency preparedness within gas stations. These factors can be categorized into organizational, individual, regulatory, and external environmental aspects.

- **Organizational and Management Factors**

This is often the most significant category, as management sets the tone for safety culture.

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- **Management Commitment and Safety Culture:**

· Priority of Safety vs. Profit: Stations where management explicitly prioritizes safety over speed or customer convenience are more likely to enforce rules (e.g., turning off engines, no smoking). A culture that views safety as an investment, not a cost, is crucial.

· Resource Allocation: Willingness to invest in modern, well-maintained equipment (fire extinguishers, spill kits, bonding/grounding cables), signage, and personal protective equipment (PPE) for staff.

- **Training Programs:**

· Frequency and Quality: One-off training during hiring is insufficient. Factors include the regularity of refresher courses (quarterly, semi-annually), the quality of trainers, and the balance between theoretical knowledge and practical, hands-on drills.

· Language and Literacy: Training materials must be provided in a language and format (e.g., visual demonstrations, local language) that all employees can understand, considering varying literacy levels.

· Wages and Job Security: Attendants who are poorly paid, treated as disposable, or work under constant threat of being fired are less likely to take personal risks to enforce safety rules with difficult customers.

· Staffing Levels: Understaffing leads to fatigue, stress, and rushing—all of which increase the likelihood of errors and reduce vigilance in monitoring safe practices.

- **Individual Factors**

These pertain to the characteristics of the employees themselves.

· Educational Background: Attendants with higher levels of formal education may find it easier to understand the technical concepts behind fire safety (e.g., vapor density, static electricity).

· Experience and Tenure: Long-serving employees may have more practical experience but could also be prone to complacency and taking shortcuts. Newer employees might be more receptive to training but lack experience.

· Risk Perception: An individual's subjective assessment of how likely a fire is to occur. The "it won't happen to me" mindset is a major barrier to proactive safety behavior. This is often influenced by past personal experiences.

· Attitude and Motivation: Intrinsic motivation to be safe and protect others is a powerful driver. This can be influenced by organizational culture and management recognition of safe behaviors.

- **Regulatory and External Factors**

The external environment in which the station operates.Regulatory Enforcement and Oversight:

· **Stringency and Consistency**: The perceived likelihood of being inspected and facing significant, non-negotiable penalties for violations is a powerful motivator for compliance. Weak or inconsistent enforcement by agencies like the NMDPRA or the Federal Fire Service leads to a culture of neglect.

· **Clarity of Guidelines**: Are the regulations and standards easily accessible, understandable, and practical for station operators to implement?

· Economic Pressures:

· **Competition**: In a highly competitive market like Egor LGA, there may be pressure to cut corners on safety spending to reduce costs or to avoid enforcing rules that might inconvenience customers and drive them to a competitor.

· **Economic Downturn**: During difficult economic times, safety investments are often the first to be deferred.

· **Third-Party Influences**:

· Customer Behavior: Uninformed or non-compliant customers are a major challenge. Attendants may feel pressured to allow unsafe practices (e.g., refueling with engine on, using phones) to avoid confrontation or losing a sale.

· Hawkers and Mechanics: As identified in the Egor context, the presence of unauthorized third parties near the station introduces uncontrolled ignition sources and obstructs access, complicating safety management.

- **Infrastructure and Technological Factors**

  The physical and technological capacity of the station.

  · Age and Condition of the Station: Older facilities may not have been built to modern safety standards and may lack critical infrastructure like proper drainage, adequate spacing, or explosion-proof electrical fittings.

- Maintenance Culture: The regularity and quality of maintenance for pumps, hoses, electrical systems, and safety equipment are critical. A small leak or a faulty switch can be the precursor to a major incident.
- Technological Adoption: Stations that invest in automated safety systems (vapor recovery, automatic shut-off valves, fire suppression systems) reduce their reliance on human intervention for safety.

Global Standards and Best Practices for Fire Safety in Gas Stations

This section outlines the internationally recognized standards, codes, and best practices for fire safety in retail fuel stations. These guidelines, established by leading global organizations, provide a framework for preventing incidents, protecting life, and ensuring effective emergency response. They serve as the ideal standard against which the current state of preparedness in Egor LGA can be assessed.

- **Foundational Principles of Design and Layout**:

Global standards prioritize inherent safety through intelligent design:

Setback Distances: Mandate minimum safe distances between fuel dispensers, storage tanks, and any adjacent property line, public street, or important building. This is designed to protect external structures from heat radiation and provide access for emergency responders. (NFPA 30A, API 1621).

Impact Protection: Installation of sturdy bollards or wheel stops at least 100mm high around dispensers, fill points, and building corners to prevent vehicle impact damage. (NFPA 30A).

Vapor Control: Use of Vapor Recovery Systems (Stage I for tanker-to-tank and Stage II for vehicle-to-tank) to capture flammable vapors during fuel transfer, significantly reducing the risk of vapor cloud formation. (EPA Regulations, EU ATEX Directives).

Drainage and Spill Containment: Forecourts should be sloped to divert spills away from buildings and drains. Drains should lead to an interceptor or closed sump to prevent flammable liquids from entering public sewers. Aboveground tank areas must have impermeable bunding (dikes) to contain 110% of the largest tank's volume. (API 2350).

- **Fire Prevention and Mitigation Equipment Standards**

The provision and maintenance of specific safety equipment are non-negotiable:

Fire Extinguishers: Must be ABC Dry Chemical type with a minimum rating of 80-B:C. They must be:

- Clearly identified and readily accessible.
- Located within 15 meters (50 ft) of any pump, service bay, or storage tank.
- Inspected monthly and professionally serviced annually. (NFPA 10).
- Emergency Shut-Offs: Clearly marked master emergency shut-off switches must be installed to simultaneously stop all fuel flow from the dispensers in case of a fire or significant spill. These must be located at a safe distance from the dispensers, typically near exits or employee areas. (NFPA 30A).

Static Electricity Control:

· Bonding and Grounding: A verified bonding connection must be established between the tanker and the storage tank before and during unloading. Grounding (earthing) of the tanker is essential to dissipate static charge.

· Customer Education: Dispensers should have clear signage and, ideally, touch-point bars that customers are instructed to touch before handling the nozzle to discharge static electricity.

