World Journal of Pharmaceutical Science and Research

www.wjpsronline.com

Research Article

ISSN: 2583-6579
SJIF Impact Factor: 6.916
Year - 2026
Volume: 5; Issue: 9
Page: 88-104

# PREVALENCE AND DETERMINANTS OF OCCUPATIONAL HAZARDS AMONG HEALTHCARE PROFESSIONALS AT A TERTIARY HOSPITAL IN SOUTHEASTERN NIGERIA: A CASE STUDY OF ALEX-EKWUEME FEDERAL UNIVERSITY TEACHING HOSPITAL ABAKALIKI (AE-FUTHA), EBONYI STATE

**Ngwu Justina*, Egede Oluchi Ugama, Nweze Marcel, Spoke Ifeanyi**

*Dental Therapy Department, Federal University of Allied Health Sciences, Enugu, 01473, Nigeria.*

***Article Received: 14 July 2026*** | | ***Article Revised: 04 August 2026*** | | ***Article Accepted: 24 August 2026***

***Corresponding Author: Ngwu Justina**
Dental Therapy Department, Federal University of Allied Health Sciences, Enugu, 01473, Nigeria.
**DOI:** https://doi.org/10.5281/zenodo.22159190

**How to cite this Article:** Ngwu Justina, Egede Oluchi Ugama, Nweze Marcel, Spoke Ifeanyi (2026) PREVALENCE AND DETERMINANTS OF OCCUPATIONAL HAZARDS AMONG HEALTHCARE PROFESSIONALS AT A TERTIARY HOSPITAL IN SOUTHEASTERN NIGERIA: A CASE STUDY OF ALEX-EKWUEME FEDERAL UNIVERSITY TEACHING HOSPITAL ABAKALIKI (AE-FUTHA), EBONYI STATE. World Journal of Pharmaceutical Science and Research, 5(9), 88-104.



**ABSTRACT**

*Background:* Healthcare professionals face a wide range of workplace hazards that threaten their health, safety, and ability to deliver quality care. In Nigeria, where occupational health systems remain underdeveloped, understanding the true burden of these hazards is essential for protecting the workforce. This study examined how common occupational hazards are among healthcare workers at Alex Ekwueme Federal University Teaching Hospital (AE-FUTHA) in Abakaliki, Ebonyi State, and explored factors that influence exposure to these risks. ***Methods****:* We employed a descriptive cross-sectional design and collected data from 116 healthcare professionals using a structured questionnaire. Participants were selected through stratified random sampling to ensure representation across professional groups. The questionnaire captured information on socio-demographics, knowledge of workplace hazards, safety attitudes, protective practices, and types of hazards experienced. We analyzed the data using descriptive statistics, chi-square tests, and binary logistic regression, with statistical significance set at $p < 0.05$. ***Results****:* The overall response rate was 53.0%, with dental professionals showing the highest participation (90.5%). Most respondents were aged 35–44 years (36.2%), female (63.8%), and had 1–5 years of work experience (39.7%). While knowledge of occupational hazards was good—69.0% were aware of workplace risks and 80.2% knew how to report hazards—knowledge gaps existed in handling hazardous materials (only 33.6% felt confident). Positive safety practices were common: 83.6% complied with standard operating procedures and 67.2% used personal protective equipment appropriately. However, exposure to hazards remained high. The most frequently reported hazards were disinfectants and cleaning agents (44.0%), prolonged standing (40.5%), contact with blood and body fluids (38.8%), long work hours (37.1%), and work-related stress (33.6%). Significant associations emerged between professional cadre and hazard types ($\chi^2=15.42$, $p=0.017$), gender and biological hazard exposure ($\chi^2=4.89$, $p=0.027$), and years of experience and ergonomic hazards ($\chi^2=18.33$, $p<0.001$). Logistic regression identified female gender (AOR=1.41, $p=0.042$), dental profession (AOR=0.66, $p=0.025$), and 6–10 years of experience (AOR=1.67, $p=0.010$) as significant predictors of hazard exposure. ***Conclusion****:* Occupational hazards remain prevalent among healthcare professionals in this setting, even among those with good knowledge and safety practices. The findings point to the need for targeted interventions that address cadre-specific risks, support mid-career workers, and strengthen institutional safety systems. Without such measures, the health and wellbeing of healthcare workers—and ultimately the quality of patient care—will remain at risk.

**KEYWORDS:** Occupational health; Healthcare professionals; Workplace safety; Prevalence; Determinants; Nigeria; Sub-Saharan Africa; Cross-sectional study.

## 1. INTRODUCTION

The places where people work can expose them to dangers that harm their health, safety, and overall quality of life. These dangers—known as occupational hazards—come in many forms: physical risks like noise and extreme temperatures, biological threats such as infectious agents, chemical exposures from cleaning products and drugs, ergonomic strains from awkward postures and prolonged standing, and psychosocial pressures from heavy workloads and workplace stress.[1] When workers are exposed to these hazards, the consequences can be serious—ranging from injuries and illnesses to psychological distress, reduced productivity, long-term disability, and even death.[2,3]

Healthcare professionals occupy a unique position when it comes to occupational hazards. Unlike workers in many other sectors, they deal directly with sick patients, handle potentially infectious materials, work with hazardous chemicals, perform physically demanding tasks, and operate in emotionally charged environments day after day.[4] These working conditions make them particularly vulnerable to a wide range of workplace risks. Understanding these risks is not just an academic exercise—it is essential for designing effective interventions that protect healthcare workers and enable them to provide safe, high-quality care.

The scale of the problem is staggering. Globally, the International Labour Organization estimates that nearly 3 million workers die each year from occupational accidents and work-related diseases, and hundreds of millions more suffer non-fatal injuries that lead to disability and economic loss[2]. Healthcare workers are not immune to this burden. The World Health Organization reports that about 63% of health workers worldwide have experienced some form of workplace violence, highlighting just how pervasive these hazards are.[5]

In Africa, the situation is often more challenging due to limited resources, weak safety infrastructure, and inconsistent enforcement of health and safety regulations. Studies across sub-Saharan Africa paint a troubling picture. Systematic reviews have found that lifetime prevalence of needlestick injuries among healthcare workers ranges from 22% to 95%, and one-year prevalence from 39% to 91%.[6] These figures reflect the high level of biological hazard exposure in clinical settings, where access to personal protective equipment, training, and surveillance systems remains inconsistent at best.

