Original

Acceptance of COVID-19 Vaccine and Associated Knowledge, Attitude, Practice (KAP) and Socio-demographic Factors among Resident Doctors

[1,2,3]Aria ON, [1]Nnama AI, [2]Iroegbu-Emeruem LU

[1]University of Port Harcourt Teaching Hospital, Rivers State, Nigeria
[2]Rivers State University, Port Harcourt, Rivers State, Nigeria
[3]University of Liverpool, Liverpool, United Kingdom

Corresponding author: Oti Nimi Aria, *Department of Surgery, Rivers State University, Port Harcourt, Rivers State. Nigeria; otinimi@yahoo.com; +2348177475337*

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Abstract

Background: Despite the global emphasis on the prevention of COVID-19 and other communicable diseases through vaccination, there are still reports of vaccine hesitancy even among healthcare workers. This study provides useful insights on the underlying causes of vaccine hesitancy to guide the development of strategies likely to reduce vaccine hesitancy and strengthen the control of vaccine-preventable infections in a developing country like Nigeria. To evaluate the acceptance of COVID-19 vaccine and the associated KAP and socio-demographic factors among resident doctors at The University of Port Harcourt Teaching Hospital (UPTH) in order to provide information necessary for vaccine enlightenment programmes and for policymakers focused on controlling vaccine-preventable pandemics.

Method: A cross-sectional survey of resident doctors at the UPTH was done. A validated self-administered online questionnaire was used to collect the data on the acceptance and KAP of COVID-19 vaccine. Multinomial logistic regression was used to assess the strength of association of socio-demographic variables and KAP with the acceptance of COVID-19 vaccine.

Result: The study found a high acceptance rate of 79.7% for the COVID-19 vaccine. Notably, there was a significant link between accepting the vaccine and having a positive attitude towards it ($p = 0.0001$) and also engaging in good practices ($p = 0.001$). However, there wasn't a clear connection between vaccine acceptance and having a good knowledge about it ($p = 0.606$). After adjusting for confounding variables, young adults aged 25 – 30 years showed the strongest relationship to vaccine acceptance when compared to older age groups (AOR= 8.74).

Conclusion: The acceptance of COVID-19 vaccine among resident doctors (79.7%) was significantly associated with younger age, good attitude, and good practice.

Keywords: Covid-19, vaccination acceptance, resident doctors

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Introduction

The COVID-19 virus is mainly spread by human to human transmission through virus-laden respiratory droplets.[1] The World Health Organisation (WHO) recommended preventive strategies such as face masks, physical distancing and vaccination to curb the spread.[2,3] The care of COVID-19 patients and vaccine administration are health workers' responsibilities.[4] Resident doctors are doctors undergoing a structured specialty training programme in approved hospitals in Nigeria. They play a vital role in the healthcare system due to their relatively large workforce and front-line service.[5]

COVID-19 vaccination is heavily debated, shrouded with speculation and suspicions, but also with success stories.[6,7] According to a recent poll, people are more inclined to accept the COVID-19 vaccine if their healthcare provider recommends it.[8] However, some healthcare professionals have expressed an unwillingness to take or recommend the vaccine due to worries about the vaccine's fast-tracked development and concerns about side effects.[9,10,11]

There is a scarcity of data on COVID-19 vaccine acceptance and the associated KAP and sociodemographic factors among resident doctors at the University of Port Harcourt Teaching Hospital (UPTH) and similar health institutions. Therefore, this study aims to address this research gap so as to develop evidence-based vaccine enlightenment programmes and provide information for policymakers focused on controlling the COVID-19 and other vaccine preventable pandemics.

Method

A cross-sectional survey was done using a validated electronic self-administered structured questionnaire which was adopted from a previous similar study.[7] UPTH is a tertiary facility which provides medical training for doctors, as well as specialized care for the residents of Rivers State and its environs. Ethical approval was obtained from the Ethics Committee of UPTH. The study population consisted of 300 resident doctors. The inclusion criteria were that participants must be resident doctors at the study centre at the time of the study and must consent to participate. Convenience sampling was done, and the sample size was calculated using the formula for proportion for a small finite population.[12] The sample size was 158 participants which was inclusive of 10% attrition. Participant recruitment and data collection was carried out in January, 2022. An E-flier containing the study details and a link for interested resident doctors to click to voluntarily give consent and proceed to complete a google form questionnaire was posted on the official WhatsApp group of the Association of Resident Doctors (ARD).

