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Knowledge about covid-19 disease and acceptance of covid-19 vaccines among undergraduates of a federal university in south- south Nigeria

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ABSTRACT

Background: Following the covid-19 outbreak in Hubei, China in December 2019, efforts were made to decrease transmission rates and contain the spread of the virus, using the newly developed covid-19 vaccines. The aim of this study was to explore the knowledge about, and acceptance of covid-19 vaccines among undergraduates of a federal university in Nigeria.

Objectives: The study assessed the knowledge of undergraduates about covid-19 and their willingness to take covid-19 vaccine.

Methods: The study adopted a descriptive, quantitative approach with a study population of 2450 undergraduates in the halls of residence. Participants were selected using a non-probability convenience sampling technique calculated based on the assumption of a 50% vaccine acceptance rate, a 5% margin of error and a confidence interval of 95%. A validated 30 item self-structured questionnaire collecting data on demographics, knowledge of covid-19, its vaccines, vaccine coverage and willingness to take the covid-19 vaccine was administered in person to the respondents. Data were analyzed using Statistical Package for Social Sciences (SPSS) Version 21 to obtain the frequency, percentage, mean and standard deviation of data collected. Ethical approval was gotten from the management of the University and Informed consent was also obtained from the respondents.

Results: There were 332 respondents, made up of 169 females. Knowledge level was relatively high as indicated by almost 100% on covid-19 and 99.4% on the vaccines. Results also indicated low covid-19 vaccination coverage as only 3.9% had taken the vaccine and 44.3% of respondents indicated refusal to take the vaccine.

Conclusion: This study reported low covid-19 vaccination coverage with high refusal of respondents on acceptance of the vaccine. There is need to increase awareness about covid-19 vaccine (and other vaccines generally) as this will increase vaccination and promote safety.

Keywords: covid-19, pandemic, undergraduates, vaccines

Connaissance de la maladie covid-19 et acceptation des vaccins covid-19 parmi les étudiants de premier cycle d'une université fédérale du sud-sud du Nigeria

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RÉSUMÉ

Contexte : Plus d'un an, depuis l'émergence de l'épidémie de covid-19 à Hubei, en Chine, en décembre 2019, des efforts ont été déployés pour réduire les taux de transmission et contenir la propagation du virus à l'aide des vaccins covid-19 nouvellement développés. Le but de cette étude était d'explorer les connaissances et l'acceptation des vaccins covid-19 parmi les étudiants de premier cycle d'une université fédérale au Nigeria.

Méthode : L'étude a adopté une approche descriptive et quantitative avec une population de 2450 étudiants de premier cycle dans les résidences universitaires. Les participants ont été sélectionnés à l'aide d'une technique d'échantillonnage de convenance non probabiliste calculée sur la base de l'hypothèse d'un taux d'acceptation du vaccin de 50%, d'une marge d'erreur de 5 % et d'un intervalle de confiance de 95%. Un questionnaire auto-structuré validé de 30 items recueillant des données sur la démographie, la connaissance sur le covid-19, ses vaccins, la couverture vaccinale et la volonté de prendre le vaccin covid-19 a été administré en personne aux répondants. Les données ont été analysées à l'aide de SPSS afin d'obtenir la fréquence, le pourcentage, la moyenne et l'écart type des données recueillies. L'approbation éthique a été obtenue auprès de la direction de l'université et le consentement éclairé des personnes interrogées a également été obtenu.

Résultats : Il y avait 332 répondants, 169 étaient des femmes. Le niveau de connaissance était relativement élevé, comme l'indique le taux de près de 100% pour le covid-19 et de 99,4% pour les vaccins. Les résultats indiquent également une faible couverture vaccinale pour le covid-19, puisque seulement 3,9% des personnes interrogées ont pris le vaccin et 44,3 % ont indiqué avoir refusé de prendre le vaccin.

