



KNOWLEDGE AND COVID 19 VACCINE UPTAKE AMONG ELDERLY IN OGUN STATE, NIGERIA

*¹Agbede, C.O. & ²Adenitire, G.S.

*^{1,2}Department of Public Health, Babcock University, Nigeria

*Corresponding Author Email: agbedec@babcock.edu.ng, gbenganicer1@gmail.com

ABSTRACT

The elderly are more prone to the risk of COVID19-associated morbidity and mortality than other age groups and have been prioritized for COVID19 vaccination. Therefore, this study assessed knowledge and uptake of COVID-19 vaccination among the elderly in Ogun State Nigeria. This study employed a cross-sectional design. A multistage sampling technique was employed to select one hundred and seventy-five participants. A validated structured questionnaire was used in data collection. The data collected was analyzed using descriptive and inferential statistics; all statistical tests were performed at a level of significance $p \leq 0.05$. The participant's mean age was 67.4 ± 2.3 and less than half (40.6%) had no formal education. The participants' mean score for knowledge was 10.6 ± 5.8 , while 64.0% had poor knowledge of the COVID-19 vaccine. Only 2.3% reported they had been vaccinated against COVID 19, while greater than half (67.4%) were willing to receive the vaccine against COVID 19. There was a significant difference in the average knowledge score in the age group ($F = 7.6$; $p = 0.001$). Also, no significant relationship was found between participants' knowledge and COVID-19 vaccine uptake ($X^2 = 2.3$; $p = 0.3$). In conclusion, participants had insufficient knowledge of the COVID-19 vaccine and poor uptake of the COVID 19 vaccine. A larger number of participants were willing to receive the COVID19 vaccine. It is recommended to implement an educational intervention to increase their knowledge and improve uptake of the COVID 19 vaccine.

Keywords: COVID 19 vaccine, Elderly, Knowledge, Uptake

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INTRODUCTION

Coronavirus disease (COVID19) is a deadly viral disease that affects several nations across the globe. The death rate of the COVID19 virus is higher than that of common contagious diseases. The symptoms of COVID19 include fever, fatigue, dry cough, shortness of breath, pneumonia, anosmia, and ageusia (Richardson *et al.*, 2020; Guan *et al.*, 2020; Tong *et al.*, 2020). COVID-19 is transmitted by droplets, contact with infected patients, fomites, contact with surfaces, or contaminated objects (Liu *et al.*,2020).

Though everyone is at risk of COVID-19, elderly people face considerable risks of having severe illness if they are diseased because of changes in their body that accompanied ageing and the possible outcome of underlying health statuses (WHO, 2020). COVID-19 has escalated the morbidities and mortalities in those with an underlying chronic disease and those with a suppressed immunity despite their ages, and in the elderly people who were more susceptible to have these conditions. It is reported that the mortality rate for elderly people in the age of 60 increases to 8.0% and 14.8% at the age of 70 and over 80 (Brooke and Clark, 2020).

So far, non-pharmaceutical interventions have been able to slow the progress of the disease, but the most favourable approach to curtail the pandemic and reduce death and disease rates rely upon medical technology, antiviral agents and vaccines. The worthwhile public health intervention ever, which has saved millions of lives, is a vaccine (Hussein *et al.*, 2015; Rodrigues and Plotkin, 2020). Immunization fuels the immune system to produce antibodies to fight a specific infectious agent in the body (CDC, 2021).

COVID-19 vaccines have evolved rapidly, with some already approved and available for people over the age of 16 years (Mishra and Tripathi, 2020). Success in ending the COVID-19 pandemic depends in large part on the mass rollout of vaccines. Vaccination against COVID-19 in Nigeria started on 5th March 2021. As of 23rd November 2021, a total number of 6,021,560 people had received the first dose of the COVID-19 vaccine representing 2.79% of the National population while 3,369,628 people had received the second dose representing 1.56% of the National population (National Primary Health Care Development Agency, 2021a). The first phase of the vaccination was for frontline health workers and persons aged 50 and above. People aged 18 to 49 with comorbidities were also vaccinated (National Primary Health Care Development Agency, 2021b). The effectiveness of vaccination depends on the accessibility and acceptability of the vaccine by the people (Buttler *et al.*, 2021). Several studies have identified factors mitigating the acceptance of COVID-19 vaccines, such as personal beliefs regarding vaccines and COVID-19 (Kourlaba *et al.*, 2021; Sallam *et al.*, 2021), health literacy (Biasio *et al.*,2021; Danchin *et al.*, 2020), knowledge (Kourlaba *et al.*, 2021; McCaffery *et al.*, 2020).

