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ASSESSMENT OF KNOWLEDGE, PERCEPTION AND PUBLIC ACCEPTANCE OF A COVID-19 VACCINE IN NASARAWA STATE, NIGERIA.

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ABSTRACT

The aim of this study was to assess the knowledge and awareness of Covid-19, a Covid-19 vaccine and the willingness to accept same by residents of Nasarawa State, Nigeria. To identify the major sources of information about Covid-19 vaccine and find out the general public perception of Covid-19 in Nasarawa state. The survey design was adopted and a well-constructed questionnaire was employed to generate quantitative data from 385 respondents. Descriptive statistics such as frequency, mean, standard deviation, variance, simple percentages, tables and charts were used to analyze the data, Chi-square was also used to test hypothesis using the Statistical Package for the Social Sciences (SPSS) Software version 26. The study was limited to the state's capital due to limited available resources. The results of the study's hypothesis at $p<0.05$ revealed that residents of Nasarawa State are aware and knowledgeable of Covid-19, however, are not willing to accept a Covid-19 vaccine. In the case of a few whom indicated interest in the vaccine, majority preferred an American (27%) or African (23%) made vaccine. It is imperative that to combat Covid-19 in Nasarawa state, all stakeholders must engage in relentless persuasive awareness campaign to enlighten the people on Covid-19 vaccines and its importance to humanity.

Keywords: Acceptance, Covid-19, Knowledge, Perception, Vaccine.

JEL Classification Codes: I10, I12, I18, Y1.

INTRODUCTION

Several diseases have caused different levels of global pandemic at different times but it wasn't so anticipated that the world will be brought to its knees in 2020, following the rise of SARS-CoV-2, the causative agent for Covid-19 which resulted in an unprecedented state of emergency for health (Loomba et al, 2021). The end of 2019 marked the beginning of a season where people had to make a choice between wearing a mask, hand sanitize, been six feet apart (social distancing) or risk been six feet beneath the earth. The advent of the novel Coronavirus disease 2019 (Covid-19) which was first identified in Wuhan province of China in the later part of December, 2019 and eventually declared a global pandemic 11th March, 2020 has been said to have no immediate treatment nor cure (WHO, 2020 & UNODC, 2021), however, there are several vaccines that have recently scaled through clinical trials and are currently administered in different countries having received urgent approvals to curtail the pandemic. Thus far, as at the date of this writing there are 178,360,849 confirmed cases, with over 60% recoveries from the illness and 3,869,384 deaths worldwide as at March 14, 2021 (NCDC, 2021; WHO, 2021). The beginning of Nigeria's travail with Covid-19 cases was on the 27th of February, 2020, with an index case via an Italian citizen and as of April, 2020 there were over 280 laboratory confirmed case of Covid-19 in Nigeria with 51 discharge and 7 deaths. As of 20th June, 2021 there has been 167,258 confirmed cases, 163,557 recoveries, 2,117 deaths with 1,532 active cases. However, only 2,280,983 persons have been tested so far, of the over 200 million estimated population for Nigeria. In Nasarawa State, there have been 2,384 confirmed cases, 2,345 recoveries and 39 deaths reported so far, with only 25,344 persons tested (Olapegba et al, 2020; NCDC, 2021 & National Populations Commission, 2019).

The study of Kwok, Lai, Wei, Wong & Tang (2020) and Sanche et al (2020) cited in Loomba et al (2021) revealed that a Covid-19 vaccine will need an acceptance level of at least 55% of the population to provide satisfactory herd immunity with an estimate reaching a prospect as high as 85% which is also subjective to the country and infection rate. However, it was also well noted that reaching the required vaccination levels is not one that should be assumed but that well and articulate documentation should be conducted during vaccination, given cognizance to the level of vaccine hesitancy by the vast majority which is fueled by misinformation regarding the importance, safety, effectiveness (de Figueiredo, Simas, Karafillakis, Paterson & Larson, 2020) and intent of the vaccine manufacturers and partners. Different mass media and social media platforms have been infiltrated with different false and misinforming ideas about the pandemic, for example, that 5G network was linked to the virus, vaccine trial participants died after taking a trial dose, the virus was a bioweapon in the struggle for world power between China and USA (Megget, 2020 & Geldsetzer, 2020) or that it was another form of punishing the world by the supernatural for the crimes committed on earth. The source of such information must be investigated as such misguiding information may find fertile soil upon the already existing fear, planting seeds of doubt, distrust and cynicism over new vaccines thus, threatening to limit the public acceptance and uptake of Covid-19 vaccines.

While anticipating a vaccine for Covid-19 a survey was carried out in June 2020 and discovered that, 38% in the United Kingdom and 34.2% in the United States of America were willing to accept and take a Covid-19 vaccine while, a further 31% and 25% respectively were not sure that they would accept to be vaccinated against Covid-19 (McAndrew & Allington, 2020). Similarly, same study was carried out in Uganda and it was discovered that 53.6% of

respondents showed acceptance to be vaccinated where those of 18-20 age group were more likely to take the vaccine amongst which male subjects were twice as likely to accept the vaccine. Nonetheless, 46.7% of the respondents considered it too much a risk to be vaccinated (Echoru, Ajambo & Bukenya, 2020). In another global cross-sectional survey, carried out by Mannan and Farhana (2020), it was revealed that 65.50% of respondents strongly agree that it is important to get a vaccine to protect the people from Covid-19, however, 44.70% of the respondents expressed their worries about unforeseen impacts of the Covid-19 vaccine following the speed in time for development, clinical trial and approval of the vaccine. In view of these global response rate to Covid-19 vaccine, this raises the concern for Nigeria as to what the response will be for a nation whose citizens are highly suspicious of their leaders, a nation whose populace are reserved about the intent of foreigners and a nation considered to be the religious and poverty headquarters of the world.

