

Research Article

Perception and Predictors of COVID-19 Vaccine Uptake Among Adults in the Federal Capital Territory, Nigeria

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Abstract

Vaccination has been considered as one of the most effective public health interventions. The uptake of COVID-19 vaccine was suboptimal in Nigeria. Therefore, the purpose of the study was to assess the uptake of the vaccine and its predictors among adults in FCT, Nigeria.

Method: A descriptive cross sectional study involving 1,082 respondents was conducted using computer-assisted telephone interview participants were selected using simple random sampling from the directories of the main mobile network providers. STATA version 17 was used for data analysis. Chi square and logistic regression were used for association.

Results: About 52% of the respondent were male, and 56% were between the ages 18 and 35 years. About 73% had a positive perception towards COVID-19 vaccine. The vaccine uptake was 48.5% (95CI:46-52). Predictors of vaccine uptake were; age, positive perception, being a Civil servant and lack of community support.

Conclusion: The COVID-19 vaccine uptake is low, similar to the National average, this underscore the importance of intensive awareness creation across different media channels, strengthening community support, integrating COVID-19 vaccine into the routine immunization, would have all improved the uptake. All of this can be improved upon in the event of future outbreaks.

1. Introduction

Covid-19 pandemic has impacted negatively on the global health system and economies. By November 2023, a total of 771,820,937 confirmed cases globally were documented, including 6,978,175 deaths in the world [1]. World Health organization reported over 12 million cases of COVID-19 in Africa, with about 260,000 death. In Nigeria there 267,173 confirmed cases of COVID-19 and 3,155 death [1, 2].

In order to reduce the spread of the virus as well as reducing both the mortality and morbidity, several vaccines were developed and deployed for this purpose. These vaccine candidates were rapidly trialed at various clinical and population-based settings, and rapid approvals were given for their administration at population levels. The COVID-19 vaccine was developed in an unprecedented record time to stop the pandemic. Its introduction is associated with a lots of scepticism and lack of trust in its effectiveness and safety, Possibly owing to the paucity of data on the effectiveness and misconceptions. Perceptions around the vaccines has been strongly linked to uptake of vaccination [3, 4].

Vaccine uptake which refers to the number of people who receive the specified vaccine dose(s) [5] was low despite its free distribution and availability, low uptake will delay attainment of herd immunity and prolong the the outbreak with its attendant consequences. As at 2023, only 30% of Nigeria population has been fully vaccinated as against the target of 70% [2]. This low uptake may be influenced by factors such as; low risk perception of COVID -19, negative perception of the vaccine itself, lack of trust in health system and government and other demographic characteristics [4, 6–8].

There is still paucity of information on the COVID-19 vaccine uptake and its predictors. A few studies were conducted in various parts of the country before the year 2023 which did not capture the late acceptors of the vaccine, there has not been any study conducted on the uptake and predictors of COVID-19 vaccine among residents of FCT, who are of diverse characteristics and include the ruling class.

Therefore, this study aimed to assess the perception on COVID-19 vaccines and the predictors of COVID-19 vaccine uptake among adults in FCT, Nigeria, this would contribute to lesson learned on COVID-19 pandemic and as guide for decision makers in developing strategies for future outbreaks.

2. Methods

2.1. Study Design and Setting

A descriptive cross-sectional study of all adults aged 18 years and above residing in the federal capital territory (FCT), Abuja, Nigeria. FCT is located in the North-Central zone of Nigeria, Abuja serves as the administrative capital of Nigeria, with a population of 4.1 million [9]. People from all walks of life including the ruling class live in Abuja.

2.2. Sample Size and Sampling technique

The sample size was determined using the formula below

$$n = \frac{Z^2 \times p \times (1-p)}{d^2}$$

Using a prevalence of 50% and margin of error of 3% to ensure a robust analysis, a non-response rate of 10% was added to give a sample size of 1185. A simple random sampling using computer generated mobile phone numbers were generated from MTN and Airtel directories with 284,058 active subscribers.

The Participants who refused to give consent, individuals who could not speak English/Pidgin and those who were not in the city as at the time of the study were excluded from the study.

2.3. Data collection tool

COVID 19 perception and vaccine acceptable tools was adapted for the study, it was a structured instrument with four sections; perception on COVID-19 vaccination and Uptake of COVID 19 vaccination and interpersonal communication as well as the sociodemographic characteristics.

