



PERCEIVED PREVALENCE OF COVID-19 AND ITS ASSOCIATION WITH PERSONAL PROTECTIVE EQUIPMENT UTILIZATION AMONG HEALTHCARE WORKERS IN RIVERS STATE

*¹Amadi, C.E., & ²Alegbeleye, J.O.

¹Department of Human Kinetics, Health and Safety Studies, Ignatius Ajuru University of Education, Port Harcourt, Nigeria

²Department of Obstetrics and Gynaecology University of Port Harcourt Teaching Hospital, Rivers State.

*Correspondence author email: ceamadi@gmail.com

Abstract

The use of personal protective equipment (PPE) has been at the forefront of the combat against the COVID-19 pandemic. This study investigated the prevalence of COVID-19 and its association with personal protective equipment utilization among healthcare workers in Rivers State. The study was a descriptive cross-sectional survey of 2,696 healthcare workers in secondary and tertiary health facilities in Rivers State. A multi-stage sampling method was adopted, and data was collected using a structured questionnaire. Statistical analysis was done using the Statistical Package for Social Sciences (SPSS) version 25.0, and the level of statistical significance was set at a p-value of ≤ 0.05 . Results are presented in mean and percentages. The study showed a high perceived prevalence of COVID-19 among healthcare workers in Rivers State. There was a significant association between adherence to PPE utilization and the perceived prevalence of COVID-19 among healthcare workers (p-value < 0.05). Poor PPE utilization is associated with a high perceived prevalence of COVID-19 among healthcare workers in Rivers State. It was recommended that the management boards of health institutions should improve on the adherence to PPE utilization by setting up committees to enforce the use of PPE among healthcare workers in Rivers State.

Keywords: Covid-19, Healthcare workers, PPE, Prevalence, Utilization

Introduction

Coronaviruses (CoV) are enveloped, single-stranded RNA viruses that cause flu-like symptoms, including severe acute respiratory symptoms, high morbidity, and mortality. Due to migration, the Middle East, Asia, and a few other countries were only home to these viruses in 2003 (SARS-CoV) and 2009 (MERS-CoV), respectively (Ejeh et al., 2020). However, in late December 2019, China reported an outbreak of a viral pneumonia in Wuhan, Hubei Province, China, which quickly spread to other areas. Since then, the number of infected cases and affected countries by this novel coronavirus disease (also known as SARS-CoV-2 or COVID-19) continued to increase, the World Health Organization (WHO) declared COVID-19 a pandemic in March 2020 (Sabetian et al., 2021). During the COVID-19 pandemic, it was widely assumed that failure to use personal protective equipment (PPE) was linked to an increase in the occurrence of COVID-19 infection.

As a result, assessing the prevalence of COVID-19 cases among healthcare workers (HCWs) in the general population has become a crucial factor in the epidemiologic analysis of the pandemic. According to studies conducted around the globe, HCW prevalence among SARS-CoV-2-infected populations ranges from 3% to 19% (Alajmi et al., 2020). HCWs made up 3.8% of the 44,672 cases reported in a Chinese Centre for Disease Control (CDC) report from 2020 (Wu & MacGoogan, 2020). However, two Italian studies by Fusco et al. (2020) and Livingston and Bucher (2020) reported that HCWs made up 9% and 9.8% of cases respectively.

A hospital prevalence study from Qatar by Alajmi et al. (2020), reported a prevalence of 10.6% among tested HCWs, whereas the CDC in the United States (2020), reported a 19% prevalence of COVID-19 in HCWs among a population of 49,370 people. In comparisons of HCWs and the general population with COVID-19, patterns of disease, demographics, epidemiology, clinical trends, and outcomes have also been documented (Ali et al., 2020; Bandyopadhyay et al., 2020; CDC, 2020; Wang et al., 2020). According to Elimian et al. (2020), the national

average of COVID-19 prevalence among healthcare workers in Nigeria is 9.3%, with Rivers State having a higher rate of 15.2% (Alasia & Maduka, 2021).

Personal protective equipment (PPE) is a device used to protect against the transmission of infection from person to person. Health workers use PPE to prevent the spread of a pathogen from either a suspected or confirmed case or a pathogenic specimen. PPE is used to prevent disease transmission from patients to HCWs and HCWs to patients. Goggles, face shields, fluid-resistant medical or surgical masks, particulate respirators, gloves, disposable coveralls, water-proof or heavy-duty aprons, waterproof boots and hoods, or head covers are examples of PPE that can be used alongside other infection-prevention measures (Peter-Kio & Amadi, 2021). Following the guidelines, PPE usage is essential for preventing healthcare workers (HCWs) from contracting occupational infections while providing patient care, especially from droplet- or airborne-transmitted diseases. This is because healthcare workers who treat patients with infections like coronavirus (COVID-19) are at risk of contracting the infection themselves (Verbeek et al., 2020).

