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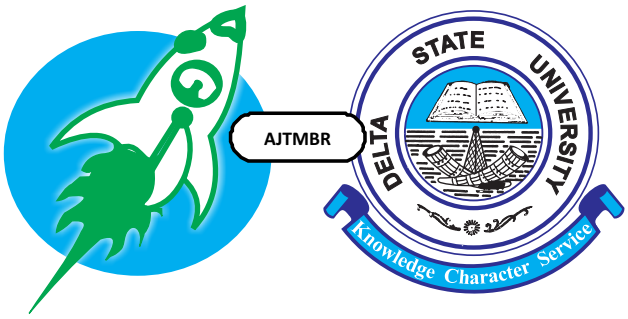

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Focus and Scope

The African Journal of Tropical Medicine and Biomedical Research is a multidisciplinary and international journal published by the College of Health Sciences, Delta State University of Abraka, Nigeria. It provides a forum for Authors working in Africa to share their research findings on all aspects of Tropical Medicine and Biomedical Sciences and to disseminate innovative, relevant and useful information on tropical medicine and biomedical sciences throughout the continent. The journal will publish original research articles, reviews, editorials, commentaries, short reports, case reports and letters to the editor. Articles are welcome in all branches of medicine and dentistry including basic sciences (Anatomy, Biochemistry, Physiology, Pharmacology, Psychology, Nursing etc) and clinical sciences (Internal Medicine, Surgery, Obstetrics and Gynaecology, Dental surgery, Child Health, Laboratory Sciences, Radiology, Community Medicine, etc). Articles are also welcome from social science researchers that document the intermediating and background social factors influencing health in countries of Africa. Priority will be given to publication of articles that describe the application of the principles of primary health care in the prevention and treatment of diseases.

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Acknowledgments

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Table of Contents

Knowledge and Uptake of Covid-19 Vaccine Amongst Students of Tertiary Institutions in Oghara, Delta State, Nigeria

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Abstract

Introduction: Coronavirus disease is a global health emergency that began in China, in 2019. It resulted in several morbidity and mortality worldwide. The introduction of Covid-19 vaccine in Nigeria was hampered by wide spread vaccine hesitancy due to factors like misinformation, rapid rollout, safety concerns, potential adverse effects, and conspiracy theories. The objective of this study was to assess the knowledge and uptake of Covid-19 vaccine among students of tertiary institutions in Oghara, Delta State, Nigeria.

Materials and methods: A descriptive cross-sectional study design was employed to collect data from 354 participants in three tertiary institutions in Oghara using multistage sampling technique. Data analysis was done using IBM-SPSS version-26 software. Both descriptive and inferential statistics were done and level of significance set at $P<0.05$.

Results: Most respondents were between ages 21-25 (53.2%) with females constituting 55.6%. Seventy-one percent of respondents had good knowledge of Covid-19 vaccine. Only 27% had been vaccinated while 73% are unvaccinated. Among those unvaccinated, 57.7% were not willing to be vaccinated. Good knowledge of Covid-19 vaccine ($P=0.048$) and having previous exposure to information, education and communication about Covid-19 vaccine ($P=0.024$) were found to have a statistically significant association with the uptake of Covid-19 vaccine.

Conclusion: Majority of students of tertiary institutions in Oghara have good knowledge of COVID-19 vaccine however the uptake was poor. More effort should be invested in providing accurate information about the vaccines while mitigating misinformation.

Keywords: Acceptability, COVID-19 vaccine, Knowledge, Uptake

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INTRODUCTION

In December 2019 in Wuhan, a city in the Hubei province of China, a cluster of fast spreading viral pneumonia was observed among citizens, although initially called Wuhan pneumonia by local health workers;[1] this highly contagious disease (COVID-19) caused by severe acute respiratory syndrome corona virus-2 (SARS-CoV-2 virus) quickly spread world-wide and was declared a global pandemic by the world health organization (WHO) on March 11, 2020.[2]

The majority of COVID-19 infections results in mild-to-moderate symptoms and recovers without the need for special treatment; but a substantial number of cases lead to severe illness which may ultimately lead to death.[3]

With no scientifically proven treatments or medicines found; governments across the world

imposed border control measures, travel bans, public health campaigns, social distancing, mask mandates, and quarantine in a bid to stop the spread of the virus that has caused a massive economic downturn[4].

