Texila International Journal of Public Health
ISSN: 2520-3134
DOI: 10.21522/TIJPH.2013.12.02.Art006

Exploring the Knowledge, Attitude and Practice of Covid-19 Vaccination and Associated Factors in Relation to Covid-19 Vaccine Uptake among Residents of Abakaliki Metropolis in Ebonyi State, Nigeria

Stella Uju Eze
Public Health Department, Texila American University, Guyana

Abstract

This study assessed knowledge, attitude, and practices of COVID-19 vaccination and other factors about vaccine uptake among residents of Abakaliki metropolis in Ebonyi State, Nigeria. A semi-structured questionnaire was used to collect data from four hundred (400) residents who formed the sample for the study. The majority of the respondents showed good knowledge of the non-legality of the COVID-19 vaccine. A few had adequate information and knowledge on the benefits of COVID-19 vaccine. Also, knowledge gaps exist among the respondents on vaccine eligibility and when protective immunity against COVID-19 will be achieved. The findings showed that news from TV/Radio, Government agencies, social media and discussions amongst friends, family and healthcare providers play important roles in influencing the respondents' opinions regarding vaccination. It revealed that the general public's intention to accept the COVID-19 vaccine is influenced by availability, storage and quality issues as well as the capacity of healthcare workers. It further suggests that attitude towards the COVID-19 vaccine has an important influence on the intention to take it. The findings showed that protection against COVID-19 infection; vaccines being available at no cost and eradicating COVID-19 infection were the main perceived benefits. Nigeria needs to employ different approaches to ensure that citizens exhibit positive attitudes towards the vaccine including using community meetings to pass information to the masses; training and using community members to increase access to correct information; conducting community engagement activities to improve acceptance; and using social media to provide correct information on personal risk and susceptibility to COVID-19 disease

Keywords: *Attitude, COVID-19, Hesitancy, Knowledge, Practice, Uptake, Vaccination.*

Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the novel coronavirus is responsible for COVID-19, which was declared by the World Health Organization (WHO) as a pandemic on March 11, 2020 [1]. Globally, there were over 605 million confirmed cases and 6.4 million deaths as of 11th September 2022 [2]. In Nigeria, a total of 264,617 cases were confirmed, 3,582 active cases, 257,880 discharged and 3,155 deaths as at 14th September 2022 [3]. Since COVID-19 pandemic is a major threat to public health and has had a significant impact on all aspects of life including education, vaccination seems to be the surest way of curbing its harmful effects. In December 2020, several vaccines were authorized to prevent COVID-19 infection, and more than 50 COVID-19 vaccine candidates were being developed [4].

Vaccines have been a successful measure of disease prevention for decades. However, vaccine hesitancy and refusal are significant concerns globally, prompting the World Health Organization (WHO) to declare vaccine hesitancy among the top 10 health threats in

Received: 09.04.2024 ***Accepted: 24.04.2024*** ***Published on: 28.06.2024***
Corresponding Author: ujueneh1900@yahoo.com

2019 [5]. Moreover, the rapid development of vaccines casts doubts on safety [6].

Nigeria and indeed Africa has experienced slow pace in the administration of the vaccine due to low level of acceptance and negative attitudes from the citizens [7], [8] reported that only 0.3% of the total population of the 15 countries in the Economic Community of West African States (ECOWAS) were fully vaccinated, three months after the commencement of COVID-19 vaccination in the region. As of 15th September 2022, only 31,901,816 Nigerians were vaccinated representing 29.1% of the entire population [9]. The majority of Nigerians seem to accept the vaccine only when travelling out of the country or made compulsory for public figures and healthcare workers [7].

Negative attitude to vaccination results in low vaccine uptake thereby exacerbating efforts to control vaccine-preventable diseases [10]. Given that several studies reported controversial results about the efficacy and safety of the COVID-19 vaccine in the real world, attitudes towards COVID-19 vaccination among the general population were uncertain [11]. Understanding the knowledge, attitudes, and practices of the general population regarding vaccination and its associated factors was of the utmost importance as the uptake of the vaccine is still below the anticipated and accepted levels. Moreover, it shall aid public health experts to create specific outcome-based vaccine awareness strategies, and, consequently, will help to reduce the disease incidence [12]. Knowledge, attitude, and practice (KAP) surveys are important tools to understand what is known, believed and done in the context of the topic of interest [13]. The data from KAP studies provide information for resource allocation in the planning and implementation of intervention measures [13].

Literature has it that in low-and-middle-income countries, vaccination is at risk of being delayed for a variety of reasons including lack of public trust, lack of resources, and vaccine shortages [14]. The WHO Strategic Advisory Group of Experts (SAGE) defined vaccine hesitancy as a “delay in accepting or refusing vaccination despite the availability of vaccination services”. Three factors influence vaccine acceptability, such as confidence, convenience, and complacency. Confidence is defined as trust in the vaccine's effectiveness and safety, trust in the delivery system as the healthcare system, and trust in policymakers. Furthermore, vaccination convenience refers to the ease with which the vaccine can be obtained, which includes physical availability, affordability, and accessibility. Vaccine complacency is linked to a low noticed risk of vaccine-preventable disease and, as a result, more negative attitudes against vaccines [15]. Understanding the local population's knowledge, attitudes, and practices (KAP) or acceptance of the COVID-19 vaccine is vital [16].

