

## Knowledge of Safety Precautions among Healthcare Workers in Rivers State

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### ABSTRACT

*This study investigated the knowledge of safety precautions among healthcare workers in Rivers State. The study adopted the descriptive cross sectional research design. The population of the study comprised of health care workers in Rivers State, the sample size for this study was 422 derived using Cochran formula and data gotten using a multistage sampling technique with two stages. The instrument for data collection was a structured questionnaire titled "Questionnaire on knowledge of safety precautions among healthcare workers". The data collected from this study were collated and analyzed with the Statistical Products for Service Solution (SPSS) using the descriptive statistics of frequency, simple percentages for answering research questions, and regression model was used to test the null hypotheses at 0.05 level of significance. The result showed that majority 333(81.2%) of the respondents had good knowledge of safety precautions. The result also revealed in regression analysis there was a significant relationship between demographic variables (job category [ $f(7,402) = 5.775, p < 0.05$ ] and years of working experience [ $f(3,406) = 32.286, p < 0.05$ ]) and knowledge of safety precautions. It was concluded that there was good knowledge of safety precautions among healthcare workers in Rivers State. It was recommended that the ministry of health should develop comprehensive safety handbooks or manuals that provide step-by-step instructions on safety procedures and guidelines for healthcare workers and make these resources available in print and digital formats.*

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### INTRODUCTION

Safety precautions are vital in any healthcare setting to protect both healthcare workers and patients from potential risks and hazards. Hence, knowledge of safety precautions among healthcare workers is crucial for preventing accidents, injuries, and the spread of infections. Therefore, infection control is a critical component of healthcare safety precautions. Healthcare-associated infections (HAIs) continue to be a significant concern in healthcare settings. A study by Jokar and colleagues (2020) found that healthcare workers' knowledge of infection control practices was significantly associated with the prevention and control of HAIs. Proper hand hygiene techniques, including handwashing with soap and water or using alcohol-based hand sanitizers, are essential to reduce the transmission of pathogens. According to a study by Wong and colleagues (2017), healthcare workers who had received training on

hand hygiene demonstrated better knowledge and adherence to hand hygiene practices. Additionally, wearing appropriate personal protective equipment, such as gloves, masks, and gowns, is crucial to prevent the spread of infectious diseases. A study by Oliveira et al. (2019) found that healthcare workers with adequate knowledge of PPE use had a lower risk of exposure to bloodborne pathogens.

However, a study by Sultana et al. (2019) emphasized the importance of healthcare workers' knowledge of medication safety practices, such as accurate medication administration, proper dosage calculation, and identification of potential drug interactions. Healthcare workers should be well-informed about medication storage, handling, and disposal procedures to minimize errors and ensure patient safety. Training programs focusing on medication safety have been shown to improve healthcare workers' knowledge and reduce medication errors (Halaweh et al., 2018).

Hence, personal protective equipment (PPE) or safety plays a vital role in protecting healthcare workers from occupational hazards. Adequate knowledge of PPE selection, use, and disposal is critical to ensure its effectiveness. A study by Hines et al. (2020) highlighted that healthcare workers' knowledge of PPE increased significantly after receiving specific training on its proper use. Properly fitted N95 respirators are essential for protecting healthcare workers from airborne infectious diseases. A study by Kimberly et al. (2020) showed that healthcare workers with better knowledge of respirator use had higher compliance rates in utilizing them correctly.

Furthermore, extensive knowledge of safety precautions among healthcare workers is crucial in ensuring the well-being of both healthcare providers and patients. Infection control practices, medication safety measures, and proper use of personal protective equipment contribute significantly to reducing the risk of infections, medical errors, and occupational hazards. Continuous training and education programs focused on these safety precautions are instrumental in enhancing knowledge and adherence among healthcare workers, thereby maintaining a safe healthcare environment. Though, there are factors that could also contribute to the knowledge of safety precautions among healthcare workers.