2.4. Method of Data Collection

Data were obtained through Computer Assisted telephone Interview (CAPI) over three months period November 2023 to January 2024. Trained interviewers scheduled interviews with the respondents via mobile phone. Verbal informed consent was obtained before the commencement of the interview.

The questions items on perception required respondents to indicate their feelings on likert-scale. The respondents are either to Strongly Agree (SA), Agree (A), Disagree (D), or Strongly Disagree (SD). The score for each response ranges from 4–1 accordingly.

2.5. Method of Data Analysis

This research employed descriptive statistical tools like tables, simple frequency distribution, percentage and mean scores to provide better understanding of the variables. While simple percentage/frequency distribution tables were used to analyze personal information of respondents, Average Mean Score was used to analyze the opinions of respondents who either SA, A, D, or SD on each item question, a total score for the seven items was 28. Respondents who scored 50% and above, were said to have good perception and those below 50% had poor perception.

In testing hypotheses, chi square test was used for categorical variables. The level of significant was set at 5%. Significant variables were used to determine logistic model for vaccine uptake among the respondents. Analysis was carried out using STATA version 17 [10]. Results were presented below in tables.

3. Results

A total of 1082 respondents completed the questionnaire and were analyzed. Table 1 shows that male constituted 51.8% of the respondents and 56% of the respondents were between 18 -35 years. Majority (65%) of the respondents had attained tertiary level of education, about 49% of them are self employed and 17% of them are Civil servant.

The Table 2 shows the perception of the respondents on the efficacy and safety of the vaccine. About 70% agreed that COVID-19 vaccine would protect most people from having the severe form of the disease. People who got the vaccine could still be infected was agreed with, by 71% of the respondents. About 69% agreed that COVID vaccine is better to traditional treatment, only 39.5% disagreed with this statement “COVID-19 vaccine have negative impact on health”, while 72% of the respondents agreed that the vaccine is safe. About 77% believed they were less worried about COVID-19 infection with COVID-19 vaccine, while 73% believed that with COVID -19 vaccine they are protected as well as their family. The total mean score for perception is 16.4± 6.4

Table 3 shows a total of 72.6% of respondents has positive perception. Gender, age, level of education, occupation and place lived were similar in both groups. Individuals with high risk has a significantly high proportion for positive perception for COVID-19 vaccine compare to those with negative perception.

In Table 4, 48.5% of the respondents were vaccinated. More males were vaccinated than female, this was not significant. As the age categories increased there was significant increase in the proportion of those who were vaccinated. The civil servant significantly have a

higher proportion among those that were vaccinated compare to other categories of workers. Level of education of the respondents and the place where they live did not show significant difference in proportions.

The Table 5 shows that respondent who reported that they heard messages on COVID-19 vaccine have significantly higher proportion of vaccine uptake compared to those who did not. Community support and positive perception towards COVID-19 vaccine were strongly associated with vaccine uptake.

Table 6 shows that ages 36 to 60 had 36% higher odds of being vaccinated than those between 18 and 35 years. Other categories of workers had a lower odds ranging from 61-62% than the civil servants for vaccine uptake. Respondents without community support have 75% lower odds than those who have the support. Those with positive perception had six times odds of being vaccinated compared to those with negative perception.

Table 1: Socio-demographic characteristics of the respondents

Characteristics	Total (n=1082)
Gender	
Male	561 (51.8)
Female	521 (48.2)
Age (years)	
18-35	610 (56.4)
36-60	421 (38.9)
61 and above	27 (2.5)
Refused	24 (2.2)
Level of education	
No formal/basic	56 (5.2)
Secondary	284 (26.2)
Tertiary	704 (65.1)
Prefer not to say	38 (3.5)
Where do you live in	
City	438 (40.5)
Town	579 (53.5)
Village	60 (5.5)
Refused	5 (0.5)
Occupation	
Civil servant	184 (17.0)
Professional worker	200 (18.5)
Self employed	529 (48.9)
Others	74 (6.8)
Unemployed	66 (6.1)
Refused	29 (2.7)

Table 2: Perception on safety, efficacy and benefit of COVID-19 vaccine and health system

