
Correlates of Adherence to Infection Prevention and Control Practices (IPC) Among Healthcare Workers from Primary Healthcare Centers in Osun State, Nigeria

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Abstract *This quantitative based study examines Correlates of Adherence to Infection Prevention and Control Practices (IPC) among Healthcare Workers from Primary Healthcare Centers. Descriptive design was adopted for this study with a sample size of 124 health workers from urban and rural areas, selected across 3 Local Government Areas in the State, using multi-stage sampling techniques. Data collected using Pre-tested semi-structured questionnaire. Data was processed using Statistical Package for Social Sciences (SPSS), version 27. Analysis was conducted using descriptive statistics, while hypotheses was tested using t-test at p-value of 0.05 or less. Results revealed that, majority of the respondents were within age group, 20-29 years (30.7%) and 50 years & above (37.1%) respectively. Also over a third (37.1%) had completed diploma, with about 10 years' experience or over. Overall 44.5% of the total respondents have adequate knowledge of IPC. Also over half (54.4%) had more negative attitude towards IPC, while slightly over half (51.9%) of the respondents had more poor adherence to IPC. Hypotheses tested revealed that, there is a significant difference in the knowledge ($t(123) = 4.116; p = .000$), attitude ($t(123) = 5.289; p = .000$) and adherence ($t(123) = 4.481; p = .000$) to IPC among healthcare workers in rural and Urban PHCs in Osun State. The study concluded that, there is knowledge deficit on IPC practices, while adherence and attitude towards IPC practice among majority health workers in both rural and urban PHCs violates the standard expectation from Healthcare professionals. These insights underscore the need for designing appropriate interventions and policy formulation towards implementation of existing promotional guidelines on IPC.*

Keyword: adherence, knowledge, attitude, infection prevention, control practices

INTRODUCTION

Global best practice requires healthcare professionals to adhere to standard precautions while caring for patients, which implies ensuring appropriate measures to prevent spread of diseases within the Health facility's space (Sangini *et al.*, 2020). This align with the fact that, healthcare professionals owe themselves duty to adhere to precautionary measures, without distorting the process of care; this is termed "Safety First" in occupational hazard. However, continuous flouting of standards precautions such as; poor attitude towards some basic standard procedures or non-adherence to use of personal protective equipment (PPE), continue to increased exposure of health workers and patients to various forms of hospital-based infections, especially in Nigeria (Otokpa *et al.*, 2024). This forms a significant public health concerns, as it impede the wellness of hospital users, patients and healthcare professionals, contributing to increased global disease burden as well as increase mortality and morbidity rate (Nwakwo *et al.*, 2020).

The global rise in cases of HAI continues to question the competency, behavior and adherence of healthcare professionals towards infection prevention and control practices (Aguwa *et al.*, 2020; Mohammed *et al.*, 2024). The World Health Organization (WHO), the prevalence of HAIs ranges between 5.7% and 19.1% in hospital settings globally (WHO, 2019). WHO-led systematic review revealed that the prevalence of HAIs varies between 7.6% and 15.5% in high-income and low- and middle-income countries, respectively, prevalence of HAIs in Europe and the USA at 6.5% and 3.2%, respectively (Magill *et al.*, 2018). However, this is more severe among low income countries, where Nigeria is categorized. Yet, hospital acquired infections is preventable with good knowledge, positive attitude and increased adherence to infection prevention and control practices. A study estimated the prevalence of HAI in West African region to be between 300000-500000, with associated annual deaths of about 5000 (Nigeria Centre for Disease Control, 2019). Nigeria contributed the highest burden of the disease with upsurge in the number of cases in the past few years (Adeke, 2021).

Studies in this part of the world have shown that multiple factors are correlated with the level of adherence to IPC practices, with majority focus on demographic characteristics, availability and accessibility of hospital equipment, management and government factors, among others (**Source**). Little attention have been given to knowledge and attitude as major correlates of adherence to IPC, which constitute a significant gap in studies. This create a suspense, especially within different localities (Rural and Urban) about if Healthcare workers who possessed adequate knowledge and positive attitude towards IPC practices are more likely to comply with standard precautions such as hand hygiene, use of personal protective equipment (PPE), and waste management. A systematic review by Sahu *et al.*, (2023) highlighted that continuous education and hands-on training significantly correlate with increased adherence rates. Likewise, positive attitudes toward infection control practices are also associated with improved adherence. According to Amegah *et al.*, (2022), healthcare workers with a strong sense of responsibility toward patient safety demonstrated higher levels of IPC practice adherence. The availability of IPC resources along with

managerial support, has a strong correlation with practice adherence. A cross-sectional study in Nigeria by Ogunisola *et al.*, (2021) found that inadequate supply of IPC materials significantly decreased adherence among healthcare workers. Similarly, Aguwa *et al.* (2020) found that, long hospital stay is known to be a predisposing factor to the occurrence of hospital-acquired infections in patients. It is an established fact that, lack of appropriate infection prevention and control practice is a clear violation of the etiquette of Healthcare professions, considering the fact that, Health workers are at the frontline of hospital infection prevention and control and owe patients/clients a duty to care as well as to prevent intending diseases.

