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Knowledge and acceptability of COVID-19 vaccine among residents of Jos-south Local Government Area in Nigeria

Acceptability of COVID-19 vaccine

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Abstract
Objective: Major efforts are being made to curtail the spread and adverse effects of the coronavirus pandemic using vaccines. Ever since vaccines have become available, there has been a global effort to attain herd immunity of at least 75% through the administration of vaccines. There is a dire need to assess the knowledge as well as the acceptability of COVID-19 vaccines among residents of Jos South Local Government. This study aims to assess the knowledge and acceptability of the COVID-19 vaccine among residents of Jos South Local Government.
Methodology: It was a descriptive cross-sectional study, 318 respondents were selected using a multistage sampling technique, with a 98.7% response rate. Data were collected using an interviewer-administered semi-structured questionnaire and analyzed using IBM SPSS version 25. Frequency tables were drawn from univariate analysis and Chi-square was used to test for association between two categorical variables. The level of significance is set at $P<0.05$.
Result: This study revealed that 50.6% of respondents have good knowledge of the COVID-19 vaccine, while 70.8% have good acceptability of the COVID-19 vaccine, 66.0% were already vaccinated, a significant association was found between age and COVID-19 vaccine acceptability among respondents at ($\chi2=9.495$, $p=0.045$).
Conclusion: The level of acceptance of the COVID-19 vaccine was moderately high among the participants, more than two-thirds of the respondents had good knowledge and acceptability of the COVID-19 vaccine. Therefore, the need for more health-related education among the general populace to alleviate any fears associated with the vaccine is urgently required.

Keywords: Perception, Acceptability, COVID-19, Vaccine

Plain English Summary

This study aims to find out how much the residents of Jos South local government know about COVID-19 vaccine and if they will be ready to get the vaccine. The findings from the study thus revealed that just half of them know much about the disease while two-third will be ready to accept the vaccine.

Introduction

A massive global human disaster has been created by a recent contagious respiratory infectious disease caused by a novel coronavirus (SARS-CoV-2) which holds the same veiled RNA structure resembling SARS-CoV-1 that caused the Severe

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Acute Respiratory Syndrome (SARS) outbreak (1). The most effective way of controlling infectious diseases is often vaccination, while success is often challenged by individuals and groups who choose to delay or refuse vaccines (2). Although immunization has successfully reduced the global burden of illness and death, public confidence in vaccines can be affected by various concerns. As such, vaccine hesitancy can lead to delays and refusal and sometimes contribute to disease outbreaks (3).

At the early period of the COVID-19 pandemic when there was no known COVID-19 vaccine or treatment, herd immunity was suggested as a possible remedy for tackling SARS-CoV-2, the COVID-19 virus (4). It was however estimated that herd immunity cannot be reached until 66.7% of the total population, vulnerable or healthy, gets exposed to SARS-CoV-2 (5). Estimates from a study conducted across the West African sub-region revealed that for herd immunity to be achieved, 261 billion cases and nearly 5 million deaths would be recorded (at a case fatality rate of 2%). To arrest the increasing morbidity and mortality due to COVID-19, research has been conducted for the development of a COVID-19 vaccine, and COVID-19 vaccines are currently available in some countries.

The effectiveness of vaccination programs and the global objective of eradicating the pandemic require optimal acceptance of the vaccine across all countries. The success of any vaccination program is largely dependent on how well the vaccines are accepted among the population and the willingness of people to be vaccinated. Vaccine hesitancy a continuum that encompasses delay, reluctance, or refusal to receive a vaccine despite its availability (6) is a major obstacle to vaccination among the general population and health workers, and widely held perceptions of the safety of vaccines may contribute significantly to this phenomenon. Hence, the purpose of this study is to assess the perception and acceptability of the COVID-19 vaccine among residents of Jos South Local Government area.

Methodology

Study Area

Jos South is a Local Government Area in Plateau State, Nigeria. the de facto capital of Plateau state. Its headquarters is located in Bukuru town on 9°48′00″N 8°52′00″E.

It has an area of 510 km^2 and a population of 306,716 at the 2006 census. It is the second most populated Local Government Area in the state after Jos-North. There are twelve (12) wards in Jos South Local Government.

Study Design

This was a descriptive cross-sectional study.

Study Population

This study was carried out among adults that are above 18 years old who have lived in the Jos South community for at least one year while those who were ill at this time of the study were excluded.

