

Effect of Health Education Intervention on ... Ibrahim, Y. A., Et. al. (2025)

Effect of Health Education Intervention on Personal Protective Equipment Attitude among Health workers in Infectious Disease Hospitals in Kano State, Nigeria

IBRAHIM, Yusuf Adamu¹

yusufibrahimadamu999@gmail.com

08034241172

SULEIMAN, Mariam Adefunke¹

masuleiman50@gmail.com

08063348206

ADAMU, Abdulkareem Biu¹

Adamubiu@yahoo.com

08035066955

SANUSI, Muhammad¹

mohaisan62@gmail.com

¹Department of Human Kinetics and Health Education, Ahmadu Bello University, Zaria - Nigeria

Abstract

This study examined the effect of health education intervention on attitude towards Personal Protective Equipment (PPE) use among laboratory health workers in infectious disease hospitals in Kano State. To achieve this purpose, a pre-test, post-test, experimental and control group quasi-experimental design was used. The population of the study comprised sixty-nine (69) laboratory health workers in infectious disease hospitals in Kano State, Nigeria. A sample size of 60 respondents was drawn from the population using a multi-stage sampling procedure, which includes purposive, simple random, and availability sampling. The instrument for data collection was a researcher-structured closed-ended questionnaire, which was validated by five (5) experts in the Department of Human Kinetics and Health Education and the College of Medicine, Ahmadu Bello University, Zaria. The instrument was pilot-tested using Cronbach's Alpha, and a reliability coefficient of 0.872 was obtained. Descriptive statistics of frequency and percentage were used to describe the demographic characteristics of the respondents. The research questions were answered using mean and standard deviation. Inferential statistics of paired sample t-test and independent sample t-test were used to test the stated hypotheses at a 0.05 level of significance. The result revealed that the health education intervention significantly improved attitudes ($t = 17.91, p = 0.000$) towards the use of PPE among laboratory health workers in infectious disease hospitals in Kano State. Additionally, there were significant differences between the experimental and control groups in attitudes ($t = 15.71, p = 0.000$) after the intervention. Based on the findings of the study, the study concluded that health education intervention significantly improved laboratory health workers' attitudes towards the use of PPE in infectious disease hospitals in Kano State. Workers in the experimental group outperformed those in the control group in attitude towards the use of PPE after the intervention. The study recommended that the Hospital Management Board should organise periodic attitude-reorientation workshops and prioritise attitude-focused health education programmes on PPE use, especially in facilities with poor practices, to sustain positive behavioural change and align all staff with best PPE usage behaviours.

Keyword: Health Education Intervention, Personal Protective Equipment, Attitude, Infectious Diseases

Introduction

Personal Protective Equipment (PPE) encompasses specialised clothing and devices such as gloves, masks, goggles, and respirators designed to shield healthcare workers from biological, chemical, and physical hazards inherent in laboratory environments. In infectious disease hospitals, where exposure to high-risk pathogens is routine, PPE constitutes the primary barrier between the laboratory worker and potentially life-threatening agents. Beyond its technical function, PPE also carries symbolic weight: its correct and consistent use signals a commitment to safety culture, professional responsibility, and respect for one's own and one's colleagues' well-being (Ibrahim et al., 2022). Globally, the World Health Organization [WHO] underscores that while availability of PPE is foundational, the attitudes of healthcare workers toward donning and doffing protocols critically determine actual compliance (WHO, 2020). During outbreaks of diseases such as COVID-19 and Ebola, even well-resourced facilities have encountered resistance rooted not in supply shortages but in perceptions that PPE is cumbersome or unnecessary when one has "seen it all before" (Verbeek et al., 2020). Attitudinal barriers ranging

Effect of Health Education Intervention on ... Ibrahim, Y. A., Et. al. (2025)

from underestimating one's risk to viewing PPE as an impediment to efficient workflow have repeatedly undermined infection control efforts, demonstrating that material provision alone is insufficient without addressing the beliefs and motivations that shape behaviour. In high-income settings, systematic reviews reveal that negative attitudes toward PPE often stem from discomfort, perceived interference with patient communication, and previous experiences with poorly fitting or low-quality equipment (Gould et al., 2017). Even where institutional policies mandate strict PPE use, frontline workers may circumvent guidelines if they believe the risk is low or if wearing full gear compromises manual dexterity. These findings highlight the necessity of interventions that go beyond didactic instruction to target the affective and normative dimensions of behaviour, namely, how workers feel about PPE and how they perceive their peers' expectations (Verbeek et al., 2020).

