

RESEARCH ARTICLE

Perception and acceptance readiness for
COVID-19 vaccine in NigeriaOladipupo Olaleye^{1,2*}, and Samson Akande²¹John Hopkins Centre for Communication Programs, Ibadan, Nigeria²Department of Health Promotion and Education, College of Medicine, University of Ibadan, Ibadan, Nigeria(This article belongs to *Special Issue: Population and Reproductive Health Dynamics under Covid-19 in Sub-Saharan Africa*)

Abstract

The development of coronavirus disease 2019 (COVID-19) vaccine is widely regarded as a tremendous scientific progress. However, the level of vaccine acceptance has been a concern in Nigeria. Thus, we conducted a study to analyze the perception and acceptance readiness for COVID-19 vaccine among Nigerians, yielding analysis data that could inform policy for raising the COVID-19 vaccine acceptance rate. A total of 302 respondents were surveyed in this cross-sectional study to explore their perception and acceptance readiness for COVID-19 vaccine. A total score of ≤ 14 was considered having negative perception of COVID-19 vaccine whereas a score > 14 was regarded as having positive perception. Most respondents (71.2%) had a negative perception of the vaccine. The majority of these respondents (96.7%) had not been vaccinated, out of which 46.6% claimed to be willing to take the vaccines if they were provided free of charge, while 15.1% expressed their willingness to be vaccinated even if payment was required. There was no variable associated with readiness or non-readiness to take the COVID-19 vaccine. Major reasons for non-readiness include doubt about the vaccine authenticity/safety/effectiveness (59.2%), low level of trust in the government (12.6%), and fear of side effects (10.7%). In conclusion, to boost the COVID-19 vaccine uptake in Nigeria, both governmental and non-governmental bodies should participate in continuous public engagement to assure the public that the vaccine is safe and effective.

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1. Introduction

Vaccination is one of the most successful approaches to public health intervention and a cornerstone for the prevention of communicable infectious diseases (Puri *et al.*, 2020). Before the coronavirus disease 2019 (COVID-19) pandemic, more time, usually in years, is required to develop a vaccine for an infectious disease (Adigwe, 2021). The swift conception and development of COVID-19 vaccines represent a huge scientific breakthrough in modern human history (Loembé & Nkengasong, 2021), marking a giant leap in our effort to combat the virus which had infected over 181 million persons globally and caused over 4 million deaths between December 2019 and

September 2021 (Machingaidze & Wiysonge, 2021). Soon after the invention, more than a billion doses of COVID-19 vaccines were shipped worldwide (Loembé & Nkengasong, 2021). Vaccine production and distribution have become a top priority in many countries. To limit the spread of the disease, every nation, including Nigeria, struggled to acquire the sufficient amount of vaccines.

Vaccination is a viable solution to stall the dissemination of vaccine-preventable infections, but vaccine hesitancy still remains a major threat to global health, although vaccine was an invention of the past century (WHO, 2019; Puri *et al.*, 2020). The level of COVID-19 vaccine acceptance has been a global concern, even in Europe (Reno *et al.*, 2021). As of January 2021, low COVID-19 vaccine acceptance rates were recorded in Kuwait (23.6%), Jordan (28.4%), Italy (53.7%), Russia (54.9%), Poland (56.3%), the US (56.9%), and France (58.9%) (Sallam, 2021). Many African countries had barely administered 18 million COVID-19 vaccine doses; out of the 37 million, they received in April 2021 (Loembé & Nkengasong, 2021), indicating that only <2% of the vaccines had been inoculated at that time, corresponding to a coverage of only 1.4% or a very smaller fraction of the continent's population (Loembé & Nkengasong, 2021).

The level of COVID-19 vaccine acceptance in Nigeria has hitherto a public health concern since the arrival of the first batch (four million doses of vaccine) in March 2021. As of September 2021, only 2.2% Nigerians had taken at least a dose of the vaccine, which was markedly lower than the global rate of 45% at the same period (Our World in Data, 2022). The total COVID-19 vaccination rate as of March 2022 was 9.4%, with 4.3% having completed the initial protocol and 5.1% being partially vaccinated (Our World in Data, 2022).

