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# A CORRELATE BETWEEN OCCUPATIONAL SAFETY, HEALTH AND SAFETY PRACTICES AND WORKPLACE ENVIRONMENT AMONG STAFF OF LOWER USUMA DAM WATER TREATMENT PLANT BWARI, ABUJA

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## ABSTRACT

*This paper investigates the correlation between occupational safety practices and the workplace environment at the Lower Usuma Dam Water Treatment Plant in Bwari, Abuja. The study employed a descriptive survey design, gathering data from 200 staff members, with 192 responses analyzed. Findings indicate that 68.8% of respondents acknowledged that workplace hazards lead to adverse health effects, while 81.8% reported that exposure to hazards causes' injury or illness. The analysis demonstrated a significant positive relationship ($r = 0.594$, $p = 0.001$) between awareness of safety practices and overall workplace quality. Additionally, effective record utilization of safety hazards was found to enhance compliance among staff ($r = 0.428$, $p = 0.000$). These results underscore the critical role of OHS management in shaping a safe work environment, thereby enhancing employee well-being and operational effectiveness. The study advocates for ongoing safety training and the implementation of comprehensive safety policies to mitigate risks and improve workplace conditions.*

**Keywords:** Occupational safety practices, workplace environment, employee health, risk management, safety compliance, Bwari, Abuja.

## Introduction

A safe and conducive work environment is essential for minimizing accidents and promoting employee satisfaction. Occupational safety and health (OSH) practices play a crucial role in ensuring a safe and conducive work environment, particularly in industries such as water treatment, where the potential for workplace hazards is significant. Research has consistently demonstrated a strong link between workplace safety and employee health outcomes (Adeleye et al., 2019). Poorly maintained equipment, exposure to hazardous chemicals, and unsafe practices can lead to severe injuries and adverse health effects, impacting both individual workers and overall productivity (Useche et al., 2019). Studies have shown that many workers in water treatment facilities lack sufficient knowledge of OSH practices, leading to heightened risks of injuries and illnesses. For instance, a significant percentage of workers in Nigeria and other countries have reported inadequate training on safety protocols, resulting in a reliance on personal protective equipment (PPE) that is often underutilized. The International Labour Organization (2013) underscores the importance of establishing comprehensive safety and health standards grounded in international conventions. These standards are designed to protect workers across various economic sectors, emphasizing the need for effective implementation through legislation, training, and ongoing evaluation of safety practices. Despite these frameworks, many organizations, including water treatment plants, struggle with the practical application of OSH practices, resulting in gaps that compromise worker safety.

Work environment hazards include poorly maintained equipment, unsafe machinery, and exposure to hazardous chemicals, among others (Adewole & Opele, 2019). Potential injuries from these risks can encompass hearing loss, vision impairment, and physical harm such as cuts, burns, bruises, broken bones, and electric shocks. The impacts of occupational health and safety are particularly evident during the construction and decommissioning phases of water and sanitation facilities. Studies have consistently demonstrated that personnel at water treatment plants often possess insufficient knowledge and awareness of occupational safety and health (OSH) practices, resulting in a heightened risk of injuries and illnesses (Opele & Babale, 2025). Research has revealed that employees in water treatment facilities in India had limited awareness of OSH regulations and practices, with only 25% consistently utilizing personal protective equipment (PPE). A study focusing on water treatment plant workers in the United States indicated that they lacked adequate knowledge regarding chemical hazards and safe handling procedures (Chukwu et al., 2023). The findings suggest that OSH training and awareness programs are often inadequate or non-existent, Workers may not understand OSH regulations and practices, Use of PPE is inconsistent and Knowledge of chemical hazards and safe handling procedures is limited.

The utilization of PPE and safety procedures is inconsistent, participation in safety training varies among employees, Safety culture and individual perceptions significantly influence the use of safety practices and Regular safety training improves the application of safety practices

(Hohnen & Hasle, 2011). According to Wallerstein and Weinger (1992), three significant issues must be addressed for the field of worker health and safety education to progress: the lack of clarity and consensus regarding the objectives of worker education, the absence of standards for effective teaching methods including insufficient skills among trainers and inadequate program evaluation (Awogbami et al., 2021).