In many African healthcare settings, entrenched systemic challenges such as intermittent supply chains and resource constraints compound attitudinal issues (Alshammari et al., 2018). When PPE is scarce, workers may come to view it as an expendable "luxury" rather than an indispensable safeguard, reinforcing the notion that strict adherence is only expected under emergency conditions. Cultural factors, including a fatalistic view of disease and deference to hierarchical decision-makers, can further diminish personal agency in insisting on full protective measures. Conversely, in contexts where leadership models and peer champions visibly prioritise PPE, positive attitudinal shifts have emerged, underscoring the role of social influence in shaping safety culture (Muhammed et al., 2025). Within Nigeria, surveys conducted across tertiary and secondary healthcare facilities indicate widespread ambivalence toward PPE use among laboratory health workers (Adeloye et al., 2017). Commonly cited reasons include the belief that routine tasks pose minimal threat, discomfort during prolonged wear, and a sense of overconfidence in one's technical skill to avoid contamination without full protective gear. Such attitudes often lead to selective compliance, donning gloves for high-risk procedures but forgoing masks or gowns when risk is perceived as low, thereby undermining comprehensive infection prevention strategies (Adeloye et al., 2017; Amin et al., 2024). Kano State, Nigeria's most populous region, has borne the brunt of recurrent outbreaks such as Lassa fever and bacterial meningitis, placing laboratory personnel at heightened risk (Nigeria Centre for Disease Control [NCDC], 2021). Yet, few studies have probed the attitudinal underpinnings of PPE non-compliance in the state's infectious disease hospitals. Preliminary observations suggest that when laboratory workers view PPE donning and doffing as cumbersome or question its efficacy, particularly in resource-strained settings where equipment quality is variable, their commitment to consistent use wanes, elevating the risk of nosocomial transmission and occupational illness (Akagbo et al., 2017). Given the centrality of attitude in determining PPE adherence, health education interventions tailored to reshape beliefs and motivations hold significant promise. By employing strategies such as role modelling by senior staff, peer-led discussions, and experiential learning that emphasises both the personal and collective benefits of PPE, interventions can foster more favourable attitudes and, in turn, more reliable use of protective equipment (Arlinghaus & Johnston, 2017). It is against this backdrop that the present study seeks to evaluate the effect of a targeted health education intervention on attitudes toward PPE use among laboratory health workers in infectious disease hospitals in Kano State.

Objectives of the study

1. The effect of health education intervention on attitude towards the use of personal protective equipment among laboratory health workers in infectious disease hospitals in Kano State after the intervention.
2. The difference between experimental and control groups after health education intervention on attitude towards the use of personal protective equipment among laboratory health workers in infectious disease hospitals in Kano State

Research Questions

1. What is the effect of health education intervention on attitudes towards the use of personal protective equipment among laboratory health workers in infectious disease hospitals in Kano State after the intervention?
2. What is the difference between the experimental and control groups after health education intervention on attitude towards the use of personal protective equipment among laboratory health workers in infectious disease hospitals in Kano State?

Hypotheses

1. What is the effect of health education intervention on attitudes towards the use of personal protective equipment among laboratory health workers in infectious disease hospitals in Kano State after the intervention?

Effect of Health Education Intervention on ... Ibrahim, Y. A., Et. al. (2025)

2. What is the difference between the experimental and control groups after health education intervention on attitude towards the use of personal protective equipment among laboratory health workers in infectious disease hospitals in Kano State?