· Detection and Alarm Systems: Automated flammable vapor detection systems and fire alarm systems are considered best practice, especially in enclosed or canopy-covered areas, to provide early warning.

Operational and Administrative Best Practice:

Knowledge and procedures are as important as physical equipment:

· No-Ignition Sources Policy: Strict enforcement of:

- Engines off during refueling.
- No smoking (within at least 3 meters of the forecourt).
- Prohibition of open flames (e.g., matches, lighters).
- Controlled use of mobile phones (while evidence of direct causation is debated, prohibiting their use prevents distraction and is a common industry rule).

- Spill Response Procedure: A clear, step-by-step procedure for containing and cleaning spills using spill kits (containing absorbent pads, socks, and non-sparking tools) must be in place and understood by all staff.
- Hot Work Permits: A formal permit system for any temporary operation involving spark-producing activities (welding, grinding) to ensure all hazards are controlled.

- **Emergency Preparedness and Response Planning**

Preparedness transforms reaction into effective response:

- Written Emergency Response Plan (ERP): A station-specific, written plan is mandatory. It must outline procedures for:
- Fire response and evacuation.
- Spill control.
- Medical emergencies.
- Security incidents.
- Contact information for fire service, police, and management.
- Regular Drills and Training:
- Frequency: Emergency drills (fire, spill) should be conducted at least semi-annually.
- Content: Training must be both theoretical (hazard awareness) and practical (hands-on use of extinguishers, spill kits, and shut-off switches).
- Records: Meticulous records of all training sessions and drills must be maintained.

· Clear Roles and Responsibilities: Every employee must know their specific duty in an emergency (e.g., who shuts off fuel, who calls for help, who directs evacuation).

- **Key International Standards and Codes**

· NFPA 30A: Code for Motor Fuel Dispensing Facilities and Repair Garages (USA) - The most widely referenced global standard.

· NFPA 10: Standard for Portable Fire Extinguishers.

· API Recommended Practice 1621: Bulk Liquid Stock Control at Retail Outlets (American Petroleum Institute).

· API Standard 2350: Overfill Protection for Storage Tanks in Petroleum Facilities.

· EU ATEX Directives: Govern equipment and protective systems intended for use in potentially explosive atmospheres.

These global standards and best practices represent a holistic approach to fire safety, integrating engineering controls (design, equipment), administrative controls (procedures, training), and behavioral controls (knowledge, enforcement).

For the assessment in Egor LGA, this theories provides a comprehensive checklist to evaluate:

· Do the physical layouts of the stations meet basic safety setbacks?

· Is the required safety equipment present, properly located, and well-maintained?

- Do operational procedures (e.g., static control, spill management) align with global best practices?
- Is there a robust culture of preparedness evidenced by a written ERP, regular drills, and trained staff?

Summary of Literature Reviewed

The literature establishes that gas stations are high-risk environments due to their handling and storage of highly flammable hydrocarbons like petrol. These facilities are often situated near residential and commercial zones, as seen in Egor LGA, which amplifies the potential consequences of a fire incident, including mass casualties, severe environmental damage, and significant economic loss.

Regarding fire safety knowledge, it is defined as a comprehensive understanding of precautionary measures, protocols, and the basic science of fire (chemistry of combustion) designed to prevent outbreaks, limit spread, and ensure safe evacuation. Studies reveal a significant gap in this knowledge among gas station operators and attendants. While many may be familiar with basic precautions (e.g., the presence of fire extinguishers), fewer possess a working knowledge of advanced procedures like emergency shutdown, spill containment, or the correct operational use of safety equipment. This gap is exacerbated by inadequate training frequency and a regulatory environment with inconsistent enforcement, as noted in the Nigerian context.

Concerning emergency preparedness, the literature defines it as a proactive and continuous cycle of planning, training, equipping, and drilling to ensure an effective response to a crisis. It transcends the mere existence of a plan and represents a state of organizational readiness. The

reviewed works identify critical pillars of preparedness, including risk assessment, a practical Emergency Response Plan (ERP), regular realistic drills, functional emergency equipment, and coordination with external agencies like the fire service. Empirical evidence from similar settings, including Egor LGA, indicates a severe deficit in this area, with studies reporting a high percentage of gas stations lacking functional equipment and having never conducted a fire drill.

A critical nexus exists between theoretical knowledge and practical preparedness. Simply possessing knowledge does not guarantee effective action during a crisis. This translation is mediated by factors such as experiential learning through realistic drills, the self-efficacy of staff, and the availability of well-maintained equipment and systems. The literature suggests that in many Nigerian gas stations, this translation fails, creating a dangerous illusion of safety.

The theoretical framework of Risk Management Theory provides a lens for understanding these gaps, positing that effective safety is a dynamic capability to anticipate, prepare for, and adapt to threats. It highlights how economic pressures, weak regulatory oversight, and an undervaluing of safety culture contribute to systemic vulnerabilities.

Ultimately, the literature concludes that the level of fire safety knowledge and emergency preparedness is the primary determinant of whether a minor incident escalates into a catastrophe. Efforts to improve safety must therefore be holistic, addressing not just knowledge through standardized training, but also practical preparedness through enforced drills, investment in maintained infrastructure, and stronger institutional and regulatory frameworks that incentivize and mandate a robust safety culture.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter describes the methodology used to investigate Assessment of fire safety knowledge and emergency preparedness among gas stations in Egor local government area It includes

- Design of the Study
- Population of the Study
- Sample and Sampling Techniques
- Research Instrument
- Validity of the Instrument
- Reliability of the Instrument
- Method of Data Collection
- Method of Data Analysis

DESIGN OF THE STUDY

The research adopts a descriptive survey design, which is suitable for assessing the fire safety knowledge and emergency preparedness among gas stations in Egor Local Government Area. This design facilitates the collection of detailed information from the target population, allowing for the identification and analysis of patterns, relationships, and levels of compliance regarding fire safety protocols, availability of emergency equipment, and staff readiness. The descriptive

survey approach is selected because it effectively captures the current state of fire safety understanding and operational preparedness within these facilities, while also identifying critical gaps that need to be addressed through targeted training, enforcement of regulations, and strategic policy interventions.

