



# **Adherence To Personal Protective Equipment Utilization And Determinants Among Healthcare Workers in Rivers State**

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## **ABSTRACT**

This study investigated the adherence to PPE utilization and determinants among healthcare workers in Rivers State. The study adopted the descriptive research design with a population which comprised of all the healthcare workers at the secondary and tertiary health facilities in Rivers State. A sample size of 383 was selected using the multi-stage sampling procedure. Data was collected using a structured questionnaire and analysed with the aid of the statistical product for service solution (SPSS) version 23.0, using statistical tools such as percentage, mean, and chi-square test at 0.05 level of significance. The result of the study showed that, the extent of adherence to PPE was low as the grand mean of  $1.77 \pm 0.52$  was less than the criterion mean of 2.5. There was a significant association between availability of PPE and adherence to PPE utilization ( $X^2$ -value = 9.673, df = 1, p-value = 0.002). It was concluded that, the adherence to PPE utilization among healthcare workers in Rivers State was low and the determinants were perceived risk and availability of PPE. It was recommended that, the government should provide more funding for the healthcare sector for the procurement of PPE for the health care workers.

**Keywords:** Adherence, Availability, Healthcare Workers, PPE

## **INTRODUCTION**

Adherence to personal protective equipment is one of the first steps taken to reduce the transmission of Covid-19 which has devastated several nations of the world. According to the World Health Organization (2021), Covid-19 has spread to over 200 countries and territories with over 142 million cases and over 3 million deaths globally. In Nigeria, the first reported Covid-19 case was in Lagos on February 27, 2020. The case in Nigeria has since risen to 164,423 with 2,061 deaths as at April 21<sup>st</sup> 2021 (NCDC, 2021). The virus which spreads from person to person is believed to occur mainly through respiratory beads, taking after the spread of the flu. In the case of a droplet transmission, the virus is discharged within the respiratory secretions when an individual who is infected coughs, sneezes or talks. The virus makes coordinate contact with the mucous layers. Infection can also occur when a person touches a contaminated surface and thereafter, touches his or her eyes, nose or mouth (Ayobami et al., 2020). Thus, adherence to personal protective equipment is imperative to prevent the spread of a pathogen from either a suspected or confirmed case or a pathogenic specimen.

Personal protective equipment are devices that serve as physical barrier, used to shield against the transmission of infection from person to person. These physical barriers include; goggles, face shields, fluid-resistant medical or surgical masks, particulate respirators, gloves, disposable gowns and disposable

coveralls. Other PPE include water-proof or heavy-duty aprons, waterproof boots and hoods or head covers in combination with other infection preventive measures (Ejeh et al., 2020). However, adherence to PPE entails not only using them but with the right procedure such as donning and doffing. Hesaraki et al. (2020) stated that, the donning and doffing procedure entails putting on of the PPE and removing it appropriately in such a way that is not hazardous. Yet, several factors influence the use of PPE such as availability of PPE, knowledge and perceived risk of COVID-19.

Perceived risk is the perception about the threat of a disease. Perceived risk of covid-19 among healthcare workers can influence how often and consistent they use PPEs. When healthcare workers feel that they are at high risk of being exposed and contracting the Covid-19 virus, they will be encouraged to consistently use the equipment (Savoia et al., 2020), especially when it is made available. According to Barranco and Ventura (2020), the situation where they require PPE for a medical procedure or examination and they are not available, HCWs may be forced to conduct the medical procedure without proper PPE. On the other hand, some may not also adhere if they are not knowledgeable about it. Hossain et al. (2020) reported from their study that, this recommended procedure was practiced but to some extent. Thus, Savoia et al. (2020) noted that, healthcare workers need to be regularly updated on the importance and need to use PPE regularly. When this is done, they will be abreast of the consequences of not using PPE.