The epidemiological dynamics of disease control, as well as the vaccination program's effectiveness, adherence, and success, depend on knowledge, attitude and practices towards COVID-19 vaccination [16].

Lack of appropriate knowledge and awareness, negative attitude, and poor adherence to precautionary measures could be the reasons for the increased number of active COVID-19 cases among the general population. A sufficient magnitude of knowledge and vaccine acceptability among the community is necessary to secure the community spread of coronavirus infection [17]. Thus, this study aims to assess the public’s knowledge, attitude, and practices (KAP) of COVID-19 vaccination and also other associated factors about COVID-19 vaccine uptake. The study will help the Government and stakeholders to formulate and implement vaccination interventions using evidence-based best approaches.

Methods and Materials

A semi-structured questionnaire [18] was used to collect data from the general population on the objectives of the study. Four hundred (400) residents of Abakaliki metropolis (50% males and 50% females) formed the sample for the study. The age groups of interest were ages 18 years and above because they fell within the target for COVID-19 vaccination in Nigeria. Other inclusion criteria were that the person must be willing to participate in the survey and must sign informed consent.

The questionnaire was made in two main parts. The first part contained socio-demographic profiles of the respondents while the second part covered questions on the survey proper. Direct questionnaire administration was adopted. The perceptions of the respondents regarding COVID-19 vaccination uptake and utilization was measured by assessing their knowledge, attitude, practice, and concerns. Data collected was analyzed using frequency distribution tables and percentages. The entire study lasted for twelve weeks from April to June 2023.

Results

Four hundred questionnaires were distributed to the general population, with a complete (100%) return rate. Of the 400 participants that responded to the questionnaire, 200 (50%) were males and 200 (50%) were females. The socio-demographic characteristics of the respondents are shown in Table 1 below:

Table 1. Socio-Demographic Profile of Respondents (General Public). n = 400

	Male	**Female**	**Total**
	n =200 (50%)	n = 200 (50%)	n = 400
Age of Respondents			
18 – 27 years	16 (53.3%)	14 (46.7%)	30 (7.5%)
28 – 37 years	65 (50.8%)	63 (49.2%)	128 (32%)
38 – 47 years	73 (50.7%)	71 (49.3%)	144 (36%)
48 – 57 years	44 (51.2%)	42 (48.8%)	86 (21.5%)
58 – 67 years	4 (33.3%)	8 (66.7%)	12 (3%)
Educational Attainment			
Primary Education	4 (40%)	6 (60%)	10 (2.5%)
Secondary Education	114 (46.3%)	132 (53.7%	246 (61.5%)
Tertiary Education	82 (56.9%)	62 (43.1%)	144 (36%)

Marital Status			
Married	112 (48.7%)	118 (51.3%)	230 (57.5%)
Widowed	14 (33.3%)	28 (66.7%)	42 (10.5%)
Divorced	2 (33.3%)	4 (66.7%)	6 (1.5%)
Separated	5 (41.7%)	7 (58.3%)	12 (3%)
Never Married	68 (62.8%)	42 (38.2%)	110 (27.5%)
Occupation			
Student	15 (50%)	15 (50%)	30 (7.5%)
Employee	118 (50.4%)	116 (49.6%)	234 (58.5%)
Business	63 (50.8%)	61 (49.2%)	124 (31%)
Retired	2 (25%)	6 (75%)	8 (2%)
Farmer	2 (50%)	2 (50%)	4 (1%)

Note: Adapted from Danso D., 2021 [18]

Table 1 above shows an equal number of male (200 [50%]) and female (200 [50%]) respondents. The majority 144 (36%) of the respondents were in the age range of 38 – 47 years, closely followed by the age range of 28 - 37 years (128 [32%]), ages 48 – 57 86 (21.5%) respondents while ages 18 - 27 years were 30 (7.5%) and ages 58 – 67 years were 12 (3%) respondents. On educational attainment, the majority 246 (61.5%) of the respondents had secondary school education, with 144 (36%) respondents attained tertiary education. Few participants - 10 (2.5%) - had primary education. Most 230 (57.5%) respondents are married, with 110 (27.5%) never married and 42 (10.5%) widowed respondents. Respondents who were either separated or divorced were 12 (3%) and 6 (1.5%) respectively. Occupation status showed that the majority 234 (58.5%) of the respondents were employees, while 124 (31%) were in business and 30 (7.5%) were students. Retired and farmers were 8 (2%) and 4 (1%) respondents respectively.

Knowledge, Attitude, Practices, and Concerns Regarding the Covid-19 Vaccine

The knowledge, attitude, practices, and concerns of the participants were measured with their perceptions on the legality of taking the COVID-19 vaccine, eligibility for COVID-19 vaccination and protective immunity against COVID-19 infection. Other dimensions measured were the influence of sources of information and statements regarding different aspects of COVID-19 vaccination and COVID-19 preventive measures.

Perceptions on Legality of Taking Covid-19 Vaccine

From the findings in Table 2 above, majority 387 (96.8%) out of 400 respondents responded

that COVID-19 vaccine is not legally mandatory and 13 (3.2%) did not have an opinion. This implies that the respondents have good knowledge on legality of COVID-19 vaccines as majority of them noted that taking COVID-19 vaccine is not mandatory.