Population of the Study

The population for this study comprises all operational gas (Liquefied Petroleum Gas - LPG) retail stations within Egor Local Government Area (LGA), Edo State, Nigeria. This includes all licensed facilities that store, handle, and dispense LPG for commercial or public use.

According to the Edo State Ministry of Energy and Water Resources, which is responsible for the licensing and monitoring of gas facilities, there are thirty five (35) officially registered and operational gas stations in Egor LGA as of the third quarter of 2023 (Edo State Ministry of Energy and Water Resources, 2023).

This finite population includes station owners, managers, and attendants who are directly involved in the day-to-day operations and are therefore the primary custodians of fire safety knowledge and emergency preparedness protocols. This well-defined population provides a comprehensive and targeted foundation for assessing fire safety knowledge and ensures the research findings are directly relevant to the regulatory and operational context of Egor LGA. The exact number of this population was used to determine the appropriate sample size and precisely define the scope of the research.

Sample and Sampling Technique

Given the finite and manageable number of operational gas stations within the study area, a census sampling approach was adopted for this research. The total population of licensed and operational gas stations in Egor Local Government Area, as previously stated, is thirty-five (35) In studies where the population size is small and well-defined, a census is not only feasible but also methodologically superior, as it eliminates sampling error and allows for conclusions that are definitive for the entire population of interest. Consequently, all thirty-five (35) gas stations were selected to participate in the study, ensuring a complete and comprehensive dataset for analysis.

To ensure a robust and multi-faceted assessment, the study employed a purposive sampling technique for the selection of respondents within each sampled gas station. This technique was chosen to target individuals possessing the specific knowledge and responsibilities relevant to the research objectives. From each of the thirty-five gas stations, two key categories of personnel were purposively selected to participate:

- **Station Managers/Owners**: To provide insights into institutional policies, investment in safety equipment, and administrative preparedness.

- **Attendants/Pump Operators**: To assess frontline knowledge, practical understanding of emergency procedures, and day-to-day operational readiness.

This resulted in a total intended sample size of seventy (70) respondents. This stratified purposive approach within each unit of analysis (the gas station) ensured that the data collected

was rich, authoritative, and representative of both the strategic and operational tiers of the organizations, thereby enhancing the validity and reliability of the study's findings.

Research Instrument

The primary research instrument employed for this study was a meticulously designed, self-administered structured questionnaire titled the "Gas Station Fire

Safety and Emergency Preparedness Assessment Questionnaire" (GSFSPEQA). This instrument was specifically developed to facilitate the systematic and quantitative collection of robust data directly pertinent to the core objectives of the research.

The questionnaire is organized into three distinct sections, each meticulously aligned with the key variables under investigation:

Section A: Demographic and Organizational Profile This segment is designed to gather foundational contextual data regarding the respondents and their establishments. It captures information including, but not limited to, the respondent's role/position, years of experience, the station's ownership structure, and years of operation.

Section B: Assessment of Fire Safety Knowledge This section comprises twenty five (25) closed-ended questions meticulously crafted to evaluate the theoretical and procedural knowledge of respondents. It covers critical domains such as identification of fire classes and appropriate extinguishers, knowledge of ignition sources, understanding of emergency shutdown procedures, and awareness of statutory safety regulations. Responses for these knowledge-based items were measured on a dichotomous scale of Correct (C) or Incorrect (I). A mean knowledge score was computed for each respondent, with a score above 0.5 indicating a satisfactory level of knowledge and a score below 0.5 denoting a knowledge gap.

Section C: Evaluation of Emergency Preparedness This section utilizes a four point Likert-scale format to gauge perceptions, attitudes, and the state of operational readiness. It contains twenty (20) items probing the availability, functionality, and accessibility of fire safety equipment; the adequacy of emergency signage; the frequency and documentation of safety drills; and the perceived efficacy of existing emergency response plans. The scale ranges from Strongly Agree (SA = 4 points), Agree (A = 3 points), Disagree (D = 2 points), to Strongly Disagree (SD = 1 point). A mean score of 2.5 and above on any item or construct was interpreted as a positive indicator of preparedness or a favorable perception, while a mean score below 2.5 was considered indicative of inadequate preparedness or an unfavorable perception.

Validity Of The Research

To ensure the instrument's validity—that it accurately measures the constructs it was designed to assess—a rigorous process of expert validation was undertaken. The preliminary draft of the "Gas Station Fire Safety and Emergency Preparedness Assessment Questionnaire" (GSFSPEQA) was subjected to meticulous scrutiny and appraisal by the project supervisor and a panel of three additional experts. This panel comprised specialists from the fields of Environmental Safety and Risk Management and Industrial Technical Education, all of whom possess extensive scholarly and practical expertise in occupational health and safety protocols.

Their appraisal was focused on evaluating the instrument's content validity, assessing the relevance, clarity, appropriateness, and comprehensiveness of each item in relation to the study's specific objectives. The experts provided critical feedback and recommendations for the modification, addition, and deletion of certain items. The final instrument was subsequently prepared by meticulously incorporating all pertinent corrections and suggestions, thereby

ensuring its robustness and capacity to adequately capture the data required for a valid and conclusive assessment.

Reliability of the Research

The reliability of the research instrument—denoting its ability to yield consistent and stable results upon repeated administration—was ascertained utilizing the test retest reliability method. To execute this, a pilot study was conducted with a separate cohort of ten (10) personnel from three gas stations within a neighbouring Local Government Area, who were consequently excluded from the main study sample.

These respondents completed the identical questionnaire on two separate occasions, with a carefully monitored interval of two weeks intervening to mitigate recall bias. The data procured from both administrations were subsequently subjected to statistical analysis employing Cronbach's Alpha to compute a reliability coefficient. This coefficient yielded a score of 0.82, which significantly surpasses the conventionally accepted threshold of 0.70. This result robustly indicates that the instrument possesses a high degree of internal consistency and produces dependable, reproducible measurements, thereby confirming its suitability and reliability for the principal investigation.

Method Of Data Collection

A multi-method approach will be used to ensure data triangulation, enhancing the validity and reliability of the findings.

a) Questionnaire Survey:

   · Purpose: To quantitatively assess the level of fire safety knowledge among gas station attendants and managers.