This implies that people who consider that the coronavirus is infectious and deadly, have a good understanding and achieve high health literacy are more likely than others to accept COVID-19 vaccines. Improving these factors through educational interventions can improve the uptake of vaccination. Thus, the elderly must improve their knowledge and health literacy which will increase vaccine uptake in the future. To facilitate the design of such an educational

intervention program, however, formative research aimed at generating baseline information related to the knowledge and acceptability of the COVID-19 vaccine among the elderly is needed. This explained why this study assessed the knowledge and uptake of the COVID-19 vaccine among the elderly in Ogun State, Nigeria.

MATERIAL AND METHODS

STUDY DESIGN AND SAMPLING TECHNIQUE

This is a descriptive, cross-sectional study conducted among elderly men and women aged 65 years and older in selected churches and mosques in four communities in Ogun State. The participants included the elderly in Odeda Local Government, Imeko Afon Local Government, Obafemi Owode Local Government and Yewa North Local Government. A multi-stage sampling procedure was employed to recruit the study participants as follows: Stage one was the random selection by ballot of two Senate areas from the three Senate areas in Ogun State, comprising 55% of the Local Government Areas in Ogun State. In the second stage, Four LGA was selected by balloting out of the eleven (11) LGA in Ogun central and Ogun west senatorial districts. In the third stage, a proportional sampling technique was employed to select participants from places of worship (Churches and mosques). These places of worship were selected because the most active elderly are usually found there. One hundred and seventy-five participants were recruited for the study. The ethical issues discussed with the participants before they were included in the study were the voluntary nature of participation in the study, freedom to withdraw from the study anytime without any sanction and the inconvenience they might experience. Ethical approval was given by the Health Research and Ethics committee of Babcock University (BUHREC)

STUDY INSTRUMENT AND MEASURE

The instrument was a validated structured questionnaire that was self-administered. The instrument used was developed after consulting previously published articles relating to the COVID-19 vaccine. The questionnaire included questions concerning socio-demographic information; knowledge relating to COVID -19 and uptake of COVID-19 vaccination. The socio-demographic characteristics assessed were age, sex ethnic group. Participants' level of knowledge was assessed using a 33-point knowledge scale. The knowledge issues asses included the following: causative agent of COVID-19, the mode of transmission, and the prevention of COVID-19. Each correct response was allotted 1 mark while an incorrect answer was allotted 0. "Don't know" was scored zero as well. Knowledge scores were categorized into poor (0-11) fair (12-22) and good (23-33). A 2-point rating scale was used to elicit responses from participants' COVID-19 vaccine uptake. The question asked was about the COVID-19 vaccine and willing to take the COVID-19 vaccine. The two items were scored as follows: Yes= 1, No = 0.

Data analysis

The data obtained were selected and entered manually into the computer-facilitated by a coding guide. The IBM SPSS version 23 was used to analyze the data to create descriptive statistics (frequency table, mean and standard deviation) and inference (correlation). All statistical tests were performed at a significance level of $p \leq 0.05$.

RESULTS

PARTICIPANTS SOCIO-DEMOGRAPHIC CHARACTERISTICS

The socio-demographic characteristics of the participants are presented in Table 1. The participants were aged 65 to 77 years with a mean age and a standard deviation of 67.43 ± 2.30 years. Most (102 (58.3%)) of the respondents were males. Less than half (71 (40.6%)) of the respondents reported having no formal education. Half (88 (50.3%)) participants were Muslim. A little above half (92 (52.6%)) of the participants were married. Most (113(64.6%)) of the participants reported being an artisan before they retired. A significant proportion (138(78.9%)) of the respondents were Yoruba. This is because of the location of the study population which is Ogun State.

