

Research Article

# Prevalence and Predictors of COVID-19 Vaccine Acceptance in a Healthcare Setting in Bauchi State, Northeastern Nigeria: Outcome of a Cross-Sectional Study

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## Abstract

Background: COVID-19 has been a deadly disease in the last three-four years with huge economic impact globally. Although it does not seem to be severe in our environment, but the aftermath is devastating. Public health preventing measures like limiting social gatherings, maintaining social distance, isolating infected persons, and lately vaccines were promising in controlling the spread of the infection and pandemic. Methodology: A descriptive cross-sectional research design was used to select samples of healthcare professionals who made the inclusion criteria. A stratified random sampling technique was used to select samples of 226 healthcare workers present at the clinics and offices. Data extracted were analyzed using frequencies, percentages, and chi-square test at 95% CI and a level of significance of 0.05. Result: The finding showed; the prevalence rate of vaccine acceptance is 82.3% and the chi-square tests analysis revealed a statistically significant association between vaccine acceptance and age (p-value=0.034), professionalism (p-value= <0.001), educational level (p-value=0.047) and year of working experience (p-value= 0.023). Conclusion: Prevalence of COVID-19 vaccination is generally high. However, a significant number of healthcare workers were hesitant to take it if not for government command. Sociodemographic factors were statistically associated with vaccine acceptance. We recommend healthcare workers across the state to be exposed to training on immunization and how to improve vaccine acceptance in the community.

## Keywords

Prevalence, COVID-19, Vaccination, Healthcare, Workers

## 1. Introduction

Coronavirus disease (COVID-19) is a viral infection responsible for respiratory tract infections, severe pneumonia, sepsis, acute kidney injury and even end organs. It was first

isolated in a town called Wuhan in China toward the end of year 2019 and declared as a global pandemic by the World Health Organization (WHO) on March 13<sup>th</sup>, 2020 [1].

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Healthcare workers (HCWs) are regarded as epitome of health-related issues, including vaccination [2]. They are expected to lead by example and therefore should be the first to be vaccinated. Physicians and other health care providers are still among the most trusted people when it comes to health care advice. The Wellcome Global Monitor surveyed people in more than 140 countries and found that almost three-quarters of their participants trust a medical doctor, or a nurse more than other health professionals. These groups of staff can increase vaccine acceptance thereby preventing the spread of infectious disease and can offer support and encouragements to what matters from the patient's perspective [3].

COVID-19 vaccination results in about 80% reductions in rates of infection and hospitalization, and mortality and these appeared unaffected by patients' sociodemographic features [4]. Although COVID-19 infection is seen to be less severe in Nigeria, the lockdown has significantly hindered transportation across major cities and constrained economic activities. The circular flow of income within the country has significantly reduced and had a negative effect on economic growth and development [5].

COVID-19 vaccination was proven to effectively prevent severe coronavirus disease, hospitalization, and death of the vulnerable populations because of the highest risk of severe disease and death [6]. WHO advice and recommends to countries to work toward vaccinating all the health workers and almost all vulnerable groups, including people who are in their seventh decade and above together with Immunocompromised patients or those with underlying health conditions [7].

Nevertheless, the majority of the population are vaccine doubters and so many conspiracy theories circulating that have led to non-acceptance of the vaccine. Hence, to improve vaccine acceptance in Nigeria, context-specific research that is aimed at identifying factors associated with vaccine hesitancy across the prevailing cultural, tribal, and religious tendencies is urgently required [8]. To stop the spread of the infections, vaccination become paramount, especially with a high tendency of the virus mutating and a greater risk of resurgence. Vaccination among these groups should raise concern for some reasons because exposure of nurses to the risk of SARS-CoV-2 infection exacerbates personnel shortages in the healthcare system. It can be assumed that nurses are likely also unwilling to encourage other people to COVID-19 vaccines, which has a negative impact on public perceptions of this vaccination [9].