Objectives

- 1) To assess the level of knowledge about Infection Prevention and Control practices among healthcare workers in selected Primary Health Cares in Osun State.
- 2) To assess the attitude towards Infection Prevention and Control practices among healthcare workers in selected Rural and Urban Primary Health Cares in Osun State.
- 3) To determine the level of adherence to Infection Prevention and Control practices among healthcare workers in selected Rural and Urban Primary Health Cares in Osun State.

Hypotheses

1. There is no significant difference in the level of knowledge of Infection Prevention and Control practices among healthcare workers from rural and Urban selected PHCs in Osun State.
2. There is no significant difference in the attitude towards Infection Prevention and Control practices among healthcare workers from rural and Urban selected PHCs in Osun State.
3. There is no significant difference in the adherence to Infection Prevention and Control practices among healthcare workers from rural and Urban selected PHCs in Osun State.

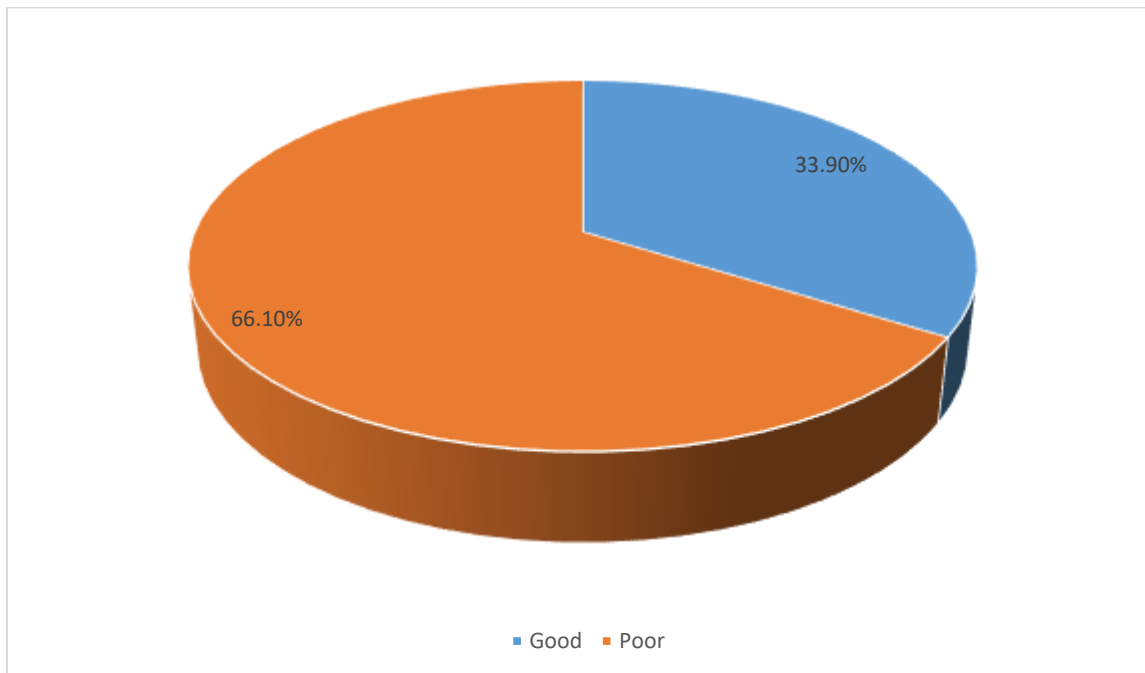
METHOLOGY

This quantitative based study, using adopted descriptive design was conducted among health workers. This study was conducted in twelve Primary Healthcare Centers (two from rural and two from urban areas) selected across three 3 Local government Areas out of the 30 Local Government Areas of the State. The sample size was calculated using Slovine formula, which gave 124, with the inclusion of 10% attrition rate. Respondents were selected using five (5) stages multi-stage sampling techniques, each were presented with a validated semi-structured questionnaire as instrument for data collection, which was also retrieved after completion. Retrieved Data was imputed on excel spreadsheet and checked for error of filling. Subsequently data was transferred into Statistical Package for Social Sciences (SPSS), version 27 for analysis. Descriptive statistics of frequency counts and percentages was employed to analyze data for demographic characteristics of respondents as well as objectives. Also, summary of categorization of variables was presented in charts. T-test was used to test hypotheses at p-value less than 0.05.