Nigeria is faced with several challenges in response to COVID-19 pandemic and as is typical to the African continent, Nigeria is almost already burdened by other diseases such as malaria, yellow fever, Lassa fever, tuberculosis, meningitis amongst others (Adekunle, Adegboye, Gayawan & McBryde, 2020). Hence, combating the menace of this pandemic requires a well-structured and coordinated strategy with a synergy from all tier of government and international partners. The United Nations Office on Drugs and Crime (UNODC, 2021) submitted a paper on Covid-19 vaccines and corruption risks and revealed some possible scenarios for the proliferation of fake vaccines and the manipulation of the distribution process amongst the people around the globe. The paper posited that it is possible that variables such as favouritism, nepotism, leakages in emergency funding and procurement challenges present a rare opportunity for the alteration of a Covid-19 vaccine in terms of quality and service delivery, however, it is important to note here that the foregoing corruption tendencies as put forth by the UNODC is only a call for concern to the level of degree of acceptance and willingness of the citizens to be vaccinated in a nation.

At the time for pre-vaccine trail, a study was carried out in Nigeria to find out the knowledge, perception and preparedness of Nigerians to participate in a vaccine trial and it was discovered that 96.3% of the population were aware of the existence of Covid-19 but only about 13% considered themselves highly exposed to the virus. Furthermore, 75.3% believed it right that a vaccine should be developed to fight against the virus and were aware that several possible Covid-19 vaccines were underway to approval. 59.8% were in support that Nigeria should participate in the trial but such trial should take place only in isolation centres. Of most worthy concern was that 81.7% observed that they will not take the vaccine if they think it will in any form disrupt their daily life activity (Enitan, Oyekale, Akele, Olawuyi, & Olabisi et al (2020). Similarly, in another study it was discovered by Amakiri, Ogbodo, Chude & Offor et al, (2021) that 98% of Nigerians were aware of the plans for a Covid-19 vaccine and the effort of the Nigerian government to purchase same, however only 51.1% showed willingness to take a Covid-19 vaccine in Nigeria even though 52% respondents do not agree with the idea of making the usage of the vaccine compulsory in Nigeria.

The insufficiency of research on the public's knowledge and perception of a Covid-19 vaccine in literature at present does not mean that there are no mixed reactions or other issues that undermine the effectiveness of administration of Covid-19 vaccine in Nigeria and Nasarawa state in particular. Factors that influences different reaction to the vaccine may be known to the public but may not be known to the health care professionals (Ugal & Adaranijo, 2020) and the government. The importance of this knowledge gap must not be underestimated as it is

considered a serious limitation to understanding the extent of the problem posed by misguided information regarding Covid-19 in Nasarawa state, Nigeria. This study is therefore capable of contributing to the stock of knowledge by researching into the awareness of the public, their perception and possible response to a Covid-19 vaccine.

The paucity of data on the subject with specific reference to Nasarawa state gave birth to the need for this study. Therefore this study is intended to be undertaken to explore the public's knowledge and perception of a Covid-19 vaccine in Nasarawa State, Nigeria. This study intends to answer the following questions: what is the knowledge of Nasarawa state residents about Covid-19 and its symptoms? Are residents of Nasarawa State aware of a Covid-19 vaccine and willing to accept same? What are the major sources of information about covid19 and the vaccine to residents of Nasarawa State? What is the general public perception of Covid-19 in Nasarawa state?

H_0: Residents of Nasarawa state are not aware of a Covid-19 vaccine.

H_0: Residents of Nasarawa state are not willing to take a Covid-19 vaccine.

METHODS

STUDY DESIGN

This study is designed to employ quantitative data, thus, the survey design is adopted for the study. The survey design is a research method that allows the use of systematic procedure to measure human behaviour by using formal and well-structured research tools.

STUDY AREA AND POPULATION

The study will be conducted in Lafia local government area, the capital city of Nasarawa state. Lafia is a cosmopolitan urban settlement geographically located in the North Central part of Nigeria. It lies about 284 kilometers south of Jos, Plateau state. It has an area of 2,737 km^2 with an estimated population of 445,300 (National Population Commission, 2016). The study population consists of consenting persons who are residents of Lafia local government area

INSTRUMENT FOR DATA COLLECTION

The instrument is a well refined questionnaire constructed to collect data from consenting study participants. The developed instrument was validated by a pilot study in Lafia LGA, where 20 copies will be distributed to 20 randomly selected residents of Lafia Local Government Area to determine its readability, validity and acceptability, thus, refinement may be done following the response and observations made. The survey instrument comprises of 31 closed-ended questions and requires less than 10 minutes to complete. The 31 item questionnaire is divided into three sections. The first section are questions relating to socio-demographic information and a check box for the participant to indicate their consent to participate in the study. The second section is to assess the knowledge and awareness of covid-19, while, the third section assesses the knowledge, awareness, source of information and willingness to accept a covid-19 vaccine. This survey will be self-paced within a given time frame so that participants will have sufficient time to comprehend and answer all questions.

SAMPLING AND DATA COLLECTION

Using the Yamane Taro sample size determination formula of 1967, the sample size is generated thus:

$$n = \frac{N}{(1+Ne^2)} \qquad (1)$$

$$n = \frac{445{,}300}{(1 + 445{,}300(0.05)^2)}$$

$$n = \frac{445{,}300}{(1 + 445{,}300(0.0025)}$$

$$n = \frac{445{,}300}{(1 + 1113.25)}$$

$$n = \frac{445{,}300}{1114.25}$$

$$n = 399.64101$$

$$n = 400$$

The data was collected by the research assistants whom travelled to each community/settlement in Lafia local government area to administer the instrument to respondents and explained to those who may not be literate enough to comprehend. Questionnaires were administered to 400 respondents, however, only 385 were returned.

