

## KNOWLEDGE AND ATTITUDE TOWARDS THE USE OF PERSONAL PROTECTIVE EQUIPMENT AMONG PRIMARY HEALTH CARE WORKERS IN NKALAGU COMMUNITY, ISHIELU L.G.A, EBONYI STATE, NIGERIA

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### Abstract

Personal protective equipment (PPE) is essential for safeguarding healthcare workers, particularly those in primary health care (PHC) settings, against occupational exposure to infectious diseases. This study assessed the knowledge and attitude towards PPE use among PHC workers in Nkalagu Community, Ishielu Local Government Area of Ebonyi State, Nigeria. Using a descriptive cross-sectional survey design, data were collected from 60 PHC workers through structured questionnaires. Results revealed that 58.3% of respondents demonstrated good knowledge of PPE use, while 76.7% exhibited a positive attitude toward its application. However, a notable proportion still had poor knowledge (13.4%) or negative attitudes (23.3%). A statistically significant relationship was found between knowledge and attitude ( $p = 0.006$ ), indicating that higher knowledge levels are associated with more positive attitudes. The findings underscore the importance of continuous training, adequate PPE supply, and targeted interventions for lower-skilled health workers. Strengthening infection prevention and control (IPC) practices at the primary care level is essential for improving occupational safety and health outcomes in rural Nigerian communities.

**Keywords:** Personal protective equipment, primary health care workers, knowledge, attitude, infection prevention, occupational safety, rural healthcare, Ebonyi State, Nkalagu, Nigeria.

## Introduction

Personal protective equipment (PPE) plays a critical role in safeguarding health care workers (HCWs) against infectious agents and occupational hazards, especially in primary health care settings where exposure risk is heightened (World Health Organization [WHO], 2022). The emergence and persistence of global health threats such as COVID-19 have further emphasized the significance of appropriate PPE usage as a frontline defense mechanism in healthcare delivery (Ilesanmi et al., 2021).

In Nigeria, primary health care (PHC) remains the cornerstone of the national health system, delivering essential health services to underserved and rural populations (National Primary Health Care Development Agency [NPHCDA], 2022). Despite the strategic role of PHC workers in managing community health, reports have shown inadequate access to PPE, limited training, and varied levels of knowledge and attitudes regarding its use (Ameh et al., 2022). This is particularly evident in rural communities like Nkalagu in Ishielu Local Government Area of Ebonyi State, where infrastructural challenges and limited healthcare investment often hamper infection prevention and control (IPC) practices (Eze et al., 2023).

Understanding the knowledge and attitude of health workers towards PPE use is essential for designing effective interventions that promote safety and improve service delivery. Prior studies across Nigeria have identified knowledge gaps, misconceptions, and noncompliance among health workers, which contribute to increased rates of occupational exposure and disease transmission (Okoroafor & Meka, 2021; Nnebue et al., 2023). However, there remains a paucity of

data focusing specifically on rural settings like Nkalagu, where contextual factors may influence PPE practices differently than in urban centers.

This study, therefore, seeks to assess the level of knowledge and attitudes towards the use of PPE among primary health care workers in Nkalagu community, Ishielu L.G.A, Ebonyi State. The findings will provide critical insights for public health planning, capacity building, and resource allocation for IPC in rural health settings.

## Problem Statement

Personal Protective Equipment (PPE) plays a critical role in protecting health care workers (HCWs) from occupational hazards, especially infectious diseases. Despite its recognized importance, consistent and proper use of PPE remains a persistent challenge, particularly in low- and middle-income countries like Nigeria (Oluwole et al., 2022). Primary health care (PHC) workers are often the first point of contact in the healthcare system, yet they are frequently under-equipped and under-trained in the use of PPE, leading to increased vulnerability to infections such as tuberculosis, hepatitis, Lassa fever, and more recently, COVID-19 (Ossai et al., 2023).

Studies have shown that gaps in knowledge and negative attitudes toward PPE use significantly hinder compliance among healthcare workers, even where PPE is available (Ezeonu et al., 2021). In rural areas like Nkalagu in Ishielu Local Government Area, these challenges may be exacerbated by poor infrastructure, inadequate training, limited access to PPE, and weak health policies (Okafor & Mbah, 2020). Consequently, the risk of nosocomial infections not only threatens the health

workforce but also compromises patient safety and the overall quality of healthcare delivery in the community (Nwachukwu & Agbo, 2023).