In Nigeria, the inadequate knowledge of the risks of HAI and the measures of risk reduction has limited control activities. Documented evidence revealed that the prevalence of HAI over the 5 years was 2.6% (95% CI: 2.4–2.8). This made the surgical and medical wards have the most infections (48.3%) and (20.5%) respectively. Urinary Tract Infection (UTI) and surgical site infection (30.7%) were the most prevalent (43.9%) HAI. UTIs were significantly higher in surgical and medical wards, surgical site infections in obstetrics and gynecology wards, and soft tissue infections and bacteremia in pediatric wards ( $P < 0.05$ ). This poor knowledge among healthcare workers compromised prevention rules and adherence. Hence, gram-negative infections occurred about four times as often as gram-positive infections with *Klebsiella sp.* and *staphylococcus aureus* being the predominant isolates (34.3%) and (20.1%) respectively (Ige et al., 2011). However, to prevent HAIs in the in Rivers State and other hospitals, it is necessary to improve the knowledge of healthcare workers and to implement data-driven prevention guidelines and practices.

## Aim of the Study

The study aims to investigate knowledge of safety precautions among healthcare workers in Rivers State.

## RESEARCH METHODS

The design of the study was a descriptive cross-sectional research design. The study area was Healthcare Facilities in Rivers State. The population of the study consisted of healthcare workers in Rivers State. The sample size of 422 was calculated using the Cochran formula. A two-stage sampling technique was employed for the study. The instrument for data collection was a structured questionnaire titled 'Questionnaire on compliance with safety precautions among healthcare workers'. Data collected were coded using statistical package for social sciences (SPSS) and analysed using the descriptive statistics of frequency percentages (%), Mean, Standard Deviation and regression for analysis of research questions. However, inferential statistics of regression was used to test the null hypotheses for 1 and 2 at 0.05 alpha level. Permission was sought and obtained from the healthcare facilities. A written informed consent was obtained from the directors of various healthcare facilities to be studied while oral consent was obtained from the participating healthcare workers before the commencement of the study. During the informed consent process, participants were assured of their privacy that data collected for this study will be used only for the study. There was no anticipated risk to the participant for participating in the study. There was no direct benefit to the study participant except that they will contribute to the findings of compliance with safety precautions among healthcare workers for the target group, which will in turn influence policy formulation and interventions. Ethical clearance was obtained from the Research and Ethics committee of the Highstone Global University.

## RESULTS

Research question 1: What is the knowledge of Safety Precautions among Healthcare Workers in Rivers State?

**Table 1: Knowledge of safety precautions**

S/N	Items	True Freq(%)	False Freq(%)	Decision
1	Safety precautions include hand washing, using personal protective equipment (PPE) such as apron, eye google, safety boot, hand gloves, etc	410 (100)	0(0.0)	Good
2	Potential ways of occupational exposure are needle stick/sharp injury, splash on the eye, inhalation, etc.	379(92.4)	31(7.6)	Good
3	All patients, healthcare workers, and communities in healthcare facilities are at risk of healthcare-related infections	370(90.2)	40(9.8)	Good
4	Standard precautions not should be applied to all patients regardless of their infectious status	205(50.0)	205(50.0)	Fair

5	Adhering to standard precautions protect HCWs from getting infected by patients	370(90.2)	40(9.8)	Good
6	Adhering to standard precautions do not protect patients from getting infected by HCWs	137(42.2)	237(57.8)	Poor
7	Adhering to standard precautions prevent the mutual transfer of infection among patients	378(92.2)	32(7.8)	Good
8	Adhering to standard precautions protect HCWs while handling infectious waste	410(100)	0(0.0)	Good
9	Adhering to standard precautions protect HCWs while handling sharp waste	389(94.9)	21(5.1)	Good
10	All patients/clients are not potentially infectious irrespective of their diagnostic status?	173(42.2)	237(57.8)	Poor
11	Gloves should always be worn when having contact with any other body fluids except sweat?	285(69.5)	125(30.5)	Good
12	The gown should always be worn during activities that are likely to generate splashes or sprays of blood, body fluids, secretions, or excretions.	379(92.4)	31(7.6)	Good
13	A face mask, face shield, and/or goggles should be used if splashing of blood or body fluids might occur.	410(100)	0(0.0)	Good
<b>Grand total</b>		<b>333(81.2)</b>	<b>77(18.8)</b>	<b>Good</b>

Decision: less than 50% = Poor; 50%=Fair; above 50% = Good

Table 1 showed the knowledge of safety precautions among Healthcare Workers. The result showed that majority 333(81.2%) of the respondents had good knowledge of safety precautions while 77(18.8%) had poor knowledge.