RESULTS**Table 1: Frequency distribution of respondents on demographic characteristics**

Items	Frequency	Percentage (%)
Age		
20-29 years	38	30.7
30-39 years	18	14.5
40-49 years	22	17.7
50 years & above	46	37.1
Sex		
Male	23	18.5
Female	101	81.5
Marital Status		
Single	28	22.5
Married	87	70.2
Others	9	7.3
Working Cadre		
Medical Doctor	2	1.6
Nurse and Midwives	15	12.1
CHEW	59	47.6
CHO	22	17.7
Porter/Cleaner	12	9.7
Laboratory scientist	0	0.0
Others	14	11.3
Highest Qualification		
Diploma	82	66.1
Bachelor's Degree	20	16.1
Master's Degree	9	7.3
Others	13	10.5
Years of work experience		
Below 1 year	28	22.6
1-5 years	33	26.6
6-10	21	16.9
10 years and above	42	33.9
Current place of work		
Rural	47	37.9
Urban	77	62.1
Where you work		
Medical outpatient	9	7.3
Antenatal unit	44	35.5
Immunization	18	14.5
Postnatal unit and family planning unit	47	37.9
Others	6	4.8

Table 1 above present frequency distribution of respondents by demographic characteristics. The results shows that, respondents concentrated within age 20-29 years (30.7%) and 50 years & above (37.1%) respectively. Results revealed that, female were the majority representing 81.5%. Also most (70.2%) of the respondents were married. Results also shows that, the respondents were widely distributed across different field of health sciences, however CHEW and CHO occupies the highest representation (47.6%) and (17.7%) in the respondents. Also majority of the respondents had completed diplomas (37.1%) and its equivalent. Results also shows that, many of the respondents have worked for, below 1 year (22.6%); between 1-5 years(26.6%) and 10 years' experience or over (33.9%). Also significantly high percentages (62.1%) of the respondents were from urban. More results show that, respondents had been selected across major departments and units in PHCs, however most respondents were from Antenatal unit (35.5%) and Postnatal unit and family planning unit (37.9%).



The figure above shows that overall, a significant higher percent (66.1%) of respondents lack adequate knowledge of Baseline information on Infection Prevention and Control practices.

Figure 1: Overall Baseline Knowledge

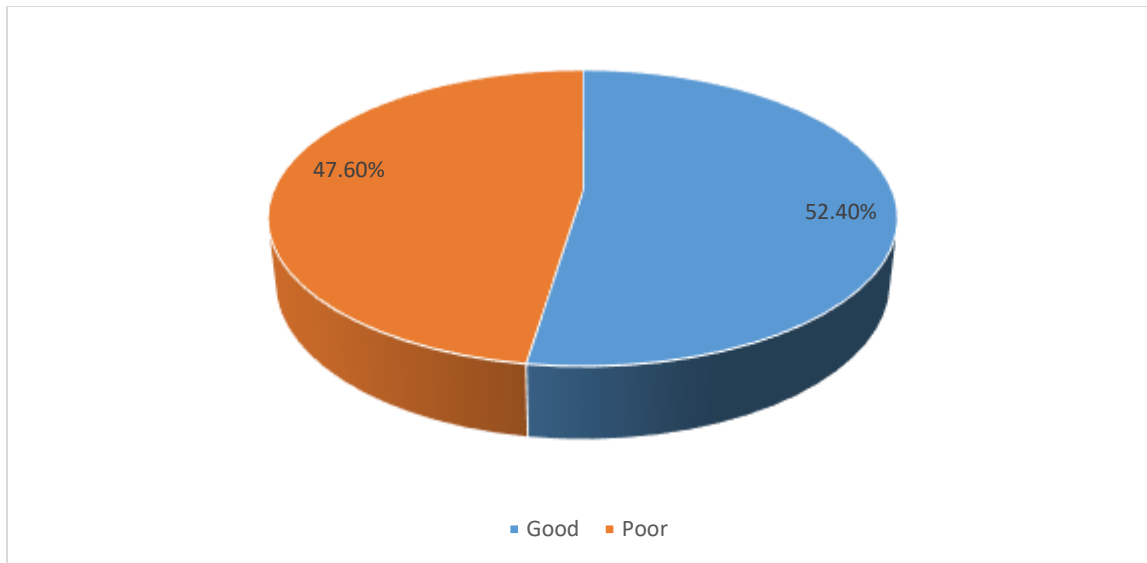


Figure 2: Overall hand hygiene knowledge

The figure above shows that overall, over half (52.4%) of respondents had adequate knowledge of hand hygiene on Infection Prevention and Control practices.