As at 28th January 2022, there have been 364,191,494 confirmed cases, 5,631,457 deaths globally reported by the World Health Organization (WHO).[5] This has been a significant concern to public health and has greatly affected all aspects of people's lives all over the world. On February 27, 2020, Nigeria announced the confirmation of its first case, which was an Italian national who tested positive at the Virology Laboratory of Lagos University Teaching Hospital.[6] Subsequently, all 36 states and the Federal Capital Territory, Abuja were affected; and by September 25, 2022, Nigeria had recorded 265,105 confirmed cases, 257,594 patient discharges and 3,155 deaths. However, Delta state confirmed its first case on the 7th of April, 2020 and by February 2022 it has recorded 5,727 confirmed cases, 5,170 discharges and 112 deaths.[7]

The long-term pandemic's effects on public health are still being felt by communities throughout the world. Lockdowns and travel restrictions imposed to stop the spread of COVID-19 have severely hindered economic activity that has led to low economic output and loss of jobs for almost half of the world's workforce; roughly affecting 3 billion people as well as lower household incomes and increase healthcare costs.[8]

To help restrict the spread and eliminate the likelihood of future incidents, preventive measures in the form of vaccines is crucial and the need for a safe and effective vaccine has intensified in every region of the world[9]. Vaccines are biological preparations that provide active acquired immunity to a particular infectious disease. They do so by stimulating an immune response (producing antibodies) to an antigen, a molecule found on a pathogen.[10]

Several vaccines, including those from Oxford-AstraZeneca, Pfizer-Biontech, Moderna/ NIAID, Johnson and Johnson, etc., have been made available for use in various nations. The first worldwide mass vaccination campaign started in December 2020 and was first limited to individuals deemed to be at high risk, such as elderly people and healthcare professionals.[11]

The rapid development and deployment of COVID-19 vaccines is the result of not only unprecedented levels of international collaboration but also of decades-long massive public investment in research, development, and manufacturing capacity.[12] It is particularly significant when framed against previous estimates of the probability of the approval process for a vaccine entering clinical trials of as little as 12% to 33% after some 7 to 9 years of development.[13]

Despite the availability of vaccines, vaccine compliance remains variable and inconsistent, and vaccine hesitancy is considered a vital obstacle to instituting preventive measures to combat infectious diseases.[14]

Covid-19 vaccine hesitancy and uptake refusal are global, and several factors have been propounded as reasons for population response to the vaccine use. These include misinformation, rapidity of its rollout, government perceived insincerity in some quarters, concerns of safety, potential adverse effects and conspiracy theories, including an alleged link to the 5G network and vaccine impact on fertility and pregnancy.[15]Vaccine hesitancy was also linked to age, low educational attainment, female sex, black race, single or divorced status,

and unemployment.[16]

Among tertiary students the risk of contracting the virus and spreading it to others is high due to student's activities, behaviors, socializing and unwillingness to adhere to COVID-19 preventive measures. Asymptomatic infections typically affect young students (less than 20 years old), who can then infect others, particularly those in high-risk groups.[17]

Although a number of studies have attempted to investigate the knowledge and uptake of the COVID-19 vaccine among various group of the population, evidence is scarce among tertiary students in Oghara, Delta state, Nigeria. Due to populated class settings and communal living, tertiary institutions may contribute to the rapid spread of Covid-19. Also, it is assumed that students of higher learning are agents of change and would have a better influence on their families, friends, and society. Thus, assessing the knowledge and uptake of the Covid-19 vaccine amongst these students would help informed decisions towards reducing the spread of the disease. It is therefore against this background, that the study was conducted to assess knowledge and uptake of Covid -19 vaccine among students of tertiary institutions in Oghara, Delta State, Nigeria.

