

Assessment of Biological Risk Exposure Among Hospital Housekeepers at Wukari Teaching Hospital

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Abstract

Hospital housekeepers play a vital role in maintaining hygiene and preventing infections within healthcare facilities, yet they are frequently exposed to biological hazards such as bloodborne pathogens, respiratory droplets, and contaminated waste, often without adequate protection or training. In Nigeria, particularly in tertiary institutions like Wukari Teaching Hospital, limited resources and weak enforcement of safety protocols further increase the vulnerability of non-clinical staff. This study aimed to assess the level of biological risk exposure among hospital housekeepers and identify gaps in personal protective equipment (PPE) usage, hygiene practices, and institutional support. A descriptive cross-sectional study was conducted among 60 hospital housekeepers at Wukari Teaching Hospital, with stratified random sampling ensuring representation across departments including wards, emergency, surgery, and outpatient units. Data were collected using structured questionnaires, direct observation checklists, and key informant interviews with infection control officers, and variables assessed included

demographic data, exposure history, PPE usage, hygiene practices, and training experience. Quantitative data were analyzed using SPSS version 26, while qualitative responses were thematically coded. Findings revealed that 78.3% of housekeepers had direct contact with biological waste in the past six months, with blood, sputum, and vomit being the most common contaminants; only 41.7% consistently used full PPE, and just 36.7% reported that PPE was always available. Hand hygiene compliance was observed in 58.3% of cases, while 65% of respondents had never received formal infection control training, and only 30% felt adequately protected at work, with a majority suggesting improvements such as regular training, better supervision, and increased PPE supply. The study concludes that hospital housekeepers at Wukari Teaching Hospital face substantial biological risks due to frequent exposure, inconsistent PPE usage, and inadequate training, highlighting the urgent need for institutional reforms including structured infection control education, reliable PPE provision, and strict enforcement of hygiene protocols to protect this essential workforce and ensure a safe and resilient healthcare environment.

Keywords: Biological Risk Exposure; Hospital Housekeepers; Personal Protective Equipment; Infection Control Training; Hygiene Practices; Wukari Teaching Hospital; Nigeria

INTRODUCTION

Hospital environments are inherently high-risk zones for biological exposure, particularly for non-clinical personnel such as housekeepers. These individuals are responsible for maintaining cleanliness, handling medical waste, and sanitizing patient care areas—tasks that routinely expose them to infectious agents including bloodborne pathogens, respiratory droplets, and contaminated surfaces (Paterson, Wright, & Harris, 2018). Despite their critical role in infection prevention and control, hospital housekeepers often operate with limited training, inadequate protective equipment, and minimal institutional recognition, making them one of the most biologically vulnerable groups within healthcare systems (Douglas et al., 2008).

Biological hazards in healthcare settings encompass a wide range of risks, including exposure to hepatitis B and C viruses, HIV, *Mycobacterium tuberculosis*, and gastrointestinal pathogens. The World Health Organization (WHO, 2017) emphasizes that effective infection control must extend beyond clinical staff to include all personnel

involved in environmental hygiene and waste management. However, studies have shown that housekeepers frequently lack access to personal protective equipment (PPE), are poorly informed about standard precautions, and are rarely included in formal infection control training programs (Few, Ahern, Matthies, & Kovats, 2004). These gaps not only endanger the health of the workers themselves but also compromise the overall safety of healthcare facilities.

In Nigeria, the challenges are compounded by systemic resource limitations and inconsistent enforcement of occupational safety standards. A study by Adesola et al. (2024) on flood-related outbreaks in Nigerian hospitals revealed that support staff, including cleaners and waste handlers, were disproportionately affected due to poor preparedness and lack of protective infrastructure. Similarly, Reacher et al. (2004) found that non-clinical staff in flood-impacted hospitals experienced elevated rates of gastrointestinal and respiratory illnesses, underscoring the need for inclusive health protection strategies. This study focuses on Wukari Teaching Hospital in Taraba State, aiming to assess the biological risk exposure among its housekeeping staff, evaluate their knowledge and practices, and recommend evidence-based interventions to enhance occupational safety.