Coronavirus disease 2019 (COVID-19) vaccine acceptance is essential in controlling the virus spread and the pandemic at large. Vaccine knowledge influences vaccine acceptance and understanding this is vital in planning immunization strategies [10, 11]. Adult populations who had good knowledge about the COVID-19 vaccine are significantly associated with accepting the COVID-19 vaccine. Because of the role played by healthcare workers in a community, they should be seen ac-

cepting the vaccine first before influencing others in the community. They are regarded as role models regarding health-related issues, including vaccination. The emergence of efficacious vaccination is essential to mitigating the high morbidity and mortality rate of COVID-19, as immunization is adequate to a varying extent in reducing the severity of complications, leading to reduced hospitalization and mortality [2]. An effective vaccination coverage requires 70% of the general population to be vaccinated to have previous infections to achieve herd immunity [8].

The COVID-19 vaccination acceptance rate among healthcare workers in China is estimated to be 78%. The acceptance or rejection of COVID-19 vaccines among HWs can, thus, influence the acceptability of COVID-19 vaccines at the community level [12, 13].

In Africa, approximately 60.6% of the healthcare workers were willing to receive the COVID-19 vaccine in Libya. Islamic Republic of Iran reported prevalence of acceptance to be 62% among their healthcare workers [14].

Among health workers, the vaccine acceptance rate was between 32.5 and 55.5%. Out of the surveys conducted on health workers, two showed COVID-19 vaccine acceptance rates below 50% with the highest of 55.5% in Ondo, Edo, and Delta. The lowest COVID-19 vaccine acceptance rate 32.5% was seen among health workers surveyed in all the six geopolitical zones of the country. The vaccine acceptance rate ranged from 20.0% to 58.2% among adults across the six geopolitical zones of the country [8].

Vaccine hesitancy is a global problem. Surveys in 2021 report revealed that between 50% and 60% of all respondents worldwide would be willing to receive a COVID-19 vaccine, with wide variations across countries. Confidence in the importance of vaccines has the strongest association with vaccine uptake; however, confidence in the importance (necessity and value) safety, and effectiveness of vaccines [15]. Hesitancy was due mainly to safety issues and negative information about vaccines from social media [12].

Good knowledge of the vaccine is significantly associated with acceptance [2, 16]. Secondary education and above, age  $\geq 46$  years old, and having a chronic disease were significantly associated with accepting the COVID-19 vaccine [16]. The main predictors for COVID-19 vaccine acceptance were bordered around safety concerns and potential side effects of the COVID-19 vaccines. Physicians and HCWs in the intensive care unit as predictors of COVID-19 vaccine acceptance and higher vaccine acceptance with a general preference for the Moderna and Pfizer vaccines [2].

#### *Aims and Objective of the Study*

The main aim of the study is to Assess Prevalence and Sociodemographic Predictors of COVID-19 Vaccine Acceptance Among Healthcare Workers in Bauchi State Specialist Hospital, Bauchi. Specifically, the objectives of the study are to;

1. determine the level of COVID-19 vaccine acceptance among healthcare workers

- determine the prevalence of COVID-19 vaccination among healthcare workers.
- determine socio-demographic factors associated with COVID-19 acceptance among healthcare workers.

## 2. Materials and Method

To achieve the purpose of the study, a descriptive cross-sectional survey design was employed. The design deals with problems or situations that are felt over a wide area by a large population to ascertain what exists in their natural settings. A descriptive cross-sectional observational study reporting prevalence and predictors of COVID-19 vaccine acceptance in a healthcare setting is considered.

The study was carried out in tertiary hospitals in Bauchi State: Bauchi State Specialist Hospital is located at Ajiya Tahir Road old Bacas in Bauchi metropolis, Bauchi State.

The hospital is enriched with many clinical, nonclinical departments, and colleges with a wide variety of healthcare professionals set to deliver services that will promote healthcare service delivery in the state. There are different clinical departments with about four hundred (400) bed capacity.

