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Assessment of Knowledge and Compliance with Infection Prevention and Control Measures among Health Workers in Lassa Fever Treatment Centre at Abubakar Tafawa Balewa University Teaching Hospital, Bauchi: A Cross-sectional Study

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Abstract

Background: Lassa fever is a highly endemic viral haemorrhagic disease in Nigeria, posing significant occupational risks to healthcare workers (HCWs). Despite established infection prevention and control (IPC) guidelines, nosocomial transmission persists. This study assessed the knowledge, compliance, and resource availability for IPC among HCWs at the Lassa Fever Treatment Centre of Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH), Bauchi, and examined factors associated with compliance.

Methods: A cross-sectional study was conducted among 40 HCWs (doctors, nurses, laboratory scientists, and support staff) directly involved in patient care, selected using purposive sampling. Data were collected using a pre-tested, semi-structured questionnaire and analyzed with *IBM SPSS Statistics* version 26. Descriptive and inferential statistics (Chi-square tests) were performed, with a criterion mean of 2.5 used to assess knowledge and practice.

Results: The response rate was 90.9%. Most respondents were male (55.0%), aged 20–35 years (45.0%), and held a first degree (55.0%). Overall IPC knowledge was adequate (grand mean = 3.0), although gaps were observed in knowledge of correct personal protective equipment (PPE) use (mean = 2.3). Compliance was moderate (grand mean = 2.9), with good adherence to hand hygiene (mean = 3.3) and isolation protocols (mean = 3.2), but notable deficiencies in consistent PPE use (mean = 2.4) and reporting of accidental exposures (mean = 2.3). IPC resources were generally available (grand mean = 3.0), except for inadequate and non-functional handwashing facilities (mean = 2.4). Years of work experience were significantly associated with compliance ($p < 0.05$).

Conclusion: Healthcare workers at the ATBUTH Lassa Fever Treatment Centre demonstrate adequate IPC knowledge; however, this does not consistently translate into optimal compliance. Identified gaps in PPE use and hand hygiene infrastructure increase occupational risk. Targeted interventions, including practical training, routine supervision, and infrastructural improvements, are required to strengthen IPC practices and enhance healthcare worker safety.

Keywords: infection prevention and control; Lassa fever; healthcare workers; knowledge; compliance; Bauchi

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Introduction

Infection Prevention and Control (IPC) is a cornerstone of safe healthcare delivery, particularly in settings managing highly infectious diseases such as Lassa fever. IPC comprises evidence-based practices, including hand hygiene, use of personal protective equipment (PPE), environmental sanitation, waste management, and adherence to standard precautions, designed to prevent healthcare-associated transmission of infectious agents (Steven, 2024; World Health Organiza-

tion, 2023). The importance of IPC is further amplified in the context of viral haemorrhagic fevers due to their high transmissibility and case fatality rates (Ahmad, 2024).

Lassa fever, an acute viral haemorrhagic illness caused by the Lassa virus (an arenavirus), is endemic in West Africa, particularly Nigeria. While primary transmission occurs through contact with excreta of infected *Mastomys natalensis* rodents, secondary human-to-human transmission frequently occurs in healthcare settings via exposure to infected blood, bodily fluids, or contaminated materials. Consequently, healthcare workers (HCWs) are at heightened occupational risk, particularly where IPC protocols are inadequately implemented (Eze et al., 2025; Olawale & Yusuf, 2023).

Healthcare workers play a central role in outbreak response but remain highly vulnerable during Lassa fever epidemics. Occupational exposures, including needle-stick injuries, improper handling of contaminated materials, and inconsistent use of PPE, are commonly reported. Evidence from Nigerian tertiary healthcare settings indicates that gaps in IPC training, inconsistent availability of PPE, and inadequate supervision contribute significantly to nosocomial infections among HCWs (Bamidele, 2024; Nwankwo & Ekanem, 2024). Such infections not only endanger healthcare workers but also reduce workforce capacity and compromise the quality of patient care.

The (Nigeria Centre for Disease Control and Prevention (NCDC), 2024) has strengthened IPC frameworks in designated Lassa fever treatment centres; however, reports of infections among HCWs persist. Several factors, including heavy workload, fatigue, inadequate institutional support, and behavioural determinants such as risk perception, continue to influence adherence to IPC protocols (Ibrahim & Okeke, 2023; Salihu et al., 2025). Despite the availability of guidelines, there remains a paucity of empirical data evaluating the level of IPC knowledge, compliance, and resource availability in Lassa fever treatment centres.