Extensive COVID-19 vaccination is critical to safeguarding personal health, protecting vulnerable populations, reopening socioeconomic life, and achieving population health and safety through immunity (NASEM, 2021); however, vaccine hesitancy has emerged as a global challenge and there is increasing worldwide concern toward a general non-acceptance of vaccines (Sallam, 2021; Reno *et al.*, 2021; Cooper *et al.*, 2021; Adigwe, 2021). With 232,813,000 infections and 4,970,000 deaths reported in 40 countries as of September 2021 (Reuters COVID-19 Global Tracker, 2021), the low level of vaccine acceptance is still a major concern for the public health sector (Sallam, 2021). In Nigeria, the slow progress of vaccination might account for the spike in confirmed cases, for instance, the dramatic rise of cases from 164,000 in April to 201,798 in September 2021 (NCDC, 2021). To prevent future increase in the cases of COVID-19, we need to determine

the factors responsible for vaccine hesitancy. Therefore, perception and acceptance readiness for COVID-19 vaccine in Nigeria, including the reason for hesitancy, is worth investigating. As such, the research questions for this study include:

- (i) What is the level of perception of respondents toward COVID-19 vaccine?
- (ii) What is the level of acceptance readiness for COVID-19 vaccine?
- (iii) What are the major reasons for non-readiness?

This study aimed to determine the perception and acceptance readiness of COVID-19 vaccine among Nigerians.

2. Data and methods

2.1. Study design and area

This cross-sectional study was conducted in Nigeria. In this study, the respondents were surveyed using Google Forms, an online survey tool.

2.2. Measures

Data were collected using a 27-item questionnaire, which was developed and designed using Google Forms. The questionnaire was divided into three sections, covering sociodemographic details, perception on COVID-19 vaccine, and acceptance readiness for the vaccine. Participants were also asked if they have taken the COVID-19 vaccine (only one dose of the vaccine was available at the time when the study was conducted in April 2021). Furthermore, for those who were yet to be vaccinated and were not ready to be vaccinated, they were requested to provide reasons for their non-readiness.

2.3. Questionnaire administration

A link to the survey was posted on various social media platforms, including Facebook and WhatsApp, in April 2021, and responses were received for a period of 20 days before the link was deactivated. A total of 302 responses were received from respondents residing in all six geopolitical zones in Nigeria.

2.4. Data management and analysis

The questionnaire on the Google Form was designed to prevent multiple submissions by the same user, using internet protocol (IP) privacy protection system. Regardless of the browser used, no single user filled the form twice. Data validation measures were also used to ensure all questions which were completed to avoid missing data. Responses were exported as Google Excel sheet file after the survey link was deactivated.

The sociodemographic variables such as age, geopolitical zone, and marital status were expressed as mean, percentages,

and frequencies. The perception of COVID-19 vaccine was rated using 18-point perception scale. A total score of ≤ 14 and >14 (the 70th percentile) was categorized as negative and positive perception, respectively. The acceptance readiness for COVID-19 vaccine was analyzed using descriptive and inferential statistics (Chi-square). Reasons for non-willingness were presented as a theme. Differences with $p < 0.05$ were considered statistically significant.

3. Results

3.1. Sociodemographic characteristics

The mean age of the respondents was 26.6 ± 9.2 years, and 73.2% of them were single. The majority of the respondents were males (52.5%), and more than half (58.1%) had tertiary education degree while 41.9% had attained secondary education. Most of the responses (80.5%) were from the South-West geopolitical region, while the South-South region contributed the least number of responses to this survey. Furthermore, most of the respondents were urban dwellers. Slightly more than one-fifth of the respondents were health workers (21.9%) as shown in Table 1.