The study population comprises all medical doctors, nurses, pharmacy, laboratory, dental, medical records and radiology staff who made the inclusion criteria. Bauchi State specialist hospital has five hundred and twenty healthcare professionals carrying out all the medical services of the hospital. Also, to improve service delivery in the hospital, locum healthcare personnel were recruited across different units and departments by the State Government.

### 2.1. Sample Size

The sample size for the study was determined from the sample population using Yamane's formula since the actual population of study is known [17].

$$n = N / [1 + N(e)^2]$$

Where:

n signifies the sample size

N signifies the population under study

e signifies the margin error = 0.05 [18]

N=520

e= 0.05

$n = 520 / 1 + 520(0.05)^2$

$n = 520 / 2.3$

$n = 226$

**Table 1.** Sample Size Summary.

Population of Study	Sample Frame	Sample
Nurses	219	95
Pharmacy	16	7
Radiographers	21	9
Dentist	39	17
Medical Records	113	49
Laboratory	87	38
Total	520	226

### 2.2. The Scope of the Study

The study is delimited to the assessment of prevalence and sociodemographic predictor of COVID-19 vaccination among healthcare workers in the clinical and administrative area Bauchi State Specialist Hospital, Bauchi who made the inclusion criteria between the periods of October-December 2023.

### 2.3. Ethical Consideration

An ethical clearance was obtained from the state Ministry of Health through the office of the Honorable Commissioner, Bauchi State Ministry of Health. An informed consent was given to the subjects before administering the questionnaires, ensuring the principle of anonymity and confidentiality.

### 2.4. Sampling Procedure

The study participants were recruited using a multi-stage sampling technique. At first, a stratified simple random sampling technique was used to divide respondents into strata according to their departments. A convenient sampling technique was used to select the participants based on the sample size and sample proportion. This continued until the sample size was reached.

### 2.5. Instrument for Data Collection

The instrument for data collection is a self-developed questionnaire. The questionnaire was organized following the research purpose and specific objectives. The questionnaire consists of three sections; Section A had seven items formulated by the researcher to obtain information on the socio-demographic profile of respondents. Section B also has nine questions on knowledge of the vaccine while section C has six items on vaccine acceptance.

Both the face and content validity were ensured by giving the instrument to colleagues and research experts in the College of Nursing Sciences, Abubakar Tafawa Balewa University Teaching Hospital Bauchi. In line with the objectives of the study, the validators' criticisms, advice and suggestions

Population of Study	Sample Frame	Sample
Doctors	25	11

guided the structuring of the instrument.

## 2.6. Procedure for Data Collection

Permission was obtained from the Chief Medical Director and Head of Departments to collect data following ethical approval. Two research assistants were briefed on the purpose of the study, how to administer the questionnaire. Data collection lasted for two (02) months. Healthcare workers were given questionnaires during their break periods in order not to disrupt their work processes and the filled questionnaire was

collected as they finished their clinics, ward rounds and handover rounds.

## 2.7. Method of Data Analysis

The data collected were coded, cleaned, modified and entered into SPSS version 24. Analysis was done using frequency counts, percentages and chi-square test. For the association between the sociodemographic characteristics of the respondents and acceptance, the chi-square test was used.

## 3. Results

**Table 2.** Socio-Demographic Characteristics of the Respondents (n=226).

Socio-demographic characteristics	Frequency	Percentage (%)
Age		
15-24 years	20	8.8
25-34 years	92	40.7
35-44 years	103	45.6
45-54 years	10	4.4
55 years and above	1	0.4
Gender		
Male	100	44.2
Female	126	55.8
Marital status		
Single	34	15.0
Married	164	72.6
Widowed	8	3.5
Divorced	18	8.0
Separated	2	.9
Profession		
Medical doctors	11	4.9
Nurses	95	42.0
Radiographers	9	4.0
Pharmacy	7	3.1
Laboratory staff	38	16.8
Dentists	17	7.5
Medical records	49	21.7
Years working experience		
0-10 years	164	72.6
11-20 years	50	22.1