Table 1: Socio-demographic Characteristics of the Participants in the study

Socio demographic items	Frequency n= 175	Percentage (%)
Age (in years) Mean age 67.43 ± 2.30 years		
65-69	153	87.4
70-74	19	10.9
75-79	3	1.7
Sex		
Male	102	58.3
Female	73	41.7
Religion		
Christian	78	44.6
Islam	88	50.3
Others	9	5.2
Level of Education		
No formal	71	40.6
Primary	53	30.3
Secondary	36	20.6
Tertiary	15	8.6
Marital status		
Married	92	52.6
Divorced	52	29.7
Widowed	31	17.7
Occupation before retirement		
Civil servant	24	13.7
Traders	38	21.7
Artisans	113	64.6
Ethnicity		
Yoruba	138	78.9
Igbo	16	9.1
Hausa	21	12.0

PARTICIPANT'S KNOWLEDGE OF COVID-19 VACCINE

Table 2 showed participants' knowledge of the COVID-19 vaccine. The knowledge items can be differentiated to the result of the mode of transmission, symptoms of the COVID 19, types of COVID 19 vaccine and the dosage of the virus. Most (64.6%) of the participants could not state correctly that COVID19 is a viral infection, moreover, the majority (65.7%) of the participants could not confirm that the pathogen that causes COVID19 could be transmitted

from person to person. When an enquiry was made concerning the spread of COVID-19, a few (26.9%) of the participants correctly confirmed that COVID19 could be spread through direct contact with respiratory droplets from an infected person. Furthermore, 52 (29.7%) of the participants correctly stated that touching the mouth/eyes after touching contaminated surfaces could result in COVID-19 spread. As regards COVID-19 symptoms, the participants correctly reported the following: fever (53.7%); throat (72.0%); dry cough (60.6%), difficulty breathing (33.7%); and loss of smell 68 (38.9%). Above a quarter (38.3%) of the participants knew that there is a vaccine against COVID-19. Most (85.1%) of the participants correctly stated that vaccination does not give lifetime protection. As regards the types of COVID-19 vaccine, the participants correctly stated the following: Moderna vaccine (18.3%), Johnson & Johnson vaccine (17.1%), Pfizer- Biotech (12.6%). A quarter (25.1%) of the participants correctly knew that only two doses of the Pfizer-BioNTech vaccine are needed for complete immunity against the virus. Additionally, few (9.7%) of the participants correctly knew that the second shot should be taken three weeks after the first shot, furthermore, only a small proportion (8.6%) knew that immunity against the virus is achieved after six weeks of complete vaccination. Above a quarter (26.3%) of the participants correctly confirmed that people living with chronic illness and the elderly such as diabetics (24.0%) are most susceptible to COVID-19. Less than half (28.0%) of the participants knew that avoiding crowded places could prevent someone from contracting COVID- 19 virus infection. Most (61.1%) of the respondents are aware that mask-wearing prevents the spread of the COVID-19 virus, in addition, more than half (53.7%) of the respondents are aware that social distancing could prevent the spread of COVID-19 virus. In contrast, a small (20%) of the respondents knew that the COVID-19 vaccine could prevent them from COVID-19 virus infection. A small proportion (10.3%) of the respondents are aware that COVID-19 vaccines were made using inactivated coronavirus as an antigen Less than half (29.7%) of the respondents knew that the COVID19 vaccine is given by injection.

The participants' mean knowledge score by socio-demographic characteristics is shown in table 3. Participants who were aged 75-79 years had a higher mean knowledge score of 19.0 ± 5.56 compared to those aged 65-69 years (10.0 ± 5.6) and 70 -74 years (13.9 ± 5.2) with a significant difference. The mean knowledge score of the male and female participants were 9.5 ± 7.7 and 12.1 ± 5.5 respectively with a significant difference ($p < 0.05$). Also, participants who had tertiary education scored a higher mean knowledge of 16.9 ± 7.0 when compared with no formal education 8.7 ± 3.4 , primary education 10.4 ± 5.8 , and secondary education 12.1 ± 6.8 with a significant difference ($p < 0.05$). The mean score of knowledge of the married, divorced and widowed participants were 11.7 ± 5.8 , 8.7 ± 5.4 , and 10.6 ± 5.7 respectively with a significant difference ($p < 0.05$).