Therefore, this study aimed to assess the knowledge, compliance, and resource availability related to infection prevention and control among healthcare workers in the Lassa Fever Treatment Centre at Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH), Bauchi. The study further sought to identify gaps and inform targeted interventions for strengthening IPC practices and safeguarding frontline healthcare workers.

Methods

Study Design

A cross-sectional survey design was employed for this study.

Study Area

The study was conducted at the Lassa Fever Treatment Centre, Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH), Bauchi, North-East Nigeria. This tertiary healthcare facility serves as the state's designated treatment centre for Lassa fever, making it an appropriate setting for assessing infection prevention and control (IPC) practices in a high-risk environment.

Study Population

The study population comprised healthcare workers (HCWs) directly involved in patient care at the treatment centre, including doctors, nurses, laboratory scientists, and support staff (ward attendants and cleaners). The total number of eligible personnel was approximately 50.

Sample Size Determination

The sample size was determined using the Taro Yamane formula for finite populations:

$$n = \frac{N}{1 + N(e)^2}$$

where: n = required sample size, N = total population of HCWs in the treatment centre (50), e = margin of error (0.05 at 95% confidence level).

$$n = \frac{50}{1 + 50(0.05)^2} = \frac{50}{1 + 0.125} = \frac{50}{1.125} = 44.44$$

The calculated minimum sample size was therefore approximated to 44 participants.

Sampling Technique

A purposive sampling technique was used to select 44 healthcare workers directly involved in patient care within the Lassa Fever Treatment Centre. This non-probability method ensured inclusion of participants with relevant exposure and experience in

IPC practices. Stratification by professional cadre was further applied to ensure proportional representation of doctors, nurses, laboratory scientists, and support staff.

Instrument for Data Collection

Data were collected using a pre-tested, semi-structured questionnaire comprising sections on socio-demographic characteristics, knowledge of IPC measures, compliance with standard precautions, and availability of IPC resources. The instrument included multiple-choice, Likert-scale, and open-ended questions.

Validity and Reliability

Content validity of the instrument was established through review by experts in public health and infection control. Reliability was assessed through a pilot study conducted among healthcare workers in a similar facility (not included in the main study), yielding an acceptable internal consistency (Cronbach's $\alpha = 0.78$).

Data Collection Procedure

Self-administered questionnaires were distributed to participants during work breaks. The purpose of the study was explained, and informed consent was obtained prior to participation. Confidentiality was ensured throughout the process. Follow-up visits were conducted to facilitate retrieval of completed questionnaires and provide clarification where necessary.

Data Analysis

Data were coded and entered into *IBM SPSS Statistics* version 26 for analysis. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize socio-demographic characteristics, IPC knowledge, compliance, and resource availability. A criterion mean of 2.5 was used to determine adequacy of responses on a 4-point Likert scale. Inferential statistics (Chi-square tests) were employed to assess associations between selected variables (e.g., years of experience, professional cadre) and compliance levels. Statistical significance was set at $p < 0.05$.

Ethical Considerations

Ethical approval was obtained from the ATBUTH Ethics Committee. Written informed consent was obtained from all participants prior to data collection. Participants were assured of confidentiality and anonymity, and were informed of their right to withdraw from the study at any time without penalty. All data were securely stored and used solely for research purposes.

Results

Response Rate

A total of 44 questionnaires were distributed, of which 40 were completed and returned, yielding a response rate of 90.9%.

Sociodemographic Characteristics of Respondents

The majority of respondents were male (55.0%), aged 20–35 years (45.0%), and married (57.5%). Over half of the participants possessed a first degree (55.0%). In terms of work experience, the largest proportion of respondents (45.0%) had 6–10 years of professional experience, indicating a mix of early-career and moderately experienced healthcare workers.

Knowledge of Infection Prevention and Control Measures

Overall, respondents demonstrated adequate knowledge of infection prevention and control (IPC) measures, with a grand mean score of 3.0. However, a notable deficiency was observed in knowledge related to the correct use of personal protective equipment (PPE), which had a mean score of 2.3, below the acceptance threshold of 2.5.