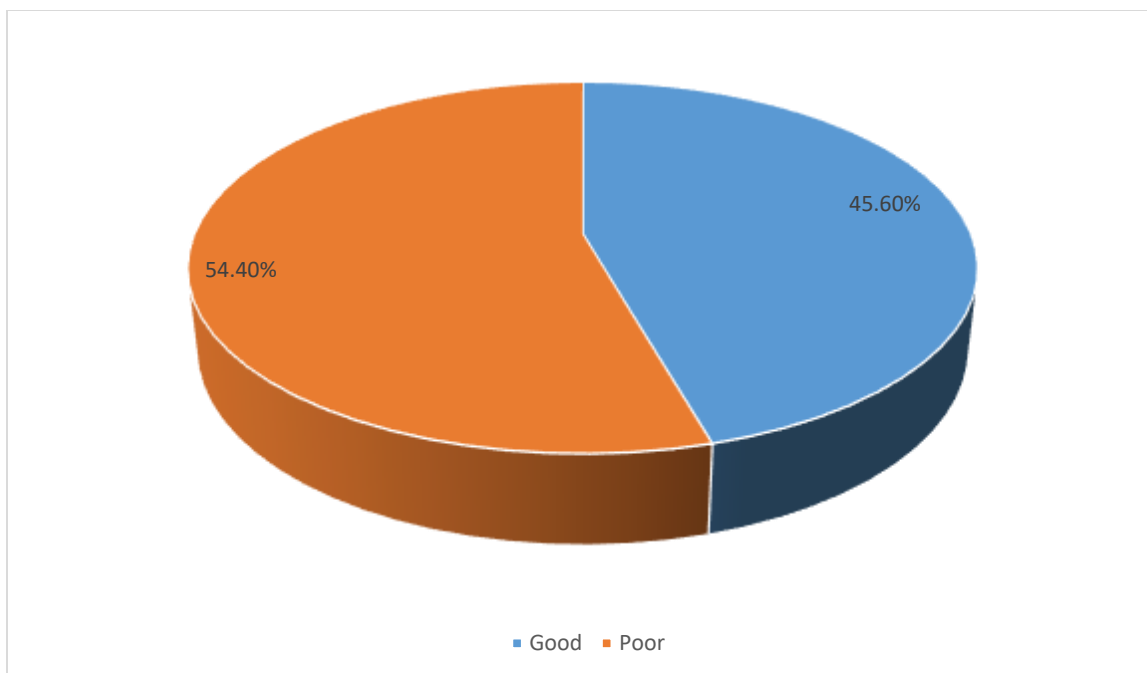


Figure 3: Overall PPE knowledge

The figure above shows that overall, over half (54.4%) of respondents lack adequate knowledge of personal protective equipment (PPE) use about Infection Prevention and Control practices.

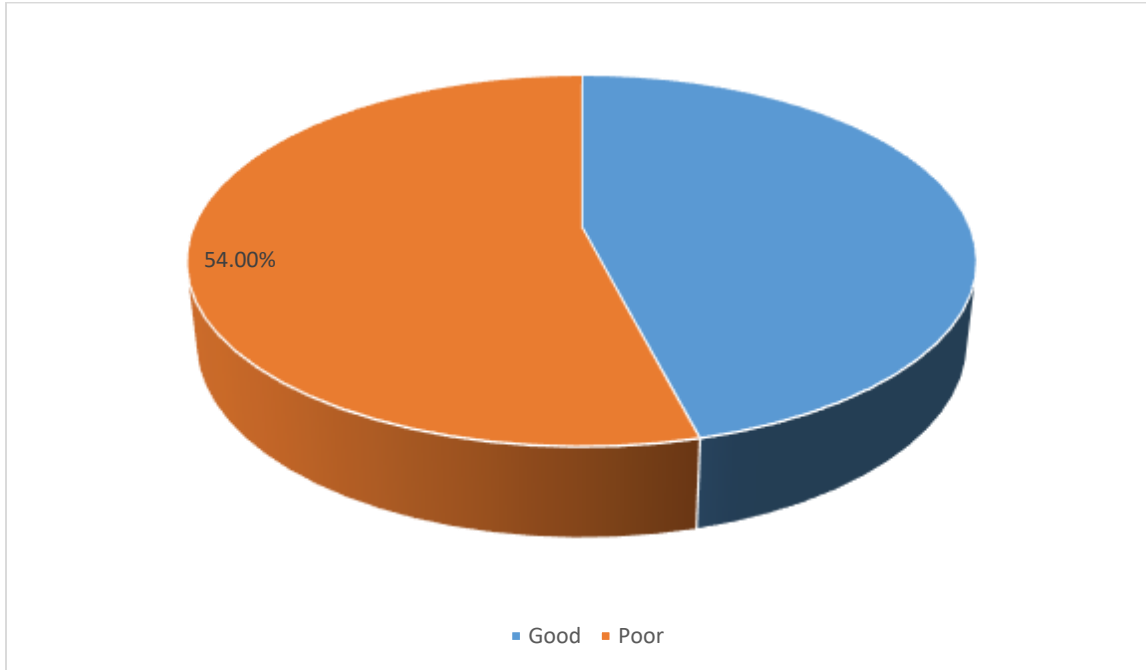


Figure 4: Overall Waste Management knowledge

The figure above shows that overall, over half (54.00%) of respondents lack adequate knowledge of Waste Management knowledge about Infection Prevention and Control practices