Socio-demographic characteristics	Frequency	Percentage (%)
21-30 years	6	2.7
30 years and above	6	2.7
Educational level		
Diploma	117	51.8
HND	41	18.1
BSc.	54	23.9
MSc.	13	5.8
PhD	1	0.4
Hospitalized due to COVID-19		
Yes	22	9.7
No	204	90.3
Total	226	100.0

Laboratory staff (Lab technicians and scientists), Pharmacy (Pharmacist and Pharmacy technicians), HND (Higher National Diploma), BSc. (Bachelor of Science), MSc. (Master of Science), PhD (Doctor of Philosophy)

A total of 226 respondents were enrolled in this study. Table 2 shows sociodemographic characteristics of the respondents. Almost half 103 (45.6%) of respondents are within the age bracket of 35-44 years. The majority of them 126 (55.8%) are females and almost three-quarters 164 (72.6%) were married. Nearly half of them are nurses 95 (42.0%) and more than

two-thirds 164 (72.6%) have been in service below 10 years. Based on the level of education acquired, more than half 117 (51.8%) respondents had a Diploma education, while only 1 (0.4%) respondent had Doctor of Philosophy (Ph.D.). More so, 22 (9.7%) of respondents were hospitalized due to COVID-19.

**Table 3.** Knowledge of COVID-19 Vaccination Among Healthcare Workers (n=226).

Knowledge of COVID-19 vaccination	Frequency	Percentage (%)
Do you know the existence of COVID-19 vaccine?		
Yes	220	97.3
No	6	2.7
How do you know it existence?		
Newspaper	14	6.2
Television	43	19.0
Radio	58	25.7
Internet	35	15.5
Verbal communication	10	4.4
Healthcare personnel	66	29.2
Do you know that there are different types of COVID-19 vaccine?		
Yes	212	93.8
No	14	6.2
Select the type of COVID-19 Vaccine you know		
AstraZeneca	76	33.6

Knowledge of COVID-19 vaccination	Frequency	Percentage (%)
Pfizer	19	8.4
Johnson and Johnson	10	4.4
Moderna	7	3.1
Sputnik V	1	.4
All of the above	16	7.1
Only two of the above	97	42.9
Do you agree that the vaccine is effective?		
Yes	79	35.0
No	147	65.0
Do you agree that the vaccine is safe?		
Yes	205	90.7
No	21	9.3
Can a person acquire COVID-19 even if vaccinated?		
Yes	104	46.0
No	122	54.0
Most COVID-19 vaccines have serious side effects		
Yes	55	24.3
No	171	75.7
The vaccine can cause COVID-19 disease		
Yes	23	10.2
No	203	89.8
Total	226	100.0

Table 3 shows the knowledge level of healthcare workers on COVID-19 vaccine. Almost all the respondents 220 (97.3%) knew the existence of the COVID-19 vaccine, and majority 60 (27.3%) knew it through healthcare personnel. Similarly, nearly all the respondents 212 (93.8%) knew that there are different types of COVID-19 vaccine, and one quarter (33.6%) knew AstraZeneca vaccine only. However,

the majority (65.0%) do not agree that the vaccine is effective, but almost all (90.7%) agreed that it is safe. 122 (54.0%) disagreed that vaccinated person can acquire COVID-19 disease, and about three-quarter (75.7%) disagreed that the vaccine has side effects. 203 (89.8%) disagreed with the vaccine causing COVID-19.