ETHICAL CONSIDERATION

Informed consent was obtained from the participants with assurance of anonymity and confidentiality before their participation in the survey. Respondents reserved the right to refuse to take part in the study, thus, their participation was voluntary with no form of coercion nor compensation. Anonymity and confidentiality was maintained throughout the study. Hence, all data obtained was kept under classified files where only researchers in charge of the survey will had access to.

DATA ANALYSIS

Data gotten from the study was entered into Microsoft excel and analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics was carried out to measure frequencies and percentage of variables and Chi-square *p* value used to test hypothesis.

RESULTS

Table 1: Socio-demographic variables of respondents.

Variables	Responses	Frequency	X	S. E.	SD	V
Sex	Male	200 (51.9%)	1.48	.025	.500	.250
	Female	185 (48.1%)				
Age Group	15-24	134 (34.8%)				
	25-34	152 (39.5%)				
	35-44	62 (16.1%)	2.02	.051	.993	.986
	45-54	30 (7.8%)				
	55 and above	7 (1.8%)				
Marital Status	Single	235 (61%)				
	Married	127 (33%)				
	Divorced/Separated	14 (3%)	1.47	.035	.681	.463
	Widowed	9 (2.3%)				
Religion	Christianity	228 (59.2%)				
	Islam	146 (37.9%)	1.44	.028	.551	.304
	Traditional	11 (2.9%)				
Education	No Formal Education	8 (2.1%)				
	Primary	20 (5.2%)				
	Secondary	133 (34.5%)	3.49	.035	.693	.480
	Tertiary	224 (58.2%)				
Occupation	Unemployed	126 (32.7%)				
	Artisan/Farmer/Trader	112 (29.1%)	2.11	.047	.925	.856
	Civil Servant	127 (33%)				
	Clergy	20 (5.2%)				
Monthly Income	Less than 30,000	160 (41.6%)				
	30,001 – 50,000	99 (25.7%)	2.07	.056	1.100	1.209
	50,001 – 100,000	66 (17.1%)				
	Above 100,000	60 (15.6%)				
	Total	**385 (100%)**				

Note. X = Mean; S. E. = Standard Error; SD = Standard Deviation; V = Variance
Source: Authors calculation

Table 1 is a representation of the socio-demographic distribution of respondents who participated in the study. Male respondents were 200 (51.9%) and females were 185 (48.1%) with a Mean on 1.48 and 0.500 Standard Deviation. The table shows that 134 (34.8%) were within the age of 15-24, 152 (39.5%) were 25-34, 62 (16.1%) were 35-44, 30 (7.8%) were 45-54, 7 (1.8%) respondents were 55 years and above, while the Mean age of the respondents was 2.02. 235 (61%) respondents were single, 127 (33%) were married, 14 (3%) were divorced and 9 (2.3%) were widowed. 228 (59.2%) were Christians, 146 (37.9%) Muslims and 11 (2.9%) were Traditionalists. Respondents with No Formal Education were 8 (2.1%), with Primary Education were 20 (5.2%), with Secondary Education were (133 (34.5%) and those with Tertiary Education were 224 (58.2%). 126 (32.7%) were unemployed, 112 (29.1%) were either Artisans, Farmers or Traders, 127 (33%) were Civil Servants and 20 (5.2%) were Clergies. With regards to monthly

income, 160 (41.6%) respondents earned less than 30,000, 99 (25.7%) earned between 30,001 and 50,000, 66 (17.1%) earned 50,001-100,000 and 60 (15.6%) earned above 100,000 monthly.

Table 2: Awareness and knowledge of Covid-19.

S/N	Question	Yes	Not Sure	No	X	SD
1	Have you heard of Covid-19 before	375 (97.1%)	3 (0.8%)	8 (2.1%)	1.04	.225
2	Do you think Covid-19 is real	284 (73.8%)	40 (10.4%)	61 (15.8%)	1.37	.664
3	Are you willing to be tested for Covid-19?	152 (39.5%)	39 (10.1%)	194 (50.4%)	1.71	.641
4	Do you think you are at risk of contracting Covid-19	123 (31.9%)	41 (10.5%)	221 (67.4%)	1.79	.618
5	Do you know anyone who has tested positive to Covid-19 before?	97 (25.2%)	26 (6.8%)	262 (68.1%)	1.82	.535
6	Do you know anyone who has died of Covid-19 before?	98 (25.5%)	32 (8.3%)	255 (66.2%)	1.83	.556

Note. X = Mean; SD = Standard Deviation.

Source: Authors calculation

In Table 2, 375 representing 97.1% of the sample size have heard of Covid-19 before, 3 (0.8%) were not sure and 8 (2.1%) had not heard of Covid-19 before. 284 (73.*%) think that Covid-19 is real, 40 (10.4%) were not sure while 61 (15.8%) do not think that Covid-19 is real. 152 (39.5%) were willing to be tested for Covid-19, 39 (10.1%) were not sure of their willingness to be tested while 194 (50.4%) were not willing to be tested for Covid-19. 123 (31.9%) think they are at risk of contracting Covid-19, 41 (10.5%) were not sure and 221 (67.4%) respondents think they are not at risk of contracting the virus. 97 (25.2%) knows someone whom have tested positive to the virus, 26 (6.8%) were not sure and 262 (68.1%) do not know anyone whom have tested positive to Covid-19 before and finally, 98 (25.5%) knows someone whom died of Covid-19, 32 (8.3%) were not sure and 255 (66.2%) do not know anyone who died of Covid-19 before.