Table 2. COVID-19 Vaccine is Legally Mandatory. n = 400

Responses		
Yes	**No**	**Don't Know**
0 (0%)	387 (96.8%)	13 (3.2%)

Note: Adapted from Danso D., 2021 [18]

Perceptions on the Eligibility of Covid-19 Vaccination

On eligibility to take the COVID-19 vaccine, Table 3 above shows that 274 (68.5%) out of 400 respondents stated that infants years of age are not eligible; 124 (31%) respondents do not know and 2 (0.5%) opined that they are eligible. 258 (64.5%) stated that children and adolescents less than eighteen years of age are not eligible, 122 (30.5%) respondents do not know and 20 (5%) agreed that they are eligible. The majority of the respondents 392 (98%) stated that adults 18 years and above are eligible, and 8 (2%) respondents do not know. 358 (89.5%) respondents stated that pregnant ladies and lactating mothers are not eligible; 26 (6.5%) agreed that they are eligible and 16 (4%) do not know. On patients with chronic diseases like diabetes, hypertension and heart disease, 158 (39%) respondents do not know; closely followed by 134 (3.5%) who stated not eligible and 108 (27%) who stated eligible. This shows a great number of the respondents do not have adequate knowledge of the issue. On persons having active COVID-19 infection, 252 (63%) stated not eligible; 86 (21.5%) stated eligible closely followed by 62 (15.5%) respondents who did not know. 368 (92%) respondents stated that persons who recovered from COVID-19 infection are not eligible; 28 (7%) respondents stated do not know and 4 (1%) stated eligible. On persons allergic to food items/drugs, 251 (62.8%) respondents do not know; 125 (31.2%) respondents stated not eligible and 24 (6%) stated eligible. On immuno-compromised patients 386 (96.5%) respondents stated they were not eligible; 10 (2.5%) respondents did not know and 4 (1%) stated eligible.

The above findings imply that there is a knowledge gap among the respondents on eligibility for the COVID-19 vaccine. This is evident with the number of respondents that do not have answers to the questions.

Table 3. The Following People May or May not be Eligible to Take Covid-19 Vaccine. n = 400

Group	**Eligible**	**Not eligible**	**Don't know**
Infant years of age	2 (0.5%)	274 (68.5%)	124 (31%)
Children and adolescents <18 years of age	20 (5%)	258 (64.5%)	122 (30.5%)
Adults 18 years and above	392 (98%)	0 (0%)	8 (2%)
Pregnant ladies and lactating mothers	26 (6.5%)	358 (89.5%)	16 (4%)

Patients with chronic diseases like diabetes, hypertension and heart diseases	108 (27%)	134 (33.5%)	158 (39.5%)
Persons having active COVID-19 infection	86 (21.5%)	252 (63%)	62 (15.5%)
Persons recovered from COVID-19 infection	4 (1%)	368 (92%)	28 (7%)
Persons allergic to food items/drugs	24 (6%)	125 (31.2%)	251 (62.8%)
Immuno-compromised patients	4 (1%)	386 (96.5%)	10 (2.5%)

Note: Adapted from Danso D., 2021 [18]

Protective Immunity Against Covid-19 Infection

The findings on achieving protective immunity against COVID-19 infection from Fig.1 above show that 153 (38.3%) respondents stated that immunity will be gotten after the second dose of vaccination, closely followed by 147 (36.8%) respondents who indicated that they do not have an idea, 76 (19%) respondents stated that it will be gotten after the first dose and 24 (6%) stated that it will be gotten after fourteen days after the first dose of vaccination.

This implication here is that a great number - 147 (36.8%) out of 400 respondents have knowledge gaps as the responses show that they do not know when protective immunity will be achieved.