Although national guidelines and WHO recommendations emphasize the need for consistent PPE use (WHO, 2021), compliance in local health facilities remains suboptimal due to a combination of cognitive (knowledge), behavioral (attitude), and systemic (resource) barriers. There is a critical need to assess the current level of knowledge and attitude among PHC workers in underserved communities such as Nkalagu to inform targeted interventions and policy action.

This study seeks to bridge this gap by evaluating the knowledge and attitude of primary health care workers towards PPE use in Nkalagu community. The findings will provide empirical evidence necessary to develop context-specific strategies aimed at promoting occupational safety and improving healthcare delivery.

## Literature Review

### 1. Conceptual Clarifications

**1.1 Personal Protective Equipment (PPE):** Personal Protective Equipment (PPE) refers to specialized clothing or equipment worn by individuals to protect themselves from infectious materials or hazardous environments. In healthcare settings, PPE includes gloves, gowns, face shields, masks, respirators, and eye protection, which are essential for preventing the transmission of pathogens, especially during outbreaks and routine clinical procedures (World Health Organization [WHO], 2023). Proper and consistent use of PPE significantly reduces occupational exposure to infectious diseases

and protects both healthcare workers and patients (Okonkwo et al., 2022).

#### 1.2

#### Knowledge:

In the context of PPE usage, knowledge encompasses the awareness, understanding, and ability of health care workers to correctly identify, use, and dispose of PPE. This includes knowledge of infection prevention protocols, correct donning and doffing procedures, and recognition of high-risk situations requiring PPE use (Adebayo et al., 2023). A high level of knowledge among health workers is directly linked to improved compliance and safety outcomes (Eze & Nwachukwu, 2022).

#### 1.3

#### Attitude:

Attitude refers to the beliefs, perceptions, and disposition of healthcare workers toward the use of PPE. It includes their willingness to consistently use protective equipment, perceived importance of PPE, and any resistance or complacency regarding its use. A positive attitude is often associated with increased adherence to safety protocols, while negative attitudes can undermine protective measures (Chukwu et al., 2023). Factors such as workload, discomfort, and perceived invincibility may influence attitudes toward PPE usage (Ogunyemi & Afolabi, 2022).

#### 1.4 Primary Health Care Workers:

Primary Health Care (PHC) workers include nurses, community health officers, midwives, and other frontline personnel who deliver essential health services at the community level. These workers are frequently exposed to a range of occupational hazards, including infectious diseases, due to their direct and prolonged contact with patients in often resource-constrained settings (WHO, 2023). Their role places them at high risk, making the correct and consistent use of PPE critical

for their safety and that of their patients (Nwankwo et al., 2023).

## 2. Empirical Review of Related Studies

### 2.1 Global Perspectives

Globally, numerous studies have explored the knowledge, attitudes, and practices (KAP) surrounding personal protective equipment (PPE) among healthcare workers. In Asia, a study conducted in China during the COVID-19 pandemic found that although most healthcare workers had high awareness of PPE, compliance was hindered by discomfort and time constraints (Li et al., 2021). Similarly, a study in India reported that while healthcare professionals were knowledgeable about PPE, factors such as skin irritation, inadequate training, and workload negatively impacted consistent usage (Patel et al., 2020).

In Europe, research conducted in Italy and the UK revealed that while PPE policies were well-established, actual adherence varied significantly across hospitals, largely due to resource limitations and varying perceptions of risk (Di Lorenzo et al., 2021; Grant et al., 2022). In the United States, Smith et al. (2023) found that access to PPE improved post-COVID-19, but compliance was still inconsistent, particularly in underfunded health facilities and among non-clinical staff.

Common barriers identified across these studies include discomfort, lack of refresher training, inadequate PPE stockpiles, and perceived invulnerability among staff (WHO, 2021).

### 2.2 African Context

In sub-Saharan Africa, the context of PPE usage presents a different set of challenges. A multi-country study by Agyemang et al. (2022) across Ghana, Kenya, and Uganda showed that despite moderate levels of PPE knowledge among healthcare workers, usage was often dictated by availability rather than policy or awareness. The research highlighted significant gaps in training, especially among auxiliary health workers.