MATERIALS AND METHODS

The study was conducted among tertiary institutions in Oghara, Delta state, Nigeria. Oghara is located in Ethiope West Local Government Area of Delta State, Nigeria. It is home to the Urhobo ethnic group of Delta State. The 2006 final census results put the population of Ethiope west at 202,712 persons.[18] However, the population of the area is estimated to be over 300,000 persons in 2020 using the national growth rate of 3 percent.[19] Oghara is home to 3 tertiary (health and educational), institutions namely: Delta State University Teaching Hospital (DELSUTH), Delta State Polytechnic (DESPO) and Western Delta University (WDU).The clinical students (nursing and medical) of Delta State University (DELSU), Abraka are sent to DELSUTH for their clinical training and posting.

A descriptive cross-sectional study design was employed to collect data from students of tertiary institutions in Oghara, Delta state between the periods of July – September 2022.
All consenting adult students of tertiary institutions in Oghara who were physically present were included in the study. Students of tertiary institutions who were below 18years of age and in the first year of study were excluded from this study.

A multistage Sampling technique was employed in this study. In the first stage, two faculties were selected by simple random sampling by balloting from the list of faculties in each of the three tertiary institutions in Oghara. In the second stage, two departments were selected from the list of departments in each of the selected faculties using simple random sampling by balloting. In the third stage, one class was selected by simple random sampling (balloting) from the list of classes in each selected department. Every eligible participant in the selected class was interviewed consecutively until the assigned sample size was completed.

The minimum sample size for this study was calculated using Fischer's formula.[20] Based on prevalence of knowledge of Covid -19 vaccine of 73.5% from a previous study,[21] an error margin of 5% and a standard normal deviation of 1.96 at 95% confidence level, the determined minimum sample size was 323. Considering a non-response rate of 10%, the sample size for this study was

increased to 354. However, 422 questionnaires were distributed (190 in DELSU, 117 in WDU and 115 in DESPO) for the study and 354 were retrieved and analysed giving a response rate of 84.0%.

Data collection was done using a pre-tested semi-structured self-administered questionnaire as the primary research instrument consisting of a series of questions to gather the relevant information from respondents.The questionnaire comprised of four sections namely: socio-demographic characteristics of respondents, knowledge of covid-19 vaccines, acceptability and uptake of covid-19 vaccine and factors influencing uptake of covid -19 vaccines respectively. The questionnaire was validated to ensure face and content validity by experts who reviewed the contents of the instrument. To ensure reliability, the instrument was pretested among 20 students in a non-participating tertiary institution in Delta State, which provided necessary feedback to refine the questions, ensure clarity and avoid ambiguity. The test-retest method was used and the resulting data yielded a correlation coefficient of 0.9 indicating high reliability.

Data collected was sorted and analyzed using IBM-SPSS (Statistical Product and Service Solution) version 26. Both descriptive and inferential statistics was done and results presented using frequency tables, cross tabulations and charts. Continuous variables were summarized using mean, median and standard deviation and categorical variables were summarized using frequencies and percentages. Chi-square was used to test for significant association between independent and dependent variables, with level of significance set at $p<0.05$.

Ethical approval (HREC/PAN/2023/018/0465) for this study was obtained from the Health Research Ethics Committee of Delta State University Teaching Hospital (DELSUTH). Permission was also granted by the heads of the respective institutions. Informed consent was obtained from each participant prior to data collection. Participation was voluntary, and respondents were assured of the confidentiality and anonymity of their responses.

RESULTS

Socio-Demographics Characteristics

This study reveal that the mean age of respondents was 22.34 ± 3.38 and most respondents were between the ages of 21-25 (58.2%) with females constituting 55.6%. The respondents were distributed across various departments, with the highest representation from Medicine (39.5%) and the lowest from Engineering (5.9%). Majority of the respondents were Christians (81.6%); Urhobo was the dominant tribe with 34.2% and a greater proportion of respondents (52.8%) were students of Delta state university (table1).