Data Analysis

The responses were collated from the Google Forms platform and exported in a spreadsheet format to a secure folder. The data was subjected to quantitative analysis using the Statistical Package for Social Sciences (SPSS) version 25. The primary outcome (dependent variable) was the respondents' acceptance of the COVID-19 vaccine. The independent variables, such as the socio-demographic data, and the KAP were coded in the variable window of the software. Gender was coded as Male = 1, Female = 2. Age groups were coded as 1= 25-30years, 2= 31-35years, 3= 36-40years, 4= 41-50years, 5= 51years and above. Marital status was coded as 1= Married, 2= Unmarried. Responses on the question of knowledge of COVID-19 were coded as 1 =True and 0 = False. Responses on the attitude toward COVID-19 in the Likert scale were coded as strongly disagree – 1, Disagree – 2, Undecided – 3, Agree – 4 and strongly agree – 5. Responses on COVID-19 practices and vaccine acceptance were coded as 1 – Yes and 0 – No.

Rows with incomplete data were removed and not utilized in the analysis. Responses on the KAP were collated and scored as 1 for each accurate answer and 0 for each inaccurate answer. The scores were collated and graded as good for at least 80% and poor for less than 80% based on Bloom's criteria as previously done in a similar study.[13] The Chi-square test of independence was used to assess the distribution of vaccine acceptance by socio-demographic characteristics and KAP scores. Multinomial logistic regression was used to assess the association of socio-demographic characteristics and KAP grades with the acceptance of the COVID-19 vaccine. The analysis was done at a 95% confidence interval, and a p-value less than 0.05 was considered significant.

Results

One hundred and fifty- eight (158) resident doctors. completed questionnaires giving a response rate of 52.7%. 52.54% were female, and 47.46% were male. The age-group distribution showed that 34.18% of the participants were between 36 – 40 years old, 32.28%

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were between 31 – 35 years old, 19.62% were between 41 – 50 years old, and 13.29% were between 25 – 30 years old. In addition, most of the respondents 63.92% were married, 34.18% were single, and 1.90% were divorced. Figure 1 shows that 79.7% of the doctors indicated that they accept the COVID-19 vaccine, 7.6% indicated that they would not accept the vaccine, and 12.7% were uncertain about their acceptance of the COVID-19 vaccine.

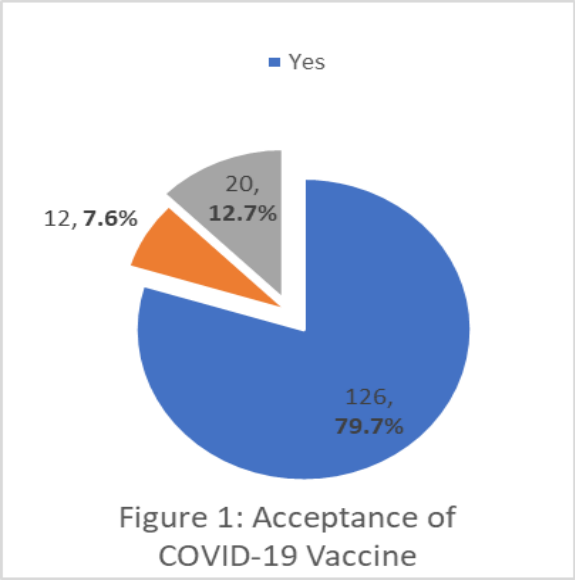

Figure 1: Knowledge of COVID-19

All the participants indicated that COVID-19 is a transmittable disease of viral aetiology. In addition, 68.9% indicated that there was no treatment for COVID-19. All respondents indicated that the disease was more dangerous in persons above 50 years old. Most of the respondents, 66.45% agreed that the COVID-19 vaccine could stop the spread of the virus, 17.72% were neutral, and 15.82% disagreed. The majority of the respondents, 74.05%, also agreed that COVID-19 vaccination would curb the spread of the virus worldwide, 10.76% were neutral, and 15.19% disagreed.