Conclusion : Cette étude fait état d'une faible couverture vaccinale par le covid-19 et d'un refus élevé des répondants d'accepter le vaccin. Il est nécessaire d'accroître la sensibilisation au vaccin covid-19 afin d'augmenter la vaccination et de promouvoir la sécurité contre la pandémie dans l'Université.

Mots-clés : connaissance, covid-19, acceptation, vaccin, étudiants de premier cycle

INTRODUCTION

Years after the emergence of covid-19 in China in December 2019, more than 756 million cases of covid-19 infection and over 6 million deaths have been confirmed worldwide.[1] Public health measures approved by the World Health Organization (WHO) and adopted by many countries to stem the pandemic relied mainly on preventive efforts.[2,3,4] Development of a safe and effective vaccine for covid-19 is seen as the long-term solution to the pandemic.[5,6] Vaccination of the population strongly relies on the acceptance of these novel vaccines.[7] The pharmaceutical industries, backed by the United Nations' support have successfully released covid-19 vaccines for administration to adults worldwide and children in a few countries which have given approval.[8]

The aim of this study was to explore the acceptance of covid-19 vaccines among resident undergraduates of the University of Benin.

METHODS

Study Design

This was a prospective descriptive study to document knowledge about the level of covid-19 and vaccine acceptance among resident undergraduates of the University of Benin, carried out between March and October 2021.

Inclusion and exclusion criteria

Inclusion criteria; Participants must be full-time undergraduate students of University of Benin, residing on campus in the halls of residence.

Exclusion criteria; Students who did not give consent.

Study population and sampling

Approximated study population of 2450 undergraduates in the halls of residence and made up of students from all the departments in the university. Participants were selected using a non-probability convenience sampling technique calculated based on the assumption of a 50% vaccine acceptance rate, a 5% margin of error and a confidence interval of 95%.

Sample size

Calculation of sample size was done by using the Cochran formula and the calculation below.

$SS = Z^2 \times Pq/e^2$

Where:

SS= sample size

Z= Z VALUE (e.g. 1.96 for 95% confidence level)

P= estimated proportion of an attribute that is present in a population (50% approx. 0.5)

q = p-1

e= margin of error (5% approx. 0.05)

The sample size derived from the calculation above is used to calculate the sample size for a finite population (where the population is less than 50,000).

NEW SS = SS ÷ [1 + (SS-1)/pop]

Pop = population

Calculations:

Study population = 2450

Using the formulas above,

$SS = 1.962 \times 0.5 \times (1-0.5)/0.05^2$

= 384.16

NEW SS = 384.16 ÷ [1 + (384.16-1)/2450]

= 332

Study instrument

A validated 30-item self-structured questionnaire collecting data on demographics, knowledge of covid-19, its vaccines, vaccine coverage and willingness to take the covid-19 vaccine was administered in person to the respondents. The questionnaire consists of three sections. Section A includes the social demographic data of respondents such as sex, age, level, department, faculty, and marital status. Section B contains questions which tests their knowledge about covid-19. Section C contains questions about the knowledge about the covid-19 vaccine while Section D contains willingness to take the covid-19 vaccine. Also, a further yes/maybe/no query was included to find out if respondents would take the vaccine when made available. Overall, 30 items; 6 questions for social demographics, 6 questions for knowledge of the virus, 10 questions for knowledge about the covid-19 vaccine and 8 questions on willingness to take the covid-19 vaccine were used to assess respondents level of knowledge and willingness.

The validity was checked by doing a pre-test on 20 participants. Modification of the tool was made based on the pre-test result. To make sure the questions are externally and internally consistent, pilot testing and Cronbach's alpha test were carried out. All the questions were tested using Cronbach's alpha test and a result greater than 0.7, indicated excellent internal consistency for responses obtained.