Health workers are all paid and unpaid individuals working in the healthcare settings who have the potential of being exposed to patients directly or indirectly and their infectious materials. They are the soldiers at the war front of the fight against the Coronavirus disease which has infected over 142 million people all over the world (WHO, 2021). One of the cardinal principles of hospital and healthcare is that it should cause no harm to the patient or to the healthcare worker. However, for many healthcare workers in the spotlight of the Covid-19 pandemic, the outcome is different. Health workers are at risk of being infected with the virus directly when rendering healthcare or indirectly when testing the specimens of patients (Itodo et al., 2020). The World Health Organization (2020) estimated that approximately 14% of Covid-19 cases reported to WHO are identified as occurring in health workers. In Rivers State, observation showed gaps in the use of PPE despite the fact that Covid-19 is a pandemic and presently are managed symptomatically. This study thus sought to investigate the adherence to PPE utilization and determinants among healthcare workers in Rivers State.

### **Research Questions**

The following research questions were formulated to guide the study;

1. What is the extent of adherence to PPE utilization among healthcare workers in Rivers State?
2. What is the extent to which perceived risk of COVID 19 determine the adherence to PPE utilization among healthcare workers in Rivers State?
3. What extent is availability of PPE a determinant of adherence to PPE utilization among healthcare workers in Rivers State?
4. What extent is knowledge of the benefit of PPE utilization a determinant to adherence to PPE utilization among healthcare workers in Rivers State?

### **Hypotheses**

The following null hypotheses are to guide the study, and were tested at 0.5 level of significance

**Ho<sub>1</sub>:** There is no significant association between perceived risk of Covid-19 and adherence to PPE utilization among healthcare workers in Rivers State.

**Ho<sub>2</sub>:** There is no significant association between availability of PPE and adherence to PPE utilization among healthcare workers in Rivers State.

**Ho<sub>3</sub>:** There is no significant association between knowledge of the benefit of PPE utilization and adherence to PPE utilization among healthcare workers in Rivers State.

### **METHODOLOGY**

This study adopted the descriptive research design. Nwankwo (2016) stated that the descriptive survey research design involves collection of data to describe certain features as they exist at a particular time, through a sample that represents a particular population. The study population comprised of 2,696

healthcare workers in secondary and tertiary health facilities in Rivers State which included eight hundred and fifty-nine (859) doctors, one thousand one hundred one hundred and ninety (1,190) nurses, sixty four (64) pharmacists, fifty three (53) Pharmacy Technician, three hundred and fifty two (352) Laboratory Scientist, fifty two (52) Laboratory Technicians, one hundred and three (103) social workers and twenty three (23) drivers. A sample size of 383 was determined using the Taro Yamane formula:  $n = N/1+N(e)^2$ . A multi-staged sampling procedure was adopted for the study. The procedure involved four stages. Firstly, the stratified sampling technique was used to group the State into three strata based on Rivers senatorial districts; Rivers East, Rivers Southeast and Rivers West; secondly, a simple random sampling method using balloting was used to select three health facilities from each of the Senatorial district. The third stage involved the determination of number of participants. A proportionate sampling technique was used to select the number of participants to sample in each facility selected while the fourth stage involved the selection of participants using the simple random sampling technique.

The instrument for data collection was a semi-structured and validated questionnaire title: Adherence to COVID-19 PPE Utilization Questionnaire (ACPPUQ). The instrument has a reliability coefficient of 0.61 and was administered to the respondents directly by the researcher. The aim of the study and methods to be adopted were clearly explained to the respondents before the administration of the instrument. Questions asked about the study were answered. The researcher sought the consent of the respondents before delivering the questionnaire which were retrieved later after completion of the filling. Data collected was analyzed with the aid of the Statistical Product for Service Solution (SPSS V-25). Statistical tools such as percentage, mean and Chi-square at 0.05 level of significance were used.

## RESULTS

The results of the study are presented below:

**Table 1: Level of adherence to PPE utilization among healthcare workers in Rivers State**

Adherence	Frequency	Percentage
Poor	263	73.9
Good	93	26.1
<b>Total</b>	<b>356</b>	<b>100.0</b>

Table 1 showed the level of adherence to PPE utilization among healthcare workers in Rivers State. The result showed that, close to 263(73.9%) had poor level of adherence while 93(26.1%) had good level of adherence to PPE. Thus, the level of adherence to PPE utilization among healthcare workers in Rivers State was low.