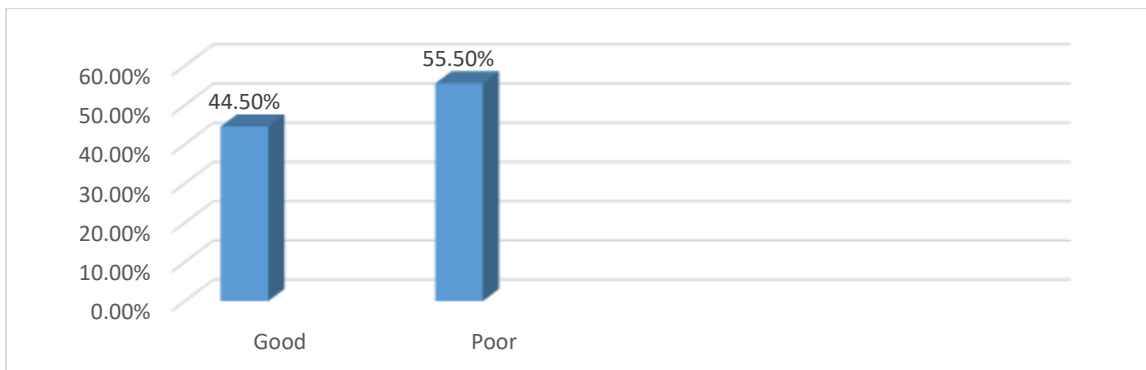


Figure 5: Grand Overall knowledge of Infection Prevention and Control practice

The figure above shows that the grand overall knowledge of Infection Prevention and Control practices is low. Specifically below half (44.5%) of respondents lack adequate knowledge of Infection Prevention and Control practices.

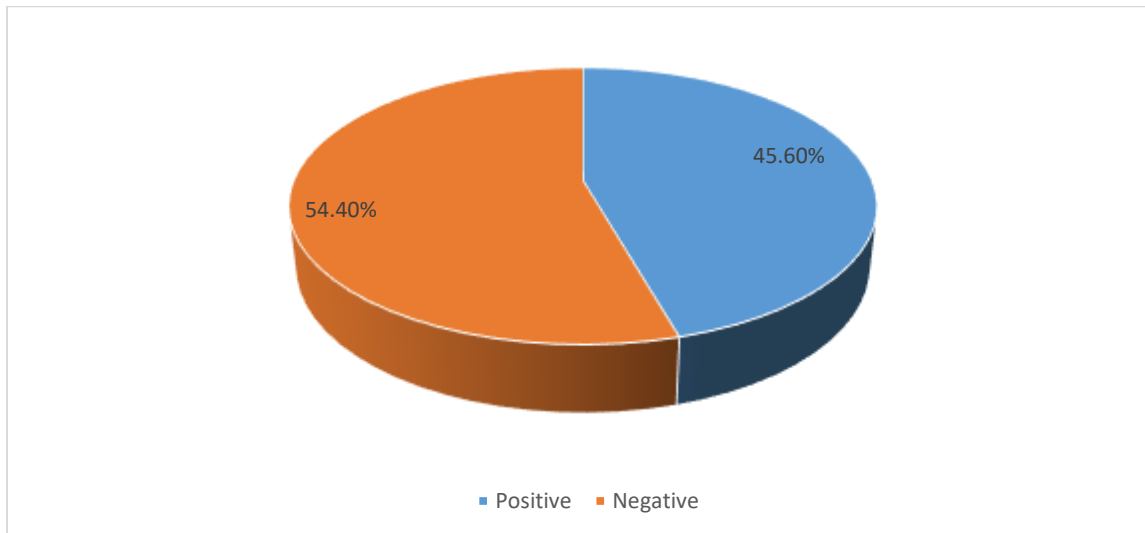


Figure 6: Overall Attitude towards Infection Prevention and Control practice

Figure above shows that, over half (54.4%) of the respondents had more negative attitude towards Infection Prevention and Control practices

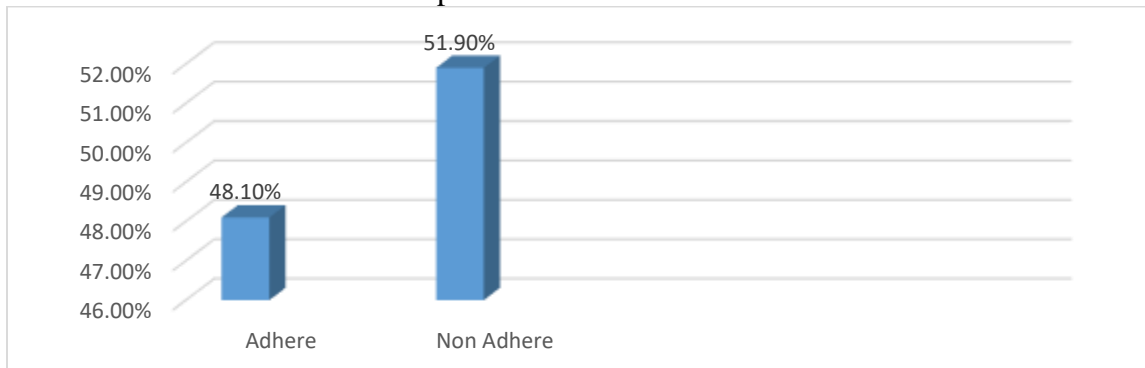


Figure 7: Overall Adherence to Infection Prevention and Control practice

Figure above shows that, slightly over half (51.9%) of the respondents had more poor adherence towards Infection Prevention and Control practices

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Testing of Hypotheses

1. There is no significant difference in the level of knowledge on Infection Prevention and Control practices among healthcare workers in rural and Urban PHCs in Osun State.