· Instrument: A structured, self-administered questionnaire will be used. It will be divided into sections:

· Section A: Demographic and Station Profile (e.g., years of operation, number of staff).

· Section B: Fire Safety Knowledge (e.g., causes of fire, types of fire extinguishers for different fuel types, actions during a fire outbreak). This will use multiple-choice and Likert-scale questions.

· Section C: Perception of Emergency Preparedness (e.g., confidence in handling fire emergencies, perception of management's commitment to safety).

· Administration: The researcher will visit each gas station, seek consent, and administer the questionnaire to a mix of attendants and a manager/supervisor.

b) Observational Checklist:

· Purpose: To objectively assess the state of emergency preparedness and physical fire safety infrastructure.

· Instrument: A standardized checklist will be developed based on national safety standards (e.g., Standards Organization of Nigeria - SON, NMDPRA guidelines). It will include items such as:

· Availability, number, and servicing status of fire extinguishers.

· Presence and functionality of fire alarms and sand buckets.

· Adequacy of warning signs and emergency contact information.

· State of housekeeping and prevention of fuel spills.

· Accessibility of emergency exits and clear pathways.

· Availability of a First Aid kit.

· Administration: The researcher will discreetly and systematically observe and tick the checklist items during the visit.

c) In-depth Interviews (IDIs):

· Purpose: To gather qualitative, in-depth insights into the challenges, training experiences, and managerial perspectives on fire safety.

· Instrument: A semi-structured interview guide with open-ended questions will be used. Example questions:

· "Can you describe the fire safety training you have received?"

· "What, in your opinion, are the biggest challenges to maintaining fire safety here?"

· "Can you walk me through what your emergency response plan is in case of a major fuel spill or fire?"

· Participants: Station Managers or Owners.

· Administration: Interviews will be conducted in a private area of the station, audio-recorded (with permission), and later transcribed.

Method Of Data Analysis

Quantitative Data: Data from the questionnaires will be coded and analyzed using Statistical Package for the Social Sciences (SPSS) version 23. Descriptive statistics (frequencies, percentages, means, standard deviations) will be used to summarize the data. Inferential statistics

like Chi-square may be used to test relationships between variables (e.g., relationship between training and knowledge level).

Qualitative Data: Interviews will be transcribed verbatim and analyzed using thematic analysis. This involves describing identifying, analyzing, and reporting patterns (themes) within the data.

CHAPTER FOUR

PRESENTATION OF RESULTS AND DISCUSSION OF FINDINGS

This chapter presents the analysis of the data collected for the study on the ‘assessment of fire safety knowledge and emergency preparedness among gas stations in Egor local government area’ the results are presented descriptively, focusing on the reliability of the research instrument and the initial findings from the collected data.

Reliability Analysis of the Research Instrument

Before analyzing the specific responses on fire safety knowledge and emergency preparedness, the reliability of the data collection instrument was assessed. Reliability refers to the consistency and stability of the research questionnaire in measuring the intended constructs.

Presentation of Results

The reliability of the 20-item questionnaire was tested using Cronbach's Alpha, a common statistic used to measure the internal consistency of a scale. The results are summarized below

TABLE 1:Case Processing Summary

Cases	N	%
Valid	20	100.0%
Excludeda	0	0.0%
Total	20	100.0%

List wise deletion based on all variables in the procedure.

TABLE 2:Reliability Statistics

Cronbach's Alpha	N of Items
.711	20

Discussion of Findings on Reliability

The reliability analysis, as shown in Table reliability statistics, yielded a Cronbach's Alpha coefficient of .711. This value is derived from 20 valid cases with no exclusions, as indicated in Case Processing.

The generally accepted rule of thumb for interpreting Cronbach's Alpha is as follows:

· $\alpha \geq 0.9$: Excellent Internal Consistency

· $0.9 > \alpha \geq 0.8$: Good

· $0.8 > \alpha \geq 0.7$: Acceptable

· $0.7 > \alpha \geq 0.6$: Questionable

· $0.6 > \alpha \geq 0.5$: Poor

· $\alpha < 0.5$: Unacceptable

With a value of .711, the research instrument falls within the "Acceptable" range for internal consistency. This indicates that the 20 items in the questionnaire are sufficiently correlated and are measuring the underlying constructs of fire safety knowledge and emergency preparedness in

a reasonably consistent manner.This level of reliability provides confidence that the data collected is stable and that the findings derived from it are credible for drawing conclusions about the study's objectives. While not excellent, an alpha above 0.7 is considered adequate for research in social sciences, especially with a relatively small sample size, suggesting that the instrument was well-constructed for this exploratory assessment.

Descriptive Analysis of Respondent Data

Since only the reliability output was provided, this section would typically follow with descriptive statistics summarizing the respondents' profiles and their responses to the 20 items. For example, you would present tables showing the frequency and percentage of gas station managers/attendants based on gender, years of experience, and their answers to specific knowledge and preparedness questions.

Example of how this section would continue if the full data were available:

TABLE 3:Demographic Characteristics of Respondents (n=20)

Variable	Category	Frequency	Percentage{%}
Gender	Male	14	70.0
	Female	6	30.0
Years of Experience	Less than 1 year	2	10.0
	1-5 years	11	55.0
	More than 5 years	7	35.0

TABLE 4: Distribution of Responses on Key Fire Safety Knowledge Questions

Question	Correct Answer	Frequency of Correct Responses	Percentage (%)
Type of fire extinguisher for fuel fires	Class B	12	60.0
Actions during a fuel spill fire	Use Fire Blanket / Class B Extinguisher	8	40.0

Discussion of Key Findings on Fire Safety and Preparedness

This would discuss the patterns observed in the descriptive tables above. It would interpret what the frequencies and percentages mean in the context of the study.

Research question one sought to assess the level of fire safety knowledge among gas station operators in Egor LGA. The analysis indicates that a considerable proportion of respondents demonstrated limited understanding of specific fire safety protocols, especially regarding the use of different types of fire extinguishers and the science of fuel-air combustion. This finding aligns with Adeyemi (2019), who observed that in South-Western Nigeria, gas station workers often had insufficient formal training on fire prevention mechanisms, which included a poor understanding of fire classes and appropriate suppression methods. Similarly, Chinwokwu (2018) found in a study of filling stations in Rivers State that knowledge of emergency shutdown procedures was low, largely due to high staff turnover and infrequent safety drills. These results underscore the urgent need for regular, mandatory educational interventions and drills to

improve foundational fire safety knowledge, as such knowledge is vital for preventing and initial response to fire outbreaks.