Rotich and Kwasira (2015) identified a positive, strong, and statistically significant correlation between employee training on OSH programs and their effective implementation within tea firms in Kenya, this may not universally apply, particularly in the context of the Kaisugu Tea Factory, where the work environment likely played a significant role in validating these findings. During the construction and operation of water and sanitation facilities, there are various potential injuries that can occur. Physical, biological, social, psychological, ergonomic, and environmental factors all influence the work environment and employee health. However, the associated risks and hazards vary in degree and acceptability. The OSHA 2007 assigns employers the responsibility of managing and mitigating risk levels and employee exposure, as well as addressing the costs associated with injuries within the workplace. Ensuring staff safety is crucial for boosting productivity. Prior studies have established that organizations prioritizing occupational safety management experience lower rates of injury and illness, along with increased employee engagement (Njuguna, 2007). Key elements, such as regular risk assessments, the provision of personal protective equipment, and the establishment of safety committees, play a vital role in shaping a positive workplace environment (Hale & Hovden, 2010). Understanding how these safety practices correlate with the overall work environment at the Lower Usuma Dam is essential for improving health outcomes and operational performance.

**Statement of the Problem**

Despite the recognized importance of occupational safety practices, there is a lack of comprehensive data on their implementation and effectiveness at the Lower Usuma Dam Water Treatment Plant. This gap in understanding can lead to unaddressed safety concerns, potentially compromising employee health and safety. This study investigates the correlation between occupational safety practices and the workplace environment among staff at the Lower Usuma Dam Water Treatment Plant. By examining the level of awareness regarding safety practices, the impact of training, and the overall quality of the work environment, this research aims to provide insights into how effective safety management can enhance employee well-being and operational effectiveness. Understanding these dynamics is essential for fostering a culture of safety that not only protects workers but also promotes the sustainability of critical infrastructure services.

**Objective of the study**

The main objective of this study is to determine the correlation between occupational safety, health and safety practices and workplace environment among staff of Lower Usuma Dam Water Treatment Plant Bwari, Abuja. This was

achieved trough the following specific objectives which sought to:

1. examine the relationship between perceived risks in the workplace, such as falling objects and exposure to hazards, and employee health outcomes.
2. determine the correlation between the level of awareness of occupational health and safety practices and the quality of the work environment.
3. evaluate the records utilization of occupational health safety hazards and its impact on safety management practices among staff.
4. analyze the relationship between the impacts of occupational safety management practices and staff behaviours in the workplace.

**Methodology**

This study employed a descriptive survey research design to explore occupational safety and health (OSH) practices within the water treatment sector, specifically at the Lower Usuma Dam Water Treatment Plant in Bwari, Abuja. The descriptive approach served as a framework for understanding the current state of OSH and its influence on the work environment. By focusing on typical challenges faced in this industry, the research aimed to gather nuanced insights into the opinions and experiences of employees regarding the identified variables. The target population consisted of all individuals working at the water treatment plant and residents in the area. A sample size of 200 was determined, with 192 completed questionnaires retrieved through random sampling. Additionally, purposive sampling was used for conducting semi-structured interviews, allowing for in-depth exploration of specific topics related to OSH practices.

Data collection was facilitated through a self-administered semi-structured questionnaire, which combined both qualitative and quantitative methods to capture relevant biodata and assess independent and dependent variables. To ensure the validity and reliability of the instruments, the questionnaire was reviewed by supervisors and experts, focusing on content validity and the stability of measurements over time. Ethical approval was obtained from the university's ethics committee, and informed consent was secured from respondents, ensuring confidentiality throughout the study. Data processing involved verifying the collected information for consistency, followed by analysis using the Statistical Package for Social Sciences (SPSS). The results were presented in tables using percentages to provide a clear overview of the findings and facilitate interpretation of the data in relation to OSH practices and workplace safety. To establish relationship between occupational safety and health practices and workplace environment among staff of lower Usuma Dam water treatment plant Bwari, Abuja.