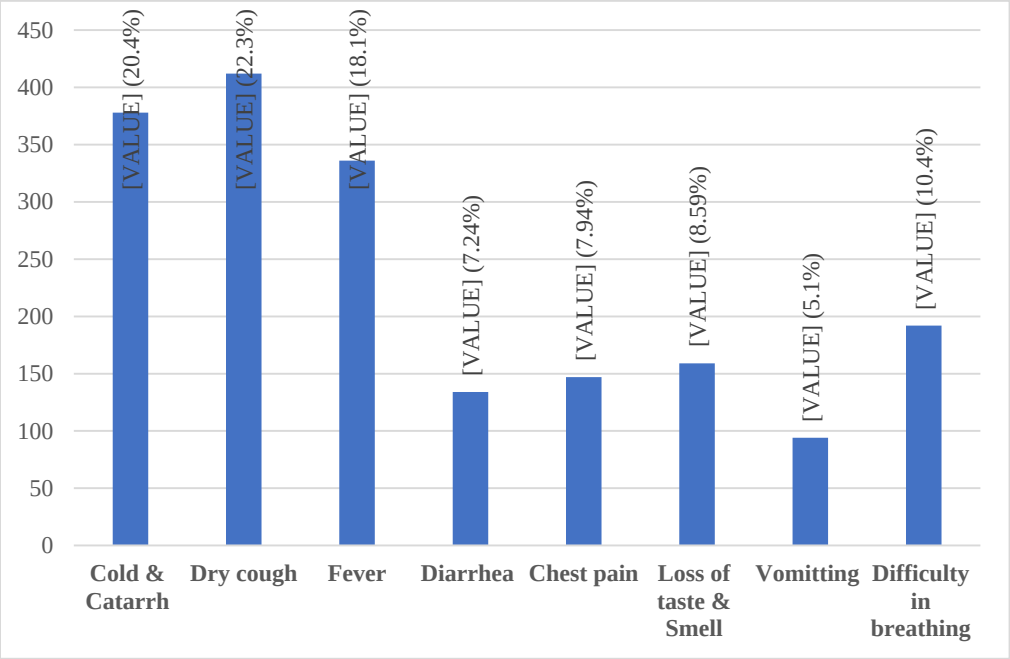

Figure 1: Vertical bar chart showing knowledge of common symptoms of Covid-19 vaccine known to residents of Lafia, Nasarawa state.

Figure 1 is a graphical representation of the common symptoms of Covid-19 as known to the respondents in Lafia, namely: dry cough, cold and catarrh, fever, difficulty in breathing, loss of taste and smell, chest pain, diarrhea and vomiting. It appears that the most common known symptoms of Covid-19 are Dry cough, Cold and Catarrh, Fever and Difficulty in breathing.

Table 3: Awareness and willingness to receive a Covid-19 vaccine

S/N	Question	Yes	Not Sure	No	X	SD
1	Do you think a vaccine can help fight against Covid-19?	223 (57.9%)	34 (8.8%)	128 (33.2%)	1.51	.654
2	Are you aware that there are different types of Covid-19 vaccine?	269 (69.9%)	34 (8.8%)	82 (21.3%)	1.39	.645
3	Are you aware that Nigeria participated in a WHO Covid-19 vaccine trial?	154 (40%)	83 (21.6%)	148 (38.4%)	1.82	.764
4	Are you aware that Nigeria has received and has begun administering some Covid-19 vaccine?	107 (27.8%)	101 (26.2%)	177 (46%)	1.98	.736
5	Do you think it is necessary to get the Covid-19 vaccine?	124 (32.2%)	90 (23.4%)	171 (44.4%)	1.91	.741
6	Do you think the vaccine is potent enough to protect you from Covid-19?	170 (44.2%)	67 (17.4%)	148 (38.4%)	1.73	.739
7	Do you think the vaccine is a solution for social distancing and face masking?	163 (42.3%)	73 (19%)	149 (38.7%)	1.77	.748
8	Should the government make the vaccine available for all citizens?	113 (29.4%)	81 (21%)	191 (49.6%)	1.92	.706
9	Will you take the vaccine if the government makes it a law?	120 (31.2%)	77 (20%)	188 (48.8%)	1.89	.707
10	Will you take the vaccine if an incentive was attached to it?	138 (35.8%)	74 (19.2%)	173 (44.9%)	1.83	.724
11	Will you advise any of your friend or family member to take the vaccine?	119 (30.9%)	77 (20%)	188 (48.8%)	1.89	.707
12	Will you accept to take the vaccine if made available?	137 (35.6%)	74 (19.2%)	173 (44.9%)	1.84	.724

Note. X = Mean; SD = Standard Deviation.

Source: Authors calculation

In Table 3, 223 (57.9%) respondents were affirmative that a vaccine could help fight against Covid-19, 34 (8.8%) were not sure and 128 (33.2%) were not in agreement to that. 269 (69.9%) were aware that there are different types of Covid-19 vaccine, 34 (8.8%) were not sure and 82 (21.3%) did not know of the existence of different Covid-19 vaccine; 154 (40%)