Categorizations of the participant's level of knowledge are shown in figure 1. The mean \pm (SD) knowledge score was 10.6 ± 5.8 . Overall, a few (3.4%) of the respondents had a high knowledge level of the COVID-19 virus and vaccine. The participants with moderate and poor knowledge levels were 32.6% and 64.0% respectively.

Table 2: Participants' Knowledge of COVID-19

Knowledge Items	Yes (%)	No (%)
COVID-19 is a virus infection	49 (28.0)	126(72.0)
COVID-19 is transmitted from person to person	51(29.1)	124 (70.9)
How does COVID-19 spread?		
COVID 19 is spread through direct interaction with infected persons respiratory droplets	47(26.9)	128 (73.1)
COVID 19 is spread by touching contaminated surfaces and touching the mouth/eyes/nose	52(29.7)	123(70.3)
Fever is a symptoms of COVID-19	94 (53.7)	81(46.3)
Sore throat is a symptoms of COVID-19	126(72.0)	49(28.0)
Dry cough is a symptoms of COVID-19	106 (60.6)	69(39.4)
Difficulty breathing is a symptoms of COVID-19	59 (33.7)	116(66.3)
Loss of smell is a symptoms of COVID-19	68(38.9)	107(61.1)
Is there a vaccine against COVID-19	67(38.3)	108(61.7)
COVID 19 vaccination give a lifetime protection	26 (14.9)	149(85.1)
Pfizer-BioNTech vaccine is a type of COVID 19 vaccine	22 (12.6)	153(87.4)
Moderna vaccine is a type of COVID 19 vaccine	32 (18.3)	143(81.7)
Johnson & Johnsons Jansen vaccine is a type of COVID 19 vaccine	30 (17.1)	145 (82.9)
Two doses of Pfizer-BioNTech vaccine is needed	44 (25.1)	131(74.9)
The second dose of the covid-19 vaccines is taken after the 3 rd week of taken the first dose	135 (77.7)	40(22.3)
It takes the body 6 weeks to build immunity against COVID 19 virus after taking the vaccine	15(8.6)	160(91.4)
Elderly are most susceptible to COVID 19	46 (26.3)	129(72.7)
People with chronic illness such as diabetes are most susceptible to COVID 19	42 (24.0)	133 (76.0)
Avoiding crowded place prevent COVID-19 virus	49 (28.0)	126(72.0)
Use of face mask prevent transmission of COVID 19 virus	107 (61.1)	68(38.9)
Social distancing prevent spread of COVID-19 virus	94 (53.7)	81(46.3)
COVID-19 vaccine prevent from getting COVID-19 infection	35 (20.0)	140(80.0)
COVID-19 vaccines was produced using in activated coronavirus as the antigen	18 (10.3)	157(89.7)
COVID-19 vaccine is given via injection	52 (29.7)	123(70.3)
Overall mean score	10.6 ± 5.8.	

Table 3: Comparison of Participants Mean Knowledge Score of COVID 19 Vaccine by Socio-demographic Information

Socio-demographic characteristics	Mean	SD	F-value	p-value
Age (in years)			7.6	0.001
65-69	10.0	5.6		
70-74	13.9	5.3		
75-79	19.0	5.6		
Gender			8.7	0.004
Male	9.5	5.8		
Female	12.1	5.5		
Level of Education			10.9	0.001
No formal education	8.7	3.4		
Primary	10.4	5.8		
Secondary	12.1	6.8		
Tertiary	16.9	7.0		
Marital Status			4.6	0.01
Married	11.7	5.8		
Divorced	8.7	5.4		
Widowed	10.6	5.7		