It was observed that 89.24% indicated that their knowledge, attitude, and acceptance of the COVID-19 vaccine plays a role in its acceptance in the general population, 6.33% were neutral, and 4.43% disagreed. About half (50.64%) of the respondents disagreed that the COVID-19 vaccination should be mandatory for all resident doctors in UPTH, 20.89% were neutral, and 28.48% agreed that the COVID-19 vaccines should be mandatory for all resident doctors at the study centre.

Also, 50% of the respondents disagreed that COVID-19 vaccination has a long-term negative effect on their health, 36.71% were neutral, and only 10.13% of the doctors agreed. Most doctors (91.77%) disagreed that using herbal products and traditional medicine can prevent COVID-19, 2.53% agreed that herbal products and traditional medicine could prevent COVID-19 and the remainder had no opinion. The majority (72.78%) of the doctors indicated that they were willing to take the vaccine and have been vaccinated, 6.96% indicated they were willing to take the vaccine and intend to do so, 7.59% indicated they were not willing, and 12.66% indicated that they were uncertain about accepting the COVID-19 vaccine. Table 1 shows the distribution of the study participant's knowledge, attitude, and practice scores. It was observed that 88% of the participants had good knowledge (score ≥ 80%) of COVID-19, and 12% had a poor knowledge (score <80%) of COVID-19. The results show that only 33% of the participants had a good attitude (score ≥ 80%) toward COVID-19, and 67% had a poor attitude (score <80%) towards COVID-19. Only 28.5% had good COVID-19 practice, and 71.5% had poor COVID-19 practice.

Table 1: Distribution of KAP of COVID 19 among study participants

Variable	Good	Poor	Total
Knowledge	139(88.0)	19(12.0)	**158 (100.0)**
Attitude	52(32.9)	106(67.1)	**158 (100.0)**
Practice	45(28.5)	113(71.5)	**158 (100.0)**

Table 2 shows the association of the demographic variables and the acceptance of the COVID-19 vaccine among the respondents. The table shows that 84% of male doctors accepted the vaccine, and 75% of female doctors accepted the vaccine. It was observed that 90.4% of persons between 25 – 30 accepted the vaccine, while only 78.43% of persons aged 31-35 years accepted the vaccine, 77.8% of the persons aged 36 – 40 years accepted the vaccine and 78.1%% of the persons between 41 years and above accepted the vaccine. The table showed that the proportion of female doctors that did not accept the vaccine was more than the proportion of male doctors that did not accept the vaccine. Hence,

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the non-acceptance by gender of the vaccine was higher among female doctors (24.10%) than male doctors (16.0%). An assessment of the vaccine acceptance by age group also showed that non-acceptance was most common among persons aged 36 -40 years (22.22%), followed by persons 41 – 50 years (21.88%), and persons aged 31 -35 years (21.57%), while non-acceptance of the vaccine among persons between 25 – 30 years old was 9.52%. The proportion of divorced persons who did not accept the vaccine was 33.33%, which was more than married persons (24.75%) and single persons (11.11%). There was no statistically significant association (p >0.05) between any of the demographic variables and the acceptance of the vaccine among the participants.

Table 2: Association of Demographic factors and acceptance of the COVID-19 vaccine

Variable	Acceptance of the Vaccine		Total	Chi-square (p-value)
	Yes n (%)	No/Unsure n (%)		
Gender				
Male	63(84.00)	12(16.00)	**75(100.00)**	1.59 (0.206)
Female	63(75.90)	20(24.10)	**83(100.00)**	
Age Group (years)				
25 – 30	19(90.48)	2(9.52)	**21(100.00)**	
31 – 35	40(78.43)	11(21.57)	**51(100.00)**	2.03 (0.729)
36 – 40	42(77.78)	12(22.22)	**54(100.00)**	
41 and above	25(78.12)	7(21.88)	**32(100.00)**	
Marital Status				
Single	48(88.89)	6(11.11)	**54(100.00)**	
Married	76(75.25)	25(24.75)	**101(100.00)**	4.27 (0.112)
Divorced	2(66.67)	1(33.33)	**3(100.00)**	