Variables	Don't know	Strongly Disagree	Disagree	Agree	Strongly Agree	Average Score
The COVID-19 vaccine will protect most people from having a serious form of the disease if they get infected	195 (18.0)	12 (1.1)	119 (11.0)	685 (63.3)	71 (6.6)	2.4
People who get the COVID vaccine can still get infected with the virus if they do not protect themselves	203 (18.8)	9 (0.8)	98 (9.1)	687 (63.5)	85 (7.9)	2.41
Vaccines are more effective at preventing COVID-19 than traditional medicines	221 (20.4)	12 (1.1)	105 (9.7)	663 (61.3)	81 (7.5)	2.34
The COVID vaccines may affect health negatively in future ®	397 (36.7)	55 (5.1)	372 (34.4)	237 (21.9)	21 (1.9)	1.69
COVID-19 vaccine is safe	185 (17.1)	17 (1.6)	96 (8.9)	693 (64.0)	91 (8.4)	2.45
COVID-19 vaccine is a good idea it make me feel less worried about catching COVID-19	136 (12.6)	9 (0.8)	107 (9.9)	729 (67.4)	101 (9.3)	2.60
COVID-19 vaccination will protect me and my family	166 (15.3)	13 (1.2)	113 (10.4)	708 (65.4)	82 (7.6)	2.49
Total mean score (SD)						16.4 (6.4)

Table 3: Factors associated with perception of COVID -19 vaccine among the respondents

Characteristics	Perception n (%)		Total (n=1082)	Statistical indices
	Positive (n=786)	Negative (n=296)		
Gender				$X^2 = 0.558$
Male	413 (73.6)	148 (26.4)	561 (51.8)	P value=0.455
Female	373 (71.6)	148 (28.4)	521 (48.2)	
Age (years)				$X^2 = 3.992$
18-35	437 (71.6)	173 (28.4)	610 (56.4)	P value=0.262
36-60	308 (73.2)	113 (26.8)	421 (38.9)	
61 and above	24 (88.9)	3 (11.1)	27 (2.5)	
Refused	17 (70.8)	7 (29.2)	24 (2.2)	
Level of education				$X^2 = 2.308$
No formal/basic	39 (69.6)	17 (30.4)	56 (5.2)	P value=0.511
Secondary	201 (70.8)	83 (29.2)	284 (26.2)	
Tertiary	521 (74.0)	183 (26.0)	704 (65.1)	
Prefer not to say	25 (65.8)	13 (34.2)	38 (3.5)	
Where do you live in				$X^2 = 2.297$
City	326 (74.4)	112 (25.6)	438 (40.5)	P value=0.513
Town	417 (72.0)	162 (28.0)	579 (53.5)	
Village	40 (66.7)	20 (33.3)	60 (5.5)	
Refused	3 (60.0)	2 (40.0)	5 (0.5)	
Occupation				Df=8
Civil servant	146 (79.4)	38 (20.6)	184 (17.0)	$X^2 = 14.050$
Professional worker	152 (76.0)	48 (24.0)	200 (18.5)	
Self employed	366 (69.2)	163 (30.8)	529 (48.9)	P value=0.069
Others	57 (77.0)	17 (23.0)	74 (6.8)	
Unemployed	46 (69.7)	20 (30.3)	66 (6.1)	
Refused	19 (65.5)	10 (34.5)	29 (2.7)	
How likely do you think contracting the disease will impact negatively on you				Df=1
Likely	404 (81.1)	94 (18.9)	498 (46.0)	$X^2 = 33.397$
Not likely	382 (65.4)	202 (34.6)	584 (54.0)	

Table 4: Demographic characteristics associated with COVID-19 vaccination among the respondents