respondents were aware that Nigeria participated in a WHO Covid-19 vaccine trial, 83 (21.6%) were not sure, 148 (38.4%) were not aware; 107 (27.8%) were aware that Nigeria has received and has begun administering some Covid-19 vaccines, 101 (26.2%) were not sure and 177 (46%) were not aware; 124 (32.2%) think it is necessary to get the Covid-19 vaccine, 90 (23.4%) were not sure, 171 (44.4%) do not think it is necessary to take the Covid-19 vaccine; 170 (44.2%) think the vaccine is potent enough to protect you from Covid-19, 67 (17.4%) were not sure and 148 (38%) do not think that the vaccine is potent enough; 163 (42.3%) think tht the vaccine is a solution for social distancing and face masks, 73 (19%) were not sure and 149 (38..7%) do not think so; 113 (29.4%) agreed that the government should make the vaccine available to all citizens, 81 (21%) were not sure and 191 (49.6%) do not agree that the government should do such; 120 (31.2%) respondents will take the vaccine if the government makes it a law, 77 (20%) were not sure and 188 (48.8%) will not take the vaccine if the government makes it a law; 138 (35.8%) will take the vaccine if n incentive was attached to it, 74 (19.2%) were not sure and 173 (44.9%) will not; 119 (30.9%) will advise any of their friends or family members to take the vaccine, 77 (20%) were not sure and 188 (48.8%) will not. 137 (35.6%) respondents said yes they accept to take the vaccine, 74 19.2%) were not sure and 173 (44.9%) will not accept to take the vaccine if made available.

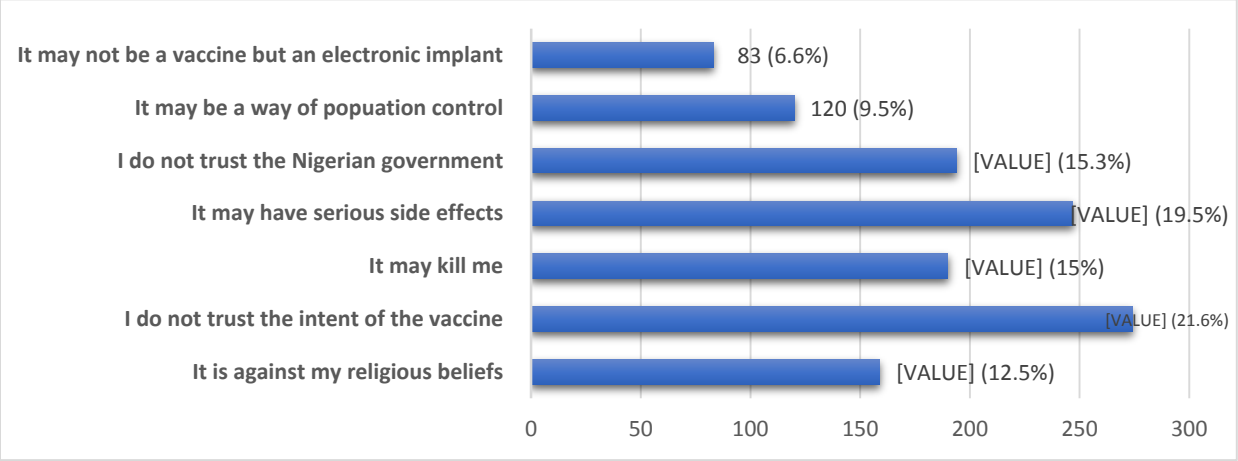

Figure 2: Horizontal bar chart showing reasons why residents of Lafia, Nasarawa state will not take a Covid-19 vaccine. Field survey, 2021.

Figure 2 is a graphical representation of the various reasons why respondents will not take a Covid-19 vaccine: It may not be a vaccine but an electronic implant; it may be a way of population control; I do not trust the Nigerian government; It may have serious side effects; it may kill me; I do not trust the intent of the vaccine; it is against my religious beliefs. Figure 2 shows that the most common reasons why people will not take the vaccine are because they do not trust the intent of the vaccine and also because it may have serious side effects.

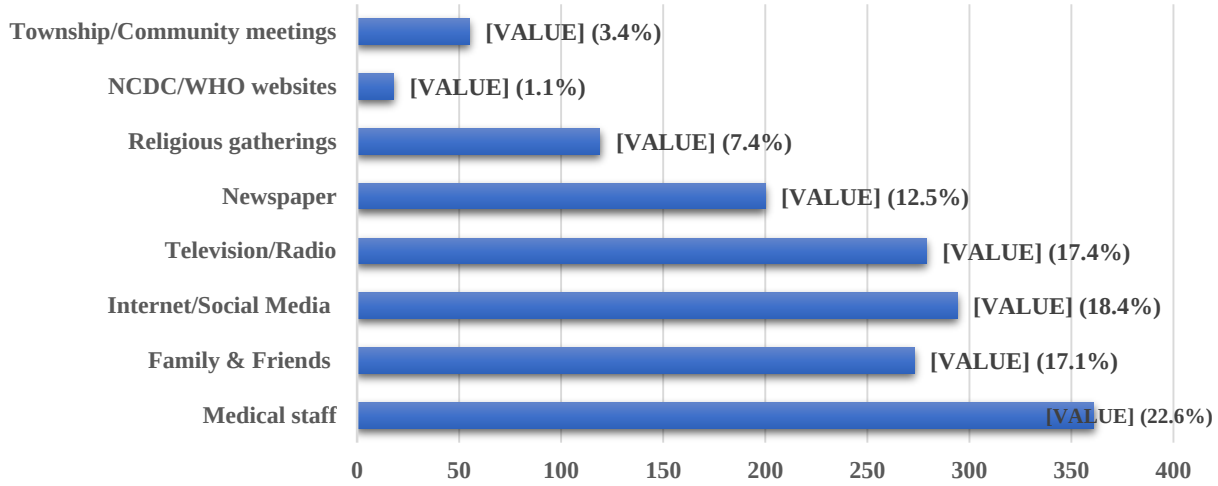

Figure 3: Horizontal bar chart showing sources of information on Covid-19 vaccine to residents of Lafia, Nasarawa state. Field survey, 2021.