Table 3 shows the association of the KAP of COVID-19 with the COVID-19 vaccine acceptability. It was observed that 79.1% of the persons with good knowledge accepted the vaccine, while 84.02% of doctors with poor knowledge accepted the vaccine. There was no statistically significant association between good knowledge and the acceptance of the vaccine (p = 0.606). All doctors (100.0%) with good attitude accepted the vaccine, and only 69.8% with poor attitude accepted the vaccine. There was a statistically significant association between good attitude and vaccine acceptability (p = 0.0001) as all the respondents with good attitude indicated that they would accept the vaccine. Consequently, persons with good attitude were 1.4 times (95% C.I; 1.2 – 1.6) more likely to accept the COVID-19 vaccine. Only 62.2% of the doctors with good practice accepted the vaccine, while 86.7% of the doctors with poor practice of COVID-19 accepted the vaccine. There was a statistically significant association between good practice and vaccine acceptance (p = 0.001).

Table 3: Association of KAP and COVID-19 Acceptance.

Variable	Acceptance of the Vaccine			Chi-square (p-value)	OR (95% C.I)
	Yes n (%)	No/Unsure n (%)	Total N (%)		
Knowledge					
Good	110(79.14)	29(20.86)	139(100.00)	0.266 (0.606)	0.7 (0.1 - 2.6)

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Poor	16(84.21)	3(15.79)	19(100.00)		
Attitude					
Good	52(100.00)	0(0.00)	52(100.00)	19.68 (0.0001)*	1.4 (1.2 - 1.6)
Poor	74(69.81)	32(30.19)	106(100.00)		
Practice					
Good	28(62.22)	17(37.78)	45(100.00)	11.96 (0.001)*	0.2 (0.1 - 0.5)
Poor	98(86.73)	15(13.27)	113(100.00)		

Statistically significant (p<0.05), OR: Odds Ratio, CI: Confidence interval

Multinomial regression analysis was used to assess the strength of association of demographic variables (Exp (β)) with the acceptance of the vaccine as presented in Table 4. The acceptance of the vaccine was not statistically associated with gender (male and female). There was a statistically significant association (p <0.05) between age groups and the acceptance of the vaccine.

The analysis showed that younger age groups have a stronger acceptance of the vaccine than older age groups. The strength of association between vaccine acceptance and persons between 25 – 30 years was the strongest ($\beta = 8.74 \times 10^{-8}$), followed by persons between 31 – 35 years ($\beta = 4.42 \times 10^{-8}$) and persons between 36 – 40 years ($\beta = 4.27 \times 10^{-8}$). There was no significant association between marital status and acceptance of the vaccine. However, the association between vaccine acceptance and being single was higher ($\beta = 3.2$) compared to married persons ($\beta = 1.38$).

The results presented in Table 4 indicate a multinomial regression analysis examining the association between demographic variables and acceptance of the vaccine. Let's interpret the results for each variable:

***Gender*:**
Males show a higher acceptance rate of the vaccine (84.00%) compared to females (75.90%), with an Adjusted Odds Ratio (AOR) of 1.79. However, the association between gender and vaccine acceptance is not statistically significant (p-value = 0.164), as the confidence interval (0.79-4.06) includes the value of 1 and the p-value is above the threshold of 0.05.

Age Group (years):
Respondents aged between 25-30 years have the highest acceptance rate (90.48%) with a statistically significant (p<0.001) high AOR of 8.74, indicating they are much more likely to accept the vaccine compared to the reference group (41 and above).

Those in the 31-35 age group also show higher acceptance (78.43%) with a significant association (AOR = 4.42, p<0.001), suggesting they are more likely to accept the vaccine than the reference group.