Methodology

This study adopted a quasi-experimental pre-test/post-test design to evaluate the effect of a health education intervention on laboratory health workers' attitudes towards the use of personal protective equipment (PPE). Participants were assigned by simple random draw at the hospital level into an experimental group, which received the intervention, and a control group, which received no intervention. Both groups completed the same attitude assessment immediately before (T1) and after (T2) the six-week intervention period, allowing for within- and between-group comparisons of attitude change. The research was conducted in the only two infectious disease hospitals in Kano State: Yargawa Isolation Centre, Dawakin-Kudu and Infectious Disease Hospital, Fagge. The total population comprised all laboratory health workers at these facilities, 32 at Yargawa and 37 at Fagge. These laboratory health workers include Medical Laboratory Scientists, Laboratory Technicians, and Laboratory Assistants. A total of 60 participants (30 per hospital) were selected in line with established guidelines that recommend at least 30 subjects per experimental condition for adequate power. First, purposive sampling identified the two hospitals for relevance to infectious disease laboratory services. Next, simple random sampling via paper draw assigned one hospital to the experimental arm and the other to the control arm. Finally, availability (convenience) sampling recruited 30 consenting laboratory staff from each hospital who met the inclusion criteria (minimum six months' employment, direct engagement in laboratory work and PPE use). Data were gathered using a researcher-developed 15-item questionnaire specifically measuring attitudes towards PPE use. Items were rated on a four-point Likert scale (Strongly Agree = 4 to Strongly Disagree = 1). Mean scores ≥ 2.50 indicated a positive attitude, while scores < 2.50 indicated a negative attitude. The questionnaire focused solely on dimensions of willingness, perceived importance, and confidence in PPE use, excluding knowledge- or practice-based items. To ensure face and content validity, five experts in health education and medical laboratory science from Ahmadu Bello University reviewed the questionnaire; their feedback was incorporated into the final draft. A pilot test involving 30 laboratory workers at Aminu Kano Teaching Hospital (outside the study sites) produced a Cronbach's alpha of 0.872, demonstrating high internal consistency for the attitude scale. The six-week intervention comprised weekly one-hour sessions every Saturday at the experimental hospital. The curriculum delivered through lectures, group discussions, role-plays, and testimonials addressed (a) the importance of PPE in protecting against infectious agents, (b) personal and systemic barriers to consistent PPE use, (c) strategies to foster positive attitudes and peer support for PPE compliance, and (d) mechanisms for sustaining attitude change. Activities emphasised reflecting on personal beliefs, sharing experiences, and committing to consistent PPE use. After obtaining institutional approvals and informed consent, the pre-test attitude questionnaire was administered to both groups. The experimental group then participated in the intervention as outlined, while the control group continued routine duties. One week after the final session, both groups completed the post-test. Data were entered into Statistical Package for Social Sciences version 30 and analysed using means and standard deviations to describe attitude scores, and paired-sample t-tests to assess within-group change. An independent-sample t-test compared post-test attitudes between groups, with significance set at $p \leq 0.05$.

Presentation of Results

Research Question 1

What is the effect of health education intervention on attitudes towards the use of personal protective equipment among laboratory health workers in infectious disease hospitals in Kano State after the intervention?

Table 1: Mean Scores of Responses on the Effect of Health Education Intervention Programme on Attitude towards the Use of Personal Protective Equipment among Laboratory Health Workers in Infectious Diseases Hospitals in Kano State

Attitude towards the Use of PPE	N	Mean	Std. Dev.	Mean Difference
Pretest	30	3.01	0.72	0.72
Post-test	30	3.73	0.75	

(Decision Mean = 2.50)

Effect of Health Education Intervention on ... Ibrahim, Y. A., Et. al. (2025)

Table 1 revealed the mean scores of responses on the health education intervention programme regarding attitude towards the use of personal protective equipment (PPE) among laboratory health workers in infectious disease hospitals in Kano State after the intervention. The results showed that the pretest mean score for participants' attitude toward PPE use was 3.01, while the post-test mean score increased to 3.73. This reflected a mean difference of 0.72, indicating a positive shift in attitude following the intervention. Given that the decision mean was 2.50, both the pretest and post-test scores were above this threshold, confirming that even before the intervention, laboratory health workers had some positive attitude toward the use of PPE. However, the significant increase in the post-test mean further confirmed that the health education intervention had a notable effect in strengthening their attitude toward PPE usage. This improvement implied that the intervention was effective in reinforcing the importance of PPE in preventing exposure to infectious agents, likely by enhancing awareness, correcting misconceptions, and motivating safer workplace behaviour.