Compliance with Standard IPC Practices

The overall level of compliance with IPC practices was moderate (grand mean = 2.9). High levels of adherence were observed for hand hygiene practices (mean = 3.3), proper handling of contaminated instruments (mean = 3.1), and adherence to isolation protocols (mean = 3.2). In contrast, consistent use of PPE (mean = 2.4) and prompt reporting of accidental exposures (mean = 2.3) were below the acceptable threshold, indicating critical gaps in compliance.

Table 1: Demographic Characteristics of Respondents ($n = 40$)

Characteristic	Frequency (n)	Percentage (%)
Age Group		
20–35 years	18	45.0
36–51 years	16	40.0
52 years & above	6	15.0
Gender		
Male	22	55.0
Female	18	45.0
Marital Status		
Single	15	37.5
Married	23	57.5
Divorced	2	5.0
Academic Qualification		
NCE/OND	10	25.0
HND/BSc/B.Ed	22	55.0
M.Ed./Ph.D.	8	20.0
Working Experience		
1–5 years	12	30.0
6–10 years	18	45.0
11 years & above	10	25.0

Availability and Adequacy of IPC Resources

Most IPC resources were reported to be available and adequate, with an overall grand mean of 3.0. However, handwashing facilities and availability of sanitizers were rated below the acceptable level (mean = 2.4), suggesting significant deficiencies in essential infection control infrastructure.

Factors Associated with IPC Compliance

Chi-square analysis revealed a statistically significant association between years of work experience and level of IPC compliance ($\chi^2 = 6.32, p = 0.042$). Healthcare workers with more than 10 years of experience were more likely to demonstrate adequate compliance compared to those with fewer years of experience. No statistically significant associations were observed between IPC compliance and professional cadre or gender ($p > 0.05$).

Table 2: Mean Scores on Knowledge of IPC Measures among Healthcare Workers ($n = 40$)

Item	Mean	SD	Decision
Aware of standard IPC guidelines	3.2	0.6	Accepted
Understand Lassa fever transmission	3.1	0.7	Accepted
Knowledgeable about correct PPE use	2.3	0.8	Rejected
Know hand hygiene procedures	3.0	0.5	Accepted
Understand importance of isolation	3.4	0.6	Accepted
Grand Mean	**3.0**		

Note: Decision based on a criterion mean of 2.5. Scores ≥ 2.5 were accepted, while scores < 2.5 were rejected.

Table 3: Mean Scores on Compliance with Standard IPC Practices among Healthcare Workers ($n = 40$)

Item	Mean	SD	Decision
Consistently wear PPE	2.4	0.7	Rejected
Practice proper hand hygiene	3.3	0.5	Accepted
Follow proper handling of contaminated instruments	3.1	0.6	Accepted
Adhere to isolation protocols	3.2	0.5	Accepted
Report accidental exposures immediately	2.3	0.8	Rejected
Grand Mean	**2.9**		

Note: Decision based on a criterion mean of 2.5. Scores ≥ 2.5 were accepted, while scores < 2.5 were rejected.

Table 4: Mean Scores on Availability and Adequacy of IPC Resources among Healthcare Workers ($n = 40$)

Item	Mean	SD	Decision
PPE readily available	3.1	0.6	Accepted
Hand washing facilities/sanitizers sufficient	2.4	0.7	Rejected
Isolation rooms adequate	3.2	0.5	Accepted
Sufficient disinfectants/cleaning materials	3.0	0.6	Accepted
Adequate waste management systems	3.1	0.5	Accepted
Grand Mean	**3.0**		

Note: Decision based on a criterion mean of 2.5. Scores ≥ 2.5 were accepted, while scores < 2.5 were rejected.

Discussion

This study assessed infection prevention and control (IPC) knowledge, compliance, and resource availability among healthcare workers (HCWs) in a Lassa fever treatment centre, revealing both strengths and critical gaps.

Healthcare workers demonstrated adequate overall knowledge of IPC measures, consistent with findings from other Nigerian treatment centres (Musa et al., 2023). However, a significant deficit was identified in knowledge regarding the correct use of personal protective equipment (PPE). This finding aligns with (Abdullahi & Bello, 2022), who reported that detailed PPE protocols are often poorly retained without regular, practical training. Given that PPE constitutes the first line of defence against occupational exposure, this gap is particularly concerning and underscores the need for targeted, hands-on training interventions.