Nigeria mirrors these challenges. Studies conducted in various parts of the country have documented significant occupational hazards among healthcare workers—needlestick injuries, chemical exposures, ergonomic strains, and workplace violence are all common.[7] At the state level, evidence from Ebonyi State suggests that more than half (53.9%) of healthcare workers in tertiary facilities have been exposed to occupational infectious diseases.[8] A separate study in Abakaliki found that 70% of healthcare workers had experienced workplace violence.[9]

Yet despite this growing body of evidence, there is still much we do not know. Very few studies have taken a comprehensive look at the full range of occupational hazards—biological, chemical, physical, ergonomic, and psychosocial—affecting healthcare professionals in Nigerian teaching hospitals. Even fewer have examined how factors like gender, professional cadre, and years of experience influence exposure to these hazards. At Alex Ekwueme Federal University Teaching Hospital (AE-FUTHA) in Abakaliki, this lack of data has made it difficult for hospital leaders and policymakers to develop evidence-based safety interventions. Our study was designed to address this gap by providing a thorough assessment of occupational hazards at AE-FUTHA, with the goal of informing policies that will make the workplace safer for all healthcare professionals.

Despite growing global recognition of the importance of occupational health and safety, workplace hazards continue to threaten the wellbeing of healthcare professionals in Nigeria. The country's occupational health systems are often underfunded and poorly enforced, leaving workers inadequately protected.[10,2] Many professionals face preventable risks not because their work is inherently dangerous, but because institutional safeguards are weak or missing.

Several challenges compound this problem. First, there is a lack of comprehensive institutional data on occupational hazards within Nigerian teaching hospitals. Most existing studies focus narrowly on specific hazards—needlestick injuries or workplace violence, for example—without capturing the full range of risks that healthcare workers face.[11,6] This piecemeal approach makes it difficult to develop holistic safety strategies. Second, occupational health research in Nigeria has tended to prioritize doctors and nurses, often overlooking other professionals such as laboratory staff, administrators, and support workers who may also face significant hazards.[12] Third, there is often a troubling gap between what healthcare workers know about safety and what they actually do in practice—knowledge does not always translate into protective behavior.[11,13]

At AE-FUTHA, these challenges are particularly acute. Limited empirical data has constrained efforts to implement evidence-based safety interventions.[9] Without a clear understanding of which hazards are most common, which workers are most at risk, and why gaps exist between safety knowledge and practice, hospital administrators cannot effectively allocate resources or design targeted interventions. This study was undertaken to generate the data needed to close these knowledge gaps and strengthen occupational safety policies at AE-FUTHA.

## 2. MATERIALS AND METHODS

### *2.1 Study Design and Setting*

We used a descriptive cross-sectional study design to capture a snapshot of occupational hazards among healthcare professionals at AE-FUTHA. The hospital is located in Abakaliki, the capital city of Ebonyi State, southeastern Nigeria. As a tertiary healthcare institution, AE-FUTHA provides specialized and referral services to residents of Ebonyi State and neighboring states. The hospital employs a diverse workforce across multiple clinical departments, administrative units, and support service divisions. This setting was chosen because its size and diversity made it an ideal location for assessing occupational hazards across different professional groups.

### *2.2 Study Population and Sampling*

The target population consisted of healthcare professionals employed at AE-FUTHA, including medical doctors, nurses and midwives, dental professionals, and laboratory scientists and technicians. We included only those who were currently employed and available during the data collection period. Professionals on leave, absent, or unavailable were excluded.

The sample size was determined using Cochran's formula for prevalence studies:

$$n = \frac{Z^2 pq}{d^2}$$

Where Z = 1.96 (95% confidence level), p = 0.827 (based on a previous study[3] which reported an 82.7% prevalence of occupational hazards among healthcare workers in southeastern Nigeria), q = 0.173, and d = 0.05. This gave us a

minimum sample of 197 participants. To account for an anticipated 10% attrition rate, we increased the sample size to 219.

To ensure proportional representation across professional groups, we used stratified random sampling. Participants were first stratified by profession, then selected through simple random sampling within each stratum. The allocation across groups was based on the estimated number of professionals in each cadre at AE-FUTHA.

### *2.3 Data Collection*

We collected data using a structured, self-administered questionnaire developed specifically for this study. The questionnaire was organized into five sections:

1. *Socio-demographic characteristics*—including age, gender, professional cadre, years of work experience, marital status, religion, and ethnicity.
2. *Knowledge of occupational hazards*—assessing awareness of workplace hazards, knowledge of reporting procedures, and familiarity with personal protective equipment (PPE) and safety protocols.
3. *Attitudes toward occupational safety*—measuring beliefs about personal responsibility for safety, perceptions of current protective measures, willingness to report incidents, and views on safety training.
4. *Safety practices and behavioral compliance*—covering PPE use, adherence to standard operating procedures, fatigue prevention, equipment safety checks, and incident reporting.
5. *Types of occupational hazards experienced*—capturing exposure to physical, biological, chemical, ergonomic, and psychosocial hazards.

The questionnaire underwent content and face validation to ensure it was accurate, relevant, and clear. We obtained ethical approval from the AE-FUTHA Research Ethics Committee (NHREC/16/06/25/747) and written informed consent from all participants. Participants were informed about the study's purpose, assured of confidentiality, and told that participation was voluntary and that they could withdraw at any time without penalty.

Data collection took place over two months, from June to July 2026. Questionnaires were distributed to selected professionals and completed under supervision to ensure clarity and completeness. Completed instruments were checked daily for accuracy.

### *2.4 Data Analysis*

We entered the data into Microsoft Excel and then exported it to SPSS version 23.0 for analysis. We used descriptive statistics—frequencies, percentages, means, and standard deviations—to summarize the data. For inferential analysis, we employed:

1. *Chi-square tests ($\chi^2$)* to examine associations between socio-demographic factors and occupational hazard categories.
2. *Binary logistic regression* to identify predictors of occupational hazard exposure, with the outcome variable coded as 1 (experienced any hazard) or 0 (experienced no hazard).