In Figure 3, the graph shows the sources of information about Covid-19 vaccine to the respondents, they are: township/community meetings; NCDC/WHO websites; Religious gatherings; Newspaper; Television/Radio; Internet/Social Media; Family and Friends and Medical staff.

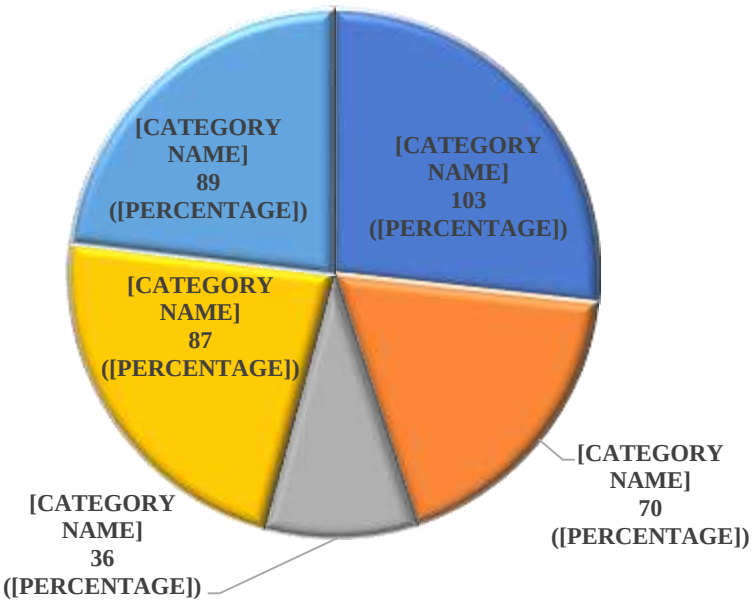

Figure 4: Sources of vaccine preferred by residents of Lafia, Nasarawa state.

Figure 4 shows the different sources of vaccine as preferred by respondents. 103 (26.8%) preferred American made vaccine; 70 (18.2%) respondents prefer European; 36 (9.4%) were for Asian; 87 (22.6%) preferred African and 89 (23.1%) preferred a Nigerian made vaccine.

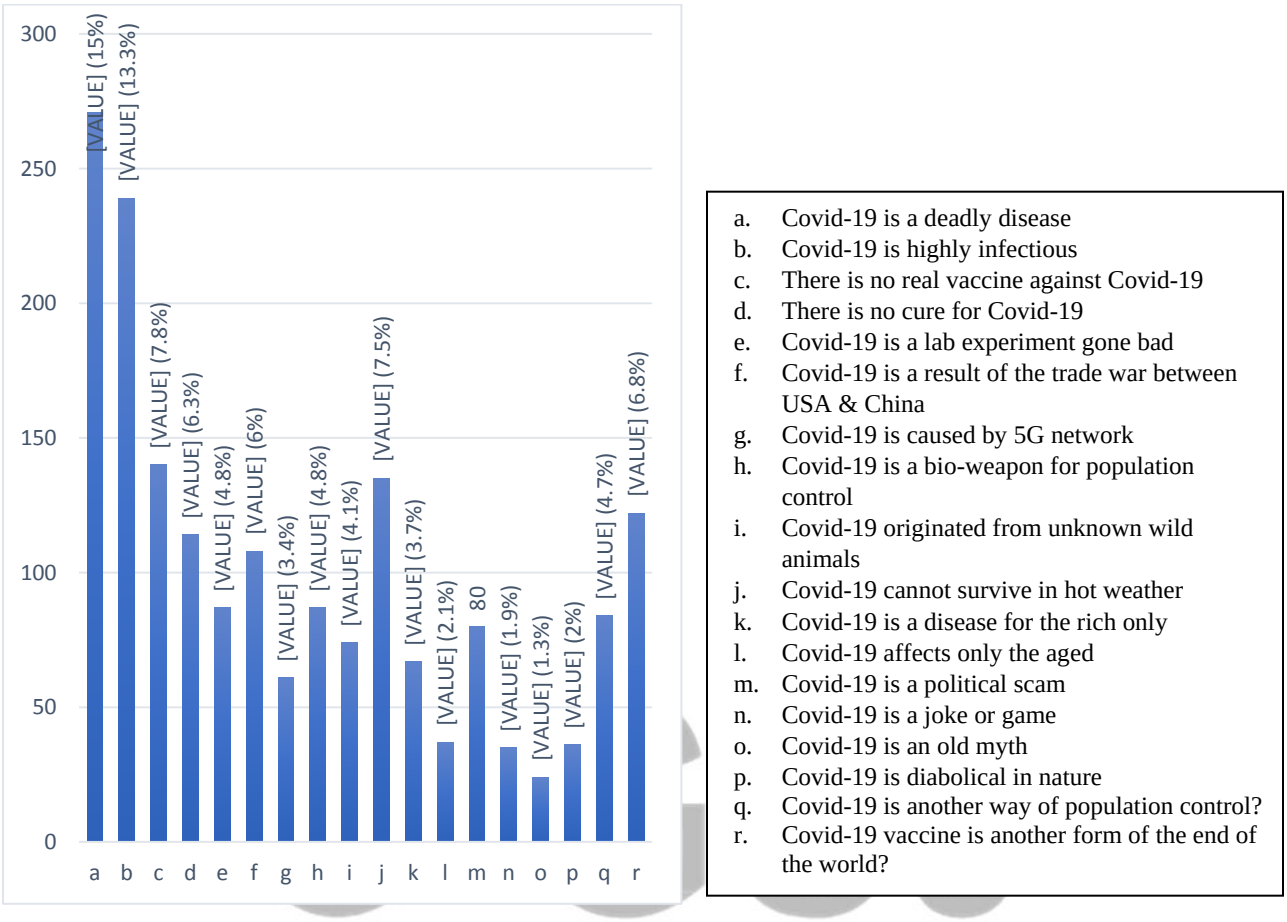

Figure 5: Vertical bar chart showing general knowledge about Covid-19 among residents of Lafia, Nasarawa State.