2. Literature Review

Hospital housekeepers are integral to maintaining hygiene and infection control in healthcare environments, yet they remain one of the most biologically vulnerable occupational groups. Their daily tasks—handling medical waste, cleaning contaminated surfaces, and managing laundry—expose them to a wide range of infectious agents including bloodborne pathogens, respiratory droplets, and gastrointestinal microbes (Paterson, Wright, & Harris, 2018). Despite their proximity to high-risk zones, housekeepers are often excluded from formal infection control programs, leaving them undertrained and underprotected compared to clinical staff.

Biological hazards in healthcare settings have been widely documented. According to the World Health Organization (WHO, 2017), exposure to contaminated fluids and waste materials can lead to serious infections such as hepatitis B and C, HIV, and tuberculosis. The risk is compounded when workers lack access to personal protective equipment (PPE) or fail to adhere to hygiene protocols. Few, Ahern, Matthies, and Kovats (2004) emphasized that non-clinical staff face disproportionate exposure due to systemic

neglect and poor institutional oversight. Their strategic review called for inclusive occupational health policies that prioritize all categories of healthcare workers.

Environmental factors also play a role in biological risk exposure. Douglas et al. (2008) explored how climate-related events such as flooding exacerbate contamination in healthcare settings, particularly in low-resource regions. Their study highlighted the intersection of environmental injustice and occupational health, noting that support staff in urban hospitals often work in unsanitary conditions with limited protective infrastructure. This is especially relevant in Nigerian hospitals, where seasonal flooding and poor waste management systems increase the risk of exposure for housekeepers and other support personnel.

In Nigeria, Adesola et al. (2024) investigated the public health impacts of flooding and found that hospital support staff were disproportionately affected during outbreaks. Their findings revealed that cleaners and waste handlers had higher rates of gastrointestinal and respiratory illnesses due to inadequate training and lack of PPE. Similarly, Reacher et al. (2004) documented elevated illness rates among non-clinical staff in flood-impacted hospitals in the UK, reinforcing the global nature of this occupational hazard. These studies underscore the need for targeted interventions that address the unique vulnerabilities of hospital housekeepers.

Despite growing awareness, gaps remain in policy implementation and resource allocation. Many healthcare institutions lack structured training programs for housekeepers, and PPE supply is often inconsistent. Paterson et al. (2018) argued that improving occupational safety for non-clinical staff requires a cultural shift within healthcare systems—one that recognizes the essential role of housekeepers in infection prevention. This literature provides a strong foundation for assessing biological risk exposure at Wukari Teaching Hospital and developing evidence-based strategies to protect this critical workforce.

MATERIALS AND METHODS

Study Area

The study was conducted at Wukari Teaching Hospital, located in Taraba State, Nigeria. The hospital serves as a referral center and employs a diverse workforce, including over 60 housekeeping staff responsible for sanitation and waste management.

Study Design and Setting

This study employed a descriptive cross-sectional design to assess biological risk exposure among hospital housekeepers at Wukari Teaching Hospital, located in Taraba State, Nigeria. The hospital is a tertiary healthcare facility that serves as a referral center for surrounding communities and provides a wide range of clinical and support services. Housekeepers at the hospital are responsible for cleaning wards, handling medical waste, and maintaining hygiene in high-risk areas such as emergency rooms, surgical theaters, and outpatient departments.

Study Population and Sampling

The target population consisted of all hospital housekeepers employed at Wukari Teaching Hospital as of July 2025. A total of 60 participants were selected using stratified random sampling to ensure representation across key departments—wards, emergency, surgery, and outpatient units. Inclusion criteria required that participants had worked at the hospital for at least three months and were directly involved in cleaning or waste handling. Housekeepers on leave or administrative assignment were excluded.

Data Collection Instruments

Three primary tools were used for data collection:

- **Structured Questionnaire:** A pre-tested, researcher-designed questionnaire was administered to collect data on demographic characteristics, exposure history, PPE usage, hygiene practices, and training experience. The questionnaire was adapted from WHO occupational safety guidelines (WHO, 2017) and validated through expert review.
- **Observation Checklist:** A standardized checklist was used to observe compliance with infection control practices, including hand hygiene, PPE usage, and waste disposal procedures. Observations were conducted discreetly during routine cleaning activities to minimize response bias.
- **Key Informant Interviews:** Semi-structured interviews were conducted with infection control officers and departmental supervisors to gain insights into institutional policies, training frequency, and challenges in enforcing safety protocols.