Similarly, individuals in the 36-40 age group have an acceptance rate of 77.78% with a significant AOR of 4.27 (p<0.001), indicating an increased likelihood of vaccine acceptance compared to the reference group.

Marital Status:
Single individuals have a high vaccine acceptance rate (88.89%) with an AOR of 3.21, but the association is not statistically significant (p-value = 0.383).

Married respondents show a lower acceptance rate (75.25%) with an AOR of 1.39, and the association between being married and vaccine acceptance is not statistically significant (p-value = 0.797).

Divorced individuals have an acceptance rate of 66.67%, but due to the small sample size of this group (only 3 individuals), their AOR is not provided, and they serve as the reference group for this variable.

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Table 4: Multinomial Regression of Demographic Data with Acceptance of the Vaccine

Variable	Acceptance of the Vaccine			AOR (95% C.I)	P-value
	Yes n (%)	No/Unsure n (%)	Total N (%)		
Gender					
Male	63(84.00)	12(16.00)	75(100.00)	1.79 (0.79-4.06)	0.164
Female[R]	63(75.90)	20(24.10)	83(100.00)	-	-
Age Group (years)					
25 – 30	19(90.48)	2(9.52)	21(100.00)	8.74 (1.40-9.74)	**<0.001***
31 – 35	40(78.43)	11(21.57)	51(100.00)	4.42 (1.34-4.61)	**<0.001***
36 – 40	42(77.78)	12(22.22)	54(100.00)	4.27 (1.45-4.90)	**<0.001***
41 and above[R]	25(78.12)	7(21.88)	32(100.00)	-	-
Marital Status					
Single	48(88.89)	6(11.11)	54(100.00)	3.21 (0.23-43.93)	0.383
Married	76(75.25)	25(24.75)	101(100.00)	1.39 (0.12-16.68)	0.797
Divorced[R]	2(66.67)	1(33.33)	3(100.00)	-	-

Statistically significant (p<0.05), AOR: Adjusted Odds Ratio, CI: Confidence interval; R=Reference value

Table 5 presents a multinomial regression analysis examining the relationship between knowledge, attitudes, and practices (KAP) related to vaccine acceptance.

***Knowledge*:**
Individuals with good knowledge have a vaccine acceptance rate of 79.14%. However, the Adjusted Odds Ratio (AOR) is 0.48, and the p-value is 0.317, which means that the association between good knowledge and vaccine acceptance is not statistically significant. The AOR suggests that individuals with good knowledge are less likely to accept the vaccine compared to those with poor knowledge (the reference group), but the confidence interval is wide (0.12-1.99), and the p-value indicates no strong evidence of a real effect.

***Attitude*:**
All individuals (100%) with a good attitude towards vaccines accept them. The AOR for good attitude is 0.21, with a confidence interval of (0.08-0.51). The p-value is 0.001, which is statistically significant, indicating that individuals with good attitudes have lower odds of vaccine acceptance compared to those with poor attitudes (the reference group). Despite the counterintuitive direction of effect, the result is significant, suggesting other factors may be at play.

***Practice*:**
Individuals with good practices towards vaccines have a lower acceptance rate (62.22%) with a statistically significant association (AOR = 0.33, p = 0.001), indicating they are less likely to accept the vaccine compared to those with poor practices (the reference group). This finding, like that for attitude, is counterintuitive as one would expect good practices to be associated with higher vaccine acceptance.

Table 5: Multinomial regression of KAP with Acceptance of the Vaccine

Variable	Acceptance of the Vaccine			AOR (95% C.I)	P-value
	Yes n (%)	**No/Unsure n (%)**	**Total N (%)**		
Knowledge					
Good	110(79.14)	29(20.86)	139(100.00)	0.48 (0.12-1.99)	0.317
Poor[R]	16(84.21)	3(15.79)	19(100.00)	-	-

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Attitude					
Good	52(100.00)	0(0.00)	52(100.00)	0.21 (0.08-0.51)	**0.001***
Poor[R]	74(69.81)	32(30.19)	106(100.00)	-	-
Practice					
Good	28(62.22)	17(37.78)	45(100.00)	0.33 (0.14-0.67)	**0.001***
Poor[R]	98(86.73)	15(13.27)	113(100.00)	-	-