*Significant < 0.05

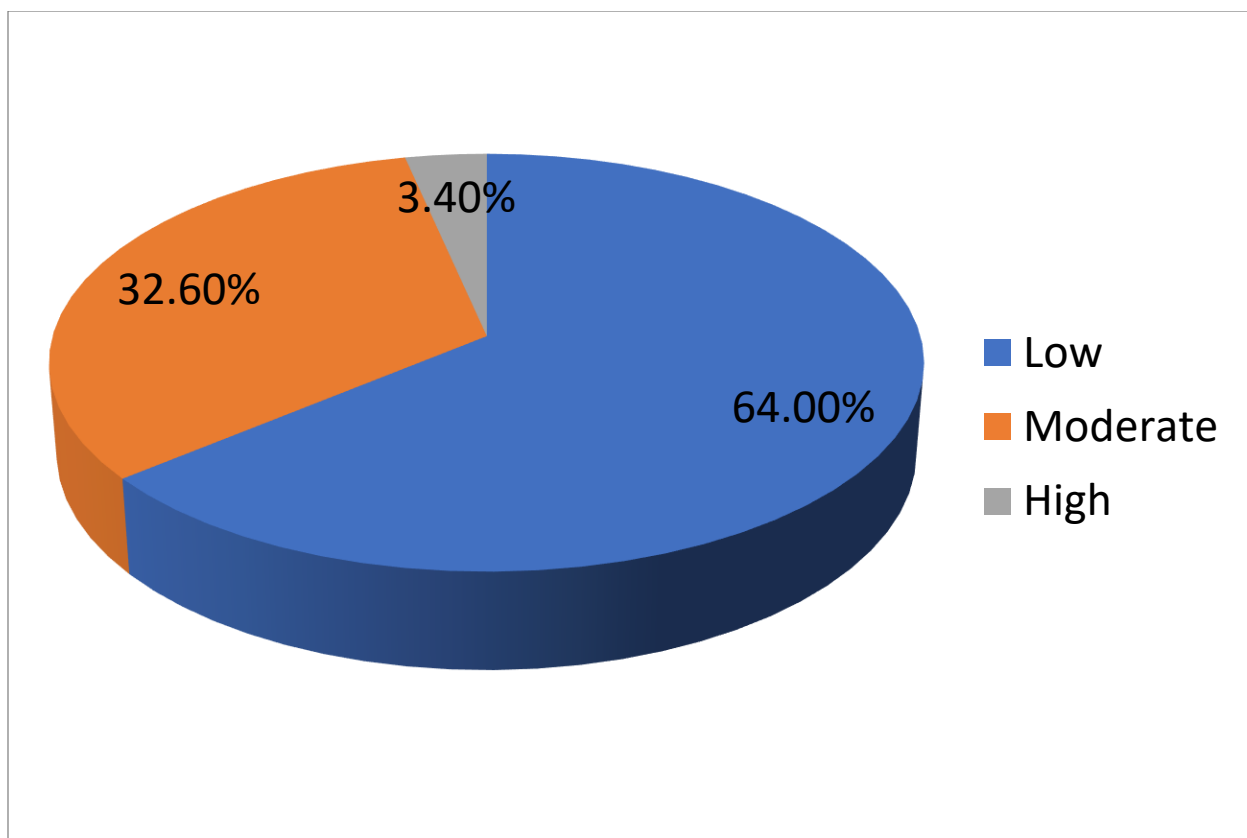


Figure 1: Categorization of the Participant's Level of Knowledge of COVID 19 Virus, and Vaccine

PARTICIPANTS' COVID-19 VACCINE UPTAKE

Only 4(2.3%) of the respondents reported to had been vaccinated against the COVID-19 virus and had completed their vaccination. Greater than half (67.4%) of the respondents reported their willingness to be vaccinated against the COVID-19 virus (See, Table 4). There was no significant relationship between participants' knowledge of the COVID-19 vaccine and their uptake of the COVID-19 vaccine ($\chi^2 = 2.3$; $p = 0.3$). There was no significant relationship between participants' age and their uptake of the COVID-19 vaccine ($\chi^2 = 0.9$; $p = 0.6$). Also, there was no significant relationship between participants' level of education and COVID-19 vaccine uptake ($\chi^2 = 1.8$; $p = 0.6$) (See, Table 5).