Research question 2: What the relationship between demographic variables (years of working experience and job category) and knowledge with Safety Precautions among Healthcare Workers in Rivers State?

**Table 2:** Relationship between demographic variables (job category, and years of working experience) and knowledge of Safety Precautions among Healthcare Workers in Rivers State

Variable	Knowledge of Safety precautions		Total Freq (%)
	Good Freq (%)	Poor Freq (%)	
<b>Job category</b>			
Doctors	27(52.9)	24(47.1)	51(100)
Nurses	69(65.1)	37(34.9)	106(100)
Pharmacists	10(66.7)	5(33.3)	15(100)
Radiographic	10(66.7)	5(33.3)	15(100)

lab technician	20(43.5)	26(56.5)	46(100)
hospital sanitary workers	28(65.1)	15(34.9)	43(100)
community health workers	45(81.8)	10(18.2)	55(100)
Others	67(84.8)	12(15.2)	79(100)
Total	276(67.3)	134(32.7)	410(100)
<b>Years of service</b>			
1-5 years	139(85.8)	23(14.2)	162(100)
6-10 years	74(65.5)	39(34.5)	113(100)
11-15 years	31(33.3)	62(66.7)	93(100)
16 years and above	32(76.2)	10(23.7)	42(100)
Total	276(67.3)	134(32.7)	410(100)

Table 2 revealed that 27(52.9%) of the respondents who were doctors, 69(65.1%) who were nurses, 10(66.7%) who were pharmacists, 10(66.7%) who were radiographers, 20(43.5%) who were laboratory technicians, 28(65.1%) who were hospital sanitary workers, 45(81.8%) community health workers and 276(67.3%) others had good. For years of service, 139(85.8%) who worked for 1-5 years, 74(65.5%) who worked for 6-10 years, 31(33.3%) who worked for 11-15 years and 32(76.2%) who worked for 16 years and above had good knowledge of Safety Precautions.

Table 3: Regression analysis showing significant relationship between demographic variables (job category, and years of working experience) and knowledge with Safety Precautions among Healthcare Workers in Rivers State

Model		Sum of Squares	Df	Mean Square	F	Sig.	Decision
1	Regression	8.178	7	1.168	5.775	.000	<b>Rejected</b>
	Residual	81.324	402	.202			
	Total	89.502	409				
1	Regression	17.239	3	5.746	32.286	.000	<b>Rejected</b>
	Residual	72.263	406	.178			
	Total	89.502	409				

**\*Significant, p<0.05**

The result in table 3 above revealed that there was a significant relationship between demographic variables (job category [f(7,402) = 5.775, p<0.05] and years of working experience [f(3,406) = 32.286, p<0.05]) and knowledge with Safety Precautions among Healthcare Workers in Rivers State. Therefore, the null hypothesis which stated that there is no significant relationship between demographic variables (job category, and years of working

experience) and knowledge with safety precautions among Healthcare Workers in Rivers State was rejected.