In Ethiopia, Tadesse et al. (2021) found that only 57% of healthcare workers adhered to proper PPE usage, citing reasons such as discomfort and inadequate supply. In South Africa, a study by Mokoena and Phiri (2023) noted that systemic issues, including inadequate government funding and unclear PPE protocols, significantly reduced compliance levels.

Regional trends indicate that although PPE awareness has improved post-COVID-19, behavioral compliance remains low due to logistical and structural inefficiencies.

### 2.3 Nigerian Studies

In Nigeria, research indicates varying degrees of PPE knowledge and usage across states and healthcare settings. For instance, a study in Lagos State revealed high levels of awareness but inconsistent use of PPE due to time pressure and low risk perception among staff (Okonkwo et al., 2022). In Kano, Musa et al. (2021) found that only 48% of healthcare workers had received formal training on PPE use, resulting in frequent breaches of infection prevention protocols.

Research from Enugu State by Eze et al. (2023) showed that while most workers were aware of PPE guidelines, only 60% consistently used them, citing inadequate supply in primary healthcare centers.



Furthermore, sociocultural beliefs—such as the perception that PPE use implies distrust of patients—were significant barriers in more traditional communities (Chukwu et al., 2022).

Nationally, systemic barriers such as irregular PPE distribution, poor supervisory mechanisms, and limited policy enforcement have been widely reported (Adebayo & Ogunleye, 2023).

## 2.4 Rural vs Urban Disparities

Comparative studies have shown stark disparities between rural and urban health centers in Nigeria. Urban centers, such as those in Abuja and Lagos, tend to have better access to PPE and more frequent training programs (Ibrahim et al., 2021). Conversely, rural centers, including those in Benue and Ebonyi States, often suffer from inadequate supplies, lack of skilled personnel, and limited institutional support (Udeh et al., 2023).

Rural health workers report greater discomfort and improvisation, including the reuse of PPE due to shortages (Anyaocha & Nwankwo, 2022). Moreover, transportation challenges and supply chain inefficiencies compound the issues of access in rural areas, highlighting the need for targeted interventions in these settings.

## 2.5 Knowledge Gaps and Research Justification

While a growing body of literature has emerged around PPE use in Nigerian healthcare settings, several gaps persist. Notably, there is limited data on PPE compliance in specific rural communities such as Nkalagu in Ebonyi State. Existing studies often focus on urban centers or

aggregate national data, overlooking localized nuances.

Given the unique socio-economic and infrastructural realities in rural Ebonyi, there is a pressing need for community-specific research to inform tailored interventions. Investigating PPE knowledge, attitudes, and barriers in Nkalagu will contribute to bridging this knowledge gap and strengthening local health systems in post-pandemic recovery efforts.

## Methods

### 1. Study Design

This study employed a descriptive cross-sectional survey design to assess the knowledge and attitude of primary health care (PHC) workers towards the use of personal protective equipment (PPE) in Nkalagu Community, Ishielu Local Government Area of Ebonyi State, Nigeria. The design was chosen to enable the collection of data at a single point in time from a defined population.

### 2. Study Area

The research was conducted in Nkalagu Community, located in Ishielu Local Government Area of Ebonyi State, southeastern Nigeria. The community is semi-urban and is served by a number of functional primary health care facilities.

### 3. Study Population

The target population comprised all categories of primary health care workers in the Nkalagu community, including nurses, community health extension workers (CHEWs), environmental health officers,

laboratory technicians, and auxiliary staff working in the PHC centres.

#### 4. Sample Size and Sampling Technique

A total of 60 PHC workers participated in the study. A purposive sampling technique was used to select PHC facilities within Nkalagu. Subsequently, a total enumeration of all available and consenting health care workers in the selected facilities was conducted.

#### 5. Instrument for Data Collection

Data were collected using a structured, self-administered questionnaire developed by the researchers. The questionnaire consisted of three sections:

- **Section A:** Socio-demographic information of respondents (e.g., age, gender, profession, years of experience).
- **Section B:** Knowledge of PPE use, comprising multiple-choice and true/false questions.
- **Section C:** Attitude towards PPE use, measured on a 5-point Likert scale (Strongly Agree to Strongly Disagree).