3.2. Perception of COVID-19 vaccine

Through this survey, we found that the majority of the respondents (71.2%) had negative perception toward the COVID-19 vaccine. Some of the respondents (23.8%) agreed that the COVID-19 vaccine at that time was not effective and few opined that COVID-19 is not real, so a vaccine for it is not needed (Table 2).

3.3. COVID-19 vaccination

Figure 1 presents the percentage of the respondents who have taken COVID-19 vaccine. Only 3.3% (10) of the respondents have been vaccinated among which 50.0% were males, while 96.7% (292) remained unvaccinated.

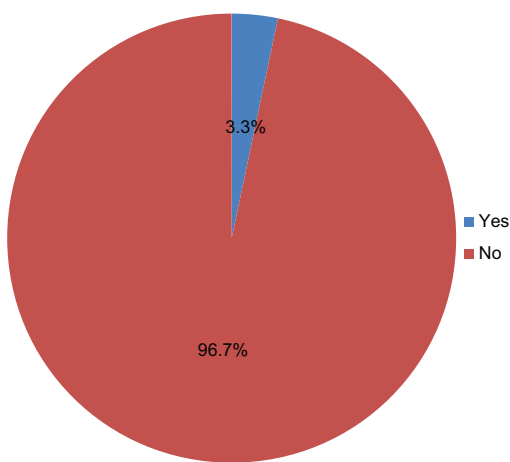


Figure 1. Percentage of vaccinated respondents

Unsurprisingly, significantly more health workers (7.9%) have been vaccinated compared with non-health workers (2.1%). On the other hand, more rural dwellers (16.7%) have received the vaccine compared with semi-urban (0.0%) and urban (3.0%) dwellers. We found that marital status, educational level, and religion of the respondents were not associated with their status of vaccination (Table 3).

3.4. Acceptance readiness for COVID-19 vaccine

Among those who were yet to take COVID-19 vaccine (96.7%), 46.6% were willing to be vaccinated if the vaccines were accessible and given free of charge, and only 15.1% of the respondents expressed willingness to take the vaccine even if they need to pay for the vaccine (Table 4). Age, sex, marital status, being a health worker, type of residence, and level of education had no association with acceptance readiness for COVID-19 vaccine (Table 5). Major reasons for non-readiness were doubt about vaccine

Table 1. Sociodemographic characteristics of respondents

Variable	Frequency	Percentage
Sex		
Male	157	52.5
Female	142	47.5
Age group		
16–30	207	69.5
31–45	79	26.5
>45	12	4.0
Mean age		26.6±9.2
Marital status		
Single	221	73.2
Married	81	26.8
Highest level of education		
Secondary school	126	41.9
Bachelor/Diploma	98	32.5
Master/Doctoral	77	25.6
Religion		
Christianity	233	92.1
Islam	17	6.7
Others	3	1.2
Health worker		
Yes	63	79.1
No	239	20.9
Type of residence		
Rural	18	5.9
Semi-urban	50	16.6
Urban	234	77.5
Geopolitical zone		
North Central	16	5.3
North-East	10	3.3
North-East	14	4.6
South-East	14	4.6
South-South	5	1.7
South-West	243	80.5

Table 2. Perception of COVID-19 vaccine

Variable	Agree	Undecided	Disagree
The currently available COVID-19 vaccine in the world is not effective	72 (23.8)	114 (37.7)	116 (38.4)
COVID-19 vaccine is just a means for some people/government to make money	101 (33.4)	42 (13.9)	159 (52.7)
There is no need for any vaccine because COVID-19 is not real	25 (8.3)	13 (4.3)	264 (87.4)
COVID-19 vaccine is “anti-Christ/anti-Islam”	20 (6.6)	30 (9.9)	252 (83.4)
COVID-19 vaccine is just a way for some people to control the world	60 (19.8)	50 (16.6)	192 (63.6)
The available vaccine is totally not safe for human beings	67 (22.3)	98 (32.5)	136 (45.2)
The COVID-19 vaccine is not necessary because with the uptake, one can still contract the virus	146 (48.5)	77 (25.6)	78 (25.9)
COVID-19 vaccine invention is an avenue for some drug companies to engulf global money	100 (33.2)	42 (14.0)	159 (52.8)
Nigerian government should use the money allocated to purchase COVID-19 vaccines to tend to other health issues in Nigeria	127 (42.2)	27 (9.0)	147 (48.8)

