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Attitudes and perceptions of rural dwellers in Anambra state Nigeria towards receiving COVID-19 vaccination: A population based cross-sectional study

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Abstract

Background: The development of vaccines against COVID-19 has had a significant impact on managing the pandemic. However, little data exists on the level of vaccine acceptance in Nigeria and Africa.

Objective: This study assessed the knowledge, attitudes, perceptions, and acceptance of COVID-19 vaccines among rural dwellers in Anambra state, Nigeria.

Methods: This study is a cross-sectional questionnaire-based survey carried out in rural communities from February to April, 2023. A total of 400 adults, 100 adults per location who were aged 18 years and above were involved in this study using the multi-stage sampling technique.

Results: The study analyzed the willingness of rural dwellers adult to receive the COVID-19 vaccine, with 497 respondents aged 18 years and above. Majority of the respondents were female, between the ages of 18-25 years, and had attained tertiary education. Most respondents heard about the vaccine through social media and health professionals. Only 22.74% of the respondents had taken the vaccine, with 77.26% yet to receive it. Age, higher educational level, and being employed were significantly linked with the willingness to receive the vaccine.

Conclusion: The study found that while adults have good knowledge of the COVID-19 vaccine, there is little willingness to be vaccinated due to reported side effects. The study suggests a need for appropriate health education in rural areas to increase vaccine acceptance.

Keywords: COVID-19; Vaccine; Perception; Willingness; Assess; Rural

1. Introduction

The COVID-19 pandemic has affected more than 5.5 million people worldwide in 144 countries and poses a significant threat to the economies and health of affected countries, especially in third-world economies like Nigeria. The World Health Organization (WHO) has collaborated with partners to create the COVAX scheme to provide vaccines to poorer countries like Nigeria. However, there are controversies and misconceptions surrounding the COVID-19 vaccine in Nigeria that may limit its acceptance. Several studies have been conducted to assess the acceptance of the COVID-19 vaccine among the Nigerian population, with age, income, and occupation significantly affecting the potential acceptance of the vaccine. Health policy officials in Nigeria should prioritize the development of strategies that emphasize transparency, trust, and strong leadership to increase the vaccine acceptance rate.

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One study by Mohammed Al-Mohaithef et al. [1] showed that only 50.7% of the respondents were willing to accept the vaccine, and the majority (81.1%) were not willing to pay for the vaccine. Another study by Obi-Ezeani et al. [2] assessed the knowledge, perception, and willingness to receive the COVID-19 vaccine among residents of Awka metropolis, the capital city of Anambra state, Nigeria, showing that only 25.7% of the respondents were willing to receive the vaccine. This study aims to assess the perception and willingness to receive the current COVID-19 vaccine among Nigerian adults residing in the rural areas of Anambra State, Nigeria, where no study has been conducted to determine the willingness of people in the rural areas to accept the vaccine. Al-Mohaithef et al. [1] suggest that increasing the acceptance of the global immunization program may be aided by addressing socio-demographic factors related to Covid-19 vaccination. Controversies and misconceptions surrounding the COVID-19 vaccine in Nigeria could jeopardize public health efforts to halt the spread of the virus [3, 4]. The outcomes of this research could have a positive impact on public health education by promoting awareness about the significance of COVID-19 vaccination through effective public health literacy programs and educational initiatives. Additionally, comprehending communities' attitudes towards vaccines can aid in developing approaches to improve global vaccination programs.

2. Materials and methods

2.1. Study Area

The study was carried out in Anambra State, situated in the southeastern region of Nigeria, which has a population of approximately 4,177,821 people, comprising 2,117,984 males and 2,059,844 females, according to the 2006 census. The literacy rate in Anambra State is 75.1%, and the main economic activities are agriculture and trading, particularly in the rural areas. As of 2021, 643,658 residents of Anambra have been vaccinated against COVID-19. To gain insight into the opinions of rural residents regarding the COVID-19 vaccine, the two local governments with the largest rural populations, Idemili North and Anaocha, were chosen for the study. The population of these two local governments, as per the 2006 census, are Idemili North with 431,005 persons and Anaocha with 284,215 persons [5]. These figures were projected to 2020 using the equation $P_2 = P_1(1 + r)^n$, where P_2 is the projected population, P_1 is the known population (in 2006), r is the rate of natural increase (2.8%) [6], and n is the number of years between P_1 and P_2 , which is 14 years in this case. The projected population figures for Idemili North and Anaocha in 2020 are 634,433 persons and 418,360 persons, respectively.