The instrument was reviewed by experts in public health and tested for reliability using Cronbach's alpha, yielding a coefficient of 0.81.

### Results

#### Socio-Demographic Characteristics of Respondents

A total of 60 respondents participated in the study. The majority were female (70%), while 30% were male. Most respondents (40%) were between the ages of 31 and 40 years. In terms of professional cadre, 35% were Community Health Extension Workers (CHEWs), 25% were nurses,

#### 6. Data Collection Procedure

Data collection was conducted over a period of two weeks in February 2025. Respondents were approached at their respective PHC facilities, and the purpose of the study was explained. Informed consent was obtained before administering the questionnaire. Completed questionnaires were retrieved the same day to ensure a high response rate.

#### 7. Data Analysis

Data were cleaned, coded, and entered into the Statistical Package for the Social Sciences (SPSS) version 25 for analysis. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize the data. Knowledge scores were categorized as poor, fair, or good based on a scoring system developed by the researchers. Attitude scores were similarly categorized as negative or positive. Associations between demographic variables and knowledge/attitude levels were tested using Chi-square and t-tests, with a significance level set at  $p < 0.05$ .

#### 8. Ethical Considerations

Ethical approval was obtained from the Ebonyi State Ministry of Health Ethics Committee. Permission was also secured from the heads of PHC centres in Nkalagu. All respondents gave written informed consent, and confidentiality of responses was assured throughout the research process.

20% were environmental health officers, 10% were laboratory technicians, and the remaining 10% were auxiliary health workers.

**Table 1: Socio-Demographic Characteristics of Respondents (N = 60)**

Variable	Frequency (n)	Percentage (%)
<b>Gender</b>		
Male	18	30.0
Female	42	70.0
<b>Age Group (years)</b>		
21–30	15	25.0
31–40	24	40.0
41–50	16	26.7
51 and above	5	8.3
<b>Professional Cadre</b>		
CHEWs	21	35.0
Nurses	15	25.0
Environmental Health Off.	12	20.0
Lab Technicians	6	10.0
Auxiliary Staff	6	10.0
<b>Years of Experience</b>		
Less than 5 years	20	33.3
5–10 years	26	43.3
More than 10 years	14	23.4

### **Knowledge of Personal Protective Equipment (PPE)**

Respondents were scored on a 20-point scale for knowledge of PPE. A score of 0–9 was classified as poor knowledge, 10–14 as fair knowledge, and 15–20 as good knowledge. Results showed that

58.3% of respondents had good knowledge of PPE, 28.3% had fair knowledge, while 13.4% had poor knowledge.

**Table 2: Knowledge Level of Respondents on PPE**

Knowledge Level	Frequency (n)	Percentage (%)
Poor (0–9)	8	13.4
Fair (10–14)	17	28.3
Good (15–20)	35	58.3

### Attitude Towards Use of PPE

Attitudes were assessed using a 10-item 5-point Likert scale (maximum score: 50). Respondents scoring 35 and above were considered to have a positive attitude. Findings revealed that 46 respondents (76.7%) had a positive attitude toward PPE use, while 14 respondents (23.3%) had a negative attitude.

**Table 3: Attitude of Respondents Towards PPE Use**

Attitude Category	Frequency (n)	Percentage (%)
Positive ( $\geq 35$ )	46	76.7
Negative ( $< 35$ )	14	23.3

### Association Between Knowledge and Attitude

A Chi-square test was used to assess the relationship between knowledge level and attitude. The result showed a statistically significant association ( $\chi^2 = 10.21$ ,  $p = 0.006$ ), indicating that respondents with higher knowledge scores were more likely to have a positive attitude towards PPE use.