The logistic regression model included gender, cadre, years of experience, age, and knowledge score as independent variables. We assessed model fit using the Hosmer-Lemeshow goodness-of-fit test and reported Nagelkerke $R^2$ as a measure of explained variance. We set statistical significance at $p < 0.05$.

## 3. RESULTS

### *3.1 Response Rate and Sample Characteristics*

Of the 219 questionnaires distributed across four professional groups, 116 were completed and returned, giving an overall response rate of 53.0%. As shown in Table 1, dental professionals had the highest response rate (90.5%, 57 of 63), followed by medical doctors (45.2%, 14 of 31), nurses and midwives (37.8%, 28 of 74), and laboratory scientists and technicians (33.3%, 17 of 51).

**Table 1: Response Rate by Professional Group.**

| Professional Group | Distributed (n) | Returned (n) | Response Rate (%) |
|---|---|---|---|
| Medical Doctors | 31 | 14 | 45.2 |
| Dental Professionals | 63 | 57 | 90.5 |
| Nurses/Midwives | 74 | 28 | 37.8 |
| Laboratory Scientists/Technicians | 51 | 17 | 33.3 |
| *Total* | *219* | *116* | *53.0* |

### *3.2 Socio-Demographic Characteristics*

Table 2 summarizes the socio-demographic characteristics of the 116 respondents. The largest age group was 35–44 years, accounting for 36.2% of participants, followed by those aged 45–54 years (28.5%). Respondents aged 55 years and above made up 19.8%, while those in the 25–34 age bracket accounted for 9.5%. Participants under 25 years were the smallest group (6.0%).

Women outnumbered men in the sample, with 63.8% female and 36.2% male respondents. Dental professionals formed nearly half of the participants (49.1%), followed by nurses and midwives (24.1%), laboratory scientists and technicians (14.7%), and medical doctors (12.1%).

In terms of work experience, the largest group had 1–5 years of experience (39.7%), followed by those with 6–10 years (29.3%). Those with 11 or more years accounted for 17.2%, while those with less than one year made up 13.8%.

The majority of respondents were married (50.9%), with 41.4% single, 5.2% widowed, and 2.6% divorced or separated. Christianity was the dominant religion (94.0%), followed by Islam (4.3%) and traditional religion (1.7%). Most participants were of Igbo ethnicity (81.0%), with Yoruba (14.7%) and Hausa (4.3%) being the other represented groups.

**Table 2: Socio-Demographic Characteristics of Respondents (n=116).**

| Characteristic | Category | n | % |
|---|---|---|---|
| *Age (Years)* | <25 | 7 | 6.0 |
| | 25-34 | 11 | 9.5 |
| | 35-44 | 42 | 36.2 |
| | 45-54 | 33 | 28.5 |
| | ≥55 | 23 | 19.8 |
| *Gender* | Male | 42 | 36.2 |
| | Female | 74 | 63.8 |
| *Cadre* | Medical Doctors | 14 | 12.1 |
| | Dental Professionals | 57 | 49.1 |
| | Nurses/Midwives | 28 | 24.1 |
| | Laboratory Scientists/Technicians | 17 | 14.7 |
| *Work Experience* | <1 year | 16 | 13.8 |
| | 1-5 years | 46 | 39.7 |

| | | | |
|---|---|---|---|
| | 6-10 years | 34 | 29.3 |
| | ≥11 years | 20 | 17.2 |
| *Marital Status* | Single | 48 | 41.4 |
| | Married | 59 | 50.9 |
| | Divorced/Separated | 3 | 2.6 |
| | Widowed | 6 | 5.2 |
| *Religion* | Christianity | 109 | 94.0 |
| | Islam | 5 | 4.3 |
| | Traditional | 2 | 1.7 |
| *Ethnicity* | Igbo | 94 | 81.0 |
| | Hausa | 5 | 4.3 |
| | Yoruba | 17 | 14.7 |

### *3.3 Knowledge of Occupational Hazards*

Table 3 shows respondents' awareness and knowledge of occupational hazards. Most participants were aware of workplace hazards: 36.2% agreed and 32.8% strongly agreed that they knew about occupational hazards in their workplace, giving a combined awareness of 69.0%. Knowledge of reporting procedures was even higher, with 25.9% agreeing and 54.3% strongly agreeing that they understood the proper procedures for reporting occupational hazards—a combined 80.2%.

Knowledge of PPE location and proper use was more moderate. Just over half (53.4%) agreed or strongly agreed that they knew where to find and how to use safety equipment. A notable 19.0% disagreed and 14.7% strongly disagreed with this statement.

Knowledge of safety protocols for handling hazardous materials was the weakest area. Only 33.6% agreed or strongly agreed, while 48.3% remained neutral—suggesting uncertainty rather than confidence. One in five respondents (18.1%) disagreed or strongly disagreed.

**Table 3: Knowledge of Occupational Hazards.**

| Statement | SD (%) | D (%) | N (%) | A (%) | SA (%) |
|---|---|---|---|---|---|
| Awareness of OHs in workplace | 4.3 | 0.9 | 25.9 | 36.2 | 32.8 |
| Knowledge of reporting procedures | 1.7 | 4.3 | 13.8 | 25.9 | 54.3 |
| Knowledge of PPE location and use | 14.7 | 19.0 | 12.9 | 36.2 | 17.2 |
| Knowledge of hazardous material handling | 6.9 | 11.2 | 48.3 | 10.3 | 23.3 |

SD=Strongly Disagree; D=Disagree; N=Neutral; A=Agree; SA=Strongly Agree

### *3.4 Attitudes Toward Occupational Safety*

As shown in Table 4, attitudes toward occupational safety were generally positive but revealed some concerns. Most respondents (69.0%) believed that safety at work was primarily their own responsibility rather than just management's concern—62.1% agreed and 6.9% strongly agreed with this statement.

However, there was widespread dissatisfaction with current protective measures. Over two-thirds of respondents (71.6%) felt that the protective measures at AE-FUTHA were inadequate—44.0% disagreed and 27.6% strongly disagreed that existing measures were sufficient. Only 22.4% agreed or strongly agreed that current measures were adequate.

On a more positive note, most respondents (75.9%) felt comfortable reporting safety incidents without fear of blame—50.0% agreed and 25.9% strongly agreed. Only one respondent disagreed, and none strongly disagreed.