Data collection

The principal executive officers of each hostel were informed of the approval for this study. In order to ensure a high response rate, a cover letter accompanied each questionnaire to respondents explaining the research objectives with the assurance of confidentiality of information collected. The questionnaires were self-administered to undergraduate students residing in the University hostels by the researcher and retrieved same day.

Data analysis

Data collected were sorted, coded, and entered into the Microsoft Excel spread sheet. All data were analysed using the Statistical Package for the Social Sciences version 24 (IBM: SPSS Inc.) software package for statistical analysis. Descriptive statistics were carried out on all variables. Mean of the sample, standard error of mean, variance and standard deviation determined were used to summarize the average results. The data were presented in percentage for easier assessment and evaluation.

Ethical consideration

Permission to carry out the study was obtained from the Dean of Student Affairs office of the University through the Dean, Faculty of Pharmacy while copying the principal executive officers of the hostels. Informed consent was also obtained from the respondents, and they were made to understand that participation was voluntary.

RESULTS

Section A: Demographics of respondents

A total of 332 respondents were included in this study, giving a 100% response rate. A total of 169 (50.9) were females and 331 (99.7%) of respondents were single. Age and level of study are illustrated in Figures 1 and 2.

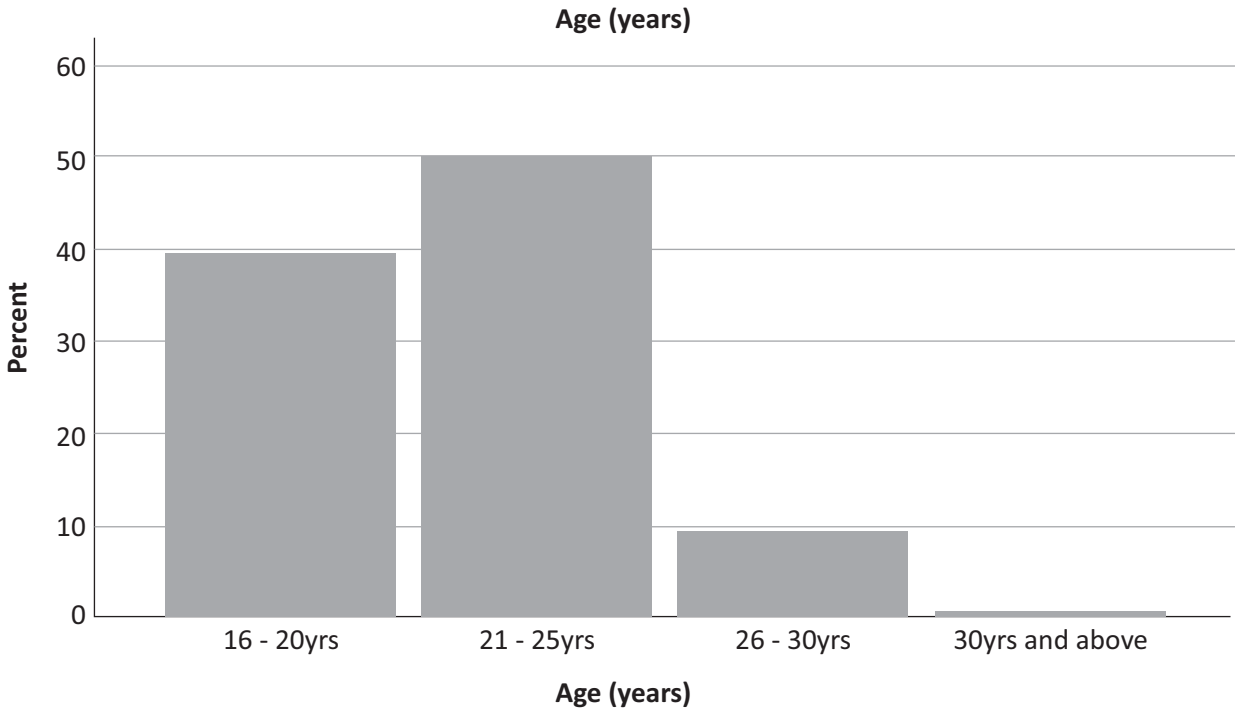

Figure 1: Age distribution of respondents

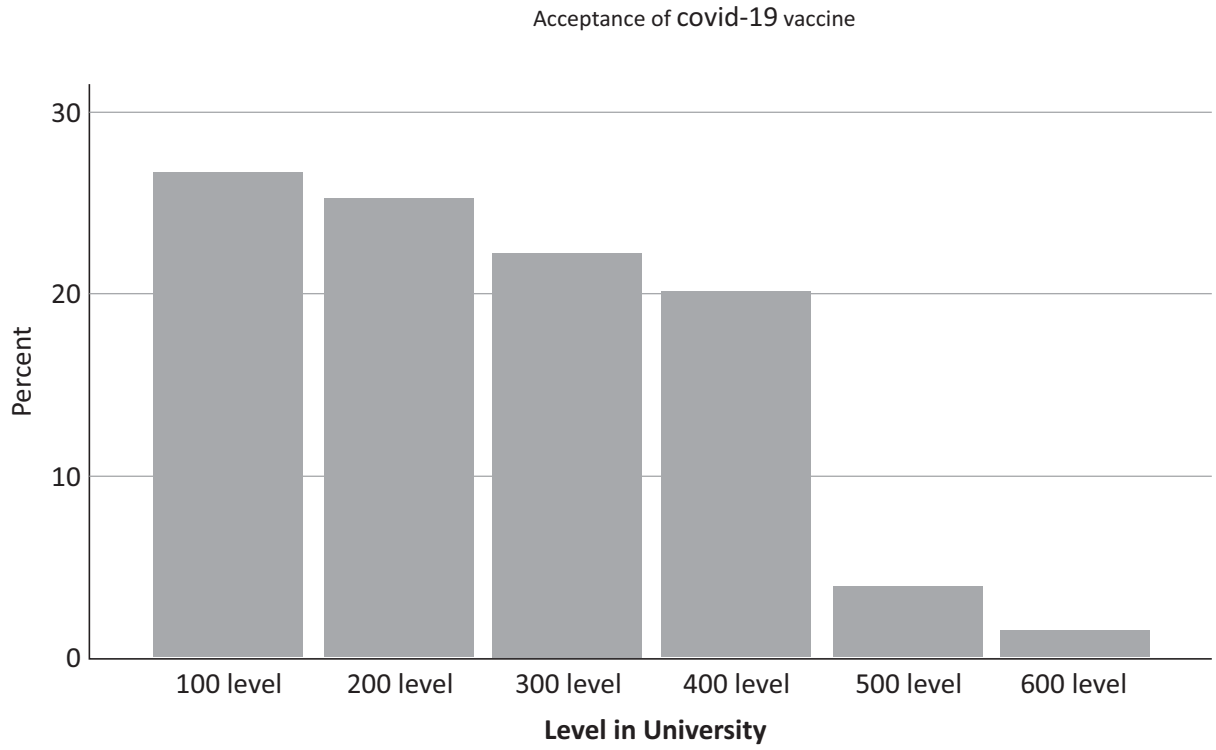

Figure 2: Students' level of study

Section B: Knowledge about the Corona-virus Disease 2019 (covid-19)

All the study participants reported that they have heard about covid-19 of which their most common source of information was media and internet 315 (94.9%) having compared it to other sources. Responses are illustrated in Figure 3.

On symptoms and modes of transmission, high response rates were seen across all options, showing that most of the symptoms and modes of transmission were well known. On effective ways of prevention, prevention bycovid-19 vaccines seems to have the least response when compared to the other preventive measures. Responses on knowledge of symptoms, mode of transmission and modes of prevention are presented in Table 1.