**Table 2: Availability of PPE for healthcare workers in Rivers State**

SN	Items	Always	Most times	Sometimes	Rarely	Never
1	Hand gloves are always available	199(55.9)	10(2.8)	142(39.9)	0(0.0)	5(1.4)
2	Availability of N95 mask	39(11.0)	19(5.3)	199(55.9)	93(26.1)	6(1.7)
3	Disposable gowns are available	25(7.0)	27(7.6)	79(22.2)	220(61.8)	5(1.4)
4	Disposable surgical masks are available to me	23(6.5)	19(5.3)	89(25.0)	218(61.2)	7(2.0)
5	Have adequate and sufficient PPE	22(6.2)	8(2.2)	53(14.9)	261(73.3)	12(3.4)
	<b>Overall</b>	<b>58(16.3)</b>	<b>17(4.8)</b>	<b>112(31.5)</b>	<b>7(2.0)</b>	<b>158(44.4)</b>

Table 2 showed the availability of PPE to healthcare workers in Rivers State. The result showed that, overall, a greater proportion (44.4%) of the respondents indicated that PPE were never made available for

them, 31.5% indicated sometimes, 16.3% always, 4.8% most times and 2.0% rarely. Thus, the extent to which PPE were made available for the healthcare workers was poor.

**Table 3: Chi-square test of significant association between availability of PPE and adherence to PPE utilization among healthcare workers**

Availability	Adherence		Total F(%)	Df	X <sup>2</sup> -value	p-value	Decision
	Good F(%)	Poor F(%)					
High	28(31.1)	62(68.9)	90(100)	1	1.55	0.02*	Rejected
Low	65(24.4)	201(75.6)	266(100)				
Total	93(26.1)	263(73.9)	356(100)				

**\*Significant**

Table 3 showed the chi-square test of significant association between availability of PPE and adherence to PPE utilization among healthcare workers. The result showed that there was a significant association between availability of PPE and adherence to PPE utilization (X<sup>2</sup>-value = 1.55, df = 1, p < 0.05). Thus, the null hypothesis which stated that there is no significant association between availability of PPE and adherence to PPE utilization among healthcare workers in Rivers State was rejected.

**Table 4: Chi-square test of significant association between perceived risk of Covid-19 and adherence to PPE utilization among healthcare workers**

Perceived risk	Adherence		Total F(%)	Df	X <sup>2</sup> -value	p-value	Decision
	Poor F(%)	Good F(%)					
Low	65(73.9)	23(26.1)	88(100)	1	0.00	0.99	Not rejected
High	198(73.9)	70(26.1)	268(100)				
Total	263(73.9)	93(26.1)	356(100)				

**Not significant**

Table 4 showed the chi-square test of significant association between perceived risk of Covid-19 and adherence to PPE utilization among healthcare workers. The result showed that there was no significant association between perceived risk of Covid-19 and adherence to PPE utilization (X<sup>2</sup>-value = 0.00, df = 1, p-value>0.05). Thus, the null hypothesis which stated that there is no significant association between perceived risk of Covid-19 and adherence to PPE utilization among healthcare workers in Rivers State was not rejected.

**Table 5: Chi-square test of significant association between knowledge of the benefit of PPE utilization and adherence to PPE utilization among healthcare workers**

Knowledge	Adherence		Total F(%)	Df	X <sup>2</sup> -value	p-value	Decision
	Good F(%)	Poor F(%)					
Poor	14(66.7)	7(33.3)	21(100)	1	0.60	0.44	Not
Good	249(74.3)	86(25.7)	335(100)				Rejected
Total	263(73.9)	93(26.1)	356(100)				

**Not significant**

Table 5 showed the chi-square test of significant association between knowledge of the benefit of PPE utilization and adherence to PPE utilization among healthcare workers. The result showed that there was no significant association between knowledge of the benefit of PPE utilization and adherence to PPE utilization (X<sup>2</sup>-value = 0.60, df = 1, p-value>0.05). Thus, the null hypothesis which stated that there is no significant association between knowledge of the benefit of PPE utilization and adherence to PPE utilization among healthcare workers in Rivers State was not rejected.