Statistically significant (p<0.05), AOR: Adjusted Odds Ratio, CI: Confidence interval; R=Reference value

Discussion

Doctors and the COVID-19 Vaccine

Doctors were given priority to receive the COVID-19 jab due to their high risk of infection and their influence on the health-related decisions of the general population.[14] This approach was met with varying responses from physicians as some were eager to be vaccinated, some vehemently against it, and others undecided. A survey of physicians in Thailand showed that 95.6% accepted the COVID-19 vaccine out of the 705 respondents, but 21.4% were unwilling to recommend the vaccine to their patients and family members.[15] Another cross-sectional survey of 1268 doctors in Egypt reported a 24% acceptance of the COVID-19 vaccine, with female doctors less willing to accept the vaccine than male colleagues.[13] In both studies, convenience and snowball sampling techniques were done, and electronic questionnaires were employed appropriately. However, a random sample would have yielded more generalisable findings for the population.[15] Lastly, a study carried out in the United States of America (USA) revealed that younger doctors, such as house officers and resident doctors had a higher acceptance than older doctors.[16] The findings of these studies are similar.

Acceptance of the COVID-19 Vaccine

Vaccine acceptance and confidence are guided by public healthcare delivery systems and trust in vaccination safety and effectiveness.[17] This study had a vaccine acceptance of 79.7%, which is relatively higher than reported in other HCWs' studies done in Ghana and the United States of America, with 39.3% and 36% acceptance, respectively.[18,19] This variance in the level of acceptance could be due to the inclusion of nurses and other HCWs in three institutions, while the current study only focused on doctors in one institution. A similar Nigerian study reported that doctors were more willing to be vaccinated than nurses.[20] The high vaccine acceptance observed in this study is consistent with other studies involving doctors in China, with vaccine acceptance of 76.98%.[21] It could be assumed that the high level of scientific and medical knowledge possessed by doctors compared to the general population could account for a relatively higher likelihood of vaccine acceptance.[21,22,23,24]

Demographic factors and Acceptance of COVID-19 Vaccine

There were slightly more female participants at 52.54%, which is similar to studies done among doctors in Saudi Arabia and Thailand with a female preponderance of 57% and 50.7%, respectively.[23,24] In this current survey, the majority 66.46% of participants were between 31 to 40 years, similar to the study done in the Kingdom of Saudi Arabia, with 45.32% of the participants aged between 30 - 39 years.[25] Although this current study revealed that age had no role in accepting the COVID-19 vaccine, multinomial logistic regression analysis of the data showed a higher likelihood of vaccine acceptance among younger age groups (25 – 30 years) than persons older than 35 years. Some studies also report a higher likelihood of COVID-19 vaccine acceptance amongst adults younger than 35 years compared to those in older age groups.[7,26] However, studies conducted in the United states of America and Canada indicated that the likelihood of vaccine acceptance among HCWs increased with increasing age.[19,27] The higher likelihood of vaccine acceptance among younger doctors observed in the current study could also be attributed to longer potential exposure hours during work and eagerness to participate in medical research, which is common among younger doctors.[13,16]

Knowledge and Acceptance of COVID-19 Vaccine

It was observed that 88% of participants had good knowledge of the COVID-19 vaccine based on Bloom's criteria. However, the difference between the good and

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poor knowledge groups regarding the acceptance of the COVID-19 vaccine was not statistically significant. The proportion of doctors with good knowledge of the COVID-19 vaccine is consistent with findings in similar cross-sectional studies among healthcare workers, which indicated good knowledge of COVID-19 in 60 – 80% of HCWs.[28,29] The current study showed no statistically significant association between knowledge of COVID-19 and the acceptance of the COVID-19 vaccine among doctors, as was also reported in a survey conducted in Colombia.[30] This contrasts with the reports of the study by Wang et al., which indicated that the likelihood of vaccine acceptance significantly increased with good knowledge of COVID-19 among HCWs.[21] In addition, good knowledge has also been shown to correspond with the willingness to receive the COVID-19 vaccine among healthcare workers in other studies.[19,21,23] The observed difference in the findings of the current study and other studies may be attributed to the utilization of the multinomial regression to show the strength of association between knowledge and vaccine acceptance in the current study. The other studies used binomial regression to show an increased likelihood of vaccine acceptance and knowledge.