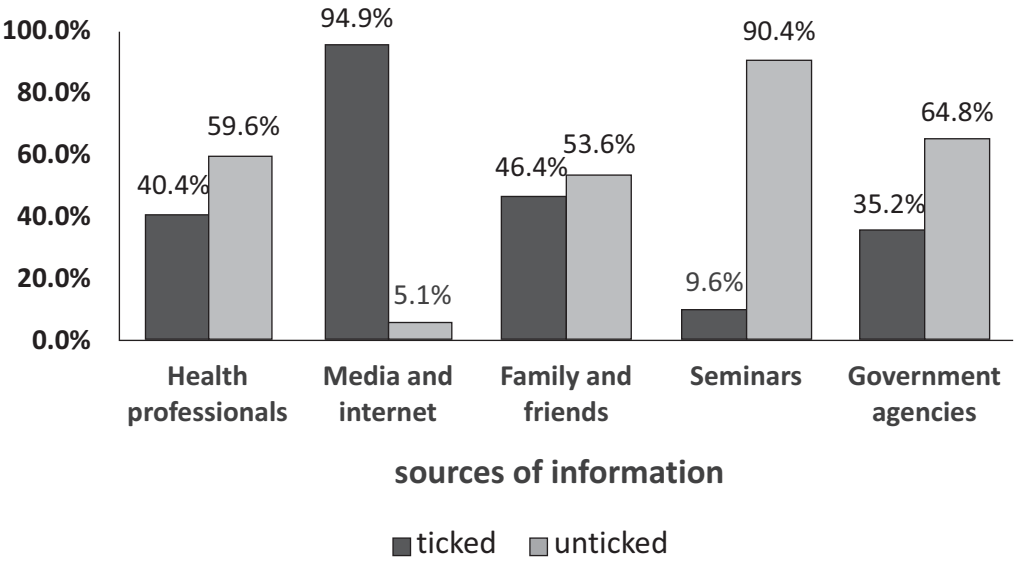

Figure 3: Sources of COVID-19 information

Table 1: Knowledge about Symptoms of covid-19 infection

What are the symptoms of covid-19? Tick more than one if applicable	**Frequency (Percentage)**
Cough	249 (75%)
Sneezing and catarrh	210 (63.3%)
Fever	220 (66.3%)
Difficulty in breathing	302 (91%)
Chest pain and loss of smell	186 (56%)
Mode of transmission of covid-19; tick more than one if applicable	
Coughing and sneezing from an infected person	302 (91%)
Body contact with an infected person	236 (71.1%)
Touching of contaminated surfaces	219 (66%)
I don't know	263 (79.2%)
What are the effective ways of covid-19 prevention? tick more than one if applicable	
Wearing of face mask	300 (90.4%)
Social distancing and self-isolation	305 (91.9%)
Washing of hands and the use of hand sanitizers	309 (93.1%)
covid-19 vaccines	151 (45.5%)

Section C: Knowledge about the covid-19 Vaccine

Of the 332 respondents, almost all the respondents (330, 99.4%) have heard of the covid-19 vaccine with the media and internet sources having 321 (94%) higher responses and seminar as a source of information had the least response of 25 (7.5%). On whether they believe that covid-19 vaccine prevents the disease, 23.5% and 28.6% strongly agree and agree respectively, while 36.45% of respondents were undecided. On determining the knowledge of the types of covid-19 vaccines available, moderate responses were gotten for Pfizer 92 (27.7%) and AstraZeneca 71 (21.4%) vaccines while majority 219 (66%) do not know the type of covid-19 vaccine available. This also affected their responses on the type available in Nigeria, as a total of 257 (77.4%) respondents do not know the type of covid-19 vaccine available in Nigeria. Responses on knowledge and perception of respondents about covid-19 vaccines are presented in Table 2 and 3 respectively.