Table 2: Independent Samples Test on difference between knowledge on Infection Prevention and Control practices among healthcare workers in rural and Urban PHCs

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	21.930	.000	4.116	24	.000	.149	.056	.087	.414
Equal variances not assumed			2.005	11.54	.001	.202	.062	.056	.428

Decision: Reject H₀, if P-value =/ \leq 0.05

The Independent Samples t-test table 2 below also shows that, there is a significance difference between level of knowledge on Infection Prevention and Control practices among healthcare workers in rural and Urban PHCs in Osun State ($t(123) = 4.116; p = .000$). Therefore, the null hypothesis which states that, there is no significance difference between level of knowledge on Infection Prevention and Control practices among healthcare workers in rural and Urban PHCs in Osun State was rejected, while the alternative was upheld. Therefore, there is a significance difference between level of knowledge on Infection Prevention and Control practices among healthcare workers in rural and Urban PHCs in Osun State.

2. There is no significant difference in the attitude towards Infection Prevention and Control practices among healthcare workers in rural and Urban PHCs in Osun State.

Table 3: Independent Samples Test on difference in attitude towards Infection Prevention and Control practices among healthcare workers in rural and Urban PHCs

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	31.642	.000	5.289	27	.000	.423	.060	.327	.599
Equal variances not assumed			4.496	13.009	.000	.402	.082	.279	.565

The Independent Samples t-test table 3 below also shows that, there is a significance difference between attitude towards Infection Prevention and Control practices ($t(123) = 5.289$; $p = .000$). Therefore, the null hypothesis which states that, there is no significance difference between attitude towards Infection Prevention and Control practices among healthcare workers in rural and Urban PHCs in Osun State is rejected, while the alternative was upheld. Therefore, there is a significance difference between attitude towards Infection Prevention and Control practices among healthcare workers in rural and Urban PHCs in Osun State

3. There is no significant difference in the Adherence to Infection Prevention and Control among healthcare workers in rural and Urban PHCs in Osun State.

Table 4 Independent Samples Test on difference in adherence to Infection Prevention and Control among healthcare workers in rural and Urban PHCs

	Levene's Test for Equality of Variances		t-test for Equality of Means					
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower
Equal variances assumed	23.753	.000	4.481	30	.000	.408	.062	.237
Equal variances not assumed			4.330	14.673	.002	.376	.044	.219

The Independent Samples t-test table 4.6 below shows that, there is a significance difference between adherence to Infection Prevention and Control among healthcare workers in rural and Urban PHCs ($t(123) = 4.481$; $p = .000$). Therefore, the null hypothesis which states that, there is no significance difference between Adherence to Infection Prevention and Control among healthcare workers in rural and Urban PHCs is rejected, while the alternative was upheld. Therefore, there is a significance difference between Adherence to Infection Prevention and Control among healthcare workers in rural and Urban PHCs.

DISCUSSION

Infection Prevention and Control practice represents one key aspect of healthcare that requires total adherence to standard precautions for the safety of health workers and patients as well as

relatives and others visiting the healthcare facility. In this study finding revealed that, majority of the respondents were in their 20s and in their 50s. This is an indication that, respondents used in this study were experienced. This finding agrees with another finding which shows that, over a third of the respondents have had over 10 years of work experience, with most having at least a year work experience. Also this finding further corroborate the fact that, majority were married, with only about one-fifth being single. More findings revealed that, all major different healthcare professionals were presented with adequate qualification. Similarly, Adeke et al., (2021) held that, tertiary education level, and work experience of ≥ 7 years. Male gender, nurse professional and were predictors of good attitude towards IPC. Also, nurse professional and married status were predictors of good practice of IPC among the respondents. More findings revealed that, the least education qualification reported was diploma, while over a third had bachelor degree and its equivalence. Mothibi (2021) found that, Infection prevention and control knowledge level and safer activities were significantly associated with older age, a bachelor's degree level and above level of education, working in a clinic, 25 or more years of work experience. However, this finding also revealed a significant difference between representation of rural and urban. This is probable due to large difference in the number of health workers posted to rural and urban healthcare centers.

Findings also revealed that, below half of the respondents had adequate knowledge of Infection Prevention and Control practice. This is unlike the report of Desta et al., (2018) who found that, 84.7% were familiar with IPC, with 140 being aware that disinfection prevents HCAI's and 141 being aware of the use of antiseptics, and 132 understood that hospital equipment must be decontaminated before being sterilized, indicating a higher percent of participants with good knowledge. The plausible reason to this could be deficiency of on-the-job trainings and reliance on trainings acquired during studentship, making health workers vulnerable to obsolete knowledge in this 21st century. Although specific findings revealed that, the knowledge status of health workers weren't totally poor. For instance, although the overall baseline knowledge on Infection Prevention and Control practices revealed that, about two-third had poor knowledge, yet over half of respondents had adequate knowledge of hand hygiene on Infection Prevention and Control practices. Amali and Van Wyk (2023) also reported similar finding where they found that, only 169 (53.9%) knew the recommended duration for hand washing and that, Healthcare workers were twice as likely to wash their hands before contact and five times more likely to wash their hands after contact with a patient, their bedding, or after a procedure.