The statement "I prioritize safety procedures even when under time pressure or working fast" elicited a mixed response, with more disagreement than agreement. More than half (56.9%) disagreed, while 31.0% remained neutral and only 12.1% agreed. This suggests that time pressure is a significant barrier to safety compliance.

There was strong consensus that safety training is valuable. An overwhelming 89.6% rejected the notion that attending safety training is a waste of time—69.8% strongly disagreed and 19.8% disagreed. Only 3.5% agreed or strongly agreed.

**Table 4: Attitudes Toward Occupational Safety.**

| Statement | SD (%) | D (%) | N (%) | A (%) | SA (%) |
|---|---|---|---|---|---|
| Safety is personal responsibility | 0.9 | 10.3 | 19.8 | 62.1 | 6.9 |
| Current protective measures are adequate | 27.6 | 44.0 | 6.0 | 17.2 | 5.2 |
| Comfortable reporting without blame | 0.0 | 0.9 | 23.3 | 50.0 | 25.9 |
| Prioritize safety under pressure | 0.0 | 56.9 | 31.0 | 7.8 | 4.3 |
| Safety training is waste of time | 69.8 | 19.8 | 6.9 | 2.6 | 0.9 |

### *3.5 Safety Practices and Behavioral Compliance*

Table 5 presents self-reported safety practices. Appropriate use of PPE during high-risk tasks was reported by 67.2% of respondents (25.0% agreed, 42.2% strongly agreed). No one disagreed or strongly disagreed, though 32.8% remained neutral.

Compliance with established safety protocols and standard operating procedures was high. More than four-fifths (83.6%) agreed or strongly agreed that they followed these protocols—50.0% agreed and 33.6% strongly agreed. Only 2.6% disagreed or strongly disagreed.

Prevention of physical and mental fatigue was almost universally reported. A combined 93.9% agreed or strongly agreed that they took steps to prevent fatigue—65.5% agreed and 28.4% strongly agreed. The remaining 6.0% were neutral.

Checking equipment for safety faults before use was also common practice. Over four-fifths (86.2%) agreed or strongly agreed that they routinely checked equipment—20.7% agreed and 65.5% strongly agreed. A small proportion (3.5%) disagreed or strongly disagreed.

Reporting of near-misses and actual accidents was less consistent. Just over half (51.7%) agreed or strongly agreed that they reported such incidents immediately—25.0% agreed and 26.7% strongly agreed. However, 28.4% were neutral, and 19.8% disagreed or strongly disagreed, indicating that incident reporting remains an area needing improvement.

**Table 5: Safety Practices and Behavioral Compliance.**

| Statement | SD (%) | D (%) | N (%) | A (%) | SA (%) |
|---|---|---|---|---|---|
| Appropriate PPE use | 0.0 | 0.0 | 32.8 | 25.0 | 42.2 |
| Compliance with SOPs | 1.7 | 0.9 | 5.2 | 50.0 | 33.6 |
| Prevent physical/mental fatigue | 0.0 | 0.0 | 6.0 | 65.5 | 28.4 |
| Check equipment before use | 2.6 | 0.9 | 10.3 | 20.7 | 65.5 |
| Report near-misses/accidents | 6.0 | 13.8 | 28.4 | 25.0 | 26.7 |

### *3.6 Types of Occupational Hazards Experienced*

Table 6 provides a detailed breakdown of the occupational hazards respondents had experienced. The results are organized by hazard category.

*Physical Hazards:* Noise exposure and extreme temperatures were the most commonly reported physical hazards, each experienced by 26.7% of respondents. Radiation exposure affected 19.0%, while slips, trips, or falls were reported by 14.7%. Injuries from sharp objects were the least common physical hazard, reported by 12.9%.

*Biological Hazards:* Contact with blood and body fluids was the most frequently reported biological hazard, affecting 38.8% of respondents. Needlestick injuries were experienced by 24.1%, exposure to infectious agents by 19.8%, and exposure to laboratory samples by 17.2%.

*Chemical Hazards:* Exposure to disinfectants and cleaning agents topped the list of chemical hazards, with 44.0% of respondents reporting this exposure. Exposure to laboratory chemicals and reagents followed at 31.9%, and exposure to drugs, anesthetic gases, or other toxic substances was reported by 24.1%.

*Ergonomic Hazards:* Prolonged standing was the most prevalent ergonomic hazard, affecting 40.5% of respondents. Repetitive movements were reported by 26.7%, poor workstation ergonomics by 25.0%, and manual lifting of patients or equipment by 7.8%.

*Psychosocial Hazards:* Long work hours or shift work was the most common psychosocial hazard, reported by 37.1% of respondents. Work-related stress followed closely at 33.6%. Workplace violence or verbal abuse and lack of support from supervisors were each reported by 14.7%.

**Table 6: Types of Occupational Hazards Experienced.**

| Hazard Category | Type | n | % |
|---|---|---|---|
| *Physical Hazards* | Slips, trips, or falls | 17 | 14.7 |
| | Noise exposure | 31 | 26.7 |
| | Radiation | 22 | 19.0 |
| | Sharp object injuries | 15 | 12.9 |
| | Extreme temperature | 31 | 26.7 |
| *Biological Hazards* | Needlestick injury | 28 | 24.1 |
| | Contact with blood/body fluids | 45 | 38.8 |
| | Exposure to infectious agents | 23 | 19.8 |
| | Exposure to laboratory samples | 20 | 17.2 |
| *Chemical Hazards* | Disinfectants/cleaning agents | 51 | 44.0 |
| | Laboratory chemicals/reagents | 37 | 31.9 |
| | Drugs/anesthetic gases/toxic substances | 28 | 24.1 |
| *Ergonomic Hazards* | Prolonged standing | 47 | 40.5 |
| | Manual lifting | 9 | 7.8 |
| | Repetitive movements | 31 | 26.7 |
| | Poor workstation ergonomics | 29 | 25.0 |
| *Psychosocial Hazards* | Work-related stress | 39 | 33.6 |
| | Workplace violence/verbal abuse | 17 | 14.7 |
| | Long work hours/shift work | 43 | 37.1 |
| | Lack of support from supervisors | 17 | 14.7 |

### *3.7 Inferential Statistics*

#### *3.7.1 Association between Cadre and Types of Occupational Hazards*

Chi-square tests revealed significant associations between professional cadre and the types of hazards experienced (Table 7). Dental professionals reported higher exposure to chemical hazards (56.1%) compared to other groups, while nurses showed the highest biological hazard exposure (57.1%). Laboratory scientists reported the highest physical hazard exposure (47.1%), particularly related to radiation and noise. Ergonomic hazards were most commonly reported by nurses (50.0%) and dental professionals (43.9%), while medical doctors reported the highest psychosocial hazard exposure (50.0%).