Table 2: Respondents'knowledge of covid-19 vaccines

Have you heard of the covid-19 vaccine?	**Frequency (Percentage)**
Yes	333 (99.4%)
No	2 (0.6%)
Tick your sources of information?	**Frequency (Percentage)**
Health professionals	120 (35.8%)
Media and internet	313 (94%)
Family and friends	110 (32.8%)
Seminars	25 (7.5%)
Government agencies	101 (30.1%)
What are the types of covid-19 vaccines you know?	
Moderna	37 (10.8%)
Pfizer	93 (27.7%)
AstraZeneca	72 (21.4%)
I don't know	219 (66%)

Table 3: Respondents'perception of covid-19 vaccines

covid-19 vaccine prevents Coronavirus Disease

	S. Agree	Agree	Undecided	Disagree	S. Disagree	Mean	Std. Deviation
Frequency	78	95	121	26	13		
Percentage (%)	23.5	28.6	36.4	7.8	3.6	3.61	1.42
	52.1%		36.4%	11.4%			

covid-19 vaccine is safe for use

	S. Agree	Agree	Undecided	Disagree	S. Disagree	Mean	Std. Deviation
Frequency	27	89	166	28	23		
Percentage	8.1	26.8	49.7	8.4	6.9	3.21	0.956
	34.9%		49.7%	15.3%			

Two doses are needed to completely vaccinate with the covid-19 vaccine

	S. Agree	Agree	Undecided	Disagree	S. Disagree	Mean	Std. Deviation
Frequency	23	27	254	19	10		
Percentage	6.9	8.1	76.2	5.7	3.0	3.10	0.726
	15.0%		76.2%	8.7%			

The covid-19 vaccination can reduce covid-19 infection rate

	S. Agree	Agree	Undecided	Disagree	S. Disagree	Mean	Std. Deviation
Frequency	33	129	141	13	17		
Percentage	9.9	38.9	42.2	3.9	5.1	3.45	0.913
	48.8%		42.2%	9.0%			

Mass vaccination is the best way to overcome the covid-19 pandemic

	S. Agree	Agree	Undecided	Disagree	S. Disagree	Mean	Std. Deviation
Frequency	37	99	132	37	28		
Percentage	11.1	29.8	39.5	11.1	8.4	3.24	1.067
	40.9%		39.5%	19.5%			

Section D: Willingness to take the covid-19 Vaccine

Of the 332 participants, a lower proportion of participants (13, 3.9%) reported that they have already being vaccinated against covid-19 while the majority of the participants (319, 96.1%) have not. About 68 (20.5%) of the study participants reported that they are willing to take the covid-19 vaccine when available, while 147 (44.3%) responded that they will not take the vaccine. One hundred and seventeen respondents (117; 35.2%) were undecided. As also presented in the results, 119 (35.8%) participants were undecided on whether they will recommend covid-19 vaccine to their friends and family. A large proportion of participants either strongly agreed or agreed that covid-19 vaccine should be taken when an individual was at the risk of getting infected. On whether the approval of the covid-19 vaccine by regulatory authorities would guarantee safety, a higher percentage of participants were undecided, while 10.2% and 22.2% strongly agreed and agreed respectively. The majority responded as either undecided, disagreed or strongly disagreed that the covid-19 vaccination should be made compulsory. About 37.7% strongly agreed and 33.1% agreed that adequate information about the vaccine will increase acceptance rate, while 3.6% and 8.7% of respondents disagreed and strongly disagreed respectively.

DISCUSSION

Vaccines have the potential to catalyze the development of herd immunity and stem covid-19 pandemic. Herd immunity is a form of indirect protection from an infectious disease when a sufficient number of people of a community became immune to an infection. To reach herd immunity through the vaccinations, there are 2 stages: ensuring the availability of vaccines and administering the vaccines.[9,10]

On knowledge about covid-19, all the respondents have indeed heard of the virus, of which their most common source of information was media and internet. This shows that the media and internet play an important role on undergraduates' knowledge. This finding is similar to data obtained from some previous studies.[11.12] These sources of information are readily available and widespread but may be misleading or misunderstood. Seminars, which are academic and professional is an important source of information in the university but had the least response. The faculties and departments have seminars for the postgraduate students, and it is expected that this should also be a major means of information dissemination/gathering among undergraduate students. On symptoms and modes of transmission, high response rates were seen across all options, supporting the claim that most of the symptoms and modes of transmission were well known. On effective ways of prevention, prevention by covid-19 vaccines seems to have the least response when compared to the other preventive measures.