This finding implies that, there is a differential level of knowledge across the component of Infection Prevention and Control practices among health workers. Specifically, higher number of respondents shows poor knowledge on Infection prevention and control practices in a hospital setting, Healthcare associated infections and Transmission of Health care associated infections (HCAI). However, on hand washing techniques, most of the respondents shows a significant good knowledge. Adegboye *et al.*, (2018) supports this findings, they found that, concerning the IPC guidelines, 22.5% were aware of the guidelines, and 73.7 were not aware of the guidelines. Eleven

participants reported to have been trained on IPC, and most agreed that IPC training programs would be helpful

Furthermore, findings revealed that, only slightly below half have adequate knowledge on Waste Management and personal protective equipment (PPE) use. Specifically, findings affirmed that there is generally poor knowledge on Familiarity with different types of personal protective equipment (PPE) used in healthcare settings, yet a higher percent were aware of disinfection of equipment in chlorinated solution after use to control cross infection. This agrees with Mothibi (2021), who found that, 51.3% were adequately knowledgeable in IPC. Also, while majority show poor knowledge of waste Management Color Codes and necessity of recapping of needles, a higher percentage understand the basis of segregation of waste as a component of infection prevention. This implies that, knowledge may vary across difference professions as well as location.

Aside of knowledge of health workers on important aspect of healthcare delivery, attitude may also play a significant role, as individual behavioural and dispositional status per time could impart their practice of Infection Prevention and Control. Findings from this study revealed below half of the respondents had more negative attitude towards Infection Prevention and Control practice. This finding align with the over poor knowledge reported and attested to major reports in literature of negative attitude of healthcare workers. This is in contrary to the work of Adeke *et al.*, (2021), where they found that, 78.6% had good attitude towards IPC. Specifically, although a higher percentage agrees that, adhering to IPC protocols is essential for patient safety, yet about two-third declined health care associated infections prevention can be achieved if standard precaution guidelines is followed. This implies that, the level of self confidence among respondent about preventing hospital based infection is low. This is also reflective in the finings which shows that, majority agrees that, Infection Prevention Control protocols are not always practicable in the health facilities and are time-consuming or burdensome. Ranoto *et al.*, (2025) found that, although IPC nurses had good understanding of infection control and a positive attitude toward it, systemic problems and resource constraints make it difficult to consistently implement optimal practices. Although above half still believes that, changing of glove, especially when soiled is good. These findings imply a mixed level of attitude with more negative disposition towards Infection Prevention and Control practice.

Findings also shows that, below half also show good adherence to Infection Prevention and Control practices. This in clear terms agrees with El-Ghitany *et al.*, (2023) who found that, Less than half of the studied HCWs were adherent to the proper duration of handwashing ($P < 0.01$). Only 5.9% of the studied HCWs usually wore full personal protective equipment (PPE) at work Therefore the level of adherence to Prevention and Control practices on overall is poor. The findings align with the poor knowledge and negative attitude recorded among a higher percentage of respondents. Otokpa *et al.*, (2024) revealed that there was a positive correlation between knowledge level and adherence to standard precautions. Healthcare workers who demonstrated higher levels of knowledge exhibited better adherence to recommended practices. Specifically, although slightly above a third of the respondents adhere strictly to hand washing and a quarter adhere strictly to

chlorination of bed after patient discharged, yet a higher percent adheres to Environmental Cleaning Surfaces decontamination, proper aseptic procedure to Prevent surgical site infection and surgical scrubbing/rubbing before donning sterile theatre garments. On the contrary, Ella, et al., (2018) found 6.8% had poor practice of IPC. This speak more of provision and availability of equipment coupled with managerial supervision of standard precautions.

A critical examination of the findings on hypotheses tested revealed that, there is a significance differences in the knowledge, attitude and adherences of prevention and control of health workers posted to rural and urban healthcare facilities, respectively. The plausible reason to this is that, most rural setting suffers poor access to needed equipment, information, technology and human capacity. Ogoina *et al.*, (2019), showed that the hospital care workers had poor knowledge of injection safety and complained of inadequate resources to practice standard precautions. Junior cadres of nurses had lower knowledge and compliance with standard precautions than more experienced doctors and nurses. The fact that, routine supervision may not be appropriate due to state of poor roads leading to those rural areas, could also impaired their compliance to standard precautionary measures.

CONCLUSION

The first point nursing guideline as identified in global best practice is safety first. However continuous flouting of standards precautions an aspect of Nursing etiquette, which subsequently have increased exposure to various forms of infection among nurses occur via several modes such as needle sticks, hand contamination with blood, exposure to air-transmitted microorganisms, remain a concern in recent times. Ethics and etiquette of practice were highlighted to guide healthcare workers in the healthcare sector towards safety and quality practice. This also necessitate need for protecting health workers and patients, however when standard precautions are not adhering to, healthcare deliveries become more harmful than solution based. Therefore, this study highlights differences in knowledge, attitude and adherence to infection prevention and control practice in the health care facilities. Based on the finding, the study concluded that, there is knowledge deficit on IPC practices which is due to locality of healthcare settings. Also the study concluded that, attitude towards IPC practice among health workers in rural and urban healthcare facilities does not portray the quality of training health workers had been subjected to before becoming a professional. The study further decried overall poor adherence to IPC practice, which could increase global disease burden, in contrary to the objectives of global health nursing. These insights underscore the need for targeted interventions and policy adjustments to address the multifaceted challenges faced by health workers in IPC practice.