2.2. Survey Design and Data Source

From February 2023 to April 2023, a study was conducted in selected settlements in two local government areas in Anambra State. The study was community-based and cross-sectional, and it involved consenting adults aged 18 years and above who were present in selected households during the visit. The primary source of data was a questionnaire survey that aimed to collect information on the factors that influenced the respondents' decision to accept or refuse the COVID-19 vaccination offered by Nigerian state health authorities. The structured questionnaires were administered in person and online to rural residents in Idemili North and Anaocha Local Government Areas. The in-person and online distribution of the questionnaires was chosen to provide the respondents with various options to participate in the study.

2.3. Study Design & Study Population

The study utilized the Yamane formula for sample size determination, which was previously used by Thecla and Ogbodo [7], in order to obtain a sample that accurately represents the target population. According to Yamane's formula (1967), a sample size of 400 is appropriate for a population of over 100,000. Using the Yamane equation at a precision level of $\pm 5\%$, the sample size was calculated as follows: $SS = N / (1 + Ne^2)$, where SS is the sample size and N is the population size of the two selected LGAs (634,433 + 418,360).

2.4. Sampling Procedure

The study employed a multi-stage sampling technique for respondent selection, which involved the following stages:

- Stage 1: Two LGAs, namely Idemili north and Anaocha, were purposively selected from a list of 21 LGAs based on their high population of urban and rural communities.
- Stage 2: Using convenience sampling and taking population into account, four rural communities were randomly chosen from the list of rural communities in the two LGAs.
- Stage 3: Simple random sampling was used to select households for the study. The number of households selected from each of the four communities was proportional to their size, and a random sample of the assigned

number was taken from the list of households in each community obtained from the National Population Commission.

- Stage 4: Two eligible participants were selected from each selected household using simple random sampling with the aid of a table of random numbers.

2.5. Data collection

Data was collected using a pretested semi-structured questionnaire. This was adapted from similar studies and used by the lead researcher and assistants to conduct the research. A validated pretested questionnaire was adopted from similar studies. Questionnaire is attached at the end of the report.

2.6. Data analyses

Data was analyzed using SPSS version 23, significance level was set at 5% and descriptive statistics was used. Chi-square test was employed. Significance level was set at $p \leq 0.05$

2.7. Ethical consideration

The names and identity of the participants were not revealed in the study for confidentiality. Participants had the option of withdrawing at any point without any consequence and no harm came to the participants.

2.8. Ethical approval

Ethical Approval for this study was obtained from the Idemili North Local Government Health Research Department with code EXT/ETH/AN/002/4526.

Written informed consents was obtained from the study participants after explanation of the study aim, procedure, and voluntary nature of participation.

3. Results

Table 1 shows the socio-demographic characteristics of the respondents. A total of 497 respondents aged 18 years and above completed the study. Majority of the respondents were between the ages of 18-25 years. 56.14% were married while 45.07% of the population attained tertiary education level with able to read and write being the least. The result reveled that majority of the respondents were Christians with 0.20% being a traditionalist.

More than half of the respondents were females (55.73%). 27.40% of the respondents accounted for the highest level of occupants that live in a rented apartment with 32.80% being self-employed.

Table 1 Demographics

Features	Category	Frequency	Percentage (%)
Gender	Male	220	44.27
	Female	277	55.73
Age (years)	18-25	133	26.76
	26-33	85	17.10
	34-41	100	20.12
	42-49	57	11.47
	50-57	64	12.88
	>58	58	11.67
Marital status	Single	195	39.24
	Married	279	56.14
	Divorced	19	3.82

	Separated	4	0.80
Educational level	Primary	23	4.63
	Secondary	216	43.46
	Tertiary	224	45.07
	Illiterate	55	11.07
	Able to read and write	2	0.40
Religion	Christianity	496	99.80
	Islam	0	0
	Traditionalist	1	0.20
	Prefer not to say	0	0
Type of residency	Own home	90	18.11
	Rented apartment	136	27.40
	Lived with relatives	135	21.20
	Others	136	27.40
Occupation	Self employed	163	32.80
	Govt employed	88	17.71
	Retiree	31	6.24
	Student	150	30.20
	Unemployed	65	13.10

In table 2, all the respondents have heard about the COVID-19 vaccine and its obtainability in Nigeria. Majority of the respondents got to know about the vaccine via social media followed by 27.40% of the respondents that got to know about the vaccine through their health professionals.