Table 3. COVID-19 vaccination by sociodemographic characteristics

Variable	Not vaccinated n (%)	Vaccinated n (%)	Test statistics	p-value
Sex				
Male	152 (96.8)	5 (3.2)	0.03	0.6
Female	137 (96.5)	5 (3.5)		
Marital status				
Single	215 (97.3)	6 (2.7)	0.9	0.3
Married	77 (95.1)	4 (4.9)		
Religion			7.5	0.1
Christianity	224 (96.1)	9 (3.9)		
Islam	17 (100.0)	0 (0.0)		
Others	2 (66.7)	1 (33.3)		
Health worker				
No	234 (97.9)	5 (2.1)	5.3	0.03*
Yes	58 (92.1)	5 (7.9)		
Residence				
Rural	15 (83.3)	3 (16.7)	11.8	0.003*
Semi-urban	50 (100.0)	0 (0.0)		
Urban	227 (97.0)	7 (3.0)		
Highest level of education			3.7	0.2
Secondary school	124 (98.4)	2 (1.6)		
Bachelor/Diploma	92 (93.9)	6 (6.1)		
Master/Doctoral	75 (97.4)	25 (2.6)		

Note: * $p < 0.05$.

Table 4. Acceptance readiness for COVID-19 vaccine.

Variable	No n (%)	Not sure n (%)	Yes n (%)
If COVID-19 vaccine is available but Nigerians would have to pay for it, would you be ready to pay to be vaccinated?	192 (65.7)	56 (19.2)	44 (15.1)
Will you be willing to take COVID-19 vaccine if it is available and free-of-charge at your community/street/nearby health center/hospital?	95 (32.5)	61 (20.9)	136 (46.6)
Will you be willing to allow your family members to receive COVID-19 vaccine?	96 (32.9)	58 (19.9)	138 (47.2)
Will you be willing to support the campaign for the uptake of COVID-19 vaccine?	85 (29.2)	67 (22.9)	140 (47.9)
Will you support your friend's decisions to take the COVID-19 vaccine?	79 (27.0)	56 (19.2)	157 (53.8)
Will you be willing to welcome the COVID-19 vaccination team into your religious house	78 (26.7)	68 (23.3)	146 (50.0)

Note: n (%): Data are expressed as count (percentage).

Table 5. Acceptance readiness for free-of-charge COVID-19 vaccine by sociodemographic characteristics

Variable	Ready to be vaccinated if provided free			Test statistics	p-value
	No n (%)	Not sure n (%)	Yes n (%)		
Sex					
Male	41 (27.0)	33 (21.7)	78 (51.3)	4.7	0.09
Female	53 (38.7)	28 (20.4)	56 (40.9)		
Marital status					
Single	71 (33.0)	46 (21.4)	98 (45.6)	0.3	0.8
Married	24 (31.2)	15 (19.5)	38 (49.3)		
Religion					
Christianity	79 (35.3)	50 (22.3)	95 (42.4)	3.9	0.4
Islam	3 (17.6)	3 (17.6)	11 (64.8)		
Others	1 (50.0)	0 (0.0)	1 (50.0)		
Health worker					
No	80 (34.2)	47 (20.1)	107 (45.7)	1.5	0.5
Yes	15 (25.9)	14 (24.1)	29 (50.0)		
Residence					
Rural	8 (53.3)	1 (6.7)	6 (40.0)	5.4	0.3
Semi-urban	12 (24.0)	13 (26.0)	25 (50.0)		
Urban	75 (33.0)	47 (20.7)	105 (46.3)		
Highest level of education					
Secondary school	40 (32.3)	24 (19.3)	60 (48.4)	2.1	0.7
Bachelor/Diploma	31 (33.7)	17 (18.5)	44 (47.8)		
Master/Doctoral	23 (30.7)	20 (26.7)	32 (42.6)		

authenticity/safety/effectiveness (59.2%), low level of trust in the government (12.6%), and fear of side effects (10.7%) (Table 6).