**Table 4.** COVID-19 Vaccine Acceptance Among Healthcare Workers (n=226).

COVID-19 Vaccine Acceptance	Frequency	Percentage (%)
Have you been vaccinated against COVID-19?		
Yes	186	82.3
No	40	17.7
Total Type of COVID-19 vaccine received	226	100
AstraZeneca	102	54.8

COVID-19 Vaccine Acceptance	Frequency	Percentage (%)
Pfizer	14	7.5
Johnson and Johnson	6	3.2
Moderna	2	1.1
Pfizer and AstraZeneca	62	33.3
Total	186	100
How many dose(s) have you received?		
First only	39	21.0
First and second only	139	74.7
A and B + booster one	6	3.2
Option C + booster two	2	1.1
Total	186	100
Were you forced to take the vaccine?		
Yes	59	31.7
No	127	68.3
Total	186	100
Who forced you take the vaccine?		
My employer/line manager	8	13.6
Healthcare workers	14	23.7
Government	33	55.9
Travelling policy	4	6.8
Total	59	100
Are you willing to retake the vaccine if the need arises?		
Yes	71	31.4
No	155	68.8
Total	226	100.0

Table 4 shows COVID-19 vaccine acceptance among healthcare workers. More than three-fourths 186 (82.3%) of the healthcare workers were vaccinated and the majority 103 (54.8%) received AstraZeneca. About three-quarters (74.7) of those vaccinated received the first and second doses. Almost one-quarter (31.7%) of the vaccinated respondents took the vaccine against their will and the majority 33 (55.9%) were forced by Government policy. One hundred and fifteen (68.8%) of the participants are not willing to retake the vaccine.

**Table 5.** Chi-square Test on Socio-Demographic Factors Associated with COVID-19 Vaccine Acceptance Among Healthcare Workers (N=226).

Statement	Vaccine Acceptance (Willingly)		X <sup>2</sup>	p-value
	Accept	Not accept		
Age			10.412 <sup>a</sup>	0.034*
15-24 years	11(4.9)	9(4.0)		

Statement	Vaccine Acceptance (Willingly)		$\chi^2$	p-value
	Accept	Not accept		
25-34 years	24(10.6)	68(30.1)		
35-44 years	30(13.3)	73(32.3)		
45-54 years	5(2.2)	5(2.2)		
55 years and above	1(0.4)	0(0.0)		
Gender			3.609 <sup>a</sup>	0.057
Male	38(16.8)	62(27.4)		
Female	33(14.6)	93(41.2)		
Marital status			5.585 <sup>a</sup>	0.232
Single	14(6.2)	20(8.8)		
Married	50(22.1)	114(50.4)		
Widowed	4(1.8)	4(1.8)		
Divorced	3(1.3)	15(6.6)		
Separated	0(0.0)	2(0.9)		
Profession			31.829 <sup>a</sup>	<0.001*
Medical doctors	3(1.3)	8(3.5)		
Nurses	29(12.8)	66(29.2)		
Radiographers	6(2.7)	3(1.3)		
Pharmacists	6(2.7)	1(0.4)		
Laboratory staff	3(1.3)	35(15.5)		
Dentists	2(0.9)	15(6.6)		
Medical records	22(9.7)	27(11.9)		
Years working experience			7.963 <sup>a</sup>	0.047*
0-10 years	43(19.0)	121(53.5)		
11-20 years	23(10.2)	27(11.9)		
21-30 years	3(1.3)	3(1.3)		
30 years and above	2(0.9)	4(1.8)		
Educational level			11.342 <sup>a</sup>	0.023*
Diploma	32(14.2)	85(37.6)		
HND	8(3.5)	33(14.6)		
BSc.	24(10.6)	30(13.3)		
MSc.	7(3.1)	6(2.7)		
PhD	0(0.0)	1(0.4)		

The study showed age ( $\chi^2=10.412$ ,  $p=0.034$ ), profession ( $\chi^2=31.829$ ,  $p<0.001$ ), years of working experience ( $\chi^2=7.963$ ,  $p=0.047$ ) and educational background ( $\chi^2=11.342$ ,  $p=0.023$ ) are statistically significantly associated with COVID-19 vac-

cine acceptance. While gender ( $\chi^2=3.609$ ,  $p=0.057$ ) and marital status ( $\chi^2=5.585$ ,  $p=0.232$ ) were not statistically associated with COVID-19 vaccine acceptance. It further indicates that 30 (13.3%) respondents within the age bracket of 35-44



years have accepted the vaccine more than the other age groups. Similarly, 43 (19.0%) respondents that are more than 10 years in service mostly accepted the vaccine more than their counterparts.