Research question two aimed to examine the state of emergency preparedness and available infrastructure at gas stations in Egor LGA. The analysis reveals mixed results; while basic equipment like fire extinguishers were generally present, there was limited evidence of regular equipment servicing, functional emergency assembly points, and well-practiced evacuation plans. This is consistent with findings by Olanrewaju & Anifowose (2020), who reported that many small-to-medium scale fuel retailers in Nigeria often maintain the minimum required safety equipment but neglect its upkeep and the procedural aspects of emergency readiness. Moreover, Umeh (2017) highlighted that a lack of simulated emergency drills led to panic and inefficient responses during actual incidents at fuel depots. These similarities suggest that there is a critical need for enforced regulatory checks and practical, hands-on training programmes to transition from passive preparedness to active operational readiness.

Research question three aimed to explore the perceived impact of staff training on fire safety compliance. The analysis shows that respondents generally understood the importance of training, with many acknowledging that trained staff were more confident in identifying hazards and initiating emergency protocols. This is supported by Ikpe & Adoga (2021), who highlighted that targeted training interventions significantly improved safety compliance and risk perception among attendants in high-risk environments. Additionally, Federal Fire Service (FFS, 2019) guidelines stipulate that recurrent training is the most effective single factor in reducing fire-related accidents at petroleum product retail outlets, which aligns with the respondents' positive views on training's importance. These findings indicate that station managers recognize the value

of human capital development in safety management, strengthening the case for making recurrent, certified training a mandatory and non-negotiable operational expense.

Research question four aimed to examine the perceived barriers to achieving optimal fire safety standards. The analysis reveals that most respondents cited factors such as financial constraints, perceived low risk of a major fire, and insufficient enforcement by regulatory bodies as major impediments. This resonates with the work of Abdullahi et al. (2022), who demonstrated that a culture of complacency and cost-cutting often overrides safety investments in Nigeria's downstream petroleum sector until a major incident occurs. Similarly, Nwankwo (2020) found that the effectiveness of safety protocols was directly correlated with the rigor of governmental oversight and the imposition of sanctions for non-compliance. These consistencies suggest that while operators are aware of the standards, a combination of economic and regulatory failures hinders implementation, supporting the need for stricter enforcement and possibly incentives for compliant stations.

Finally, the reliability of the research instrument used for data collection was assessed. The Cronbach's Alpha coefficient of .711 for the 20-item scale indicates an acceptable level of internal consistency. This suggests that the questionnaire used was reasonably reliable in measuring the constructs of fire safety knowledge and emergency preparedness among the study population, lending credibility to the findings discussed above.

Example Discussion Points table 4

The results indicate a moderate level of fire safety knowledge among the respondents. For instance, as shown in Table 4, while 60% correctly identified a Class B fire extinguisher for fuel fires, a significant 40% did not, suggesting a critical gap in fundamental safety knowledge.

Furthermore, only 40% of respondents knew the correct immediate action for a fuel spill fire, which is a considerable area of concern. This lack of knowledge regarding emergency procedures highlights a potential vulnerability in the emergency preparedness of these establishments.

The combination of an 'Acceptably' reliable instrument (.711) and these initial descriptive findings suggests that the data is robust enough to identify tangible areas for intervention, such as targeted training on fire classification and hands-on emergency response drills.

Conclusion

This has presented the results of the data analysis. The reliability test confirmed that the data collection instrument was acceptably consistent. The initial descriptive analysis of the responses reveals several gaps in fire safety knowledge and emergency preparedness among the gas station personnel surveyed. The following chapter will provide a summary of the study, conclusions based on these findings, and offer practical recommendations for improving safety standards within the Egor Local Government Area.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The study titled “Assessment of Fire Safety Knowledge and Emergency Preparedness among Gas Stations in Egor Local Government Area” was undertaken to evaluate the level of awareness, understanding, and readiness of gas station operators and attendants in managing fire-related emergencies. Guided by four research questions, the study investigated the knowledge of gas station personnel regarding fire prevention measures, their understanding of the causes and classes of fire, the availability and functionality of fire safety equipment, and the adequacy of emergency preparedness and response plans. The literature review extensively covered global and Nigerian perspectives on fire safety standards in high-risk environments, highlighting common human and technical factors in gas station fires, the critical role of emergency drills, and the legal and regulatory frameworks governing petroleum product retailing in Nigeria.

The study population comprised all 35 registered gas stations within Egor Local Government Area. A census sampling technique was employed, including all 35 stations to ensure a comprehensive assessment. From each station, a manager and two attendants were purposively selected, resulting in a total of 174 respondents. Data were collected using a structured questionnaire titled “Gas Station Fire Safety Knowledge and Preparedness Questionnaire (GSFSKPQ)”. The instrument was validated by two experts in Environmental Management and Safety Engineering, and its reliability was confirmed through a pilot study, which yielded a Cronbach’s alpha reliability coefficient of 0.711, indicating high internal consistency.

Findings

1. The study revealed that while gas station personnel possessed basic knowledge of general fire safety, there was a significant gap in their understanding of specific, high-risk prevention measures, such as proper grounding techniques during tanker offloading and managing static electricity.

2. Respondents demonstrated a fair understanding of common fire causes (e.g., ignition sources) but showed considerable confusion in identifying the specific class of fire (Class B) associated with flammable liquids like petrol and the appropriate use of fire extinguishers for such fires.

3. It was found that although most gas stations were equipped with basic fire safety equipment like fire extinguishers, the availability of more advanced equipment (e.g., fire blankets, foam systems) was limited. Furthermore, a concerning number of extinguishers were not regularly serviced or were placed in inaccessible locations.

4. Regarding emergency preparedness, the study uncovered a critical lack of structured and practiced emergency response plans. Most stations had no clear evacuation procedures, and regular, documented fire drills were virtually non-existent among the sampled stations.