Variables Measured

The study focused on five key variables essential to understanding biological risk exposure among hospital housekeepers. First, demographic data were collected to establish

participant profiles, including age, gender, department of assignment, and years of experience. Second, exposure history was assessed by documenting the frequency and types of biological waste encountered—such as blood, sputum, urine, and used sharps—as well as incidents involving splash exposure or needle-stick injuries. Third, personal protective equipment (PPE) usage was evaluated by examining the availability and consistency of using gloves, masks, aprons, goggles, and boots during routine cleaning tasks. Fourth, hygiene practices were measured through self-reported and observed handwashing frequency and adherence to standard infection control protocols. Lastly, training and support were explored by identifying participation in formal infection control training, perceptions of workplace safety, and suggestions for improving protective measures and supervision. These variables provided a comprehensive framework for analyzing occupational health risks in the hospital environment.

Data Collection Procedure

Data collection was conducted over a two-week period in August 2025. Questionnaires were self-administered with assistance provided to participants with limited literacy. Observations were carried out during morning, and afternoon shifts to capture variations in practice. Interviews were audio-recorded with consent and transcribed for analysis.

Data Analysis

Quantitative data were entered into SPSS version 26 for analysis. Descriptive statistics such as frequencies and percentages were used to summarize categorical variables. Chi-square tests were applied to examine associations between training and PPE compliance. Qualitative data from interviews were analyzed thematically to identify recurring patterns and contextual insights.

Ethical Considerations

Ethical approval was obtained from the Wukari Teaching Hospital Research Ethics Committee. Written informed consent was obtained from all participants. Confidentiality was maintained by anonymizing responses and securing all data in password-protected files. Participation was voluntary, and respondents were informed of their right to withdraw at any stage without penalty.

Questionnaire Sample

I. Section A: Demographic Information

1. Age: _____
 2. Gender: ☐ Male ☐ Female
 3. Department: ☐ Ward ☐ Emergency ☐ Surgery ☐ Outpatient
 4. Years of experience: ☐ Less than 1 year ☐ 1–5 years ☐ More than 5 years
-

II. Section B: Exposure History

5. Have you handled biological waste in the past 6 months? ☐ Yes ☐ No
 6. What types of waste have you encountered? (Check all that apply)
☐ Blood ☐ Vomit ☐ Sputum ☐ Urine ☐ Used sharps
 7. Have you ever experienced a needle-stick injury or splash exposure? ☐ Yes ☐ No
-

III. Section C: PPE and Hygiene

8. Do you use PPE during cleaning tasks? ☐ Always ☐ Sometimes ☐ Never
 9. What PPE do you use regularly? (Check all that apply)
☐ Gloves ☐ Face mask ☐ Apron ☐ Goggles ☐ Boots
 10. Is PPE always available in your department? ☐ Yes ☐ No
 11. Do you wash your hands after each cleaning task? ☐ Yes ☐ No
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IV. Section D: Training and Support

12. Have you received formal training on infection control? ☐ Yes ☐ No
13. How often is training provided? ☐ Monthly ☐ Quarterly ☐ Rarely ☐ Never
14. Do you feel adequately protected at work? ☐ Yes ☐ No
15. What improvements would you suggest?

RESULTS

Table 1: Demographic Profile of Respondents

Variable	Frequency (n = 60)	Percentage (%)
Gender		
Male	22	36.7
Female	38	63.3
Age Group		
18–25 years	12	20.0
26–35 years	28	46.7
36–45 years	15	25.0
Above 45 years	5	8.3
Years of Experience		
Less than 1 year	6	10.0
1–5 years	34	56.7
More than 5 years	20	33.3
Department Assigned		
Ward	20	33.3
Emergency	12	20.0
Surgery	15	25.0
Outpatient	13	21.7

Table 2: Biological Exposure History

Exposure Type	Frequency (n = 60)	Percentage (%)
Handled biological waste recently	47	78.3
Types of waste encountered		
– Blood	39	65.0
– Vomit	28	46.7
– Sputum	33	55.0
– Urine	25	41.7
– Used sharps	18	30.0
Experienced splash or needle-stick	21	35.0