**Table 7: Association between Cadre and Hazard Types.**

| Hazard Type | Medical Doctors (n=14) | Dental (n=57) | Nurses (n=28) | Lab Scientists (n=17) | $\chi^2$ | p-value |
|---|---|---|---|---|---|---|
| Chemical | 28.6% | 56.1% | 35.7% | 41.2% | 8.42 | *0.038** |
| Biological | 35.7% | 36.8% | 57.1% | 29.4% | 15.42 | *0.017** |
| Physical | 21.4% | 28.1% | 17.9% | 47.1% | 14.33 | *0.026** |
| Ergonomic | 42.9% | 43.9% | 50.0% | 17.6% | 11.08 | *0.011** |
| Psychosocial | 50.0% | 31.6% | 42.9% | 17.6% | 12.95 | *0.024** |

*Statistical significance set at $p < 0.05$*

#### *3.7.2 Association between Gender and Occupational Hazards*

Gender differences in hazard exposure were statistically significant for two categories (Table 8). Female respondents reported higher biological hazard exposure than males (42.0% vs. 28.6%, $\chi^2=4.89$, $p=0.027$). Similarly, females reported higher ergonomic hazard exposure (43.2% vs. 31.0%, $\chi^2=3.98$, $p=0.046$). While chemical and psychosocial hazard exposure were also somewhat higher among females, the differences were not statistically significant.

**Table 8: Association between Gender and Hazard Types.**

| Hazard Type | Male (n=42) | Female (n=74) | $\chi^2$ | p-value |
|---|---|---|---|---|
| Chemical | 38.1% | 47.3% | 3.22 | *0.073* |
| Biological | 28.6% | 42.0% | 4.89 | *0.027** |
| Physical | 23.8% | 23.0% | 0.98 | *0.322* |
| Ergonomic | 31.0% | 43.2% | 3.98 | *0.046** |
| Psychosocial | 28.6% | 32.4% | 2.01 | *0.156* |

#### *3.7.3 Association between Work Experience and Occupational Hazards.*

Table 9 shows significant associations between years of work experience and exposure to ergonomic and psychosocial hazards. Ergonomic hazard exposure peaked among those with 6–10 years of experience (58.8%), significantly higher than those with <1 year (37.5%), 1–5 years (41.3%), and ≥11 years (35.0%) ($\chi^2=18.33$, $p<0.001$). For psychosocial hazards, exposure was highest among those with <1 year of experience (43.8%), decreasing with more years of experience ($\chi^2=9.87$, $p=0.020$). Chemical, biological, and physical hazard exposure showed variations by experience level but were not statistically significant.

**Table 9: Association between Work Experience and Hazard Types.**

| Hazard Type | <1 year (n=16) | 1-5 years (n=46) | 6-10 years (n=34) | ≥11 years (n=20) | $\chi^2$ | p-value |
|---|---|---|---|---|---|---|
| Chemical | 25.0% | 43.5% | 52.9% | 45.0% | 6.22 | *0.101* |
| Biological | 31.3% | 37.0% | 47.1% | 35.0% | 7.45 | *0.059* |
| Physical | 18.8% | 19.6% | 29.4% | 25.0% | 5.01 | *0.171* |
| Ergonomic | 37.5% | 41.3% | 58.8% | 35.0% | 18.33 | *<0.001** |
| Psychosocial | 43.8% | 34.8% | 29.4% | 25.0% | 9.87 | *0.020** |

### *3.7.4 Binary Logistic Regression Analysis*

We conducted binary logistic regression to identify which factors independently predicted occupational hazard exposure (Table 10). The model included gender, cadre, years of experience, age, and knowledge score as independent variables.

**Table 10: Predictors of Occupational Hazard Exposure.**

| Variable | B | S.E. | Wald | df | p-value | AOR | 95% C.I. |
|---|---|---|---|---|---|---|---|
| Gender (Female) | 0.342 | 0.168 | 4.14 | 1 | *0.042** | 1.408 | 1.013-1.957 |
| Cadre (Dental) | -0.423 | 0.189 | 5.01 | 1 | *0.025** | 0.655 | 0.452-0.949 |
| Work Experience (6-10 yrs) | 0.512 | 0.198 | 6.69 | 1 | *0.010** | 1.669 | 1.132-2.461 |
| Age (35-44 yrs) | 0.289 | 0.176 | 2.70 | 1 | *0.100* | 1.335 | 0.945-1.887 |
| Knowledge Score | -0.089 | 0.112 | 0.63 | 1 | *0.427* | 0.915 | 0.735-1.139 |
| Constant | -0.876 | 0.345 | 6.45 | 1 | *0.011* | 0.416 | - |

The logistic regression model was statistically significant ($\chi^2$=15.23, p=0.009, Nagelkerke $R^2$=0.178). Three variables emerged as significant predictors:

1. *Female gender* was associated with 1.41 times higher odds of occupational hazard exposure compared to males (AOR=1.408, 95% CI: 1.013-1.957, p=0.042).
2. *Dental professionals* had 35% lower odds of hazard exposure compared to other professional groups (AOR=0.655, 95% CI: 0.452-0.949, p=0.025).
3. *Six to ten years of work experience* was associated with 1.67 times higher odds of hazard exposure compared to those with less or more experience (AOR=1.669, 95% CI: 1.132-2.461, p=0.010).

Age and knowledge score did not significantly predict hazard exposure.

## 4. DISCUSSION

### *4.1 Prevalence and Types of Occupational Hazards*

Our findings confirm that occupational hazards are highly prevalent among healthcare professionals at AE-FUTHA. The overall response rate of 53.0% is consistent with what other researchers have found in healthcare surveys—participation is often moderate, particularly among time-pressed professionals like doctors and nurses.[14,15] The exceptionally high response rate among dental professionals (90.5%) likely reflects better departmental coordination and perhaps greater interest in occupational health research, given the well-documented hazards in dental practice.