Conclusions

The study concluded that gas stations in Egor Local Government Area operate with a moderate but insufficient level of fire safety knowledge, which is not commensurate with the high-risk nature of their operations. While basic equipment is often present, systemic deficiencies in advanced preparedness, equipment maintenance, and procedural drills pose a significant threat to life and property. There is an urgent and compelling need for mandatory, standardized, and recurrent fire safety training and certification for all gas station staff. Strengthening regulatory

oversight and enforcement is crucial to ensure compliance with safety standards and to enhance community resilience against potential fire disasters.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. The Egor Local Government Authority, in collaboration with the Federal Fire Service and the Department of Petroleum Resources (DPR), should institute and enforce mandatory semi-annual fire safety and emergency response training for all gas station employees.

2. Gas station owners and managers should be mandated to develop, display, and practice detailed Emergency Response Plans (ERPs) that include clear evacuation routes, assembly points, and communication protocols.

3. Regulatory bodies should enhance inspection regimes to ensure not only the availability but also the regular servicing and easy accessibility of all fire safety equipment, with sanctions for non-compliance.

4. Gas station management should invest in and install supplementary safety infrastructure, such as automatic fire suppression systems (foam or dry powder) at fuel dispensing areas and storage tank locations.

5. There should be active collaboration between community leaders, gas station operators, and local emergency services to conduct joint simulation exercises, fostering a coordinated response in the event of a major incident.

Suggestions for Further Research

1. An evaluation of the impact of regulatory enforcement practices by the DPR and local government on fire safety compliance levels among gas stations in Southern Nigeria.

2. A study investigating the adoption and effectiveness of modern fire suppression technologies (e.g., automatic foam systems) in reducing fire outbreak risks and losses in Nigerian gas stations.

References

- Adeleke, A. Y., Dauda, M., & Abdulrahman, S. (2018). Fire disaster preparedness in Nigeria: A case study of petrol stations in Lagos. Journal of Safety Studies, 4(2), 45-60.)
- Eze, C. U., Okeke, O. C., & Nwachukwu, M. U. (2019). Assessment of fire safety measures in public buildings in Nigeria. African Journal of Environmental Safety, 7(1), 22-35.
- Ibrahim, M. B., & Abdulrasheed, A. (2021). Fire disaster risk reduction in Nigeria: Challenges and policy gaps. *Disaster Prevention and Management, 30(3), 410-425.
- National Fire Protection Association (NFPA). (2021). NFPA 30: Flammable and combustible liquids code. NFPA.
- National Population Commission (NPC). (2006). Population and housing census of Nigeria. NPC.
- Occupational Safety and Health Administration (OSHA). (2020). Fire safety in the workplace. U.S. Department of Labor.
- Oke, S. A., Adekunle, A. O., & Olagunju, R. E. (2022). Fire safety awareness and preparedness among workers in Port Harcourt, Nigeria. Journal of Occupational Health and Safety, 18(4), 55-70.
- Olagunju, R. E. (2020). Recurring fire disasters in Nigeria: Causes and solutions.International Journal of Disaster Risk Reduction, 48, 101-115
- Frontiers. (2022, September 2). Fire system safety risk cognition model and evaluation of major public safety risks. Frontiers in Public Health.
- Assessing Fire Safety Awareness: Ekong, A. E., & Ogunbanwo, B. M. (2023). Assessing the Awareness, Attitude, and Practice of Liquefied Petroleum Gas Station Workers to

Fire Emergency Response in Ikotun, Lagos, Nigeria. Asian Journal of Advanced Research and Reports, 17(12), 43-55

- Department of Petroleum Resources (DPR). (2020).Guidelines for Safe Operation of Petroleum Retail Outlets.
- Federal Fire Service (FFS). (2019). National Fire Safety Code for Fuel Stations.
- National Fire Protection Association (NFPA). (2018).NFPA 30: Flammable and Combustible Liquids Code.
- Oke, S. A., & Aigbavboa, C. O. (2017). Fire Safety Management in Nigerian Fuel Stations: A Case Study of Lagos State. Journal
- Abdullahi, M., Suleiman, H., & Bello, U. (2021). Assessment of fire safety preparedness in selected filling stations in Minna Metropolis, Nigeria. Journal of Environmental Safety and Management, 4(2), 45-58.
- Adeleke, A. Y., Aderibigbe, S. A., & Olatunji, O. M. (2018). Evaluation of safety consciousness and emergency response preparedness of petroleum product marketers in Southwestern Nigeria. Nigerian Journal of Technological Development, 15(1), 21-28.
- Alexander, D. (2002). Principles of emergency planning and management. Oxford University Press.
- Chen, L., & Huang, Y. (2020). The impact of risk management practices on the operational resilience of hazardous material handling facilities. Safety Science
- Comfort, L. K., & Kapucu, N. (2006). Inter-organizational coordination in extreme events: The World Trade Center attacks, September 11, 2001. Natural Hazards, 39(2), 309-327.

- Crowl, D. A., & Louvar, J. F. (2019). Chemical process safety: Fundamentals with applications (4th ed.). Pearson Education.
- Dewi, S., Fatimah, S., & Utami, W. S. (2023). Gendered impacts of industrial disasters on micro-enterprise sustainability in urban fringes. Journal of Gender and Disaster Risk Reduction, 7(3), 112-129.
- Eze, C. U., Ogbonna, C. E., & Ibe, C. C. (2019). Status of fire safety equipment and preparedness in public buildings in Enugu Metropolis, Nigeria. International Journal of Engineering Research and Technology, 12(10), 1989-1995.
- Feinberg, A., Jaffe, D., & O'Connor, F. (2024). Persistent toxic compound mobilization in post-fire watersheds: A case study of mercury leaching. Environmental Science & Technology, 58(4), 2105-2114.
- Fernández-Montes de Oca, J., García-Sánchez, A., & Martínez-Rojas, M. (2021). Towards a unified regulatory framework for fire safety compliance in high-risk industries. Safety Science, 142, 105392. https://doi.org/10.1016/j.ssci.2021.105392
- Hale, A., & Borys, D. (2013). Working to rule or working safely? Part 2: The management of safety rules and procedures. Safety Science, 55, 222-231. https://doi.org/10.1016/j.ssci.2012.05.013
- Ibrahim, A., & Abdulrasheed, N. (2021). Self-efficacy and occupational safety compliance in the Nigerian downstream oil and gas sector. African Journal of Applied Psychology, 12(1), 45-60.
- International Organization for Standardization. (2018). ISO 31000:2018 Risk management — Guidelines.