Characteristics	Vaccination status n (%)		Total (n=1082)	Statistical indices
	Vaccinated (n=525)	Not vaccinated (n=557)		
Gender				$X^2 = 0.900$
Male	280 (49.9)	281 (50.1)	561 (51.9)	P value=0.343
Female	245 (47.0)	276 (53.0)	521 (48.2)	
Age (years)				$X^2 = 15.279$
18-35	268 (43.9)	342 (56.1)	610 (56.4)	P value=0.002+
36-60	227 (53.9)	194 (46.1)	421 (38.9)	
Above 60	19 (70.4)	8 (29.6)	27 (2.5)	
Refused	11 (45.8)	13 (54.2)	24 (2.2)	
Level of education				$X^2 = 7.310$
No formal/basic	31 (51.4)	25 (44.6)	56 (5.1)	P value=0.063
Secondary	119 (41.9)	165 (58.1)	284 (26.2)	
Tertiary	355 (50.4)	349 (49.6)	704 (65.2)	
Refused	20 (52.6)	18 (47.4)	38 (3.5)	
Where do you live in				$X^2 = 5.215$
City	230 (52.5)	208 (47.5)	438 (40.5)	P value=0.137
Town	263 (45.4)	316 (54.6)	579 (53.5)	
Village	30 (50.0)	30 (50.0)	60 (5.5)	
don't know	2 (40.0)	3 (60.0)	5 (0.5)	
Occupation				Df=5
Civil servant	126 (68.5)	58 (31.5)	184 (17.0)	$X^2 = 38.508$
Professional worker	94 (47.0)	106 (53.0)	200 (18.4)	
Self employed	228 (43.1)	301 (56.9)	529 (48.9)	P value> 0.0001*
Others	35 (47.3)	39 (52.7)	74 (6.8)	
Unemployed	26 (39.4)	40 (60.6)	66 (6.1)	
Refused	16 (55.2)	13 (44.8)	29 (2.7)	

Table 5: Other factors associated with vaccination status of the respondents

Variables	Vaccination status n (%)		Total (n=1082)	Statistical indices
	Vaccinated (n=525)	Not vaccinated (n=557)		
Have you heard any message on COVID-19 vaccine in the last 1 month				
Yes	73 (60.3)	48 (39.7)	121 (11.2)	$\chi^2 = 7.606$ P value=0.006+
No	452 (47.0)	509 (53.0)	961 (88.8)	
How often listen to radio				
Once a week	144 (46.4)	166 (53.6)	310 (28.6)	$\chi^2 = 2.649$ P value=0.449
Less than once a week	86 (48.3)	92 (51.7)	178 (16.4)	
Everyday	217 (51.4)	205 (48.6)	422 (39.0)	
Not at all	78 (45.4)	94 (54.6)	172 (15.9)	
How often do you listen to TV				
Once a week	152 (47.1)	171 (52.9)	323 (29.8)	$\chi^2 = 0.615$ P value=0.893
Less than once a week	60 (47.2)	67 (52.8)	127 (11.7)	
Everyday	270 (49.5)	275 (50.5)	545 (50.4)	
Not at all	43 (49.4)	44 (50.6)	87 (8.0)	
Community support for COVID-19 vaccination				
Yes	426 (60.9)	273 (39.1)	699 (64.6)	Df=1 $\chi^2 = 120.009$ Pvalue > 0.0001+
No	99 (25.8)	284 (74.2)	383 (35.4)	
Perception of COVID-19 vaccine				
Good	477 (60.7)	309 (39.3)	786 (72.6)	$\chi^2 = 170.240$ Pvalue > 0.0001+
Poor	48 (16.2)	248 (83.8)	296 (27.4)	

+significant p value

Table 6: Logistic model in favour of vaccine uptake among the respondents

Variables	OR	P value	95% CI
Age (years)			
18-35	1.0		
36-60	1.36	0.037*	1.02-1.82
61 and above	2.50	0.060	0.96-6.52
Occupation			
Civil servant	1.0		
Professional worker	0.39	> 0.0001*	0.24-0.62
Self employed	0.35	> 0.0001*	0.23-0.52
Others	0.35	> 0.0001*	0.18-0.66
Unemployed	0.32	> 0.0001*	0.16-0.62
Do you think people in your community, support COVID-19 vaccination			
Yes	1.0		
No	0.25	> 0.0001*	0.15-0.42
Have you received or heard COVID-19 vaccine message in the last one month			
No	1.0		
Yes	1.31	0.228	0.84-3.9
Perception on vaccine			
Poor	1.0		
Good	5.92	> 0.0001*	4.12-8.52

4. Discussion

The study was conducted among the adult residents of Federal capital territory, the seat of government of Nigeria, in order to explore their perceptions to COVID-19 vaccine, and factors that influence vaccine uptake among the adult residents in FCT.