The potential to be exposed to patients and their infectious materials directly or indirectly exists for all paid and unpaid individuals working in healthcare settings (Peter-Kio & Amadi, 2021). For this study, "healthcare workers" refers to physicians, nurses, pharmacists, pharmacy technicians, lab scientists, lab technicians, social workers, and drivers. According to WHO estimates, 14% to 16% of COVID-19 cases reported to the organization are those involving medical personnel (WHO, 2020).

Observations in Rivers State revealed the paucity of data concerning the association between the perceived prevalence of COVID-19 and the use of PPE among healthcare workers. As a result, the purpose of this study was to investigate the perceived prevalence of COVID-19 and its relationship with the use of PPE among healthcare workers in Rivers State.

Research Questions

The following research questions were formulated to guide the study:

- What is the perceived prevalence of COVID-19 among healthcare workers in Rivers State?
- To what extent is adherence to PPE utilization associated with the perceived prevalence of COVID-19 among healthcare workers?

Hypothesis

H₀: There is no significant association between the perceived prevalence of COVID-19 and PPE utilization among HCWs in Rivers State

Methodology

The study adopted a descriptive research design. Chikwe (2020) stated that the descriptive survey research design "is the type of research that describes 'what is' by recording, analyzing, and interpreting conditions that exist" (p. 22). The study was carried out between January 1, and July 31, 2021. The sample size of 383 was obtained using the Taro Yamane formula: $n = \frac{N}{1+N(e)^2}$. The study population was made up of 2,696 healthcare workers in secondary and tertiary health facilities in Rivers State. There were eight hundred and fifty-nine (859) doctors, one thousand one hundred and ninety (1,190) nurses, sixty-four (64) pharmacists, fifty-three (53) pharmacy technicians, three hundred and fifty-two (352) laboratory scientists, fifty-two (52) laboratory technicians, one hundred and three (103) social workers and twenty-three (23) drivers.

A multi-stage sampling technique was used to recruit 383 participants for the study, comprising 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 districts. The third stage involved the determination of the 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, interviewer-administered, validated questionnaire with a reliability coefficient of 0.61, titled: Prevalence of COVID-19 and PPE Utilization Questionnaire (PCPPUQ).

The aim of the study and the methods to be adopted were clearly explained to the respondents before the administration of the instrument. The researcher sought the consent of the respondents before delivering the questionnaire which was retrieved later after completion. Data collected were analyzed with the aid of the

Statistical Package for Social Sciences (SPSS V-25). Statistical tools such as percentage, mean and Chi-square at 0.05 level of significance were used and results were obtained.

Results

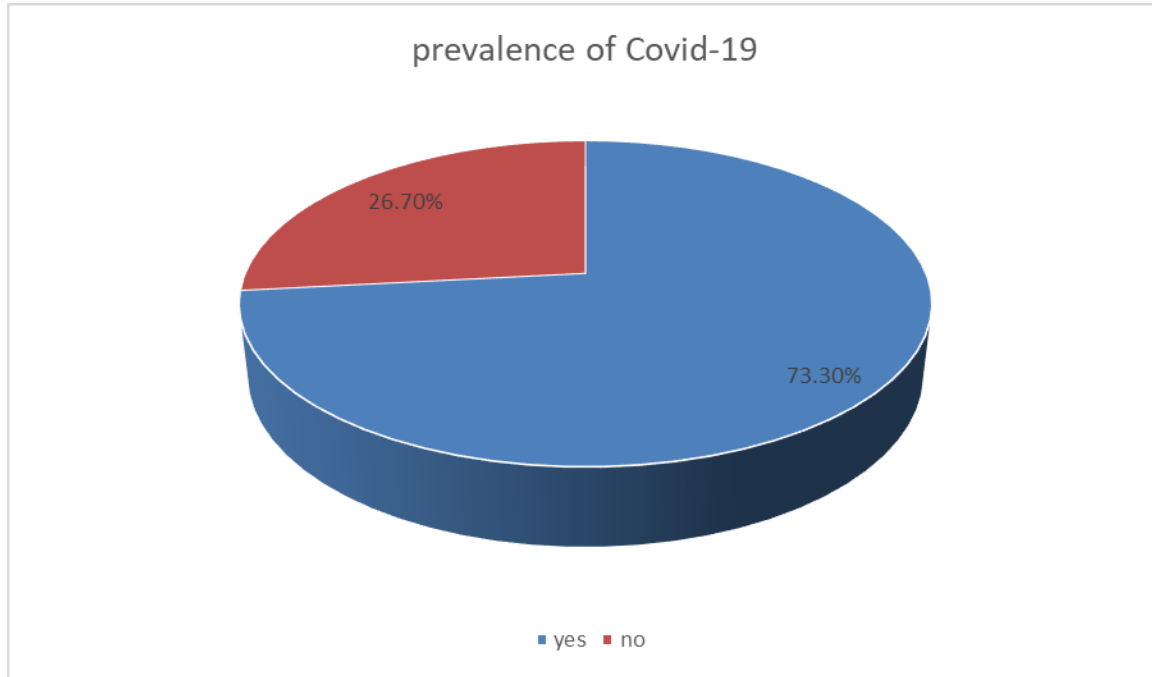


Fig. 1: Perceived prevalence of Covid-19 among healthcare workers

Fig.1 showed that about three-quarters (73.3%) of the respondents felt like they had been infected with COVID-19. Thus, the perceived prevalence of COVID-19 among healthcare workers in Rivers State was high.