4. Discussion

The majority of our respondents were single and aged between 16 and 36 years, affirming that this age group belongs to the more youthful category that prominently uses social media (Alonzo *et al.*, 2021; Asibong *et al.*, 2020; Tayo *et al.*, 2019; Shava & Chinyamurindi, 2018). Regarding the perception on COVID-19 vaccine, our findings showed that only few had positive perception toward COVID-19 vaccine. These findings are consistent with the study conducted in Jordan where public acceptance of the vaccines was low (37.4%) (El-Elimat *et al.*, 2021). However, our study contrasted with the study conducted in Bangladesh where 63% of students exhibited positive perceptions (Hossain *et al.*, 2021). Conflicting results were reported from the Arabian and Nepalese populations, in which high proportions of the surveyed respondents in Jazan Province, Saudi Arabia (Alamer *et al.*, 2021) and Nepal (Subedi *et al.*, 2021) had positive perceptions and attitude toward the vaccine. The difference observed in the level of perceptions may be due to population covered, regional diversity, study time, and differences in government responsiveness across different states in the country. Also, having low trust in Nigeria government is cited as one of the reasons for non-uptake of the vaccine.

Table 6. Reasons for non-readiness to take COVID-19 vaccine

Reason for non-readiness to take COVID-19 vaccine	Frequency	Percentage (%)
COVID-19 burden is low/does not exist in Nigeria	5	4.8
COVID is not serious as portrayed	4	3.9
Do not trust government	13	12.6
Doubt authenticity/safety/effectiveness of COVID-19 vaccine	61	59.2
Fear of side effects	12	11.7
There is no need for COVID-19 vaccine	4	3.9
Personal belief	1	1.0
Poor knowledge of COVID-19 vaccine	1	1.0
No reason	2	1.9

The level of acceptance readiness for COVID-19 vaccine was found to be very low (46.6%) even if the vaccines are provided free-of-charge and readily accessible. This is in resonance with the study conducted in Pakistan where only 48.2% agreed to be vaccinated if the vaccines are available (Arshad *et al.*, 2021). Similarly, most of the parents (66.1%) in Ankara city, Turkey, were reluctant to be inoculated with foreign COVID-19 vaccines (Yigit *et al.*, 2021). In the same vein, a study reported that the COVID-19 hesitancy

rate among staff and students in a Nigerian university was 65.0% (Uzochukwu *et al.*, 2021). In Delta state and North-East Nigeria, the levels of willingness to take COVID-19 vaccines were 48.6% and 40.0%, respectively (Josiah & Kantaris, 2021; Mustapha *et al.*, 2021), and 51.1% of the respondents in Kano, Nigeria, were willing to take the vaccine (Iliyasu *et al.*, 2021). Another paper reported that 58.2% of the respondents in several Nigeria states, which exceeds the average acceptance level, were willing to take COVID-19 vaccine (Olomofe *et al.*, 2021). Although the level of COVID-19 vaccination hesitancy reported in this study is equivalent to that reported elsewhere in Nigeria, we cannot deny that the vaccine acceptance rate or hesitancy level could be impacted by the timing of conducting cross-sectional surveys.