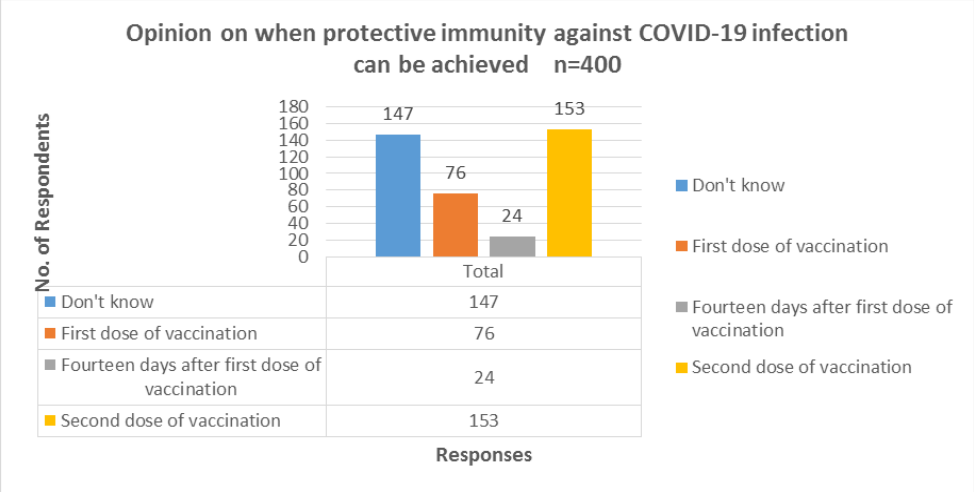

Fig. 1. Opinion on Achieving Protective Immunity Against COVID-19 Infection

Influence of Sources of Information

On the different sources of information that have influenced respondents' opinion regarding vaccination, the findings showed that discussion amongst friends and family has the highest number, Table 4 above shows that 397 (99.2%) out of 400 respondents who stated that the source had very significant effect on them while 3 (0.8%) stated somewhat significant effect. This is closely followed by information sources through healthcare providers on which 394 (98.5%) respondents stated very significant and 6 (1.5%) stated somewhat significant effect. The source of information through social media (Facebook, Instagram and WhatsApp) has 378 (94.5%) respondents who stated very significant effect and 22 (5.5%) stated somewhat significant effect. 336 (84%) respondents stated very significant effects and

64 (16%) stated somewhat significant effects to government agencies as sources of information. On news from national TV/Radio as sources of information, 241 (60.2%) respondents stated very significant effect and 159 (39.8%) stated somewhat significant effect. There is no indication of any other source of information apart from the ones listed above from the findings from the respondents.

This implication is that the respondents get information from all the sources listed in Table 4 above with varying degrees of influence. It can be deduced from the findings that the different sources of information have comparable level of influence on the respondents in making decisions concerning uptake of COVID-19 vaccine as their ratings are close to each other. However, it shows that the respondents are greatly influenced by their friends and family in making decisions concerning intention to take COVID-19 vaccine.

Table 4. How have these Sources of Information Influenced your Opinion Regarding Vaccination? n = 400

Source of Information	**Insignificant effect**	**Somewhat significant effect**	**Very significant effect**
News from National TV/Radio	0 (0%)	159 (39.8%)	241 (60.2%)
Government agencies	0 (0%)	64 (16%)	336 (84%)
Social media (Facebook, Instagram and WhatsApp)	0 (0%)	22 (5.5%)	378 (94.5%)
Discussion amongst friends and family	0 (0%)	3 (0.8%)	397 (99.2%)
Healthcare provider	0 (0%)	6 (1.5%)	394 (98.5%)
Any other source of information	0 (0%)	0 (0%)	0 (0%)

Note: Adapted from Danso D., 2021 [18]

Statements Regarding Different Aspects of Covid-19 Vaccination Uptake

On opinions of the respondents on statements regarding different aspects of COVID-19 vaccination uptake in Table 5 above, 168 (42%) out of 400 respondents disagreed to ‘when my turn of vaccination comes, I am willing to take the COVID-19 vaccine’, 158 (39.5%) neither agreed nor disagreed and only 74 (18.5%) agreed. On ‘I will prefer to acquire immunity against COVID-19 naturally rather than by vaccination’, 260 (65%) respondents agreed that they would rather acquire immunity naturally than take the vaccine, 76 (19%) respondents neither agreed nor disagreed and only 64 (16%) respondents disagreed. On ‘I am willing to get the COVID-19 vaccine, even if I have to pay to get it’, majority 320 (80%) respondents disagreed, 57 (14.2%) respondents neither agreed nor disagreed, and only 23 (5.8%) respondents agreed. On ‘I will recommend my family and friends to get vaccinated against COVID-19’, 332 (83%) respondents disagreed, 48 (12%) respondents neither agreed nor disagreed, and only 20 (5%) respondents agreed.

The findings in Table 5 above implies that the majority of the general public do not perceive nor know the benefits of COVID-19 vaccine hence they have negative attitudes towards the COVID-19 vaccine.

Table 5. Opinions on Statements Regarding Different Aspects of COVID-19 Vaccination Uptake .n = 400

Opinion	**Responses**				
	Strongly Disagree	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly Agree**
When my turn of vaccination comes, I am willing to take the COVID-19 vaccine	0 (0%)	168 (42%)	158 (39.5%)	74 (18.5%)	0 (0%)
I will prefer to acquire immunity against COVID-19 naturally rather than by vaccination	0 (0%)	64 (16%)	76 (19%)	209 (52.2%)	51 (12.8%)
I am willing to get the COVID-19 vaccine, even if I have to pay to get it	14 (3.5%)	306 (76.5%)	57 (14.2%)	23 (5.8%)	0 (0%)
I will recommend my family and friends to get vaccinated against COVID-19	10 (2.5%)	322 (80.5%)	48 (12%)	20 (5%)	0 (0%)

Note: Adapted from Danso D., 2021 [18]

Motivating Factors to Covid-19 Vaccination Uptake

Table 6 above on motivating factors on COVID-19 vaccine uptake shows that 74 (100%) respondents agreed to the following statements, 1 think there is no harm in taking COVID-19 vaccine; 1 believe COVID-19 vaccine will be useful in protecting me from the COVID- 19 infection; COVID-19 vaccine is available free of cost and, 1 feel the benefits of taking the COVID-19 vaccine outweighs the risks involved and 1 think it will help in eradicating COVID-19 infection.