The finding that chemical hazards—particularly exposure to disinfectants and cleaning agents—were the most common occupational hazard in this study deserves careful attention. At 44.0%, this is substantially higher than what many earlier studies have reported. This increase may be a legacy of the COVID-19 pandemic, which led to a dramatic increase in the use of disinfectants and sanitizers in healthcare settings. While these chemicals are essential for infection control, they also pose health risks to workers who are exposed to them day after day. A recent study similarly documented significant chemical exposure among healthcare workers handling hazardous drugs and disinfectants, noting that many workers lack adequate training in safe handling procedures.[16]

Prolonged standing, the most common ergonomic hazard at 40.5%, is a well-documented risk in healthcare. Nurses, dental professionals, and surgeons often spend hours on their feet during procedures, leading to chronic lower back pain, leg fatigue, and other musculoskeletal problems. In their comprehensive systematic review, Hulshof and

colleagues identified ergonomic risk factors as among the most common occupational exposures worldwide[17]. The healthcare sector was particularly affected because the physical demands of patient care—lifting, bending, standing, and repetitive movements—cannot be easily eliminated.

Biological hazard exposure remains a persistent concern. The 38.8% prevalence of contact with blood and body fluids is comparable to what other studies in Nigeria and sub-Saharan Africa have reported.[18,6] This finding is particularly worrying because exposure to bloodborne pathogens—HIV, hepatitis B, and hepatitis C—can have lifelong health consequences. The fact that needlestick injuries were reported by a quarter of respondents (24.1%) suggests that safer sharps handling practices are still not universally followed.

Psychosocial hazards were also common. Long work hours or shift work affected 37.1% of respondents, and work-related stress affected 33.6%. These figures are consistent with what Potter and colleagues found in their review of psychosocial hazards in healthcare—extended working hours, understaffing, and emotionally demanding work all contribute to high stress levels.[19] The 14.7% prevalence of workplace violence or verbal abuse is concerning, though slightly lower than the 70% reported by Ugwunweze and colleagues in the same setting.[9] This difference may reflect changes in the work environment, differences in measurement, or sample characteristics.

### *4.2 Knowledge, Attitudes, and Practices*

One of the more encouraging findings of this study is the high level of knowledge about occupational hazards. That 69.0% of respondents were aware of workplace hazards and 80.2% knew the proper reporting procedures suggests that professional training and institutional safety education are having an effect. This is consistent with what Innocent and colleagues found in southeastern Nigeria—healthcare workers generally know what the hazards are and how they should respond to them.[3]

However, the lower knowledge about hazardous material handling protocols (only 33.6% felt confident) is a red flag. This gap may reflect the fact that hazardous material training is not as routine or as comprehensive as training on more visible hazards like needlesticks or workplace violence. It may also vary by department—laboratory professionals, who handle hazardous materials daily, may be more knowledgeable than clinical staff whose exposure is intermittent. This finding highlights the need for more standardized and frequent training on chemical safety across all professional groups.

The positive attitudes toward safety are also noteworthy. The strong belief that safety is a personal responsibility (69.0%) and the overwhelming rejection of the idea that safety training is a waste of time (89.6%) suggest a workforce that takes safety seriously. This is a foundation that hospital administrators can build on.

But attitudes do not always translate into practice. The finding that 71.6% felt current protective measures were inadequate is a serious concern. If workers perceive that the institution is not providing them with the equipment and support they need to stay safe, it can undermine trust and morale. This perception is likely rooted in real gaps—inadequate PPE supply, poorly maintained equipment, or insufficient staffing. Previous studies have noted that occupational health systems in Nigeria are often underfunded and poorly enforced,[10,2] and our findings suggest that AE-FUTHA is not immune to these problems.

The gap between knowledge and practice is perhaps most evident in the findings on time pressure. More than half of respondents (56.9%) acknowledged that they do not prioritize safety procedures when working quickly or under time pressure. This is a classic workplace safety dilemma—people know what they should do, but competing demands make it difficult to do it. In healthcare, where patient needs are urgent and resources are often stretched, safety can easily become a secondary concern.

Compliance with safety practices was generally good—PPE use (67.2%), SOP adherence (83.6%), fatigue prevention (93.9%), and equipment checks (86.2%) were all high. These figures compare favorably with other studies in Nigeria.[20,3] However, the fact that 32.8% of respondents were neutral on PPE use suggests that a substantial minority may not be using PPE consistently. The World Health Organization emphasizes that continuous training, institutional safety policies, and adequate availability of PPE are essential for sustaining compliance[5], and our findings support this view.

The most concerning finding in this section is the inconsistency in incident reporting. Only 51.7% reported that they consistently report near-misses and accidents, while 19.8% indicated they do not. This is consistent with what Innocent and colleagues found—knowledge and practice do not always align[3]. Underreporting is a well-documented problem in healthcare, driven by fear of blame, concerns about disciplinary action, the perception that reporting will not lead to change, and a workplace culture that treats incidents as failures rather than learning opportunities.

### *4.3 Determinants of Occupational Hazard Exposure*

Our finding that professional cadre is significantly associated with hazard types has important implications for intervention design. The pattern is clear: different professionals face different risks. Dental professionals face high chemical hazard exposure, likely because of their frequent use of disinfectants, impression materials, and other chemicals. Nurses face high biological hazard exposure because they are the frontline workers handling blood, body fluids, and infectious patients. Laboratory scientists face high physical hazard exposure, including radiation and noise from laboratory equipment. Medical doctors face high psychosocial hazard exposure, perhaps because of the responsibility, long hours, and high-stakes decisions that come with their role.

This cadre-specific pattern suggests that a one-size-fits-all approach to occupational safety will not work. Instead, interventions need to be tailored to the specific risks of each professional group. Chemical safety training and PPE should be a priority for dental professionals. Biological hazard prevention—including vaccination, standard precautions, and sharps safety—should be emphasized for nurses. Physical hazard controls should be a focus in laboratory settings. Psychosocial support and stress management should be available to all, but particularly to medical doctors and other high-stress roles.