Research Question 2

What is the difference between experimental and control groups after health education intervention on attitude towards the use of personal protective equipment among laboratory health workers in infectious disease hospitals in Kano State?

Table 2: Mean difference between Control and Experimental Groups after Health Education Intervention on Attitude towards the Use of Personal Protective Equipment among Laboratory Health Workers in Infectious Diseases Hospitals in Kano State

Attitude towards the Use of PPE	N	Mean	Std. Dev.	Mean Difference
Control	30	3.12	0.76	0.61
Experimental	30	3.73	0.75	

(Decision Mean = 2.50)

Table 2 revealed the post-intervention comparison of the attitude towards the use of personal protective equipment (PPE) between the control and experimental groups of laboratory health workers in infectious disease hospitals in Kano State. The control group, which did not receive the health education intervention, had a mean attitude score of 3.12. In contrast, the experimental group, which underwent the health education intervention, recorded a higher mean attitude score of 3.73. The mean difference between the two groups was 0.61. This positive mean difference indicated that the experimental group demonstrated a more favourable attitude towards the use of PPE compared to the control group after the intervention. Notably, both groups scored above the decision mean benchmark of 2.50, affirming a generally positive attitude; however, the experimental group's higher mean confirmed that the health education intervention was effective in enhancing this attitude.

Hypothesis 1

Effect of health education intervention on attitudes towards the use of personal protective equipment among laboratory health workers in infectious disease hospitals in Kano State is not significant after the intervention.

Table 3: Paired Sample t-test representation of Pretest and Post-test of Attitude towards the Use of Personal Protective Equipment among Laboratory Health Workers in Infectious Diseases Hospitals in Kano State

Attitude towards the Use of PPE	N	Mean	Std. Dev.	Mean Difference	df	t-value	p-value
Pretest	30	3.01	0.72	0.72	29	17.91	0.000
Post-test	30	3.73	0.75				

t (30) = 17.91, p-value = 0.000

The result of the paired-sample t-test statistics in Table 3 revealed that the effect of the health education intervention on attitudes towards the use of personal protective equipment (PPE) among laboratory health workers in infectious disease hospitals in Kano State was significant after the intervention. This was because the calculated p-value of 0.000 was less than the 0.05 level of significance, and the calculated t-value of 17.91 was higher than the critical t-value of 1.972 at 29 degrees of freedom (df). Additionally, the mean score obtained for the pretest was 3.01, while the post-test mean score was 3.73, resulting in a significant mean difference of 0.72. Therefore, the hypothesis which stated that the effect of health education intervention on attitudes towards the use of PPE among laboratory health workers in infectious disease hospitals in Kano State was not significant after the intervention was rejected. This meant that the health education intervention

Effect of Health Education Intervention on ... Ibrahim, Y. A., Et. al. (2025)

significantly improved attitudes towards the use of personal protective equipment among laboratory health workers in infectious disease hospitals in Kano State.

Hypothesis 2

There is no significant difference between experimental and control groups after health education intervention on attitudes towards the use of personal protective equipment among laboratory health workers in infectious disease hospitals in Kano State.

Table 4: Independent t-test Statistics on the Difference between Experimental and Control Groups after Health Education Intervention on Attitude towards the Use of Personal Protective Equipment among Laboratory Health Workers in Infectious Diseases Hospitals in Kano State

Attitude toward the Use of PPE	N	Mean	Std. Dev.	Mean Difference	df	t-value	p-value
Control	30	3.12	0.76	0.61	58	15.71	0.000
Experimental	30	3.73	0.75				

t (60) = 15.71, p-value = 0.000

Table 4 revealed the results of an independent t-test conducted to determine whether there was a significant difference in the attitudes toward the use of personal protective equipment (PPE) between the experimental and control groups of laboratory health workers in infectious disease hospitals in Kano State after the health education intervention. The table showed that the experimental group (N = 30) had a higher mean attitude score (M = 3.73) compared to the control group (M = 3.12), resulting in a mean difference of 0.61. The calculated t-value was 15.71 with 58 degrees of freedom, and the associated p-value was 0.000, which was less than the 0.05 level of significance. This statistically significant p-value indicated that there was a significant difference in attitude between the two groups following the intervention. Therefore, the hypothesis which stated that there was no significant difference between the experimental and control groups after the health education intervention on attitudes towards the use of PPE was rejected. This implied that the health education intervention had a positive and significant impact on improving the attitudes of laboratory health workers in the experimental group towards the use of PPE compared to those in the control group.