On the statement 'My healthcare provider/doctor has recommended it for me', 48 (64.9%) respondents disagreed while 26 (35.1%) respondents agreed. Likewise, on '1 believe that taking the COVID-19 vaccine is a societal responsibility', 72 (97.3%) respondents disagreed, and 2 (2.7%) respondents agreed. On 'There is sufficient data regarding the vaccine's safety and efficacy released by the government', 65 (87.8%) respondents had no opinion, 7 (9.5%) agreed and 2 (2.7%) disagreed. On 'Many people are taking the COVID-19 vaccine', 71 (95.9%) disagreed and only 3 (4.1%) agreed to this statement as a motivating factor to their decision. On 'My friends and colleagues have taken COVID-19 vaccine', 53 (71.6%) respondents disagreed

while 21 (28.4%) respondents agreed to it as a motivating factor.

The findings here implies that adequate information and increase in knowledge on benefits of COVID-19 vaccine motivates people more thereby making them to have positive attitudes. It can also be deduced from their responses that adequate information enhances self-conviction rather than referrals and recommendations to services. Their responses revealed that data regarding the vaccine's safety and efficacy if available is not accessible to the general public. It could imply that the general public do not have adequate knowledge on the data if available.

Table 6. Opinions on Motivating Factors to Covid-19 Vaccine Uptake. n = 74

I have taken/will take the COVID-19 vaccine because:	**Responses**				
	Strongly Disagree	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly Agree**
1 think there is no harm in taking COVID-19 vaccine.	0 (0%)	0 (0%)	0 (0%)	74 (100%)	0 (0%)
1 believe COVID-19 vaccine will be useful in protecting me from the COVID- 19 infection.	0 (0%)	0 (0%)	0 (0%)	74 (100%)	0 (0%)
COVID-19 vaccine is available free of cost.	0 (0%)	0 (0%)	0 (0%)	74 (100%)	0 (0%)
My healthcare provider/doctor has recommended it for me.	0 (0%)	48 (64.9%)	0 (0%)	26 (35.1%)	0 (0%)
1 feel the benefits of taking the COVID-19 vaccine outweighs the risks involved.	0 (0%)	0 (0%)	0 (0%)	74 (100%)	0 (0%)
1 believes that taking the COVID-19 vaccine is a societal responsibility.	0 (0%)	72 (97.3%)	0 (0%)	2 (2.7%)	0 (0%)
There is sufficient data regarding the vaccine's safety and efficacy released by the government.	0 (0%)	2 (2.7%)	65 (87.8%)	7 (9.5%)	0 (0%)
Many people are taking the COVID-19 vaccine.	14 (18.9%)	57 (77%)	0 (0%)	3 (4.1%)	0 (0%)

1 think it will help in eradicating COVID-19 infection.	0 (0%)	0 (0%)	0 (0%)	72 (97.3%)	2 (2.7%)
My friends and colleagues have taken COVID-19 vaccine.	5 (6.7%)	48 (64.9%)	0 (0%)	11 (14.9%)	10 (13.5%)

Note: Adapted from Danso D., 2021 [18]

Perception on Covid-19 Preventive Measures

The respondents' level of risk perception was assessed using perception on COVID-19 prevention measures. Fig. 2 below shows the findings from the analysis.

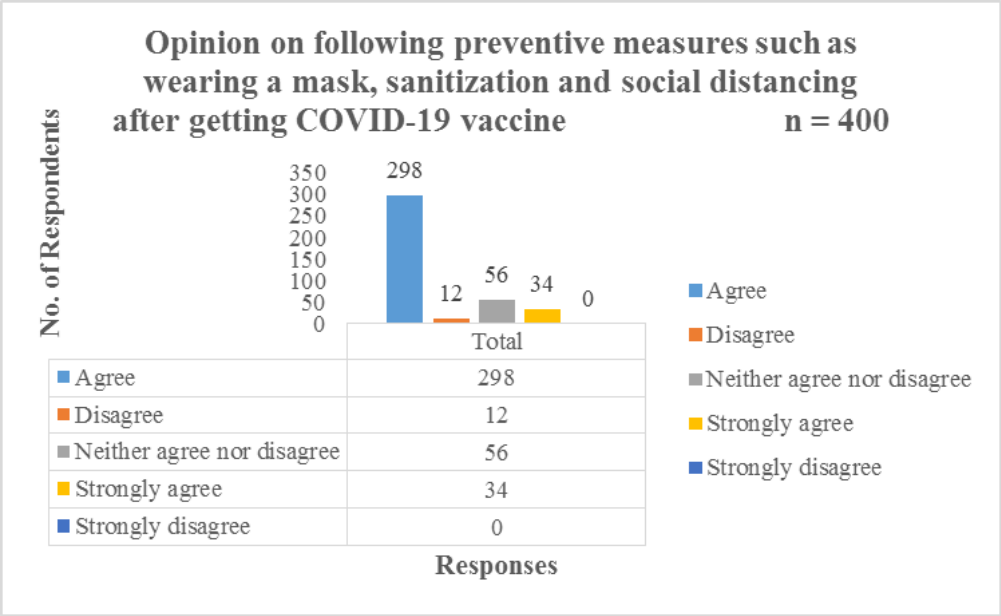

Fig. 2. Opinion on Following Preventive Measures After COVID-19 Vaccination

On the issue of following preventive measures after getting COVID-19 vaccine, majority of the respondents 332 (84%) agreed that they don't need preventive measures, 12 (3%) disagreed to that notion while 56 (14%) were neutral to the issue.