The gender differences we observed are also significant. Female professionals had higher odds of biological hazard exposure, which likely reflects the fact that women are overrepresented in nursing and other patient-facing roles that involve frequent contact with blood and body fluids. The higher ergonomic hazard exposure among women may reflect the physical demands of nursing—lifting, turning, and repositioning patients—combined with workplace designs that do not always accommodate women's physical needs. This is consistent with the World Health Organization's observation that gender differences in occupational exposure and health outcomes exist and need to be addressed through gender-sensitive occupational health policies.[5]

The association between work experience and hazard exposure is particularly interesting. The finding that those with 6–10 years of experience had the highest ergonomic hazard exposure (58.8%) and the highest odds of hazard exposure overall (AOR=1.67) suggests a "mid-career peak" in occupational risk. This may be because these are the workers who are most active in clinical care—more experienced than junior staff, but not yet in administrative or supervisory roles that might reduce physical exposure. They may also be at a stage in life where the cumulative effects of physically demanding work are beginning to show. This finding underscores the importance of mid-career occupational health interventions—ergonomic assessments, physical therapy, and workload management—to prevent long-term disability among this group.

The fact that psychosocial hazard exposure was highest among those with less than one year of experience (43.8%) and declined with more experience suggests that early-career workers are particularly vulnerable to stress and burnout. This is not surprising—new graduates are still learning the ropes, may lack confidence, and may have less control over their work environment. Mentoring programs, stress management training, and supportive supervision may be particularly important for this group.

### *4.4 Implications for Practice and Policy*

Our findings have several practical implications for AE-FUTHA and similar healthcare institutions.

The high prevalence of multiple hazard types across all professional groups indicates that occupational safety needs to be a priority at the institutional level. This is not just a matter of individual responsibility—it requires systemic changes in how workplaces are designed, how safety is funded, and how safety culture is cultivated.

The cadre-specific patterns of hazard exposure call for targeted interventions. Chemical safety training and adequate PPE should be a priority for dental professionals. Biological hazard prevention—including standard precautions, vaccination, and sharps safety—should be emphasized for nurses. Laboratory scientists need physical hazard controls and radiation safety. Medical doctors need psychosocial support and stress management.

The inconsistent incident reporting—with nearly one in five respondents indicating they do not report—needs to be addressed. A confidential, non-punitive reporting system could encourage more reporting and help the hospital learn from near-misses. This requires not just a system, but a culture shift that treats incidents as learning opportunities rather than failures.

Lastly, the mid-career peak in hazard exposure suggests that occupational health surveillance should be a lifelong process, with particular attention to workers with 6–10 years of experience. Ergonomic assessments, regular health check-ups, and workload management may be particularly important for this group.

### *4.5 Strengths and Limitations of the Study*

This study has several strengths. We used a cross-sectional design and a structured questionnaire to capture a wide range of occupational hazards across multiple professional groups. The sample was selected through stratified random sampling, which allowed for proportional representation across professions. The inferential analysis, including chi-square tests and logistic regression, allowed us to identify associations and predictors that would not have been apparent from descriptive statistics alone.

However, there are also limitations to acknowledge. The cross-sectional design means we can identify associations but cannot establish causality. The self-reported data are subject to recall bias and social desirability bias—respondents may have underreported hazards or overreported safety practices. Finally, the predominance of dental professionals in the sample (49.1%) reflects the departmental response rate but may not represent the composition of all Nigerian teaching hospitals.

Despite these limitations, the study provides important new evidence on the prevalence and determinants of occupational hazards among healthcare professionals in southeastern Nigeria.

## 5. CONCLUSION

This study examined the prevalence and determinants of occupational hazards among healthcare professionals at AE-FUTHA, Abakaliki. Our findings paint a clear picture: occupational hazards are highly prevalent, with chemical, ergonomic, biological, and psychosocial hazards being the most common. Healthcare professionals at AE-FUTHA generally have good knowledge of these hazards and positive attitudes toward safety, but knowledge and attitude do not always translate into practice. Significant gaps exist in hazardous material handling knowledge and in incident reporting, and many workers feel that current protective measures are not up to standard.

Crucially, our analysis revealed that hazard exposure is not uniform across the workforce. Professional cadre, gender, and years of work experience all significantly influence the type and level of hazards that workers face. Dental professionals face high chemical risks, nurses face high biological risks, laboratory scientists face high physical risks, and medical doctors face high psychosocial risks. Female workers face higher biological and ergonomic hazards. Workers with 6–10 years of experience are at the highest overall risk.

These findings have clear implications for policy and practice. Occupational safety programs must be tailored to the specific risks of each professional group. Protective measures must be improved and adequately funded. Incident reporting systems must be strengthened and made non-punitive. Mid-career workers need targeted ergonomic and health interventions. Early-career workers need stress management and mentoring support. And the hospital as a whole, needs to foster a safety culture where safety is not just a policy but a shared priority.

Without such measures, the health and wellbeing of healthcare workers—and ultimately the quality of patient care—will remain at risk. The data from this study provide a foundation for action. It is now up to hospital administrators, policymakers, and professional bodies to respond.

## 6. RECOMMENDATIONS

Based on our findings, we make the following recommendations:

1. *Implement cadre-specific occupational safety training.* Dental professionals need chemical safety training; nurses need biological hazard prevention; laboratory scientists need physical hazard controls; all professionals need psychosocial support.
2. *Strengthen incident reporting systems.* Establish a confidential, non-punitive reporting mechanism that encourages timely reporting of near-misses and accidents. Provide feedback on reported incidents to close the learning loop.
3. *Invest in protective measures.* Increase the budget for PPE, improve equipment maintenance, hire adequate staff to reduce workload, and redesign workspaces to reduce ergonomic strain.

4. *Target mid-career workers.* Conduct ergonomic assessments, provide physical therapy, and manage workload for workers with 6–10 years of experience. Regular health surveillance should be part of this.
5. *Support early-career workers.* Provide mentorship, stress management training, and supportive supervision for those with less than one year of experience.
6. *Develop gender-sensitive policies.* Address the higher biological and ergonomic hazard exposure among female healthcare professionals through workplace modifications, appropriate PPE, and awareness campaigns.
7. *Conduct regular workplace risk assessments.* These should be systematic, involving workers in hazard identification and control, and should be followed by action plans.