Knowledge of Respondents Regarding Covid -19 vaccines:

Majority of respondents (71.0%) had good knowledge of Covid 19 Vaccine while 29.0% had poor knowledge (figure 1). Most respondents (66.6%) agree that the vaccine helps build immunity while 69.7%% disagree that Covid-19 vaccine can prevent the disease. Social media (83.8%) was the most common source of information about the vaccine followed by television/radio (70.0%). The least common source of information about covid-19 vaccine was newspapers/newsletter (21.4%). However, NCDC website (42.9%) was the third most common source of information regarding covid-19 vaccine. Majority of respondents know about the Pfizer (70.0%) and Mordena (69.5 %%)

vaccines. While 53.5% of respondents know about Johnson & Johnson, 50.0% know about AstraZeneca vaccine. Seventy nine point nine percent of respondents are aware that COVID-19 vaccine requires at least 2 doses and 47.4% know that it is given intramuscularly. While 70.3% of participants are aware that the vaccine may have side effects, 90.4% recognize the side effects may be pain at the site of injection and fever respectively (table 2).

Uptake and Acceptability of Covid-19 Vaccine among Respondents

Only 27% of respondents (n=94) have taken the Covid-19 vaccine while majority (n=260; 73%) were unvaccinated (figure 2). Among those unvaccinated, only 42.3% were willing to get vaccinated while most of them (57.7%) were not willing to get covid-19 vaccination (table 3).The most common reason for unwillingness to get covid -19 vaccination was side effects of the vaccine (35%). However, 20.1% of respondents who were unvaccinated believe there is a conspiracy behind the vaccine; which was the reason for their unwillingness to be vaccinated (figure 3).

Factors Associated with Acceptance and Uptake of Covid 19 Vaccine

This study revealed that covid-19 vaccine was slightly more acceptable to respondents with good knowledge (27.4%) of the vaccine compared to those with poor knowledge (24.8%) of the vaccine; thus the uptake was more among respondents with good knowledge (27.4%) of the vaccine compared to those with poor knowledge (24.8%). The association between knowledge (P= 0.048) and uptake of covid-19 vaccine was statistically significant (table 4). Similarly, respondents who had received any form of Information, Education, and Communication (IEC) regarding the importance of the covid-19 vaccine had a higher uptake (31.25%) compared to those who have not receive any form of IEC (19.9%). The association between receiving IEC (P=0.024) and uptake of the vaccine was also statistically significant (table 5)

Table 1a: Socio-demographic characteristics

Variable	Categories	Frequency (n=354)	Percentage
Age (years)	18 – 20	76	21.5
	21 -25	206	58.2
	26 – 30	46	13.0
	> 30	26	7.3
	mean age (SD)	22.34	(3.38)
Sex	Male	157	44.4
	Female	197	55.6
Marital status	Single	318	89.8
	Married	36	10.1
Institution	DELSU	187	52.8
	WDU	96	27.1
	DESPO	71	20.1
Religion	Christianity	289	81.6
	Muslim	37	10.5
	Traditional	28	7.9
Tribe	Urhobo	121	34.2
	Isoko	28	7.9
	Itsekiri	33	9.3
	Ijaw	30	8.5
	Ika	39	11
	Ukwani	35	9.9
	Delta Ibo	26	7.3
	*Others	42	11.9

*others – Yoruba, Igbo, Hausa, Edo, Esan etc

Table 1b: Socio-demographic characteristics cont'd

Variable	Categories	Frequency (n=354)	Percentage
Department	Medicine	140	39.5
	Nursing	58	16.4
	Law	33	9.3
	Accounting	33	9.3
	Engineering	21	5.9
	Computer science	25	13.0
	**Others(management, arts)	44	12.4
Residence	on campus	273	77.1
	off campus	81	22.8