**Table 1: The relationship between occupational health safety practices and work place environment in lower Usuma Dam water treatment plant Bwari, Abuja.**

| S/N | Statement | SA | A | D | SD |
|---|---|---|---|---|---|
| 1 | There is a risk of an object falling from a height | 44.8% | 10.4% | 38% | 6.8% |
| 2 | Exposure to hazards in the workplace always causes injury, illness or other adverse health effects in the workplace. | 68.8% | 13% | 11.4% | 6.8% |
| 3 | I have had a change in mental condition resulting from stress or exposure to solvents. | 4.7% | 5.7% | 72.9% | 16.7% |
| 4 | I have had a change in the way my body functions, grows or develops. | 4.7% | 10.9% | 74.5% | 9.9% |
| 5 | I have experienced any trauma in the workplace. | 7.3% | 2.1% | 80.2% | 10.4% |
| 6 | There is a risk of a run-away chemical reaction or a release of compressed gas or steam. | 68.8% | 14% | 14.6% | 2.6% |

Table 1 shows that more than half of the respondents at 106 (55.2%) stated that there is a risk of an object falling from a height (potential or gravitational energy) while least among the respondents at 86 (44.8%) disagree with the majority of the respondents. Majority of the respondents at 157 (81.8%) noted that exposure to hazard in the workplace always causes injury, illness or other adverse health effects in the workplace while few among the respondents at 35 (18.2%) disagree haven a divergent opinion from the majority of the respondents. The figure shows the type of hazard exposed to a workplace.

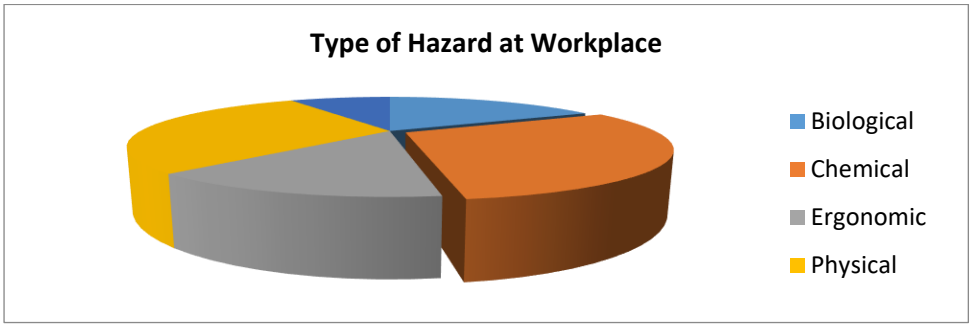



**Figure 1: Type of hazard exposed to at a workplace**

Figure 1 revealed that very few among the respondents at 20 (10.4%) experienced change in mental condition resulting from stress or exposure to solvent 172 (89.6%) while the majority of the respondents did not experience any changes in mental condition due to the stress or exposure to solvent. Minority of the respondents at 30 (15.6%) noted and experienced some changes in the way their body functions and develops while majority of the respondents at 162 (84.4%) did not experienced any malfunctions of their body or changes in the way their body develops. Few among the respondents at 18 (9.4 %) had experienced trauma in the workplace while majority of

the respondents at 174 (90.6%) did not experienced any trauma in the workplace. Preponderance of the respondents at 159 (82.8%) this agreed on the risk of a run-away of chemical reaction or release of compressed gas or steam while minority of the respondents at 33 (17.2%) noted that there is a risk of a run-away of chemical reaction or a release of compressed gas or steam.