A good percentage of the respondents know someone that have taken the vaccine and 72.83% indicated that the common side effect reported is headache followed by abdominal pains accounting for about 33.80%.

Only 22.74% have taken the vaccine and a percentage of 77.26 are yet to receive the vaccine. Among the percentage that are yet to receive the vaccine, only 20.93 are willing to receive the vaccine against 79.07% that are not willing to be vaccinated.

All the respondents believe the vaccine is accessible. Among the 497 respondents, 31.59% thinks the vaccine should be mandatory while 68.41% believe it should not be mandatory. Among the population that thinks the vaccine should be compulsory, 63.78% believes it will help reduce the spread of the virus while minority (6.04%) believes the vaccine is for high risk people.

Among those that thinks the vaccine should not be compulsory, 10.87% believes it will reinforce the misconception about the vaccine while majority (80.28%) thinks it should not be coercive.

Table 2 Result on knowledge and willingness to receive the COVID-19 vaccine

Questions	Responses	Number	Percentage
Have you heard about COVID-19 vaccine?	Yes	497	100.0
	No	0	0.0
Are you aware that COVID 19 vaccine is available?	Yes	400	
	No	97	
How did you hear about the vaccine?	Social media	200	40.24
	Newspaper	0	0.00
	Family/friend	7	19.52
	Social/religion gathering	64	12.88
	Health professionals	136	27.40
Do you know anyone that has taken the COVID-19 vaccine?	Yes	344	69.23
	No	153	30.78
If yes, is/are there any reported side effects	Yes	372	74.85
	No	125	25.15
What are the reported side effects	Chest pain	5	1.01
	Shortness of breath	20	4.02
	Fatigue	105	21.13
	Headache	362	72.83
	Back aches	109	21.93
	Fever	22	4.43
	Abdominal pains	168	33.80
	Others	7	1.41
Have you received the COVID-19 vaccine?	Yes	113	22.74
	No	384	77.26
Are you willing to receive the COVID-19 vaccine?	Yes	104	20.93
	No	393	79.07
If no, what is/ are your reasons	Medical condition	0	0
	Rumored controversies	81	16.30
	Against religion	0	0
	Not necessary	17	3.42
	Possible side effects	399	80.28
	No reason	0	0
	Others	0	

Table 3 Result on the perception of COVID 19 vaccine

Questions	Responses	Number	Percentage
Do you think the vaccine is assessable to all?	Yes	497	100
	No	0	0
Do you think the vaccine should be made compulsory in Nigeria?	Yes	157	31.59
	No	340	68.41
If yes, what is/are your reasons?	Reduce spread	317	63.78
	Safe and effective	130	26.16
	Only for high risk individuals	30	6.04
If no, what is/are your reasons	Should not be coercive	399	80.28
	May reinforce the misconception about vaccine	54	10.87
	Preference for natural immunity	8	1.61
	Possible resistance by the masses	36	7.24
	Others	0	0

In table 4, age, educational level and occupation was significantly linked with the willingness to receive the COVID-19 vaccine ($p < 0.05$).

Table 4 Relationship between socio-demographic factors and willingness to receive the COVID-19 vaccine

Characteristics		Yes	%	No	%	X ²	P-value
Gender	Male	108	44.30	112	44.30	2.225	0.134
	Female	136	55.74	141	55.73		
Age	18-25	73	35.30	60	20.70	3.443	0.101
	26-33	45	21.74	40	13.80		
	34-41	35	16.91	65	22.41		
	42-49	31	14.98	26	8.96		
	50-57	3	1.45	61	21.03		
	≥58	20	9.70	38	13.10		
Marital status	Single	65	33.33	130	43.05	2.244	0.318
	Married	123	63.08	156	51.65		
	Divorced	7	3.60	12	3.97		
	Separated	0	0.00	4	1.32		
Educational level	Primary	9	3.64	14	5.13	3.772	0.010
	Secondary	108	43.72	108	43.72		
	Tertiary	110	44.53	114	41.80		
	Illiterate	20	8.10	35	12.82		
	Able to read and write	0	0.00	2	0.73		
Religion	Christianity	221	100.00	275	99.64	2.321	0.131