The perception of Covid-19 among residents of Lafia, Nasarawa State as represented in figure 5 are: Covid-19 is a deadly disease; Covid-19 is highly infectious; There is no real vaccine against Covid-19; There is no cure for Covid-19; Covid-19 is a lab experiment gone bad; Covid-19 is a result of the trade war between USA & China; Covid-19 is caused by 5G network; Covid-19 is a bio-weapon for population control; Covid-19 originated from unknown wild animals ; Covid-19 cannot survive in hot weather; Covid-19 is a disease for the rich only; Covid-19 affects only the aged; Covid-19 is a political scam; Covid-19 is a joke or game; Covid-19 is an old myth; Covid-19 is diabolical in nature; Covid-19 is another way of population control; Covid-19 vaccine is another form of the end of the world?

TEST OF HYPOTHESIS

Table 5: H_0: Residents of Nasarawa state are not aware of a Covid-19 vaccine.

	Are you aware that Nigeria has received and has begun administering some Covid-19 vaccine?			
Sex of respondents	Yes	Not Sure	No	Total
Male	61 (15.8%)	60 (15.6%)	79 (39.5%)	200 (51.9%)
Female	46 (11.9%)	41 (10.6%)	98 (53%)	185 (48.1%)
Total	107 (27.8%)	101 (26.2%)	177 (46%)	385 (100%)

Source: Authors calculation

Table 6: Chi-Square table 1

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.143[a]	2	.028
Likelihood Ratio	7.164	2	.028
Linear-by-Linear Association	.086	1	.769
N of Valid Cases	385		

Note. Df = Degree of freedom

Source: Authors calculation

In Table 6 the hypothesis result using 5.0% value ($p<0.05$) to test the level of significance, we therefore fail to retain the null hypothesis and accept the alternative hypothesis. Thus, residents of Nasarawa state are aware of a Covid-19 vaccine.

Table 7: H_0: Residents of Nasarawa state are not willing to take a Covid-19 vaccine.

	Will you accept to take the vaccine if made available?			
Sex of respondents	Yes	Not Sure	No	Total
Male	77 (38.7%)	37 (18.6%)	86 (42.7%)	200 (51.9%)
Female	60 (32.4%)	88 (47.6%)	37 (20%)	185 (48.1%)
Total	107 (27.8%)	101 (26.2%)	177 (46%)	385 (100%)

Source: Authors calculation

Table 8: Chi-Square table 2

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.653[a]	2	.438
Likelihood Ratio	1.656	2	.437
Linear-by-Linear Association	1.076	1	.300
N of Valid Cases	385		

Note. Df = Degree of freedom

Source: Authors calculation

In Table 8, the hypothesis result using 5.0% value ($p<0.05$) to test the level of significance. The p value reveals that we retain the null hypothesis – residents of Nasarawa state are not willing to take a Covid-19 vaccine.

DISCUSSION OF FINDINGS

To achieving a healthy and disease free society, vaccination has become one of the most important advances made. It is responsible for the eradication of breakouts such as smallpox and the control of infectious diseases (Nzaji et al, 2020) such as polio, diphtheria amongst many

others in several parts of the world. Thus, scientists from different research institutions across the globe harnessed resources and paid acute attention to developing vaccines to protect against Covid-19. Suffice to say that Covid-19 will remain a serious public health issue until a valid vaccine is willingly accepted among the larger population to achieve herd immunity.

This present study is similar to that of Amakiri et al (2021) on the willingness to accept a Covid-19 vaccine in Nigeria. Their study revealed that a greater percentage of the participants were youths within the ages of 19-35 years, similarly in this study, most participants were within the age range of 15-44 years (90.4%). Both males and females were sufficiently represented in the study. This responses were generated using a well-constructed questionnaire. Table 1 shows that most respondents were single 235 (61%) or married 127 (33%) with both major religions (Christianity – 59.2% and Islam – 37.9%) adequately represented. It can also be deduced from the table that majority of the respondents are well educated and are either civil servants, Unemployed or Artisans/Farmers/Traders with a few Clergy men. The most of respondents earned a monthly income less than the Nation's minimum wage of ₦30,000.00 which is about 60 dollars (at ₦500 per $1, NGN Exchange rate as at 28/6/2021).

As in the studies of Mannan and Farhana (2020) in a global cross sectional study on knowledge, attitude and acceptance of a Covid-19 vaccine with statistical values showing China with the highest proportion of positive responses (87.42%) to accept and Afghanistan (47.22%) with the lowest response, revealing a level of reluctance to accept a Covid-19 vaccine. In Africa, South Africa (79.26%), Mauritius (82.76%), Botswana (71.23%), Mali (62.44%) and Nigeria (61.54%) showed a considerable level of variations in their level of willingness to accept a Covid-19 vaccine when made available. In the same vein, this study asked respondents in Nasarawa State, Nigeria "will you accept the vaccine when made available?" 44.9% responded in the negative, 19.2% were uncertain while, only 35.6% were affirmative to accept the vaccine. This result therefore presents a threat to the hope of achieving a herd immunity as targeted by the Nigerian government. According to Enitan et al (2020) "vaccines only work if enough people (≥80%) in a community are vaccinated to serve as a protective barrier for other vulnerable individuals who have not been vaccinated". The population willing to accept a vaccine in Nasarawa state is currently less than 50% which is 30% short of the percentage expected to be vaccinated to achieve herd immunity. Needless to say that this will invariably present a threat to curbing the spread of Covid-19 amongst the populace.