The current study identified three principal reasons fueling the COVID-19 vaccine hesitancy: Doubt about the authenticity/safety/effectiveness, low level of trust in the government, and fear of side effects. The same set of reasons was also cited in the studies by Papagiannis *et al.* (2021) and Almalki *et al.* (2021), in which many respondents claimed that the fear toward the vaccine, its potential long-term side effects, and the lack of trust in government or inefficient government efforts and initiatives were the three main factors contributing to vaccination hesitancy (Shakeel *et al.*, 2022). However, high level of acceptance readiness for COVID-19 vaccine was detected in the United Kingdom (73.5%) (Sherman *et al.*, 2022), Saudi Arabia (>90%) (Almalki *et al.*, 2021), Malaysia (Marzo *et al.*, 2021), Shanghai in China (Wu *et al.*, 2021), Japan (Machida *et al.*, 2021), Bangladesh (72%) (Hossain *et al.*, 2021), and Somalia (Ahmed *et al.*, 2021). One major factor that may have accounted for this exceptionally high level of vaccine acceptance is that residents in these countries or regions have heightened level of trust in the government compared to that in the Nigerian context. The low trust in government might be related to the alleged politicization in the distribution process of COVID-19 palliatives in the country (Eranga, 2020).

Findings also showed that health workers were more willing to accept the vaccine compared with non-health workers. In concordance with our study, a study found that only slightly more than half of the surveyed health workers in Nigeria (55.5%) were willing to receive vaccination (Adejumo *et al.*, 2021), which is in stark contrast to the higher percentages among health professionals in Greece (74.0%) (Papagiannis *et al.*, 2021), Morocco (62.0%) (Khalis *et al.*, 2021), and Mozambique (86.6%) (Dula *et al.*, 2021). Furthermore, the vaccine acceptance rates in the aforementioned nations were higher than those reported in other developing countries. For example, 27.7% and 39.3% of the respondents in Democratic Republic of the

Congo and Ghana, respectively, indicated that they would accept COVID-19 vaccine if it was made available (Nzaji *et al.*, 2020; Agyekum *et al.*, 2021).

Several limitations of this study should be acknowledged. First, the sample size was small and the findings yielded in this study cannot be generalized to the current population of Nigeria. Second, the COVID-19 vaccine acceptance, perception, and hesitancy are changing rapidly, and thus, the evaluation of these parameters measured during April 2021 can only provide a snapshot of perception and acceptance readiness at that particular time. Despite portraying “static situation” concerning the COVID-19 palliatives in 2021, the findings in this study shed light on the slow COVID-19 vaccine coverage in Nigeria as compared to other developed countries. Besides, these findings are also helpful for formulating strategies for boosting vaccine acceptance rate in future. Third, the current set of findings cannot be generalized to older adults as most of the respondents in this study were youths of 30 years of age and below. Finally, about 80% of the respondents were from the South-West Nigeria but only 20% from other five geopolitical zones. Therefore, these findings are also not representative of the situation of the other five zones. However, this study could serve as a guide for carrying out related research in these zones.

5. Conclusion

In general, among the Nigerian respondents surveyed, the percentage of individuals who have taken COVID-19 vaccine was very low. A more noteworthy finding of this study is that rural dwellers and health workers accounted for a bigger portion among those who have been vaccinated. We also found high levels of negative perception on COVID-19 vaccine and non-readiness to get vaccinated among the respondents. This study was unable to unravel any variables associated with non-readiness to accept COVID-19 vaccine, which could serve as targets for addressing this particular conundrum. However, public health authorities including governmental and non-governmental bodies are recommended to participate in continuous public engagement to assure the public that the vaccine is safe and effective, so as to assuage the fear toward the vaccine and improve vaccine acceptance.

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Conflict of interest

The authors declare no conflicts of interest.

Author contributions

Conceptualization: Oladipupo Olaleye

Formal analysis: Oladipupo Olaleye

Investigation: All authors

Methodology: All authors

Writing – original draft: All authors

Writing – review & editing: All authors

Ethics approval and consent to participate

The participants willingly consented to participate in this online study after reading about the details of the research.

Consent for publication

Informed consent of participants has been obtained for releasing their data and/or images in this paper.

Availability of data

Data can be obtained from the corresponding author upon reasonable request.

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