**Table 6.** Prevalence of COVID-19 Vaccination among Healthcare Workers (N=226).

COVID-19 Vaccination	Prevalence among Healthcare Workers	
	Yes (%)	No (%)
Have you been vaccinated against Covid-19?	186 (82.3%)	40 (17.7%)
Medical doctors	7 (63.6%)	4 (36.4%)
Nurses	70 (73.7%)	25 (26.3%)
Radiographers	8 (88.9%)	1 (11.1%)
Pharmacists	6 (85.7%)	1 (14.3%)
Laboratory staff	34 (89.5%)	4 (10.5%)
Dentists	15 (88.2%)	2 (11.8%)
Medical records	46 (93.9%)	3 (6.1%)

Table 6. Above shows results on the prevalence of COVID-19 vaccination whereby two-thirds 186 (82.3%) were vaccinated against COVID-19. It further indicates that among Medical Doctors 7 (63.6%) were vaccinated, Nurses 70 (73.7%) were vaccinated, Radiographers 8 (88.9%) were vaccinated, Pharmacists 6 (85.7%) were vaccinated, laboratory staff 34 (89.5%) were vaccinated, Dentists 15 (88.2%) were vaccinated and medical records 46 (93.9%) were vaccinated.

## 4. Discussions of the Findings

Vaccination is vital for the prevention of infectious disease spread. The success of a vaccine relies on its efficacy, knowledge and acceptance, primarily among healthcare workers (HCWs) who are at high risk of the infection and are the source of information to the general public [18, 19]. The study aimed to identify the vaccine acceptance rate and sociodemographic factors associated with it. The finding on knowing the existence of COVID-19 vaccine is in congruence with who reported that 98.3% of healthcare workers heard about the vaccine [20, 21].

At least 83.2% HCWs have been vaccinated against covid-19 or received one dose of the vaccine. The result is in keeping with 90% of healthcare workers receiving at least the first dose of Oxford/AstraZeneca in Katsina state, Nigeria [22]. It is higher than 62.1% reported in the Islamic Republic of Iran [14], 20-58.2% across Nigerian six geopolitical zones,

and 56.3% in Enugu state, Nigeria [8, 23]. This finding does not come as a surprise because 31.2% of those who took the vaccine were forced to do so out of their will. The result may not reflect the real situation of the COVID-19 vaccine uptake or acceptance by healthcare workers because only 31.4% are willing to retake the vaccine if the need arises. This could be because severe cases of the disease were not seen in this part of the world. Another reason might be since their studies were conducted two years ago. This two-year difference may positively influence knowledge, and acceptance rate and there may be more sensitization and awareness within this period. These groups of the population require adequate awareness to be ready and accept the vaccine anytime without being influenced. The majority 54.8% of the healthcare workers received the Oxford/AstraZeneca vaccine and almost all believed that it's safe. The finding is in keeping with what was reported among HCW in Katsina state, Nigeria [22]. This is because more than half of the vaccine secured and distributed in Nigeria from COVAX facility that has a partnership with GAVI, UNICEF, and WHO is Oxford/AstraZeneca and no major complication or death was reported as a result of the vaccine.

Sociodemographic characteristics were found to be statistically associated with COVID-19 vaccine acceptance.