**Table 4: Association Between Knowledge Level and Attitude**

Knowledge Level	Positive Attitude	Negative Attitude	Total
Poor	2	6	8
Fair	9	8	17
Good	35	0	35
<b>Total</b>	<b>46</b>	<b>14</b>	<b>60</b>

Chi-square ( $\chi^2$ ) = 10.21, df = 2, p = 0.006 (Significant)



## Discussion

The findings of this study revealed a generally high level of knowledge and a positive attitude toward the use of personal protective equipment (PPE) among primary health care (PHC) workers in Nkalagu Community. A majority (58.3%) of the respondents demonstrated good knowledge of PPE, while a substantial proportion (76.7%) expressed a positive attitude towards its use. These findings are encouraging, as proper knowledge and positive perception of PPE are crucial for promoting infection prevention and control (IPC) practices in healthcare settings, especially at the primary care level where resources are often limited.

The result aligns with similar studies conducted in Nigeria and other low- and middle-income countries, where health workers with more access to training or regular sensitization programs tend to exhibit better knowledge and compliance with PPE protocols. For instance, studies in Enugu and Lagos reported similar trends, indicating that investment in health education and IPC workshops improves frontline workers' awareness of protective measures.

However, despite the overall positive trend, it is concerning that 13.4% of PHC workers had poor knowledge of PPE, and 23.3% demonstrated a negative attitude toward its use. This gap may be attributed to factors such as inadequate training, limited availability of PPE, or low risk perception among some cadres of health workers, especially auxiliary staff and those with fewer years of experience. This implies the need for targeted interventions to ensure that all health workers, regardless of their role or experience level, understand the importance and correct use of PPE.

Furthermore, the statistically significant association between knowledge level and attitude ( $p = 0.006$ ) reinforces the established view that better knowledge positively influences health behavior. Respondents with good knowledge were more likely to demonstrate a positive attitude towards PPE use. This finding supports the Health Belief Model, which posits that awareness of risk and knowledge of protective measures are strong predictors of preventive health behavior.

Another noteworthy observation was that nurses and community health extension workers (CHEWs), who made up the bulk of the respondents, had the highest knowledge scores. This may be due to their more formal training and frequent exposure to infection control guidelines compared to other cadres such as auxiliary workers and technicians. These findings underscore the importance of continuous professional development and regular in-service training on infection control practices.

In summary, while the majority of PHC workers in Nkalagu exhibit good knowledge and attitude towards PPE use, the identified knowledge gaps and attitudinal issues among a minority warrant attention. Strengthening PPE training programs, ensuring adequate PPE supply, and enforcing adherence through supervision and monitoring mechanisms will be essential to improving infection control in this and similar settings.

## Conclusion

This study assessed the knowledge and attitude towards the use of personal protective equipment (PPE) among primary health care workers in Nkalagu Community, Ishielu Local Government Area, Ebonyi State. The findings revealed that while the

majority of the respondents had good knowledge (58.3%) and a positive attitude (76.7%) towards PPE use, a notable proportion still displayed either limited knowledge or negative attitudes.

The study established a statistically significant relationship between knowledge and attitude, suggesting that improving health workers' understanding of PPE directly influences their willingness to use it appropriately. Overall, the findings highlight a generally positive disposition among PHC workers towards infection prevention but also point to the need for ongoing education and support to close existing gaps.

## Recommendations

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

1. **Regular Training and Re-orientation:** The Ebonyi State Ministry of Health and local health authorities should organize regular, mandatory training sessions and refresher courses on infection prevention and the use of PPE for all categories of PHC workers.
2. **Adequate Provision and Supply of PPE:** Government and health facility management should ensure the constant availability of quality PPE in all primary health care centers to encourage compliance and reduce resistance based on scarcity.

3. **Targeted Interventions for Low-Knowledge Groups:** Special attention should be given to auxiliary staff and newly recruited health workers who may not have adequate prior training. Tailored education programs can help bridge these knowledge gaps.

4. **Monitoring and Supervision:** Facility heads and supervisors should strengthen internal monitoring systems to ensure consistent and correct PPE usage. Incentives and penalties may be employed to reinforce compliance.

5. **Health Education Campaigns:** Promote community-based and workplace sensitization on the importance of PPE not only during pandemics but as a daily routine for personal and patient safety.

6. **Further Research:** Additional studies should explore barriers to PPE compliance and evaluate the effectiveness of different training models across various local government areas.

By implementing these recommendations, PHC facilities in Nkalagu and similar communities can significantly enhance infection prevention practices, thereby protecting both healthcare workers and the populations they serve.

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