REFERENCES

- Adegboye, M.B., Zakari, S., Ahmed, B.A. and Olufemi, G.H. (2018) Knowledge, Awareness and Practice of Infection Control by Healthcare Workers in the Intensive Care Units of a Tertiary Hospital in Nigeria. *African Health Sciences*, 18, 72-78. <https://doi.org/10.4314/ahs.v18i1.11>

- Adeke, A. S., et al. (2021). Knowledge and practices of foodstuff traders on Lassa fever and rodent control in Izzi Local Government Area, Ebonyi State, Nigeria. *Journal of Interventional Epidemiology and Public Health*, 4(1), 3. DOI: 10.37432/jieph.4.1.32
- Aguwa, E. N., Arinze-Onyia, S. U. and Ndu, A. C. (2020). Knowledge and practice of standard precautions by healthcare workers in a tertiary health institution in Enugu, Nigeria. *Nigerian Journal of Clinical Practice*, 21(2), 149-155. https://doi.org/10.4103/njcp_69_17
- Amali, O. O., and Van Wyk, R. H. (2023). Infection prevention knowledge and practices among healthcare workers at a health facility in Makurdi, Benue State, Nigeria. *Journal of Public Health in Africa*, 14(11), 9. doi:10.4081/jphia.2023.2599
- Amegah, A. K., Agyei-Baffour, P., & Quansah, R. (2022). Knowledge, attitudes and practices of healthcare workers on infection prevention and control in Ghana. *BMC Health Services Research*, 22(1), 41. <https://doi.org/10.1186/s12913-021-07456-5>
- Desta, M., Ayenew, T., Sitotaw, N., et al. (2018). Knowledge, practice and associated factors of infection prevention among healthcare workers in Debre Markos referral hospital, Northwest Ethiopia. *BMC Health Services Research*, 18(1), 1-10.
- Ella AA, Abdelrahman AK, Habib AM, Alkhalegy AA (2018) Bleeding Per Rectum in EL Sahel Teaching Hospital in Egypt. *J Anesth Surg Rep: JASR-109*. DOI: 10.29011/ JASR-109. 100009.
- El-Ghitany, E.M., et al. (2023). Self-reported adherence of healthcare workers to infection prevention and control practices during the early waves of the COVID-19 pandemic in Egypt. *International Journal of Infection Control*, 19.
- Magill, S. S., et al. (2018). Changes in Prevalence of Health Care–Associated Infections in U.S. Hospitals. *New England Journal of Medicine*, 379, 1732-1744. DOI: 10.1056/NEJMoa1801550
- Mohammed, E. A., et al. (2024). Correction: Mohammed et al. Assessment of Knowledge, Attitude, and Practice towards Tuberculosis among Taif University Students. *Healthcare*, 12(2), 180.
- Mothibi, K. (2021). Infection prevention and control knowledge and practices among healthcare workers in Lobatse District Health Management Team (LDHMT) facilities: A call for an educational intervention (Master's thesis, Georgia State University). <https://doi.org/10.57709/20621406>
- Nwankwo, O. et al. (2020). Mentioned in: "Urinary tract infections (UTIs) occur due to the invasion and multiplication of microorganisms in the urinary tract" in *Microbiol. Res. J. Int.*
- Ogoina, D., Kemebradikumo, P., & Sanusi, G. (2019). Knowledge, attitude, and practice of standard precautions of infection control by hospital workers in two tertiary hospitals in Nigeria.
- Ogunsola, F. T., Adesida, S. A., & Afolabi, A. O. (2021). Determinants of compliance with infection prevention and control practices among healthcare workers in Nigerian hospitals. *Nigerian Journal of Clinical Practice*, 24(6), 875–881. https://doi.org/10.4103/njcp.njcp_200_20
- Otorkpa, O. J., Otorkpa, C. O., Emmanuel, S., Olaiya, A. P., Auta, H. S., et al. (2024). Review of global burden of disease studies: trends, challenges, and future directions. *International Journal of Public Health Science (IJPHS)*, 13(2), 766-774. doi.org
- Ranoto, L.Q., Ntimana, C.B., Mamogobo, P., & Maimela, E. (2025). Knowledge, Attitudes, and Practices of Infection Prevention and Control Nurses in Public Hospitals in the Limpopo Province: A Qualitative Study. *International Journal of Environmental Research and Public Health*, 22(1), 116. <https://doi.org/10.3390/ijerph22010116>
- Sahu, D., Aggarwal, R., & Chatterjee, R. (2023). Impact of training on adherence to infection prevention and control practices: A systematic review. *Journal of Infection and Public Health*, 16(2), 228-235. <https://doi.org/10.1016/j.jiph.2022.11.012>

Sangini, P., Suma, N., & Shetty, R. S. (2020). Healthcare workers and standard precautions: Perceptions and determinants of compliance in the emergency and trauma triage of a tertiary care hospital in South India.

World Health Organization. (2019). Report on reducing risks, promoting healthy life. Geneva, Switzerland.