**Relationship between the level of awareness of occupational health and safety practices and the staff on work environment.**

**Table 2: Relationship between the level of awareness of occupational health and safety practices and the staff on work environment.**

| Analysis Technique | Variables | Descriptors | OSH | | Works |
|---|---|---|---|---|---|
| | Awareness | r | 1.00 | . | .594** |
| | OSH | Sig. (2 - tailed) | | | 0.001 |
| Spheresma'n | | N | 192 | | 192 |
| Rho | | r | .594** | | 1.00 |
| | Work Environment | Sig. (2 - tailed) | 0.001 | | . |
| | | N | 192 | | 192 |

Table 2 revealed that using Spearman's rho coefficient, Confidence Level (CL) = 95%, It was established that the staff in lower Usuma Dam water treatment plant Bwari, Abuja acquired high level of awareness on the occupational safety and health in the work environment. This may be confirmed by Bandura, (1989) that People tend to select activities and associates from the vast range of possibilities in turns of their acquired preferences and competencies. He confirms that the natural and extrinsic effects of their actions in turn, partly determine their thought, patterns and emotional reactions in workplace.

**Table 3: Relationship between records utilization of occupational health safety hazards among staff in the work environment.**

| Analysis Technique | Variables | Descriptors | OSH | Works |
|---|---|---|---|---|
| | Awareness | r | 1.00 | .428** |
| | OSH | Sig. (2 - tailed) | | 0.000 |
| Spheresma'n | | N | 192 | 192 |
| Rho | | r | .428** | 1.000 |
| | Work Environment | Sig. (2 - tailed) | 0.000 | . |
| | | N | 192 | 192 |

Table 3 established that there is a significant relationship between Record Utilization of health and safety hazards among staff in the work environment. This meant that the staffs are fully oriented and taking careful consideration in record utilization on OSH management practices in their work place and still more training is also required for the complete adherence of record utilization policy in the work place.

The impacts of occupational health safety management practices and staffs in lower Usuma Dam water treatment plant Bwari, Abuja on work environment.

**Table 4: Impacts of occupational health safety management practices and staffs in lower Usuma Dam water treatment plant Bwari, Abuja on work environment.**

| Analysis Technique | Variables | Descriptors | OSH | Works |
|---|---|---|---|---|
| | Awareness | Correlation Coefficient | 1.00 | .398** |
| | OSH | Sig. (2 - tailed) | | 0.01 |
| Spheresma'n | | N | 192 | 192 |
| Rho | | Correlation Coefficient | .398** | 1.00 |
| | Work Environment | Sig. (2 - tailed) | 0.01 | . |
| | | N | 192 | 192 |

It was established in table 4 that there is a significant relationship between occupational safety and health management and the staff practices on the work environment. Njuguna, (2007) explained that when workers are well-motivated, they behave safely at workplace, this minimizes the human error that may cause or create unsafe working environment.

**Relationship between occupational health safety practices and work place environment in lower Usuma Dam water treatment plant Bwari, Abuja**

**Table 5: Relationship between occupational health safety practices and work place environment in lower Usuma Dam water treatment plant Bwari, Abuja.**

| Analysis Technique | Variables | Descriptors | OSH | Works |
|---|---|---|---|---|
| | Awareness | r | 1.00 | .743** |
| | OSH | Sig. (2 - tailed) | | 0.01 |
| Spheresma'n | | N | 192 | 192 |
| Rho | | R | .743** | 1.00 |
| | Work Environment | Sig. (2 - tailed) | 0.01 | . |
| | | N | 192 | 192 |

Table 5 established that there is a significant positive relationship between OSH and work environment. This meant that if the exposure to hazards and risks are reduced then the work environment would improve.

**Discussion**

The study conducted a logistic regression analysis to ascertain the relationship between the dependent and the independent variables pulled together but holding the rest constant each time. It was established that the staff in the lower Usuma Dam water treatment plant Bwari, Abuja shows significant level of awareness in the OSH in the work environment. And more orientation and training will add more positive impact on the compliance of OSH policy in the work environment. It was also established that record utilization of OSH was considered significantly by the staff of lower Usuma Dam water treatment plant Bwari, Abuja and more engagement, awareness and enlightenment needed for the total adherence. It was also established that there is high impact of OSH among the staff on work environment and which make them less likely to perceive their work environment as un-conducive. It was

established that more practicing of occupational safety and health would increase the chances of conducive working environment in the lower Usuma Dam water treatment plant Bwari, Abuja.