From the findings, it can be deduced that adequate information on COVID-19 preventive measures is lacking among the general public. It also implies that the respondents' risk perception is low hence resulting in the ensued attitude and practice.

Associated Factors in Relation to Covid-19 Vaccine Uptake

The other concerns regarding COVID-19 vaccination were assessed with the perceptions of the respondents. It looked at the other concerns that may create doubts in their minds and hinder them from accepting COVID-19 vaccine.

Opinions About the Facilitators and Barriers to Vaccine Uptake

The opinions of the respondents on the facilitators and barriers to vaccine uptake were assessed using concerns regarding the COVID-19 vaccine that may influence their decisions to

accept COVID-19 vaccine. The findings are shown in Table 7 below.

Table 7: Concerns regarding COVID-19 vaccine that have/will influence decision to receive it. n = 400

I am concerned that:	**Responses**				
	Strongly Disagree	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly Agree**
COVID-19 vaccine might not be easily available to me.	0 (0%)	13 (3.2%)	4 (1%)	383 (95.8%)	0 (0%)
I might have immediate serious side effects after taking COVID-19 vaccine.	17 (4.2%)	43 (10.8%)	0 (0%)	335 (83.8%)	5 (1.2%)
COVID-19 vaccine may be faulty or fake.	32 (8%)	38 (9.5%)	6 (1.5%)	301 (75.2%)	23 (5.8%)
COVID-19 vaccine was rapidly developed and approved.	0 (0%)	8 (2%)	16 (4%)	362 (90.5%)	14 (3.5%)
1 might have some unforeseen future side effects of the COVID-19 vaccine.	0 (0%)	18 (4.5%)	7 (1.8%)	274 (68.5%)	101 (25.2%)
COVID-19 vaccine is being promoted for commercial gains of pharmaceutical companies.	0 (0%)	35 (8.8%)	5 (1.2%)	228 (57%)	132 (33%)
COVID-19 vaccination is aimed to reduce the world population	7 (1.8%)	53 (13.2%)	18 (4.5%)	206 (51.5%)	116 (29.0%)
COVID-19 vaccine is not properly stored at the cold stores	0 (0%)	39 (9.75%)	0 (0%)	361 (90.25%)	0 (0%)
Healthcare workers are not adequately trained	0 (0%)	89 (22.3%)	0 (0%)	311 (77.7%)	0 (0%)

Note: Adapted from Danso D., 2021 [18]

On other concerns regarding the COVID-19 vaccine that have influenced/will influence decision (creating doubt in mind) to get COVID-19 vaccine in Table 7 above, 383 (95.8%) respondents agreed, 13 (3.2%) respondents disagreed to the concern that COVID-19 vaccine might not be easily available and 4 (1%) neither agreed nor disagreed to the concern. On the concern that 'I might have immediate serious side effects after taking COVID-19 vaccine', 340 (85%) respondents agreed while 60 (15%) respondents disagreed. Similarly, on the concern that 'COVID-19 vaccine may be faulty or fake', 324

(81%) respondents agreed, and 70 (17.5%) respondents disagreed while 6 (1.5%) respondents neither agreed nor disagreed.

On 'COVID-19 vaccine was rapidly developed and approved', 376 (94%) respondents agreed, 8 (2%) respondents disagreed while 16 (4%) respondents neither agreed nor disagreed. In the same vein, on the concern that '1 might have some unforeseen future side effects of the COVID-19 vaccine', 375 (93.7%) respondents agreed, 18 (4.5%) respondents disagreed, and 7 (1.8%) respondents were neutral to the concern. On the promotion of the COVID-19 vaccine for the commercial gains of pharmaceutical companies, 360 (90%) respondents agreed, 35 (8.8%) respondents disagreed and 5 (1.2%) respondents did not state any opinion. Also, on the concern that 'COVID-19 vaccination is aimed at reducing the world population, 322 (80.5%) respondents agreed to the concern, 60 (15%) disagreed while 18 (4.5%) respondents neither agreed nor disagreed. On the COVID-19 vaccine not properly stored, 391 (90.25%) respondents agreed that the vaccine is not properly stored and hence will affect their decision to take it and 39 (9.75%) disagreed. On healthcare workers not adequately trained, 311 (77.7%) respondents agreed, and 89 (22.3%) respondents disagreed.

The findings from all the concerns listed in Table 7 above reveal that the general public is majorly influenced by availability, storage and quality issues concerning the COVID-19 vaccine and capacity of the healthcare workers. This can be deduced from the trend of the responses listed above.

Discussion

Knowledge, Attitude, Practices, and Concerns Regarding the Covid-19 Vaccine

The findings revealed that majority of the respondents showed good knowledge on the non-legality of COVID-19 vaccine. A few had adequate information and knowledge on benefits of COVID-19 vaccine that motivated and made them to have a positive attitude towards taking the vaccine. However, majority of the respondents did not perceive or know the benefits of COVID-19 vaccine hence their level of acceptance of COVID-19 and readiness to accept the vaccine is low. Similarly, knowledge gaps exist among the respondents on eligibility for COVID-19 vaccine. They do not also know when protective immunity against COVID-19 will be achieved. Their responses also showed that information regarding the vaccine's safety and efficacy if available is not accessible to the general public. The existence of knowledge gaps goes a long way in affecting the people's intention to accept the COVID-19 vaccines as they might not be able to make informed choices and decisions. This finding is consistent with previous studies which reported low knowledge levels concerning the COVID-19 vaccine [19]. Interestingly, these studies showed that knowledge about the vaccine was positively correlated with one's vaccine uptake. It suggests that information is an important factor influencing vaccine acceptance and that lack of information affects peoples' willingness and attitude towards taking the vaccine. This result is consistent with the theory of reasoned action which highlights the importance of background factors such as knowledge and access to information in influencing people's intention to adopt a health behaviour such as COVID-19 vaccination [19].