Discussion of Findings

Hypothesis one revealed that the effect of health education intervention on attitudes towards the use of personal protective equipment among laboratory health workers in infectious disease hospitals in Kano State is significant after the intervention (t = 17.91, p = 0.000). This finding is strongly supported by Farotimi et al. (2018), who examined the effectiveness of a training programme on the attitude and practice of infection control measures among nurses in two teaching hospitals in Ogun State, Nigeria. The study reported that a structured training programme significantly improved the attitude toward infection control among nurses in tertiary hospitals in Ogun State, Nigeria. Their study showed a marked increase in the proportion of nurses with positive attitudes in the experimental group post-intervention (69%) compared to the control group (46.7%), with a statistically significant difference (p = 0.03). Similarly, Ekundayo et al. (2018), in their quasi-experimental study among hospital orderlies in Ogun State, observed that educational intervention resulted in a substantial increase in attitude scores immediately and three months post-intervention. This provides support that health education interventions have a sustained effect on attitudinal change towards protective health behaviours. Additionally, Mehta and Diwakar (2021) found a significant improvement in the attitudes of laboratory technicians regarding universal precautions after an educational intervention, emphasising the effectiveness of targeted training in shaping safety-conscious attitudes among health personnel. Alinejad et al. (2023) also found significant positive changes in several attitude-related constructs of the Health Belief Model (such as perceived severity and benefits) following an educational programme, confirming the pivotal role of structured health education in fostering compliance with standard precautions, including PPE use.

Hypothesis two revealed that there is a significant difference between experimental and control groups after health education intervention on attitudes towards the use of personal protective equipment among laboratory health workers in infectious disease hospitals in Kano State (t = 15.71, p = 0.000). The finding is strongly supported and corroborated by several previous empirical studies, such as Ekundayo et al. (2018), who conducted a quasi-experimental study that evaluated the effect of educational intervention on attitude towards HIV/AIDS among hospital orderlies. The results showed a significant improvement in attitudinal scores immediately and three months post-intervention in the experimental

Effect of Health Education Intervention on ... Ibrahim, Y. A., Et. al. (2025)

group. The finding thus aligns with the current study by validating the positive effect of education on health workers' attitudes towards preventive measures such as PPE use. Similarly, Farotimi et al. (2018) found that training significantly improved the attitude toward infection control among nurses in a controlled experimental design. Their results ($p = 0.03$ for attitude) mirror the current finding, thereby reinforcing the consensus that targeted educational interventions effectively foster positive behavioural change toward PPE usage. Moreover, Mehta and Diwakar (2021) examined the impact of educational intervention among laboratory technicians in India and reported a statistically significant improvement in attitudes post-training. The findings also align with Alinejad et al. (2023), who used a health belief model in their educational intervention and observed significant improvements in perceived benefits, cues to action, and behavioural performance among nurses. This further validates the assertion that structured health education can reshape attitudes towards PPE. These studies collectively validate the effectiveness of educational strategies in modifying health workers' attitudes and enhancing workplace safety protocols.

Conclusions

Based on the findings of the study, the study concluded that the health education intervention significantly improved the attitudes of laboratory health workers toward the use of personal protective equipment (PPE) in infectious disease hospitals in Kano State. Specifically, laboratory health workers who participated in the intervention (the experimental group) demonstrated more positive attitudes toward PPE use compared to those in the control group who did not receive the intervention.

Recommendations

Based on the conclusion, the study recommended the following:

1. The Hospital Management Board should organise periodic attitude-reorientation workshops on PPE use to sustain positive behavioural changes among laboratory staff.
2. The Hospital Management Board should prioritise attitude-focused health education programmes in facilities where control group practices are prevalent to align all staff with best PPE usage behaviours.