Furthermore, this study sheds more light to the study of Enitan et al (2020) where 80% of the respondents were not willing to participate in a Covid-19 vaccine trial, however, at post vaccine trial, during the administration of the first set of dose of Oxford AstraZeneca vaccine, first to frontline medical workers, public office holders and others in Nigeria, this study was conducted among the general public to determine the level of possible acceptance and only about 35.6% were willing to accept the vaccine when made available, while, 44.9% and 19.2% were not willing and not sure of accepting the vaccine (Table 3). This results affirms the poll study as reported by the National Primary Healthcare Development Agency which showed vaccine reluctance at 50% and acceptance at 50% (Usigbe, 2021), however, reluctance is still very strong. When asked why they will not take the vaccine when made available, the most common reasons were because - they do not trust the intent of the vaccine (274, 71.2%); it may have serious side effects (247, 64.2%) or because they do not trust the Nigerian government (194, 50.4%), amongst other reasons, these were the most among respondents (Figure 2).

It was fascinating to discover in Figure 3, that the most common source of information on Covid-19 vaccine were medical staff (361, 22.6%). This raises the questions of what type of

information have medical staff been communicating to the public during official/unofficial interactions? Could it be that medical staff have shown a certain level of reluctance to being vaccinated and this might have created doubts in the minds of the public? On 2nd or March, 2021 Nigeria received 3.9 million doses of Oxford AstraZeneca vaccine (Usigbe, 2021; UNICEF, 2021; WHO, 2021 & NCDC, 2021) which is less than 10% of Nigeria's estimated population, however, the government decided that it was first for frontline medical workers, public office holders and then the general public. Yet, as at the time of this writing Nigeria had not exhausted the doses of vaccine (WHO, 2021). This raises a lot of suspicion amongst Nigerians. Other common sources of information were Television/Radio (279, 17.4%); Internet/Social media (294, 18.4%); Family and friends (273, 17.1%); Newspaper (200, 12.5%); Religious gatherings (119, 7.4%); Township/Community meetings (55, 3.4%) and NCDC/WHO websites (18, 1.1%). With this, it is expedient that the government utilizes these major sources of information to enlighten the public on the importance of the Covid-19 vaccine and that it is safe, otherwise, this resistance will create a major public health concern in the near future.

In an earlier study by Enitan et al, (2020) respondents expressed a lack of confidence in the ability of the NCDC to successfully coordinate a vaccine trial in Nigeria, this doubt which was not sufficiently addressed in 2020 may have now grown to nose-dive the response to the approved vaccines in 2021. Though researchers have a high degree of confidence (80%) in the vaccines (Enitan et al, 2020) which are usually subjected to series of tests required before approval regardless of which country is manufacturing, respondents in Nasarawa state, even in their reluctance to receive the vaccine still had their preference for sources of vaccine, with most preferring an American made vaccine (103, 27%) Figure 4. The result of this findings matched the current trend of Covid-19 vaccination in Nigeria, where about 4 million doses could not be exhausted between 2nd March and 28 June, 2021 invariably suggests a high level of reluctance to be vaccinated.

CONCLUSION

The quality of information and source determines the acceptance of a product. Misinformation and disinformation could explain for the level of skepticism to be vaccinated by the populace. Contrary to the first hypothesis of this study, it appears that residents of Nasarawa State are well aware of Covid-19 and its vaccines, however, they are not willing to accept the vaccines. It became evident that the quality of information that is spreading amongst the people have also influenced their decision to not accept a Covid-19 vaccine, this will invariably make the fight against Covid-19 a task insurmountable. Residents of Nasarawa state appear to have considerable level of education as represented in the state's capital which is one of the reasons to be concerned as to their wariness towards the vaccine, when it is expected that with education should come some level of enlightenment for a vaccine.

LIMITATIONS

The limitations present in this study, firstly, the study was self-sponsored and not enough research assistants could be recruited to administer the questionnaire in all nooks and crannies of the local government area, thus, we relied on the available resources to recruit 2 research assistants whom administered the questionnaires and retrieved same within 7 days. Secondly, it was discovered in the field that a significant percentage of respondents were reluctant to respond to the study as they would not want to be associated with anything about Covid-19 nor its Vaccine. Thirdly, the several conspiracy theories surrounding Covid-19 vaccine made some respondents decline the study and others hostile to the research assistants. Finally, the state's health research and ethics committee was not approached because the study was not targeted

around patients, health workers nor health facilities. Despite these limitations, our findings provide sumptuous and valuable information devoid of bias about the current knowledge and public perception of a Covid-19 vaccine in Nasarawa state, Nigeria.

RECOMMENDATION

Our recommendations are thus:

1. Further research should be extended to finding out the various socio-demographic variables that may also determine the acceptance of a Covid-19 vaccine in Nasarawa State.
2. Further studies should provide for a larger sample size by adopting other local governments in the state, for adequate representative sampling and to reveal the true nature of the study in other parts of the state.
3. The government in partnership with other developmental agencies should engage in aggressive campaign at grassroots to debunk the various conspiracy theories that may be a limitation to the acceptance of a Covid-19 vaccine in order to achieve herd immunity.
4. The Federal Government, State government and local government should be more intentional about committing resources to facilitating public health awareness in the state on the effectiveness and safety of Covid-19 vaccine and the need to accept it when made available.
5. International donor agencies should partner with locals to facilitate public health awareness in the state with quality information about Covid-19 and its effectiveness.

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