The level of awareness and knowledge of COVID-19 in Nigeria is high owing to effective communication strategies across various platforms but the perception towards the COVID-19 vaccine has been diverse across geographical region, religion, educational attainment among other factors. Association between perception and acceptance rate of COVID-19 vaccine in the population had been demonstrated

[11].

This study revealed that 72.6% of the respondents have positive perception towards COVID-19 vaccine, this is lower than 95% that was reported in a similar study conducted in Sokoto state [12]. In Kwara state, 90% of the respondents reported positive perception [13]. It must be noted however that different instruments were used for assessment of perceptions in various studies that may have contributed to the variation. The effectiveness of vaccine in protecting against the disease was agreed upon by 69% in this study, in Sokoto state only 33.7% was reported to agree that the vaccine is effective [12].

Even though about 72% agreed that the vaccine is safe, about 60% feels that the vaccine may have negative impact on those who had the vaccine in the future. This is better than what was reported in a multi-centre study conducted among health workers, where 43% of them believed that the vaccine may not be safe [14], even though the study population are not the same, one will expect that health workers will have a better knowledge and perception compared to the general population, this position would have possibly improved by 2023, when our study was done. Those who believed that having COVID-19 disease would affect them negatively showed higher perception, about 60% of them. The risk perception is high compared to what was reported in Akwa Ibom state, where about 62% reportedly had low-risk perception [15].

When the perception for the vaccine is good, the uptake of it is expected to be high [11], this possibly explained the reason for the high acceptance rate for vaccine observed in this study. The study showed that, 48.5% had already received at least a dose of the this is comparable to what was reported in India [16], France [17] and USA [18]. The reported vaccine acceptance rate in other southern part of the country was 48.6% [19]. The vaccine uptake is far below the 70% target that was expected for any country by 2022 [2, 20]. National average for those who were fully vaccinated was 30% as at December, 2023 and about 38% received at least one dose [2, 21], the vaccine uptake rate in this study is higher than the national average, though our study did not emphasize being fully immunized. Another national survey reported vaccine uptake of 32.8% [8].

The predictors of vaccine uptake were; age group 36 to 60 years, has 36% higher odds than those below 36 years, this is also consistent with the study in Sokoto [12], and the national survey [8], the younger ones usually have a low risk perception and may not be willing to take the vaccine. Those with positive perception of the COVID-19 vaccine showed 5fold odds for COVID-19 vaccine compared to those with negative perception. Other predictors are having community support and being a civil servant favour the adoption of vaccines, this may be connected to the government policy of making COVID-19 vaccination compulsory to all the federal workers at the peak of the epidemic. This findings were similar to what as reported by Oche [12].

High level of education has been reported in several studies to be strongly associated with vaccine uptake [8, 22], but this relationship was not significant in this study, possibly because about 65% of them had tertiary level of education. A study done across low and middle income country reported that male were more likely to accept vaccination better than female [23]. Other factors reported in other studies included access to mass media, living in the urban area [8, 24], these were not significant findings.

5. Conclusion

The outcome of this study shows that perception of COVID-19 vaccine is high, this is strongly linked to high-risk perception for COVID-19 disease. Individuals with good perception, older age group (36-60 years), community support, and civil servants were more likely to have received COVID-19 vaccination. These findings underscore the importance of intensive public enlightenment in control of disease outbreak. Other recommendation based on these findings are; integration of COVID-19 vaccines or any other vaccines for control of outbreaks should be integrated into the routine immunization, the government should establish work place policies for different employers of labour as well as self-employed on access to COVID-19 vaccines.

Limitations of the study

The study being a cross sectional study only reflect information on vaccine at a given time, cannot reflect the changes that has occurred over a period of time. The study has a self selection bias, as those who participated in the study may have different views from those who did not participate. All relevant factors may not have been captured in this study such as cultural/religious belief which may influence perception and uptake of COVID-19 vaccine.

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Conflict of interest: All the authors declare no conflict of interest.

Ethics statement: The work was done with adherence to the principle of research ethics, every respondents was recruited by volunteerism and each gave a verbal consent before the interview, all the data collected were kept in confidence.

Disclaimer (Artificial Intelligence): The author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.), and text-to-image generators have been used during writing or editing of manuscripts.

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