## DISCUSSION OF FINDINGS

The finding of this study in Table 1 revealed that, the extent of adherence to PPE was low. This finding could be explained by the fact that, the respondents had negative perception about the risk of disease, so they may feel its non-essential and inconveniencing to put on PPE all the time. The finding of this study is in line with that of Kim et al. (2020) whose study investigated the adherence to personal protective equipment in exposed healthcare workers and COVID-19 illness, severity, symptoms and duration in six countries which showed inadequate adherence to PPE utilization. The similarity between the present study and the previous one might be due to the similarity in the study designs. The finding of this study is at variance with that of Alajmi et al. (2020) whose study on COVID-19 infection among healthcare workers in a national healthcare system showed that, full personal protective equipment (PPE) adherence was 82% at COVID-19-designated facilities. This variation might be due to difference in the sample size and study location. The finding of this study is also not in tandem with that of Alao et al. (2020) whose study on the assessment of health workers' knowledge, beliefs, attitudes, and use of personal protective equipment for prevention of COVID-19 infection in low-resource settings which showed that the respondents had a high level of compliance to COVID-PPE. The finding of this study is also at variance with that of Hossain et al. (2020) whose study on healthcare workers' knowledge, attitude, and practice regarding personal protective equipment for the prevention of COVID-19 showed a good level of adherence to COVID-19 PPE.

The result showed that there was a significant association between availability of PPE and adherence to PPE utilization ( $X^2$ -value = 1.55,  $df = 1$ ,  $p < 0.002$ ). The finding of this study is in line with that of Kim et al. (2020) whose study investigated the adherence to personal protective equipment in exposed healthcare workers and COVID-19 illness, severity, symptoms and duration in six countries which showed less access and availability to PPE was strongly associated with both increased risk of reporting COVID-19 illness as well as more prolonged and severe disease course in frontline HCWs. The finding of this study is also similar to that of Alajmi et al. (2020) whose study on COVID-19 infection among healthcare workers in a national healthcare system showed that, full personal protective equipment (PPE) adherence was 82% at COVID-19-designated facilities which was made possible due to availability of PPE. The similarity between the present study and the previous one might be due to the similarity in the study designs.

The result showed that there was no significant association between knowledge of the benefit of PPE utilization and adherence to PPE utilization ( $X^2$ -value = 0.60,  $df = 1$ ,  $p$ -value  $> 0.05$ ). The result also showed that the respondents had good knowledge of the benefit of PPE utilization. The finding of this study is in tandem with that of Alao et al. (2020) whose study on the assessment of health workers' knowledge, beliefs, attitudes, and use of personal protective equipment for prevention of COVID-19 infection in low-resource settings which showed that the respondents had good knowledge of PPE and that more have used PPE for protection against the disease. The similarity between the present study and the previous one might be due to the similarity in the study designs.

The result showed that there was no significant association between perceived risk of Covid-19 and adherence to PPE utilization ( $X^2$ -value = 0.00,  $df = 1$ ,  $p$ -value  $> 0.05$ ). The finding of this study is in line with that of Kim et al. (2020) whose study investigated the adherence to personal protective equipment in exposed healthcare workers and COVID-19 illness, severity, symptoms and duration in six countries which showed that perceived risk was strongly associated with both increased risk of reporting COVID-19 illness as well as more prolonged and severe disease course in frontline HCWs. The similarity between the present study and the previous one might be due to the similarity in the study designs. The finding of this study is not in keeping with that of Neuwirth et al. (2020) whose study on the adherence to personal protective equipment use among healthcare workers caring for confirmed COVID-19 and alleged non-COVID-19 patients showed an association between perceived risk and adherence to COVID-19 PPE.

## CONCLUSION

Based on the findings of the study, it was concluded that, the adherence to COVID-19 PPE utilization among healthcare workers in Rivers State was low and major determinants of the adherence to PPE utilization were the availability of PPE and knowledge of benefit of PPE utilization.

## RECOMMENDATIONS

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

1. The government should provide more funding for the healthcare sector for the procurement of PPE for the health care workers.
2. The Healthcare workers should make conscious effort to ensure they utilize or adhere strictly to PPE utilization when attending to any patient.
3. The management in each of the health facilities should set up a committee to monitor the adherence of the healthcare workers to PPE and sanction given to defaulters.

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