Sample Size Determination and Sampling Technique

The sample size was determined using Leslie Fisher's formula for estimating single proportions and the formula for estimating the minimum sample size. Prevalence of COVID-19 acceptance rate from a previous study was 25.1% (7). A non-response rate of 10% was added to cater for questionnaires that may be lost to attrition which gave a minimum sample size of 318. A multistage sampling technique was employed in the selection of 318 respondents.

Data collection

Data was collected between January 2022 and May 2022 through the use of a pre-tested, interviewer-administered questionnaire with the help of trained research assistants. The questionnaire was developed from adapted questions from previous similar studies. This was used to gather information about the socio-demographic characteristics, knowledge and acceptability of the respondents on the COVID-19 vaccine.

Data Analysis

Following data collection, the instrument was checked for completeness and correctness. Data was analyzed both quantitatively based on the study objectives. Data was processed using IBM Statistical Packages for Social Sciences (SPSS) Version 25. Frequency distributions, percentages, mean scores and standard deviations were computed and tabulated. Chi-square was employed for bivariate analysis of categorical variables at a 5% level of significance.

Ethical consideration

Ethical clearance for the study was obtained from the ethical review committee of the Ministry of Health in Jos, Plateau State and permission to carry out the study was obtained from the heads of the selected communities. Informed consent was

obtained from each of the participants and confidentiality was assured.

Out of 318 questionnaires that were distributed, 296 were filled and returned giving a response rate of 93.1%.

Results

Table 1: sociodemographic characteristics of respondents

Variables	Frequency	Percentage
Age		
<20	7	2.4
20-30	74	25.0
31-40	139	47.0
41-50	60	20.3
>50	16	5.4
Sex		
Male	178	60.1
Female	118	39.9
Tribe		
Yoruba	159	53.7
Hausa	125	42.2
Igbo	12	12
Religion		
Christianity	134	45.3
Islam	143	48.3
Traditionalist	19	6.4
Educational status		
No formal education	121	40.9
Primary	54	18.2
Secondary	54	18.2
Tertiary	67	22.6
Occupation		
Unemployed	36	12.2
Unskilled	157	53.0
Semi-skilled	53	17.9
Skilled	50	16.9

Table 1 shows the socio-demographic characteristics of respondents, most respondents 139(47%) were within the age group of 31-40 years with one hundred and seventy-eight respondents being males while 118 (39.9%) were females. One hundred and fifty-nine (53.7%) were Yorubas, 125 (42.2%) were Hausa and 12 (4.5%) were Igbo, 134(45.3%) Christians had no formal education 54(18.2%) had primary education, 54(18.2%) had secondary education, 67(22.6%) had tertiary education respectively.

Table 2: Knowledge of COVID-19 among respondents

Variables	Frequency	Percentage
Symptoms of COVID-19 (Multiple responses)		
Fever	183	61.8
Convulsion	47	15.9
Wet cough	51	17.2
Bleeding from orifices	15	5.1
Shortness of breath	21	7.1
Diarrhea	30	10.1
Loss of taste	12	4.1
Loss of smell	27	9.1
Itching	24	8.1
Ways of contacting COVID-19 (Multiple responses)		
Consumption of uncooked meat	133	44.9

Needle prick	11	3.7
Droplet infection	89	30.1
Airborne infection	93	31.4
Contaminated surface	22	7.5
Recommended sample for diagnosis of COVID-19 (Multiple responses)		
Blood	66	22.3
Oropharyngeal swab	63	21.3
Sputum	89	30.1
Fecal sample	16	5.4
Nasopharyngeal swab	79	26.7
Prevention of COVID-19 (Multiple responses)		
Hand hygiene with soap	43	14.5
Avoid unprotected sex	181	61.1
Avoid needle prick	28	9.5
Cough hygiene	50	16.9
Us e of surgical mask	14	4.7
Surgical mask when treating respiratory symptoms	17	5.7
Use of N95 mask	46	15.5
Have you heard of COVID-19 vaccine?		
Yes	255	86.1
No	41	13.9
Source of information on COVID-19 vaccine (Multiple responses)		
Health workers	123	48.2
Family members	96	37.6
Newspaper	16	6.3
Internet	6	2.4
Social media	5	2.0
Mass media	61	23.9

Table 2 shows knowledge of COVID-19 among respondents shows that 138(61.8%), 51 (17.2%) and 47(15.9%) (indicated that fever, wet cough and convulsion respectively were common symptoms of COVID-19. Also, 255(86.1%) respondents have heard of the COVID-19 vaccine before, health workers 123(48.2%) have been the commonest source of information.