Table 1: Adherence to PPE Utilization and perceived Prevalence of COVID-19 among Healthcare workers

Adherence to PPE	Perceived Prevalence		Total N (%)
	Yes	No	
	N (%)	N (%)	
High	69 (74.2)	24 (25.8)	93 (100)
Low	219 (75.5)	71 (24.5)	290 (100)
Total	288 (73.3)	95 (26.7)	383 (100)

As shown in Table 1, only 69 respondents with perceived COVID-19 infection had good adherence to PPE, while the majority, 219, of those with perceived COVID-19 infection had poor adherence to PPE. As a result, there was an association between perceived prevalence and healthcare workers' adherence to PPE usage.

Table 2: Association of adherence to PPE utilization and the perceived prevalence of COVID-19 among healthcare workers

Adherence to PPE	Perceived Prevalence		Total N (%)	Df	X ²	p-value	Decision
	Yes	No					
	N (%)	N (%)					
Low	219 (75.5)	71 (24.5)	290 (100)	1	0.05	0.02	Rejected
High	69 (74.2)	24 (25.8)	93 (100)				
Total	288 (73.3)	95 (26.7)	383 (100)				

Table 2 shows the association between adherence to PPE utilization and the perceived prevalence of COVID-19 among healthcare workers. The result showed that there was a significant association between poor adherence to PPE utilization and the perceived prevalence of COVID-19 infection among healthcare workers (X^2 -value = 0.05, df = 1, p-value < 0.05). Thus, the null hypothesis which stated that there is no significant association between adherence to PPE utilization and the perceived prevalence of COVID-19 among healthcare workers in Rivers State was rejected.

Discussion

COVID-19 was perceived to be widespread among healthcare workers in Rivers State. This observation could be explained by the respondents' poor adherence to PPE usage. It may also be attributable to inadequate PPE and poor knowledge of the perceived risk of COVID-19 infection. This high prevalence of COVID-19 among healthcare workers puts the general population at risk of increased COVID-19 infection and likely more fatality. The findings are like those of Eze-Emiri et al. (2022), who studied COVID-19 infection among healthcare workers in Rivers State, Nigeria. The similarity in findings between this study and the previous one may be due to similarity in the study population and location. Furthermore, the findings of this study were similar to those of Nguyen et al. (2020), who investigated the risk of COVID-19 among front-line healthcare workers and the general population.

However, the findings of this study differed from those of Alasia and Maduka (2021), who investigated the prevalence and pattern of COVID-19 among healthcare workers in Rivers State, Nigeria, and observed a prevalence of 15.2%. The difference in findings between the two studies could be attributed to differences in sample size and study design. Furthermore, the findings of this study differed from those of Sabetian et al. (2021), who investigated COVID-19 infection among healthcare workers in southwest Iran and found a lower prevalence of COVID-19 infection (5.62%) among health workers. This disparity in results could be attributed to differences in study design, sample size, and study population.

The study revealed a significant relationship between adherence to PPE utilization and the perceived prevalence of COVID-19 among healthcare workers in Rivers State (p-value = 0.05). It was observed that poor adherence to the use of PPE was associated with a high perceived prevalence of COVID-19. This is consistent with the report of Liu et al. (2020), who studied the use of PPE against coronavirus disease 2019 by healthcare professionals in Wuhan, China, and discovered a significant association between adherence to PPE utilization and the prevalence of COVID-19 among healthcare workers, with all 420 participants showing no clinical or laboratory signs of COVID-19 after 4-6 weeks of caring for COVID-19 patients.

The findings of the study are also consistent with those of Zangoue et al. (2021), who investigated how well healthcare workers use personal protective equipment to prevent COVID-19 infection. Their research revealed a strong association between PPE use and a low prevalence of COVID-19 among healthcare workers.

Conclusion

The perceived prevalence of COVID-19 among HCWs in the study was high. This calls for action to improve HCWs' infection prevention behaviour through increased risk communication, the provision and mandatory use of protective equipment (PPE) when attending to patients, and training on the proper use of PPE, in addition to routine infection surveillance.

Recommendations

The following recommendations were made based on the findings of the study:

- 1) The management boards of health institutions should improve adherence to PPE utilization by setting up committees to enforce the use of PPE among healthcare workers.
- 2) Healthcare workers should reduce the perceived prevalence of COVID-19 by always using PPE when attending to any patient.
- 3) The Ministry of Health should make PPE readily available for healthcare workers by providing the needed funds.
- 4) Non-governmental organizations should promote PPE utilization by making information on COVID-19 and the use of PPE available to healthcare workers using all available media.

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