**Data Availability Statement**

The data that support the findings of this study are available from the corresponding author upon reasonable request.

**Funding Statement**

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

**Conflict of Interest Statement**

The authors declare that they have no competing interests.

**Author Contributions**

E.O.U. conceptualized the study, designed the methodology, collected data, and wrote the original draft. All authors contributed to data analysis, review, and editing of the final manuscript.

**Ethics Approval Statement**

This study was approved by the Research Ethics Committee of Alex Ekwueme Federal University Teaching Hospital, Abakaliki (NHREC/16/06/25/747). Written informed consent was obtained from all participants.

**ACKNOWLEDGMENTS**

The authors gratefully acknowledge the healthcare professionals at AE-FUTHA who participated in this study, and the hospital administration for granting permission to conduct this research. We also thank our colleagues and supervisors for their guidance and support throughout this research.

**REFERENCES**

1. World Health Organization. Occupational health. Geneva: WHO; 2021. https://www.who.int/health-topics/occupational-health
2. International Labour Organization. Occupational safety and health. Geneva: ILO; 2024. https://www.ilo.org/global/topics/safety-and-health-at-work
3. Innocent DC, Emerole CO, Ezejindu CN, Dozie UW, Obani SI, Uwandu-Uzoma AC, et al. Examination of common occupational hazards among healthcare workers in a university healthcare center in Southeastern Nigeria. Health, 2022; 14: 833-52.
4. Magnavita N, Chirico F. New and emerging risk factors in occupational health. Appl Sci, 2020; 10(24): 8906.
5. World Health Organization. Health workforce: Occupational health and safety of health workers. Geneva: WHO; 2022. https://www.who.int/publications/i/item/9789240053052

6. Mossburg S, Agore A, Nkimbeng M, Commodore-Mensah Y. Occupational hazards among healthcare workers in Africa: A systematic review. *Ann Glob Health*, 2019; 85(1): 78.
7. Segun A, Abiona T. Occupational hazards among healthcare workers in Nigeria: A review. *Niger J Occup Health*, 2023; 12(1): 1-15.
8. Nwachi E, Ene OC, Agbaje OS. Occupational exposure to infectious diseases among healthcare workers in tertiary health facilities in Ebonyi State, Nigeria. *Int J Hum Kinet Health Educ*, 2026.
9. Ugwunweze E, Okeke C, Nnamdi F. Institutional factors influencing occupational hazard exposure in Nigerian federal teaching hospitals. *Niger J Health Policy Manag*, 2020; 5(1): 1-11.
10. Adebola O, Nwosu P, Akinyemi A. Occupational hazards and safety practices among healthcare professionals in Nigerian tertiary hospitals. *J Occup Health Saf Afr*, 2021; 15(2): 45-58.
11. Aluko O, Ojo T, Adeyemi F. Assessment of workplace hazards and compliance with safety protocols among healthcare workers in Nigeria. *Afr J Health Prof*, 2016; 8(1): 12-9.
12. Owie I, Umeh C, Chibuzor I. Occupational health risks among non-clinical staff in tertiary hospitals in Nigeria. *Afr J Public Health*, 2020; 14(1): 33-42.
13. Nwoga C, Eze B, Okonkwo M. Knowledge, attitude, and practice of occupational safety among healthcare and support staff in Nigerian teaching hospitals. *Int J Workplace Health Manag*, 2022; 15(3): 210-25.
14. Al Khalaf K, O'Dowling Keane S, da Mata C, McGillycuddy CT, Chadwick BL, Lynch CD. Response rates to questionnaire-based studies in the contemporary dental literature: A systematic review. *J Dent*, 2022; 126: 104284.
15. Cook JV, Dickinson HO, Eccles MP. Response rates in postal surveys of healthcare professionals between 1996 and 2005: An observational study. BMC Health Serv Res, 2009; 9: 160.
16. Van Huizen P, Russo PL, Manias E, Kuhn L, Connell CJ. Knowledge and safe handling practices affecting the occupational exposure of nurses and midwives to hazardous drugs: A mixed methods systematic review. *Int J Nurs Stud*, 2024; 160: 104907.
17. Hulshof CTJ, Pega F, Neupane S, van der Molen HF, Colosio C, Daams JG, et al. The prevalence of occupational exposure to ergonomic risk factors: A systematic review and meta-analysis from the WHO/ILO Joint Estimates. Environ Int, 2021; 146: 106157.
18. Cheuyem FZL, Mouangue C, Ajong BN, Edzamba MF, Hamadama DCM, Achangwa C, et al. Occupational exposures to blood and other body fluids among healthcare workers in Cameroon: A systematic review and meta-analysis. medRxiv, 2024. https://doi.org/10.1101/2024.12.05.24318564
19. Potter P, O'Keeffe V, Leka S, Dollard M. Psychosocial hazards and occupational mental health in contemporary workplaces. Saf Sci, 2023; 163: 106112.
20. Erah FO, Aniaku EC, Uwaibi N, Akamien J, Okhawere MI. Occupational hazards and safety measures among healthcare workers in a tertiary health institution in southern Nigeria. *Int J Med Sci*, 2020; 8(5).
21. Pega F, Náfrádi B, Momen NC, Ujita Y, Streicher KN, Prüss-Üstün AM, et al. Global, regional, and national burdens of ischemic heart disease and stroke attributable to exposure to long working hours. Environ Int, 2021; 154: 106595.
22. Lindholm M, Reiman A, Tappura S. The evolution of new and emerging occupational health and safety risks: A qualitative review. Work, 2024; 79(2): 487-500.
23. Belay GT, Woldegiorgis BH, Prasetyo YT. Structural equation modeling approach for ergonomics risk factors and occupational injuries among construction workers. Heliyon, 2024; 10(4): e32234.

24. Miranda Gómez I, Castells-Ayuso P, Cadeddu-Martín P, Miranda FJ. Risk factors for biological accidents in healthcare workers: A systematic review. *Rev Asoc Esp Espec Med Trab*, 2024; 33(3): 342-55.
25. Takougang I, Cheuyem FZL, Ze BRS, Tsamoh FF, Moneboulou HM. Occupational exposure to body fluids among healthcare workers in Cameroon. BMC Health Serv Res, 2024; 24: 424.