In our study, age is statistically significantly associated with vaccine acceptance and was higher among young individuals aged 35 to 44 years. In line with another study [22], who found that age is a predictor of vaccine acceptance and more among the young age group. It is also in keeping with other findings in Enugu state by Imedigwu et al. (2023), Abia state by Amuzie et al. (2021) in Nigeria, and Limbe Health District of Cameroon by Ukah et al. (2024) [21, 23, 24]. This similarity in age as a predictor could be because these studies involved healthcare workers who have similar characteristics and knowledge of the importance of vaccination.

According to the study, professionalism affects the vaccine acceptance. There is a significant association between vaccine acceptance and a HCW's profession. This is analogous to a finding in Abia state that showed a significant association between vaccine acceptance and healthcare worker's profession. He found that doctors have more acceptance than other healthcare workers [24]. However, in our study acceptance is more among nurses than other healthcare workers. Contrary to our findings of Ukah et al. (2024) in Cameroon and Imedigwu et al. (2023) in Enugu state, Nigeria who reported no association between profession and acceptance [20, 21, 23]. The difference may be due to differences in the research instrument and cultural background, more so, nurses were at the forefront in administering the vaccine in the state and therefore can influence coworkers at the workplace.

There was no significant association between vaccine acceptance or uptake and gender. It is like the finding of Abubakar et al (2023) in Katsina state which revealed no significant association between gender and vaccine acceptance among healthcare workers [22]. Contrary to our finding, Eze

et al. (2021), showed significant association between gender and vaccine acceptance in North, Eastern and Southern Nigeria [25]. Males were more likely to accept the vaccine than females. It is also incongruent with what was reported by Nnaemeka et al. (2022), whose finding showed male gender to be 2.8 times more likely to accept vaccines than their female counterpart [2]. This variation may be due to sample size, research instrument and sociocultural characteristics of the population study.

Years of working experience are significantly associated with vaccine acceptance. And it's said to be more among those with 10 years and above years of working experience. It corresponds to what was reported by Ukah et al. (2024) who showed longevity of service of 10 years and above as a predictor of vaccine acceptance [20, 21].

Our study revealed, educational level is a significant predictor associated with COVID-19 vaccine acceptance contrary to previous findings by Imediegwu et al (2023) and Ukah et al (2024) [20, 21, 23] This difference could be due to the differences in the study design and the research instrument.

## 5. Conclusion

The development of coronavirus disease 2019 (COVID-19) vaccines in the late 2020 was a breakthrough and provided a significant lifeline to bring the global pandemic caused by the novel severe acute respiratory syndrome coronavirus under control. Vaccines have been proven to be effective in preventing the disease. Although four-fifths of the healthcare workers had received at least a single dose, more than 30 percent of those who received were forced to do so. A good number of healthcare workers are aware of the vaccine, and more than half heard it either from a colleague or social media. The major predictors of vaccine acceptance were age, profession, educational background and year of working experience.

## 6. Recommendation

The state ministry of health should organize seminars to sensitize and continuously educate healthcare workers on the importance of vaccination in preventing infectious disease spread.

## 7. Limitation of the Study

There were some limitations in the present study. It should be considered that all surveys were snapshots taken at a point in time. So, they give us an idea of how participants are doing at the time of the survey. Thus, participants' perceptions and attitudes toward vaccines may determine the determinant of vaccine acceptance. The strength of the association should have been determined through logistic regression.

Fuel scarcity has hindered access to the hospital and economic hardship, which started at the beginning of the pandemic and is a major constraint encountered in the study.

## Abbreviations

HCW	Healthcare Workers
COVID-19	Coronavirus Disease of 2019
HOD	Head of Department
WHO	World Health Organization
GAVI	Global Alliance for Vaccine and Immunization
UNICEF	United Nations Children's Fund

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## Author Contributions

**Hassan Adamu Garkuwa:** Conceptualized the design of the study, Writing original draft and Analysis

**James Iliya Kyamru:** Methodology, Supervision, review and editing

**Usman Adamu Garkuwa:** Data curation, validation, review and editing

All authors read and approved the manuscript.

## Conflicts of Interest

The authors declare no conflicts of interest.

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