On knowledge about the covid-19 vaccines, almost all of the respondents have heard of the covid-19 vaccine with the media and internet sources also having higher responses again. But lower response was seen when their knowledge on the types of vaccines available was assessed.

On willingness to take the vaccine, our findings indicate low vaccine coverage while about half of the respondents indicated their refusal to take the covid-19 vaccine, some of respondents are yet to decide if they will take the vaccine. This needs to be addressed in other to increase the rate of acceptance. Furthermore, a significant number of students disagree on the need to make covid-19 vaccination compulsory indicating their resistance to compulsory covid-19 vaccination. On if adequate information about the covid-19 vaccine will increase acceptance rate, a higher response was seen as respondents strongly agree/agree that information is key in increasing acceptance rate.

This study has reported a poor willingness to take the covid-19 vaccine which is similar to the findings of Adeniran *et. al*. (2022)[13] but contrary to two studies, one from Italy which reported a high percentage (86.1%) of college students expressing intent to take the covid-19 vaccine 14 and 74.5% reported in Nigeria by Adebisi, *et al* (2021).[15] Another study done in Nigeria reported a higher percentage (34,1%) though still a poor acceptance of the covid-19 vaccine.[15] Among a sample of college students in South Carolina, higher acceptance of covid-19 vaccine was significantly associated with increased trust levels in mass media, health agencies, scientists, and pharmaceutical companies.(CITE REF) In order to build trust in covid-19 vaccination efforts, addressing the scope of vaccine acceptance in developing countries like Nigeria becomes important. In Universities where there are high risks of transmission and major negative impact on young adults,[17] it becomes very important that awareness on the vaccines should be carried out across all the levels and departments in educational institutions.

At present, vaccines are a critical new tool in the fight

against covid-19 pandemic. Several covid-19 vaccines have been developed through clinical trials while trying to meet the requirements for quality, safety and efficacy.[18] These vaccines were manufactured within one year after the WHO declared covid-19 to be an international public health emergency. Due to remarkable determination in vaccine research, development and production, covid-19 vaccines were developed within the shortest period in the history of vaccine production.[2] Nigeria, like other countries received covid-19 vaccines during the pandemic. A partnership between coalitions for epidemic preparedness innovations (CEPI), GAVI, UNICEF and WHO shipped 3.94 million doses of the AstraZeneca/Oxford vaccine, manufactured by the Serum Institute of India (SII), from Mumbai to Abuja (WHO- regional office for Africa 2021 and Premium times Nigeria, 2021). As of 6th June 2021, the country had administered over 2.3 million doses: about 1.96 million had received the first dose Vand 336,500 the second dose.[19,20]

Other studies describing college students' intentions and attitudes regarding covid-19 vaccination have reported more willing attitude of respondents compared to this study.[3,21] This current study adds to the growing number of studies done as regards acceptance of the covid-19 vaccine and the existing gap which requires professional intervention to improve covid-19 vaccination status in the Country.

CONCLUSION

This study shows that undergraduate residents in the University have a high knowledge of covid-19disease. They also have adequate knowledge of the covid-19 vaccines. Lapses were identified which require educational intervention. There is low covid-19 vaccine coverage in the university and a poor acceptance rate of the vaccine. This can be as a result of inadequate information and low sensitization of the undergraduates by university authorities. This study indicates the need for Management to mobilize health professionals in the university to organize seminars on the importance of covid-19 vaccination.

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