On the relationship between occupational health safety practices and workplace environment, the findings indicate a strong awareness of risks, with 68.8% acknowledging that workplace hazards lead to adverse health effects. This aligns with the literature indicating that unaddressed hazards significantly impact employee health and workplace productivity (Njuguna, 2007). The data also highlights the high awareness of falling objects as a risk (55.2%), emphasizing the need for stringent safety measures in environments with elevated work areas (Hale & Hovden, 2010).

As regards relationship between awareness of occupational health and safety practices, the correlation analysis using Spearman's rho coefficient ($r = 0.594$, $p = 0.001$) demonstrates a significant positive relationship between awareness of OHS and workplace environment quality. This supports the premise that increased awareness correlates with better safety practices (Leka & Cox, 2008). Bandura's (1989) Social Learning Theory suggests that individuals learn from their environment; thus, a well-informed workforce is likely to adhere to safety measures.

With regards to the records utilization of occupational health safety hazards, the significant relationship identified ($r = 0.428$, $p = 0.000$) suggests that effective record utilization enhances awareness of safety hazards. This aligns with findings by Roberts et al. (2015), who state that documentation is essential for maintaining compliance and improving safety practices. The emphasis on documentation and record-keeping is crucial for evaluating workplace safety measures and outcomes.

As regards impacts of occupational health safety management practices, the correlation between OHS management practices and staff behavior ($r = 0.398$, $p = 0.01$) indicates that when effective safety management is in place, employee adherence to safety protocols improves. Njuguna (2007) emphasizes that motivated employees are more likely to engage in safe practices, thereby reducing workplace hazards. This finding underscores the importance of integrating OHS management into daily operations for improved safety outcomes.

With regards to the overall relationship between occupational health safety practices and Workplace Environment, the strong positive correlation ($r = 0.743$, $p = 0.01$) between OHS practices and workplace environment suggests that as safety practices improve, the work environment becomes more conducive to employee health and productivity. This supports the assertion by (Patil & Shankar, 2023) that effective safety management is directly linked to improved workplace conditions. The findings advocate for continuous investment in OHS practices as a means to enhance overall workplace safety and employee well-being.

**Conclusion**

The analysis of the correlation between occupational safety practices and the

workplace environment at the Lower Usuma Dam Water Treatment Plant reveals a significant relationship that underscores the importance of effective safety management. The findings suggest that increased awareness and adherence to safety protocols lead to a more positive work environment, ultimately enhancing employee health and productivity. The strong correlations identified in this study affirm the need for continuous improvement in safety practices and highlight the critical role of management in fostering a safety-oriented workplace culture.

**Recommendations**

The following recommendations are suggested for policy implementation

1. Government should implement ongoing safety awareness campaigns to educate employees about the importance of occupational health and safety practices. Regular reminders and informational sessions can reinforce safe behaviours.
2. They should ensure that all staff have access to necessary personal protective equipment (PPE) and other safety resources. This investment not only protects employees but also demonstrates the organization's commitment to their welfare.
3. There is a need regularly update a comprehensive safety policy that incorporates feedback from employees. This policy should outline the roles and responsibilities of all staff in maintaining a safe work environment.
4. Management of the agency should establish a routine for conducting safety assessments and audits to identify hazards and evaluate the effectiveness of current safety measures. This proactive approach will help to mitigate risks and enhance workplace safety.
5. There is a need to foster an environment where employees feel comfortable providing feedback about safety practices and workplace conditions. This can be facilitated through anonymous surveys or suggestion boxes, ensuring that all voices are heard and considered in safety management decisions.

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