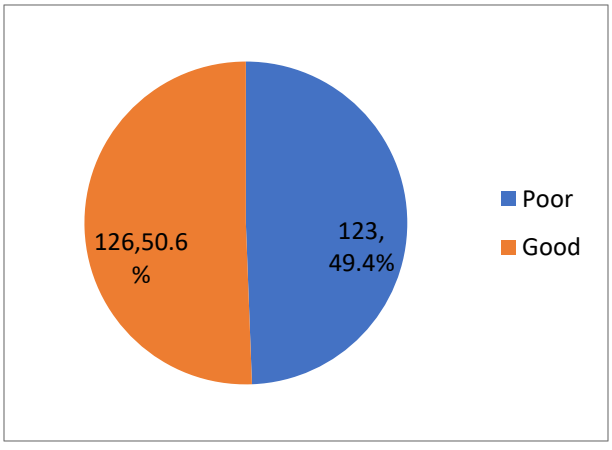

Figure 1: summarized knowledge of COVID-19 score of respondents

Figure 1 shows the summarized knowledge of COVID-19 score of respondents with 126(50.6%) respondents having good knowledge of the COVID-19 vaccine, while 123(49.4%) having poor knowledge.

Table 3: COVID-19 testing and vaccine acceptability

Variables	Frequency	Percentage
Willingness to accept COVID-19 vaccination		
Yes	164	64.8
No	89	35.2
Vaccination status of respondents		
Vaccinated	172	67.9
Unvaccinated and uncertain of willingness	56	22.1
Unvaccinated and not willing to get vaccinated	25	9.9
Reasons for willingness to be vaccinated		
I don't want to be infected	134	62.0
Coerced to be vaccinated	53	24.5
A must by the Government	15	6.9
Available in a nearby facility	22	10.3
Reason for not willing to get vaccinated		
Not enthusiastic about getting vaccinated	34	38.2
I can never be infected	14	15.7
No infected person around	21	23.6
No facility to get vaccinated	12	13.4
It's not compulsory	8	8.9

Table 3 shows COVID-19 testing and vaccine acceptability, 159(62.6%) are willing to be tested for COVID-19 and 164(64.8%) are willing to accept the COVID-19 vaccine. Also, 167(66.0%) were already vaccinated, 38(16.1%) were unvaccinated and not certain if they would accept the vaccine and 20(7.9%) were unvaccinated and were not willing to get vaccinated. Reasons given by most respondents 134(62.0%) for accepting the COVID-19 vaccination was to prevent being infected while 34 (38.2%) that did not accept the COVID-19 vaccination gave the reason that this was so because they were not enthusiastic about the vaccine.

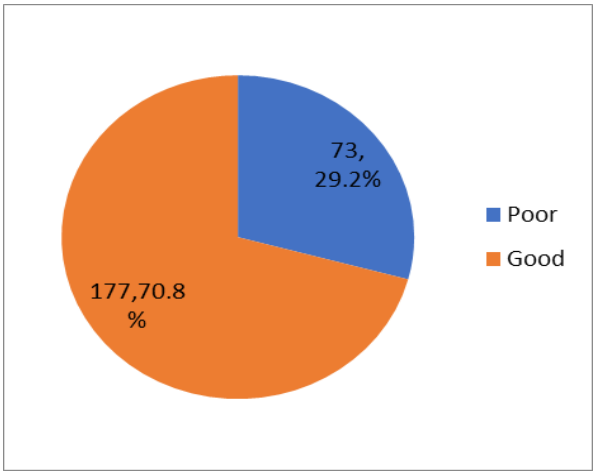

Figure 2: Acceptability of COVID-19 vaccine among respondents

Figure 2 shows 177(70.8%) had good practice of COVID-19 acceptability while 73(29.2%) had poor practice.

Table 5: association between respondent's socio-demographic characteristics and acceptability of COVID-19 vaccine