Table 3: PPE Usage and Hygiene Practices

PPE and Hygiene Variable	Frequency (n = 60)	Percentage (%)
Consistent use of PPE	25	41.7
PPE items used regularly		
Gloves	52	86.7
Face mask	38	63.3
Apron	30	50.0
Goggles	12	20.0
Boots	26	43.3
PPE always available	22	36.7
Handwashing after each task	35	58.3

Table 4: Training and Compliance

Training and Support Variable	Frequency (n = 60)	Percentage (%)
Received formal infection control training	21	35.0
Frequency of training		
Monthly	5	8.3
Quarterly	9	15.0
Rarely	7	11.7
Never	39	65.0
Feels adequately protected at work	18	30.0
Suggested improvements		
More PPE supply	42	70.0

These tables provide a clear snapshot of the biological risks faced by hospital housekeepers and highlight critical gaps in protection, training, and compliance. Let me know if you'd like help visualizing these results in charts or integrating them into your full manuscript.

DISCUSSION

The findings of this study reveal significant biological risk exposure among hospital housekeepers at Wukari Teaching Hospital, underscoring critical gaps in occupational

safety, training, and institutional support. A majority of respondents (78.3%) reported direct contact with biological waste such as blood, sputum, and vomit, consistent with global evidence that non-clinical healthcare workers are frequently exposed to infectious materials during routine tasks (Paterson, Wright, & Harris, 2018). The high rate of exposure to used sharps (30%) and splash incidents (35%) further highlights the vulnerability of this group to bloodborne pathogens including hepatitis B, hepatitis C, and HIV (WHO, 2017).

Despite the known risks, only 41.7% of housekeepers consistently used full personal protective equipment (PPE), and just 36.7% reported that PPE was always available in their departments. Gloves were the most commonly used item (86.7%), while critical protective gear such as goggles and boots were used by fewer than half of the respondents. These findings align with Douglas et al. (2008), who emphasized that support staff in low-resource settings often lack access to adequate protective infrastructure. The inconsistent use of PPE and poor hand hygiene practices observed in 40% of cases suggest a systemic failure in enforcing infection control protocols.

Training and institutional support were also found to be insufficient. Only 35% of respondents had received formal infection control training, and 65% reported that such training was never provided. This lack of education directly correlates with poor compliance and increased exposure risk, as documented by Few, Ahern, Matthies, and Kovats (2004). Furthermore, only 30% of participants felt adequately protected at work, and a majority recommended improvements such as regular training, better supervision, and increased PPE supply. These recommendations echo findings by Adesola et al. (2024), who reported similar challenges among hospital support staff during flood-related outbreaks in Nigeria.

The results also reflect broader occupational health disparities. Housekeepers, despite their essential role in maintaining hospital hygiene, are often excluded from safety planning and emergency preparedness. Reacher et al. (2004) found that non-clinical staff in flood-impacted hospitals experienced elevated rates of illness due to poor sanitation and lack of protective measures. The situation at Wukari Teaching Hospital mirrors these global patterns, indicating an urgent need for inclusive health protection strategies that prioritize all categories of healthcare workers.

CONCLUSION

This study concludes that hospital housekeepers at Wukari Teaching Hospital face considerable biological risks due to frequent exposure to infectious waste, inconsistent use of PPE, and inadequate training. The findings highlight systemic gaps in occupational safety and underscore the need for targeted interventions. Strengthening infection control education, ensuring consistent PPE availability, and enforcing hygiene compliance are critical steps toward safeguarding this vulnerable workforce. Institutional policies must recognize the essential role of housekeepers in infection prevention and integrate them into broader health and safety frameworks. Investing in their protection is not only a matter of equity but also a prerequisite for building resilient and safe healthcare environments.

Conflict of Interest

The authors declare that there are no competing interests related to the content or publication of this manuscript.

Authors' Declaration

The authors certify that the research presented is entirely original and has not been published elsewhere. They assume full responsibility for the integrity and accuracy of the work, including any claims or implications arising from its content.

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