References

- Adeloye, D., David, R. A., Olaogun, A. A., Auta, A., Adesokan, A., & Gadanya, M. (2017). Health workforce and governance: the crisis in Nigeria. *Human Resources for Health*, 15(1), 32.
- Akagbo, S. E., Nortey, P., & Ackumey, M. M. (2017). Knowledge, attitudes and practices of standard precautions among health care workers in the Greater Accra Region of Ghana. *BMC Research Notes*, 10(1), 432.
- Alinejad, N., Bijani, M., Malekhosseini, M., Nasrabadi, M., Harsini, P. A., & Jeihooni, A. K. (2023). Effect of educational intervention based on health belief model on nurses' compliance with standard precautions in preventing needle stick injuries. *BMC Nursing*, 22, 180. <https://doi.org/10.1186/s12912-023-01347-0>
- Alshammari, F., Alquwez, N., Almazan, J., & Alsolami, F. (2018). Compliance with standard precautions during clinical training of nursing students in Saudi Arabia: A multi-university study. *Journal of Infection and Public Health*, 11(2), 250-256.
- Amin, A., Abdulrauf, A., & Isiaq, A. T. (2024). Strategies for the implementation of environmental protection regulations towards sustainable waste management in Oyo State. *Gusau International Journal of Management and Social Sciences*, 7(2), 83-104. <https://doi.org/10.57233/gijmss.v7i2.05>
- Arlinghaus, K. R., & Johnston, C. A. (2017). Advocating for behaviour change with education. *American Journal of Lifestyle Medicine*, 12(2), 113-116. <https://doi.org/10.1177/1559827617745479>
- Ekundayo, A. A., Alausa, O. K., Amoran, O. E., & Adekunle, O. M. (2018). Comparative effects of educational intervention on knowledge, attitude and practice regarding HIV/AIDS among hospital orderlies in two Tertiary Hospitals. *Annals of Health Research*, 4(2), 108-119. DOI: 10.30442/ahr.0402-3-14
- Farotimi, A. A., Ajao, E. O., Ademuyiwa, I. Y., & Nwozichi, C. U. (2018). Effectiveness of training programme on attitude and practice of infection control measures among nurses in two teaching hospitals in Ogun State, Nigeria. *Journal of Education and Health Promotion*, 7(1), 1-7.
- Gould, D. J., Moralejo, D., Drey, N., Chudleigh, J. H., & Taljaard, M. (2017). Interventions to improve hand hygiene compliance in patient care. *Cochrane Database of Systematic Reviews*, 9.
- Ibrahim, N., Abubakar, S., & Garba, S. (2022). Knowledge and compliance with PPE use among laboratory staff in Nigerian tertiary hospitals. *African Journal of Laboratory Medicine*, 11(1), 78-85.
- Mehta, A., & Diwakar, M. K. (2021). Impact of Educational Intervention on Knowledge, Attitudes, and Practices of Laboratory Technicians regarding Universal Work Precautions at a Tertiary Health Care Center in Central



Effect of Health Education Intervention on ... Ibrahim, Y. A., Et. al. (2025)

- India. *Applied Biosafety: Journal of the American Biological Safety Association*, 26(Suppl 1), S27–S33. <https://doi.org/10.1089/apb.21.902607>
- Muhammed, Y., Isiaq, A. T., Suleiman, M. A., & Ningi, A. U. (2025). Awareness of occupational hazards among healthcare workers in teaching hospitals in Nigeria. *Global Journal of Health Related Researches*, 7(1), 1-5. <http://journals.abu.edu.ng/index.php/gjhr/article/download/615/285/458>
- Nigeria Centre for Disease Control. (2021). *Weekly Epidemiological Report*. Retrieved from <https://ncdc.gov.ng/reports/weekly>
- Verbeek, J. H., Rajamaki, B., Ijaz, S., Sauni, R., Toomey, E., & Blackwood, B. (2020). Personal protective equipment for preventing highly infectious diseases due to exposure to contaminated body fluids in healthcare staff. *The Cochrane database of systematic reviews*, 5(5), CD011621. <https://doi.org/10.1002/14651858.CD011621.pub5>
- World Health Organization (WHO). (2020). *Rational use of personal protective equipment for coronavirus disease (COVID-19) and considerations during severe shortages*. WHO. <https://www.who.int/ppe>