Attitude and Acceptance of COVID-19 vaccine

The findings of this study revealed that only 32.9% of the doctors had good attitude toward the COVID-19 vaccine, which is in contrast to the reports from surveys conducted in Bangladesh and Ethiopia, with good attitude reported in 78% and 84.2% of the respondents respectively.[31,32] The low percentage of good attitude towards the COVID-19 vaccination in this study may be attributed to socio-cultural beliefs or other factors not assessed in the study. Regression analysis showed a statistically significant association between good attitude and acceptance of the COVID-19 vaccine among the study participants. This is consistent with other studies that have demonstrated that good attitude to COVID-19 increases the likelihood of the COVID-19 vaccine acceptance among HCWs.[28,32,33] This current study also observed that the doctors who had not taken the vaccine but had a good attitude to COVID-19 were 1.4 times more likely to accept the vaccine. Hence, if deliberate measures are taken to improve the attitude of resident doctors in UPTH to COVID-19, the vaccine uptake could be higher among the doctors.

Practice and Acceptance of COVID-19 Vaccine

This study showed that only 28.5% of participants had good practice of COVID-19 prevention, which is similar to some other Nigerian studies that reported unsatisfactorily low and poor levels of practice for COVID-19 prevention by doctors and nurses.[34,35] This proportion is relatively low compared to a similar study which reported good practices of COVID-19 prevention among 98.5% of healthcare workers in Nepal.[36] A small proportion of the doctors in this study used herbs and traditional medicines for COVID-19 prevention, which is in keeping with the findings of a West African population based study with 5.6% of participants utilizing traditional medicine for COVID-19 prevention.[37] Combining traditional/herbal remedies and orthodox medicine has been documented as a practice among medical practitioners in Sub-Saharan African countries such as Nigeria.[26] This study's relatively low proportion of good COVID-19 practices could be due to opposing cultural or religious beliefs and practices common in Nigeria, but this was not evaluated in this current study.[38] Logistic regression analysis showed a significantly increased likelihood of vaccine acceptance with good COVID-19 practice.

Study Limitations

A mixed-method longitudinal study would have been good to follow up with the participants to see how their KAP changed over time concerning vaccine acceptance.

Study implications

The findings of this study serve as a guide for policymakers at the institutional levels, as well as local, state and federal ministries of health, in the development of practical, evidence-based strategies and policy making geared towards improving vaccine uptake among HCWs and the general population. A multi-center mixed-method study on COVID-19 vaccine acceptance and systematic reviews are also recommended as their findings will be more generalisable to the larger population.

Conclusion

The study found a high acceptance rate of 79.7% for the COVID-19 vaccine. There was a significant link between accepting the vaccine and having a positive attitude towards it ($p = 0.0001$) and also engaging in good practices ($p = 0.001$), but not between vaccine acceptance and having a good knowledge about it ($p = 0.606$). Young adults aged 25 – 30 years showed the strongest relationship to vaccine acceptance when compared to older age groups (AOR= 8.74). These findings will guide the development of evidence-based

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vaccine enlightenment campaigns and enable policymakers to enact policies that promote vaccine uptake among healthcare workers in Nigeria.

Declarations

Ethical consideration: Ethical approval was obtained from the Ethics Committee of UPTH.

Authors' contribution:
Aria ON (Guarantor) - Concept, design, literature search, data acquisition, data analysis, statistical analysis, manuscript preparation, manuscript editing and manuscript review.
Nnama AI - Literature search, manuscript preparation, manuscript editing and manuscript review.
Iroegbu-Emeruem L - Literature search, manuscript preparation, manuscript editing and manuscript review.

Conflict of interest: There is no conflict of interest.

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