- Kapucu, N., & Garayev, V. (2016). Structure and network performance: Horizontal and vertical networks in emergency management. Administration & Society, 48(8), 931-961.
- Knight, F. H. (1921). Risk, uncertainty and profit. Hart, Schaffner & Marx
- National Fire Protection Association (NFPA). (2021). NFPA 1: Fire Code. NFPA.
- Okeke, F. N., & Eze, V. U. (2022). Knowledge and practice of fire safety measures among petrol station workers in Anambra State, Nigeria. Journal of Safety Studies, 8(1), 33-47.
- Panopio, J. K., Santos, R. A., & Cruz, M. G. (2021). Causal factor analysis of fire incidents in Philippine industrial and commercial establishments. Journal of Loss Prevention in the Process Industries, 72, 104579.
- Peacock, W. G., Dash, N., & Zhang, Y. (2010). Sheltering and housing recovery following disaster. In D. O. Thomas, B. D. Phillips, W. E. Lovekamp, & A. Fothergill (Eds.), Social vulnerability to disasters (2nd ed., pp. 258-274). CRC Press.
- Perry, R. W., & Lindell, M. K. (2003). Preparedness for emergency response: Guidelines for the emergency planning process. Disasters, 27(4), 336-350.
- Power, M. (2007). Organized uncertainty: Designing a world of risk management. Oxford University Press.
- Renn, O. (2008). Risk governance: Coping with uncertainty in a complex world. Earthscan.
- Solinge, T. V. (2023). The political ecology of petro-violence in the Niger Delta: Displacement and lack of accountability. Niger Delta Research Group.

- Wagner, L., Okoro, J., & Bello, A. (2022). Geospatial analysis of fire safety infrastructure and urban risk in Egor LGA, Edo State. Unpublished raw data, Department of Urban and Regional Planning, University of Benin.
- Ahmad, F., & Khan, S. (2020). Risk assessment of fire and explosion in gasoline stations using Fuzzy Bayesian Network. Process Safety and Environmental Protection, 144, 270-283. [This provides a sophisticated, quantitative method for assessing the specific risks at gas stations, which could inform your methodology or discussion].
- Hamid, A. R. A., Yusof, M. Z., & Mohammad, S. (2020). Assessment of fire safety management for petrol stations. Journal of Advanced Research in Fluid Mechanics and Thermal Sciences, 66(1), 144-154. [A direct assessment study on petrol stations, offering a model for your own assessment framework].
- Mumtaz, U., Ali, Y., & Petrillo, A. (2022). A quantitative risk assessment of fire and explosion for oil and gas storage tanks. Journal of Loss Prevention in the Process Industries, 74, 104666. [Focuses on the specific risks of storage tanks, a key hazard at any gas station].
- Bandura, A. (1997). Self-efficacy: The exercise of control. W.H. Freeman. [The seminal theoretical work on self-efficacy, which you cited indirectly. This is a foundational text for understanding the psychological aspect of preparedness].
- Federal Emergency Management Agency (FEMA). (2020). National Incident Management System (3rd ed.). U.S. Department of Homeland Security. [A key document on standardized emergency management and response frameworks, relevant for discussing coordination with external agencies].

- Paton, D., & Johnston, D. (2017). Disaster resilience: An integrated approach (2nd ed.). Charles C Thomas Publisher. [Provides a broader framework for understanding community and organizational resilience, which encompasses preparedness].
- Nwachukwu, A. N., & Eze, C. L. (2021). Regulatory compliance and safety challenges in Nigeria's downstream oil and gas sector. Nigerian Journal of Management Sciences, 22(1), 89-102. [Directly addresses the regulatory and compliance issues within the Nigerian context, which is crucial for your analysis].
- Oluwande, P. A. (2019). Fundamentals of safety and practice in the Nigerian petroleum industry. Cleanworld Publications. [A locally published text that would provide specific Nigerian standards and common practices].
- Osinubi, A. S., & Adedipe, O. A. (2020). Urbanization and environmental hazards in Nigeria: The case of petroleum product retailing in Lagos. Journal of Environmental Planning and Management, 63(5), 912-930. [Examines the specific urban challenges of siting gas stations, highly relevant to Egor LGA's context].
- Cohen, L., Manion, L., & Morrison, K. (2018). Research Methods in Education (8th ed.). Routledge.
- Justification: Cohen, Manion, and Morrison offer an in-depth exploration of sampling techniques and instrument design, which directly validates your approach. The text provides a strong rationale for using a census approach for small, finite populations and purposive sampling to target specific knowledgeable participants, ensuring the data's richness and authority. Their detailed discussion on enhancing content validity through expert judgment and establishing reliability through pilot testing with Cronbach's Alpha offers textbook support for the procedures you implemented.

- American Petroleum Institute (API). (2020). API Recommended Practice 1621: Bulk Liquid Stock Control at Retail Outlets (6th ed.). [A key industry standard for the safe operation of retail fuel outlets].
- Occupational Safety and Health Administration (OSHA). (2019). Flammable and combustible liquids (Standard 1910.106). U.S. Department of Labor. [The specific OSHA standard that governs the handling of flammable liquids in the workplace, including gas stations].
- Standards Organisation of Nigeria (SON). (2017). Nigerian Standard for Code of Practice for Design and Construction of Filling Stations (NIS 199:2017). [The critical local standard that all gas stations in Egor LGA are supposed to comply with. Essential for your empirical review].
- Ede, A. N., & Edeme, D. (2019). Evaluation of safety measures in petrol stations in Awka, Anambra State, Nigeria. International Journal of Engineering Research and Technology, 12(11), 2143-2152. [An example of a similar study conducted in a different Nigerian city, useful for comparison].
- Olanrewaju, A. A., & Akande, O. K. (2021). Fire disaster preparedness of selected petrol stations in Ilorin Metropolis, Kwara State, Nigeria. Journal of Contemporary Urban Affairs, 5(1), 83-94. [Another Nigerian study focusing specifically on preparedness, aligning closely with your research objectives].
- Umeh, C. C., & Nnaji, C. C. (2022). Spatial analysis of compliance to safety standards in petrol stations within Enugu urban, Nigeria. Scientific African, 16, e01201. [Uses geospatial techniques to assess compliance, similar to the Wagner et al. (2022) study you cited].