Table 4: Participants Uptake of COVID 19 Vaccines

Items	Yes (%)	No (%)
Ever received COVID 19 vaccine	4(2.3)	171(97.7)
Dosage of COVID 19 vaccine received (n=4)		
Two	4(100)	
Willingness to receive COVID 19 vaccine	118(67.4)	57(32.6)

Table 5: Relationship between Participants' Knowledge, Age, Level of Education and Uptake of COVID 19 vaccine

Variable	Ever Received COVID 19 Vaccine		χ^2 -value	p-value
	Yes (%)	No (%)		
Knowledge			2.3	0.3
Low	4(3.6)	108(96.4)		
Moderate	0(0.0)	57(100)		
High	0(0.0)	6(100)		
Age group (in years)			0.9	0.6
65-69	3(2.0)	150(98.0)		
70-74	1(5.3)	18(94.7)		
75-79	0(0.0)	3(100)		
Education level			1.8	0.6
No formal education	2(2.8)	69(97.2)		
Primary	2(3.80)	51(96.2)		
Secondary	0(0.0)	36(100)		
Tertiary	0(0.0)	15(100)		

DISCUSSION

The study was designed to access the knowledge, and COVID-19 vaccine uptake among the elderly in Ogun state, Nigeria. Generally, the participants had low knowledge of the COVID 19 virus and vaccine. A similar finding was reported by Mohamed et al., in Malaysia and Enitan et al., in six geopolitical zones in Nigeria, where they reported poor knowledge about the COVID-19 vaccine (Mohamed *et al.*, 2021; Enitan *et al.*, 2020) However, this finding is at variance with the reports of Khaja et al., in Saudi Arabia, and Huynh et al., in Vietnam, where they reported adequate knowledge of COVID-19 Virus and vaccine among their participants (Khaja *et al.*, 2021; Huynh *et al.*, 2021) This difference in finding may be as a result of disparity in study location and population, also the effort of government and non-governmental agencies in the countries to ensure that the populace is well informed about COVID-19 virus.

This study revealed differences in knowledge about the COVID-19 vaccine among the participants, as participants who were within aged 74-79 years had high mean knowledge scores. More elderly people are targeted for information regarding the virus because they are the most vulnerable population. Hence, they seem to know a lot about the virus. A similar finding was reported in Malaysia (Mohamed et al., 2021). Also, the study revealed that the mean score of knowledge of the female participants was greater than the male participants. This finding corroborates the result of Islam et al., in Bangladesh (Islam *et al.*, 2021). This may be because females tend to have better health-seeking

behaviour as compared to males. This study revealed that participants with tertiary education had higher mean knowledge scores. This finding aligned with the finding reported in Bangladesh (Islam *et al.*, 2021).

More participants in this study reported never having received the COVID-19 vaccine. However, more than half of the respondents reported they were willing to receive the vaccine. The willingness of the respondents to receive the COVID-19 vaccine may be a result that they are elderly and are at greater risk of developing COVID-19 Complications. Similar findings were reported in Malaysia, Saudi Arabia, and China (Mohamed *et al.*, 2021; Elharake *et al.*, 2021; Bai *et al.*, 2021). This finding contrasts with the finding of Enitan *et al.*, in six geopolitical zones in Nigeria, where they reported that most of their participants were unwilling to accept the COVID-19 vaccine (Enitan *et al.*, 2020). The differences in results may be because of differences in the study population. This study revealed no significant relationship between participants' knowledge of the COVID-19 vaccine and their uptake. This study revealed no significant relationship between participants' level of education and uptake of COVID-19 Vaccine. This finding contrasts with the finding of Spetz *et al.*, in Sweden, where they reported a significant relationship (Spetz *et al.*, 2022)

CONCLUSION

Participants had little knowledge about the COVID-19 virus and vaccine, poor uptake of the COVID-19 vaccine, and were willing to receive the COVID-19 vaccine. There were mean differences in participants' age, gender, and education level concerning their knowledge of the COVID-19 virus and vaccine. Additionally, the knowledge, age, and education level of participants had no relationship to their uptake of the COVID-19 vaccine. Results from this study constitute baseline information for the design of an evidence-based educational intervention to improve their knowledge about the COVID-19 virus and vaccine, thereby facilitating the uptake of the COVID-19 vaccine.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest

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