## DISCUSSION

Table 1 showed the knowledge of safety precautions among Healthcare Workers. The result showed that majority 333(81.2%) of the respondents had good knowledge of safety precautions while 77(18.8%) had poor knowledge. This result was expected because of the severity of consequence of exposure to hazards especially biological, chemical and radiological hazards in the medical profession; this finding is in line with Ogbonda et al. (2020) which revealed that Healthcare workers (HCWs) have a fair knowledge of safety practices, also Abuduxike et al. (2020) showed among health workers from a hospital in Northern Cyprus 57.5% of the staff had a satisfactory level of correct knowledge towards standard precautions, in support of this finding is the result of Esu et al. (2019) where , knowledge was above average in 274 (82.6%) of the respondents out of which 141 (42.5%) had good knowledge and 133 (40.1%) had fair knowledge and Ather et al. (2020) showed majority of the healthcare workers had good knowledge regarding standard precautions and a significant positive relationship between knowledge and safety practice. However studies were in disagreement with our finding such as Akagbo et al. (2017) where knowledge of the basic concepts of safety practice was low among healthcare workers in the Lower Manya Krobo District, Ghana; only 37.0% of HCWs knew that safety practice includes hand washing before and after any direct contact with the patient, 39.0% knew about cough etiquettes and 40.0% knew about aseptic techniques which involve infection prevention strategies to minimize the risks of infection. Ogoina et al. (2015) also recorded poor knowledge of injection safety among hospital workers in two tertiary hospitals in Nigeria. This difference may be explained by the years of work experience as most of the health workers (65%) had below 5 years experience.

Table 2 revealed that 27(52.9%) of the respondents who were doctors, 69(65.1%) who were nurses, 10(66.7%) who were pharmacists, 10(66.7%) who were radiographers, 20(43.5%) who were laboratory technicians, 28(65.1%) who were hospital sanitary workers, 45(81.8%) community health workers and 276(67.3%) others had good knowledge of Safety Precautions. For years of service, 139(85.8%) who worked for 1-5 years, 74(65.5%) who worked for 6-10 years, 31(33.3%) who worked for 11-15 years and 32(76.2%) who worked for 16 years and above had good knowledge of Safety Precautions. The result showed community health workers had and workers with 1-5 years experience had good level of knowledge of safety precautions. This aligns with the findings of Abuduxike et al. (2020) where occupation was one of the predictors; doctors were less likely to have satisfactory knowledge and practice compared to nurses (OR = 0.269, 95% CI: 0.10–0.70 and OR = 0.248, 95% CI: 0.08–0.77, respectively). Ehimen et al. (2020) showed 68(41.7%) of cleaners and 29(17.8%) of nurses/community health extension workers were aware of blood-borne infections associated with occupational exposure to BBFs compared to doctors, 3(1.8%) and laboratory workers, 4(2.5%). Osagiede et al. (2020) showed a statistically significant relationship between knowledge of Safety Precautions and the HCWs level of completed education (p-value 0.019) as well as with the professional group they belong to (p-value 0.002). In Ogoina et al. (2015), House officers, laboratory scientists, and junior cadres of nurses had lower knowledge and compliance with standard precautions than more experienced doctors and nurses. Also in Akagbo et al. (2017) where most respondents had been working as health staff for 0–5 years (65.0%), knowledge of the basic concepts of Safety Precautions was low. The review shows

both work experience and job category is associated with knowledge of safety precautions, the plausible reason why the junior cadre may be more knowledgeable about safety precautions is that they are in more contact with the hazards either as cleaners or junior nurses caring for patients while the senior and more experienced doctors and nurses only come around during their ward rounds and emergencies.

## CONCLUSION

Based on the findings of this study, it was concluded that there was good knowledge of safety precautions among healthcare workers in Rivers State. Also there was a significant relationship between demographic variables and knowledge of safety precautions.

## RECOMMENDATIONS

Based on the findings of the study, the following recommendations were made:

1. Ministry of health should develop customized training programs for healthcare workers in Rivers State. These programs should encompass a range of safety protocols, including infection control, patient handling, and biohazard management.
2. Ministry of health should ensure that healthcare workers receive regular training updates to stay informed about evolving safety guidelines and protocols. These updates should be provided through workshops, seminars, and online resources.
3. Hospital management boards should promote interdisciplinary collaboration by encouraging healthcare workers from different departments and disciplines to collaborate and share their knowledge and experiences to improve overall safety compliance.
4. Hospital management should establish a system for healthcare facilities to routinely assess workplace hazards and develop risk assessments. Encourage staff to report potential hazards promptly.

## Conflict of interest

The authors have no conflict of interest to declare for this study

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None

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