The findings further revealed that adequate information on COVID-19 preventive measures is lacking which could have resulted in the respondents' low-risk perception and hesitance in accepting the vaccine. It corroborates previous studies from low-and-middle-income countries (LMICs) and elsewhere which reported vaccine hesitance among health staff and community members. For example, a study conducted in Zambia reported substantial uncertainty and hesitancy about receiving the vaccine among parents,

despite expressing high intentions to have their children receive the COVID-19 vaccine [19].

The findings revealed that news from national TV/Radio, Government agencies, social media (Facebook, Instagram, and WhatsApp), and discussions amongst friends, family and healthcare providers play important roles in influencing the respondents' opinions regarding vaccination. More so, the findings show that the respondents are greatly influenced by their friends and family in making decisions concerning their intention to take the COVID-19 vaccine.

Associated Factors about Covid-19 Vaccine Uptake

The findings revealed that the general public's intention to accept the COVID-19 vaccine is hugely influenced by availability, storage and quality issues concerning the COVID-19 vaccine as well as the capacity of healthcare workers. It further suggests that attitude towards the COVID-19 vaccine has an important influence on the intention to take the vaccine. Participants' attitude seems to have been influenced by various factors including low-risk perception, fear of side effects, access to information, myths and misconceptions about the vaccine, and vaccine availability, storage, and accessibility [20] revealed that confidence in vaccine approval, perceived effectiveness of the vaccine in protecting others, and conspiracy beliefs are the most critical drivers of vaccination intention. Reference [21] determined that distrust of the pharmaceutical industry, the side effects that the vaccine may cause, and the misinformation in the media are barriers to vaccine intake.

Further, the findings showed that protection against COVID-19 infection; vaccines being available at no cost and eradicating COVID-19 infection were the main perceived benefits. Perceived benefits appear to play an important role in influencing people's attitude towards the COVID-19 vaccine. This finding is in keeping with the reasoned action approach which postulates that, before engaging in healthy behaviour, people evaluate the benefits against the risks [22]. An individual's attitude, therefore, will depend on their evaluation of the perceived benefits compared with the risks. Those who perceive more benefits are likely to have a positive attitude towards the target behaviour, and possibly adopt it. This finding is also consistent with those reported by [23] in Libya. These authors found that people who had a family member or friend infected with COVID-19 were more likely to accept the vaccine.

Conclusion

Nigeria's government has implemented several measures to curtail the COVID-19 pandemic. However, the country has faced several challenges in achieving the global target of getting its citizens vaccinated to tame its spread. This study reveals that understanding the knowledge, attitude, practice and concerns of the masses will help the country in evidence-based programming and adaptation of approaches to achieve greater response outcomes. Nigeria needs to employ different approaches to ensure that citizens exhibit positive attitudes towards the vaccine that will lead to its acceptance including:

1. Use of community meetings as channels to pass the information on COVID-19 across to the masses.
2. Train and use community members as expert clients to increase access to correct information in the community to prevent and address the widespread myths and misconceptions about the vaccine.
3. Conduct community engagement activities that would focus on addressing behavioural beliefs and increase risk perception by people and possibly change their attitude positively to improve acceptance of the vaccine.
4. Use social media to provide correct information to people about their personal

risk and susceptibility to the COVID-19 disease.

Conflict of Interest Declaration

There is no conflict of interest to declare.

Acknowledgement

I wish to thank everyone who contributed to the success of this study. I appreciate you all.

References

[1]. World Health Organization (WHO), (2020). COVID-19 Vaccine Tracker and Landscape. https://www.who.int/publications/m/item/draft-landscape-of-covid-19-candidate-vaccines

[2]. World Health Organisation (2022). Weekly Epidemiological Update on COVID-19. Available via: https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19---14-september-2022

[3]. National Centre for Disease Control (2022). COVID-19 Nigeria. Available via: https://covid19.ncdc.gov.ng/covid19update

[4]. Nicola, M., Alsafi, Z., Sohrabi, C. and Kerwan A. (2021). The Socio-Economic Implications of the Coronavirus Pandemic (COVID-19): A Review. *Int J Surg*. (2020) 78:185–93.

[5]. Geoghegan, S., O'Callaghan, K. P. and Offit, P. A. (2020). Vaccine Safety: Myths and Misinformation. *Frontier Microbiology*, Vol. 11, pp. 372-389.