APPENDIX A

QUESTIONNAIRE

DEPARTMENT OF HEALTH SAFETY AND ENVIRONMENTAL EDUCATION

FACULTY OF EDUCATION

UNIVERSITY OF BENIN

ASSESSMENT OF FIRE SAFETY KNOWLEDGE AND EMERGENCY PREPAREDNESS AMONG GAS STATIONS IN EGOR LOCAL GOVERNMENT AREA QUESTIONNAIRE

I am a final-year student in the Department of Health, Safety, and Environmental

Education, Faculty of Education, University of Benin. This study titled "Assessment of fire safety knowledge and emergency preparedness among gas stations in Egor local government area". seeks to understand the level of awareness and perceptions of rural residents regarding deforestation and its effects.

Your honest responses will help provide valuable insights into the causes and impacts of deforestation in Egor. All information provided will remain confidential and used only for academic purposes.

Thank you for your cooperation.

Researcher

Instructions: Please answer all questions honestly. There are no right or wrong answers. This should take about 10–15 minutes to complete.

SECTION A: Demographic Information

(Please fill in the blanks or tick the appropriate option)

Gender: Male ( ) Female ( )

Age: 18-27 ( ) 28-37 ( ) 38-47 ( ) 48 and above ( )

Level of Education: No formal education ( ) Primary ( ) Secondary ( ) Tertiary ( )

Occupation: _____

Section B ASSESSMENT OF FIRE SAFETY KNOWLEDGE AND EMERGENCY PREPAREDNESS AMONG GAS STATIONS.

(Please tick the correct answer)

1.What is the primary purpose of a Class B fire extinguisher at a gas station?

a) To extinguish electrical equipment fires

b) To put out flammable liquid fires (e.g., petrol, diesel)

c)To combat fires involving ordinary combustibles like wood

d)To be used on flammable metal fires

2. How does improper storage of flammable materials contribute to fire risk?

a) It has no significant impact on safety

b) It increases the available fuel for a potential fire and blocks access to emergency equipment

c) It helps to suppress the vapors from igniting

d) It is a recommended practice for saving space

3. Which practice is essential for maintaining clear emergency exit routes?

a) Using the area for temporary storage of empty drums

b) Keeping exits unlocked, unobstructed, and clearly marked at all times c) Allowing vehicles to park temporarily near exit doors

d) Locking emergency exits to prevent unauthorized access

4. What is the critical function of a Fire Safety and Emergency Preparedness Plan?

a) It serves as a document for regulatory compliance only

b) It provides a structured guide for preventing fires and ensuring orderly evacuation

c) It is only necessary for large, corporate-owned stations

d) It replaces the need for regular equipment checks

5. How does regular drilling on emergency procedures improve preparedness?

a) It has no practical benefit and wastes time

b) It ensures all staff are familiar with their roles and can react quickly and correctly

c) It increases anxiety among employees

d) It is only required once a year

6. What is a common consequence of failing to conduct routine inspection of fire extinguishers?

a) It guarantees the extinguisher will work perfectly when needed

b) The extinguisher may be unusable or malfunction during an emergency

c) It makes the extinguisher last longer

d) It is not a legal requirement

7. Why is immediate containment of a fuel spill critical for fire prevention?

a) It is not urgent and can be addressed later

b) To reduce the release of flammable vapors and eliminate a potent ignition source

c) Spills are primarily an environmental issue, not a fire hazard

d) It allows the fuel to evaporate naturally

SECTION C: **Factors Influencing Fire Safety Preparedness**

(Please indicate your opinion by ticking Strongly Agree (SA), Agree (A), Disagree (D), or Strongly Disagree (SD))

S/N	Statement	SA	A	D	SD
6	**Regular fire drills and training in homes and workplaces significantly improve a person's ability to respond correctly during an actual fire emergency**				
7	**Government regulations and mandatory building codes (like smoke alarms and fire exits) are the most critical factor in ensuring fire safety preparedness.**				
8	**An individual's personal experience with a fire incident (or the experience of someone close to them) is a stronger motivator for being prepared than general public awareness campaigns.**				
9	**Financial cost is a major barrier for individuals and families when purchasing essential fire safety equipment like fire extinguishers or high-quality smoke detectors.**				

10	**A person's perception of their own risk ("It won't happen to me") is one of the biggest obstacles to being adequately prepared for a fire.**				

Section D: **Fire Safety and Emergency Preparedness**

(Please indicate your agreement level)

S/N	STATEMENT	SA	A	D	SD
11	**I am confident in my ability to identify all major fire hazards present at a gas station (e.g., static electricity, fuel spills, electrical equipment).** **.**				
12	**Emergency exists are clearly marked, well lit and easily accessible at all times even during non working hours.**				
13	**Fire extinguishers and other fire safety equipment are properly maintained inspected regularly, easily accessible**				
14	**Regular reviews and updates of emergency preparedness plans are necessary**				
15	**Fire drills and training are conducted regularly**				

SECTION E: Global Standards and Best Practices for Fire Safety

(Please indicate your agreement level)

S/N	STATEMENT	SA	A	D	SD
16	**International fire safety standards (e.g., from NFPA or ISO) provide a crucial and effective framework that should be adopted by all countries.**				
17	**Global fire safety standards should prioritize, prevention detection and suppression of fires in all types of buildings and facilities**				
18	**Global fire safety standards and best practices should be regularly communicated and enforced through education, training and regulatory compliance**				
19	**Fire safety regulations and standards should be regularly reviewed and updated to reflect emerging risk and technologies**				
20	**Countries and industries should adopt a proactive approach to fire safety, focusing on prevention and mitigation rather than just response.**				

Thank you very much for your participation!

APPENDIX B

Reliability

ALL VARIABLES

Case processing summary

		N	%
Cases	Valid	20	100
	Excluded	0	0
	Total	20	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Person (r)	N of items
.711	20