Moderate compliance with IPC practices was observed, with good adherence to hand hygiene and isolation protocols, but notable lapses in consistent PPE use and reporting of accidental exposures. This pattern is consistent with findings by (Eze et al., 2021; Nwankwo & Ekanem, 2024), who noted that even knowledgeable HCWs may fail to comply due to high workload, fatigue, and inadequate supervision. The low rate of reporting accidental exposures is particularly alarming, as it delays access to post-exposure management and increases the risk of transmission. This may reflect a workplace culture in which reporting is either stigmatized or insufficiently supported, highlighting the need for institutional reforms.

Although essential IPC materials such as PPE, disinfectants, and isolation units were generally available, deficiencies in hand hygiene infrastructure were identified as a critical gap. Similar findings have been reported by (Oladipo et al., 2022), who identified inadequate hand hygiene facilities as a major barrier to effective IPC implementation. This is particularly concerning given that hand hygiene remains one of the most effective and cost-efficient IPC measures. Without functional handwashing facilities and adequate supplies, compliance becomes practically difficult regardless of knowledge level.

The significant association between years of work experience and IPC compliance suggests that increased experience may enhance familiarity with protocols and risk awareness. However, the lack of association between compliance and professional cadre indicates that IPC challenges are systemic rather than profession-specific. This finding emphasizes the need for comprehensive, facility-wide interventions rather than targeted approaches limited to specific cadres.

Strengths and Limitations

This study provides valuable context-specific evidence from a high-risk clinical setting. However, several limitations should be acknowledged. The use of purposive sampling and a relatively small sample size ($n = 40$) limits the generalizability of the findings. The cross-sectional design precludes causal inference, and reliance on self-reported data introduces the potential for social desirability and recall bias, which may lead to overestimation of compliance. Additionally, the single-centre design limits the applicability of the findings to other settings. Despite these limitations, the study offers important insights for strengthening IPC practices in similar resource-limited environments.

Conclusion

Healthcare workers at the ATBUTH Lassa Fever Treatment Centre possess adequate foundational knowledge of IPC measures; however, this knowl-

edge does not consistently translate into optimal compliance. Critical gaps in PPE use and exposure reporting, coupled with deficiencies in hand hygiene infrastructure, increase occupational risk. These findings highlight that knowledge alone is insufficient, and that systemic factors, including training, supervision, and resource availability, must be addressed to ensure effective IPC implementation and protect frontline healthcare workers.

Recommendations

To address the identified gaps, it is essential to implement regular, practical, and competency-based training programmes on the correct use of PPE and management of occupational exposures, tailored to different professional cadres. In addition, healthcare facilities should establish routine IPC audits and feedback mechanisms, alongside a non-punitive reporting system to encourage timely reporting of accidental exposures. Strengthening infrastructure is also critical, particularly by ensuring the consistent availability and functionality of hand hygiene facilities, including sinks, soap, and alcohol-based hand sanitizers, across all patient care areas.

Furthermore, efforts should be made to improve workload management through adequate staffing and supportive institutional policies, thereby reducing fatigue-related non-compliance. Continuous awareness campaigns should also be conducted to reinforce the risks associated with Lassa fever and emphasize the importance of strict adherence to IPC measures for both personal and patient safety.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this study.

Authors' Contributions

The authors contributed equally to the conceptualization, design, data collection, analysis, and interpretation of the study. They also conducted the literature review, developed the research instrument, and drafted the manuscript.

The research supervisor, Dr. Abubakar Musa, provided guidance throughout the study, including critical review of the research design, methodology, data analysis, and overall structure of the work. The supervisor also contributed to the editing and refinement of the manuscript to ensure academic quality, clarity, and coherence. All contributions were directed toward ensuring the validity, reliability, and overall integrity of the research.

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What is Known About This Topic

Existing literature indicates that infection prevention and control (IPC) is a fundamental component of healthcare delivery, particularly in the management of highly infectious diseases such as Lassa fever. Healthcare workers are known to be at increased risk of occupational exposure due to direct contact with infected patients, bodily fluids, and contaminated materials, especially in high-risk treatment settings.

Previous studies have consistently demonstrated that although many healthcare workers possess basic knowledge of IPC measures, substantial gaps often exist between knowledge and actual practice. Compliance with standard precautions, including appropriate use of personal protective equipment (PPE), hand hygiene, and safe healthcare waste disposal, remains inconsistent in many healthcare facilities, particularly within resource-limited settings.

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