[6]. Afia, U. U; Obot, V. O; Johnson, N. I. (2022). Knowledge, Attitude and Acceptability of COVID-19 Vaccination among Lecturers in Universities in Akwa Ibom State, *International Journal of Ebola, AIDS, HIV and Infectious Diseases and Immunity*, Vol. 7, No. 1, pp. 38-50

[7]. Aliyu, Murtala and Gora, Abbas Adamu Lamido, "Acceptance and Attitude toward Vaccination against COVID-19: A Cross-Sectional Study of Academic Librarians in Nigeria." (2023). *Library Philosophy and Practice (e-journal).* 7488. https://digitalcommons.unl.edu/libphilprac/7488

[8]. Afolabi, M. O., Wariri, O., Saidu, Y., Otu, A., Omoleke, S. A., Ebenso, B., Adebiyi, A., Ooko, M., Ahinkorah, B. O. & Ameyaw, E. K. et al., (2021). Tracking the Uptake and Trajectory of COVID-19 Vaccination Coverage in 15 West African Countries: An Interim Analysis. *BMJ Global Health*, 6, e007518.

[9]. National Primary Health Care Development Agency (NPHCDA) (2021). COVID-19 Vaccination Update. Available via: https://nphcda.gov.ng/2021/10/20/covid-19/

[10]. Dror A A, Eisenbach N, Taiber S, et al. (2020). Vaccine Hesitancy: The Next Challenge in the Fight Against COVID-19. *Eur J Epidemiol*. 35(8):775–779. doi: 10.1007/s10654-020-00671-y

[11]. Liu Q., Qin C., Liu M., Liu J., (2021). Effectiveness and Safety of SARS-CoV-2 Vaccine in Real-World Studies: A Systematic Review and Meta-Analysis. *Infect Dis Poverty*. 10(1):1–15. doi: 10.1186/s40249-021-00915-3. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

[12]. Karlsson L. C., Soveri A., Lewandowsky S., et al., (2021). Fearing the Disease or the Vaccine: The Case of COVID-19. *Pers Indiv Differ*. 172. doi: 10.1016/j.paid.2020.110590. [PMC free article] [PubMed] [CrossRef] [Google Scholar].

[13]. Andrade C, Menon V, Ameen S, et al., (2020). Designing and Conducting Knowledge, Attitude, and Practice Surveys in Psychiatry: Practical Guidance. *Indian J Psychol Med*. 42(5):478–481. doi: 10.1177/0253717620946111.

[14]. Voysey M, Clemens S A C, Madhi S A, Weckx LY, Folegatti P M, Aley P K, et al., (2021). Safety and Efficacy of the ChAdOx1 nCoV-19 Vaccine (AZD1222) Against SARS-CoV-2: An Interim Analysis of Four Randomised Controlled Trials in Brazil, South Africa, and the UK. Lancet. 397:99–111. doi: 10.1016/S0140-6736(20)32661-1.

[15]. MacDonald N E. (2015). Vaccine Hesitancy: Definition, Scope and Determinants. Vaccine. 33:4161–4. doi: 10.1016/j.vaccine.2015.04.036.

[16]. Yisak H, Ambaw B, Belay E, Desalegn T, Getie A, Asrat M, Guangul A, Seid T, Zewde E A, Assefa M and Ewunetei A (2022) Knowledge, Attitude, Acceptance, and Practice of COVID-19

Vaccination and Associated Factors Complemented with Constructs of Health Belief Model Among The General Public in South Gondar, Ethiopia: A Community-Based Study. *Front. Public Health* 10:914121. doi: 10.3389/fpubh.2022.914121(Author).

[17]. Chinnasamy N, Adhimoolam M. (2023). Knowledge, Attitude, Practice and Acceptability Towards Covid-19 Infection and Vaccination – A Community-Based Study. *Natl J Physiol Pharm Pharmacol* 13(10):2172-2177. Doi: 10.5455/njppp.2023.13.04174202308042023.

[18]. Danso D. (2021). Assessing Efficient Cold Chain Management Practices in the Health Sector and its Impact on Service Delivery in Ghana: A Study of Komfo Anokye Teaching Hospital, KUMASI. Master's Thesis, *Kwame Nkrumah University of Science and Technology*

[19]. Sialubanje C, Mukumbuta N, Ng'andu M, et al., (2022). Perspectives on the COVID-19 Vaccine Uptake: A Qualitative Study of Community Members and Health Workers In Zambia. *BMJ Open:* 12:e058028. doi:10.1136/bmjopen-2021-058028.

[20]. Burke et al., (2021). Enablers and Barriers to COVID-19 Vaccine Uptake: An international Study of Perceptions and Intentions. Vaccine, 39, pp. 5116-5128 http://dx.doi.org/10.1016/j.vaccine.2021.07.056

[21]. Ackah et al., (2022) COVID-19 Vaccine Hesitancy in Africa: A Scoping Review. Global Health Research and Policy, 7, pp. 1-20 http://dx.doi.org/10.1186/s41256-021-00234-y

[22]. Ferrer R, Klein W M, William M K. (2015). Risk Perceptions and Health Behavior. *Curr Opin Psychol* 5:85–9. doi: 10.1016/j.copsyc.2015.03.012.

[23]. Elhadi, M., Alsoufi, A., Alhadi, A. et al., (2021). Knowledge, Attitude, and Acceptance of Healthcare Workers and the Public Regarding the COVID-19 Vaccine: A Cross-Sectional Study. *BMC Public Health* 21, 955. https://doi.org/10.1186/s12889-021-10987-3