Variables	Acceptability		Total	Statistics
	Poor	Good		
Age				
< 20	1 (1.4)	4 (2.3)	5 (100.0)	
20-30	21 (28.8)	40 (22.6)	61 (100.0)	X^2= 9.495
31-40	35 (47.9)	85 (48.0)	120 (100.0)	Df =4
41-50	9 (12.3)	43 (24.3)	52 (100.0)	*P-value =0.045
>51	7 (9.6)	5 (2.8)	12 (100.0)	
Sex				X^2 = 0.003
Male	48 (65.8)	117 (66.1)	165 (100.0)	Df =1
Female	25 (34.2)	60 (33.9)	85 (100.0)	P-value =0.958
Tribe				
Yoruba	36 (49.3)	94 (53.1)	130 (100.0)	X^2 = 0.741
Hausa	33 (45.20	77 (43.5)	110 (100.0)	Df =2
Igbo	4 (5.5)	6 (3.4)	10 (100.0)	P-value = 0.690
Religion				
Christianity	32 (43.8)	81 (45.8)	113 (100.0)	X^2 = 0.403
Islam	38 (52.1)	86 (48.6)	124 (100.0)	Df = 2
Others	3 (4.1)	10 (5.6)	13 (100.0)	P-value =0.817
Educational status				
No formal	26 (35.6)	77 (43.5)	103 (100.0)	X^2 = 3.461
Primary	16 (21.9)	30 (16.9)	46 (100.0)	Df =3
Secondary	11 (15.1)	35 (19.8)	46 (100.0)	P-value = 0.326
Tertiary	20 (27.4)	35 (19.8)	55 (100.0)	

*Statistically significant

There is a statistical association between the age of respondents and their acceptability of the COVID-19 vaccine with a p-value of 0.045.

Discussion

Knowledge of the COVID-19 vaccine in this study is average in that just a little above half of respondents have good knowledge. The level at which people will be willing to accept the vaccine depends on how much they know about the disease. This is very similar to another study done in Ibadan where 43.3% of respondents have satisfactory knowledge of the disease. The probable reason for this average knowledge may be because of various misconceptions and myths about the COVID-19 virus and its mode of transmission in the environment.

In this study, more than two third of the respondents are willing to get vaccinated with the COVID-19 vaccine. A similar study (8) presented a lower extent of vaccine willingness in Bangladesh (51.4%). This idea was corroborated by another study in Bangladesh where 60% of respondents were willing to get vaccinated (3). The probable reason why the majority of respondents will not want to get vaccinated could be because of the fear of the side effects and also because of the myth that the vaccine can cause COVID-19 infection. This is in tandem with the outcome of another study done by Grech (9) where the major reason why respondents hesitated from getting vaccinated was their fear about the safety of the vaccine. There is a need to continuously demulsify misconceptions associated with this vaccine to increase its acceptability and uptake.

The COVID-19 pandemic has caused a general rise in negative emotions among the populace. In addition, drastic changes in socioeconomic structure and lifestyle, along with prolonged isolation and a lack of social interactions, have aggravated fear and anxiety among people. It has also been shown that the acceptance of a previous vaccination increased the intention to immunize among participants who had accepted previous influenza vaccines.

The acceptance rate found in this study failed to meet the minimum vaccination coverage of 75% in a population needed to establish herd immunity in an environment, However, it was very close (70.8%).

The acceptance level of COVID-19 vaccines among respondents is fairly good as more than two third are willing to get vaccinated, though it could still be better. More enlightenment could still be

done to increase the number of people in the populace who will be willing to get vaccinated. The more people that are vaccinated, the higher the herd immunity in the community which subsequently will lead to the reduction of prevalence of COVID-19. In this study, more respondents within the age group 41 and 50 have good acceptability of the COVID 19 vaccine compared to other age groups, which was statistically significant. This is quite similar to a study done by the Bureau of Statistics where most of the respondents who were not up to 30 years old had the lowest proportion of COVID vaccine uptake compared with those above 60 years of age (11). This may be because it is widely known that the elderly have a more severe form of the disease compared to people of the younger age group.

Conclusion

Knowledge of COVID -19 was on the average, however the level of acceptance of COVID-19 vaccine was moderately high. Age was a major determinants of willingness to accept COVID -19 vaccine

List of Abbreviation

COVID-19:	Corona Virus Disease 19
SARS:	Severe Acute Respiratory Syndrome

Declarations

Ethical approval and consent to participate

Ethical clearance for the study was obtained from the ethical review committee of the Ministry of Health in Jos, Plateau State (JSLG/S/TRA/04/VOLII). Informed consent was taken from individuals and permission to carry out the study was obtained from the heads of the selected communities.

Consent for publication

All authors gave consent for publication of the work under the Creative Commons Attribution-Non-Commercial 4.0 license.

Availability of data and materials

All essential data supporting the findings of this case are available within the article. Additional data are available upon request from the corresponding author.

Competing interests

The authors declare no conflict of interest.

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Authors' contributions

IOR contributed to the conception, design and final write up.DJF, IOS and IRO contributed to literature research, final write up and proof reading

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