	Islam	0	0	0	0.00		
	Traditionalist	0	0	1	0.36		
	Prefer not to say	0	0	0	0		
Occupation	Self	79	47.59	84	50.60	4.192	0.010
	employed	13	7.83	18	10.84		
	Retiree Student	44	26.51	106	63.86		
	unemployed	30	18.10	35	21.08		

4. Discussion

This study evaluated the awareness, perception, and willingness of to receiving the COVID-19 vaccine among adults Nigerians living in rural areas of Anambra state. The findings reported that all the respondents are aware of the COVID-19 vaccine. A good percentage of the respondents are aware of its availability in Nigeria. Obarisiagbon et al [8], in a study done in Edo state reported 30% knowledge of the vaccine availability.

The respondents were aware of the vaccine via social media, newspaper, social gathering and health professionals. However, a greater percentage of the respondents (40.24%) heard about the availability of the vaccine via social media. this could be as a result of the awareness created through the media [2]. Greater percentage of the respondents (72.83%) reported that headache was the major side effect reported by the people that have taken the vaccine. A study by Omeish et al [9] on the reported COVID 19 vaccines side effects among Jordanian population revealed that out of the 1086 participants, 33.1% reported to have experienced headache after receiving the AstraZeneca or Pfizer vaccines.

Only 22.74% of the respondents have received the vaccine as well as 79.07% are not willing to receive the vaccine. This is in consonance with the findings reported by Obi-Ezeani et al [2] in a similar study that investigated the knowledge, perception and willingness to receive the current COVID-19 vaccine among residents of Awka metropolis, Anambra state Nigeria that revealed that a good number of the respondents are not willing to receive the vaccine (74.3%). This could be as a result of the reported side effects they rural dwellers have reported to have seen in other people that have received the vaccine. This was also evident in their responses; possible side effect of the vaccine (80.28%) and rumored controversies (16.30%) surrounding the virus and the proposed vaccine. Okoh et al [10], reported a prevalence of 46% of the respondents in Plateau state with fear of side effect accounting for the highest reason for the hesitancy (17.2%). The result is also comparable with the findings of Obi Ezeani et al (2) that reported 55% of the study population in Awka metropolis indicated possible side effect as the reason for not willing to take the vaccine. There is need to embark on health education to members of the general public on the importance of COVID 19 vaccination [10]. This will result in more people getting vaccinated. All the respondents (100%) thought the vaccine was accessible to everyone. This is an indication of sufficient information about COVID 19 vaccine.

Most of the respondents are not in support of the implementation of a mandatory COVID 19 vaccination. According to 80.28% of the respondents, vaccination should be option and not forced while 10.87% believe that a mandatory vaccination may perpetuate the vaccine myth. Nevertheless, 31.59% of the respondents that believe the vaccine should be made compulsory, majority believe it will help reduce the spread of the virus. This result is in consonance with the findings of Obi Ezeani et al [2] reported that 76.8% of the minority respondents that believe the vaccination should be compulsory believe it will minimize the spread of the virus. 26.16% believe it is safe and effective while 6.04% are of the opinion that the vaccine is for high risk individuals.

The socio-demographic features including educational level, occupation and age were significantly linked with the willingness to accept the vaccine. This could be attributed to their knowledge of the vaccine, their susceptibility to the virus and the benefit of being vaccinated. The findings is in consonance with the report by Obi-Ezeani et al [2] that revealed that there is significant association between occupation and the willingness to accept the vaccine among Awka metropolis dwellers. Gender, marital status, type of residence were not significantly associated with the willingness to accept the vaccine.

4.1. Strength and limitation of the study

This study gives an insight into the acceptance of the COVID 19 vaccine among rural dwellers in Anambra state. However, the study did not associate their type of residence with the willingness to receive the COVID-19 vaccine. The result should not be generalized because this study focused on the most populated rural settings of Anambra state.

5. Conclusion

The findings revealed that the participants have a good knowledge of the COVID 19 vaccine but little willingness to be vaccinated due to the reported possible side effects of the vaccine. There is need to enlighten the rural dwellers on the benefit of the vaccine and why they should be vaccinated through appropriate health education in the rural areas.

Compliance with ethical standards

Disclosure of conflict of interest

The author declare no conflict of interest.

Statement of ethical approval

The present research work does not contain any studies performed on animals/humans subjects by any of the authors'.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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