**others – management, arts etc

Table 2 Assessing Respondents Knowledge of Covid 19 Vaccine

Variable	Categories	Yes (%)	No (%)	Not sure (%)	Total responses
Function of Vaccine	Prevents Disease	33(13.1)	175(69.7	43(17.1)	251
	Helps the body build immunity	167(66.5)	41(16.3)	43(17.1)	251
Source of Information	television/Radio	150(70.0)	40(18.7)	24(11.2)	214
	Social Media	181(83.8)	30(13.9)	5(2.3)	216
	Newspapers/Newsletter	50(21.4)	184(78.6)		234
	Friends/Family members	59(21.5	200(73.0)	15(5.5)	274
	Healthcare Personnel	91(33.8)	122(45.4)	56(20.8)	269

	NCDC website	75(42.9)	100(57.1)		175
Types of Vaccine	Mordena	105(69.5)	15(9.6)	31(19.9)	156
	Johnson & Johnson	88(53.0)	64(38.6)	14(8.4)	166
	AstraZeneca	92(50.5)	72(39.6)	18(9.9)	182
	Pfizer	113(70.0)	14(8.6)	35(21.6)	162
Dose of Vaccine	One	122(74.8)	41(25.2)		163
	At least two	163(79.9)	41(20.1)		204
Route of administration	Intramuscular	117(47.4)	77(31.2)	53(22.1)	247
Side Effects		166(70.3)	49(20.8)	21(8.9)	236
Specific Side Effects	Pain at site of injection	150(90.4)	14(8.4)	2(1.2)	166
	Body weakness	100(60.2)	20(12.0)	46(27.7)	166
	Fever	150(90.4)	11(6.6)	5(3.0)	166
	Dizziness	45(27.1)	70(42.2)	51(30.7)	166
	Headache	120(72.3)	30(18.1)	16(9.6)	166

Table 3 Willingness to Receive Covid-19 Vaccine among Unvaccinated Respondents

Variables	Category	Frequency	Percent
Willingness to receive covid-19 vaccination (n=260)	Yes	110	42.3
	No	150	57.7

Table 4 Association between Knowledge and Uptake of Covid-19 Vaccine

		Have you been vaccinated?			
Variable	**Categories**	**Yes (%)**	**No (%)**	**Total**	**Test Statistics**
Knowledge of covid-19 vaccine	**Poor Knowledge**	23(19.6)	94(80.34)	117	$X^2 = 3.915$ P = 0.048 df = 1
	Good Knowledge	71(29.9)	166(70.0)	237	
	Total	94	260	354	

Table 5: Association between Reception of IEC and Uptake of the Vaccine

		Have you been vaccinated?			
Variable	**Categories**	**Yes (%)**	**No (%)**	**Total**	**Test Statistics**
Have you received any IEC regarding the importance of covid 19 vaccines?	Yes	65 (31.25)	143 (68.75)	208	$X^2 = 5.134$ P = 0.024 df = 1
	No	29 (19.9)	117 (80.1)	146	
	Total	94	260	354	

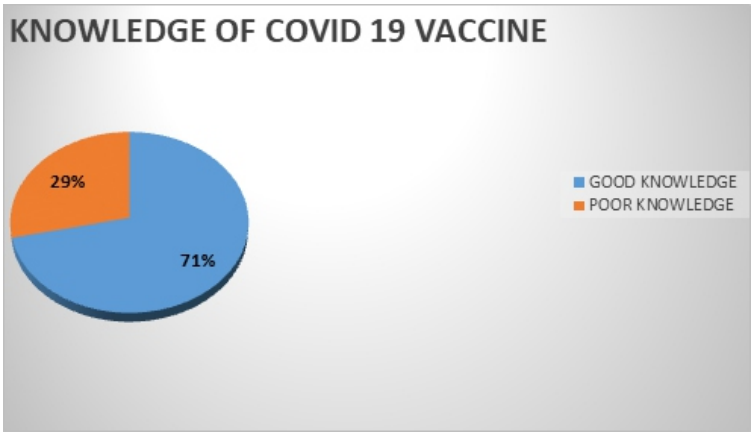

Figure 1: Knowledge of Covid-19 vaccine among respondents

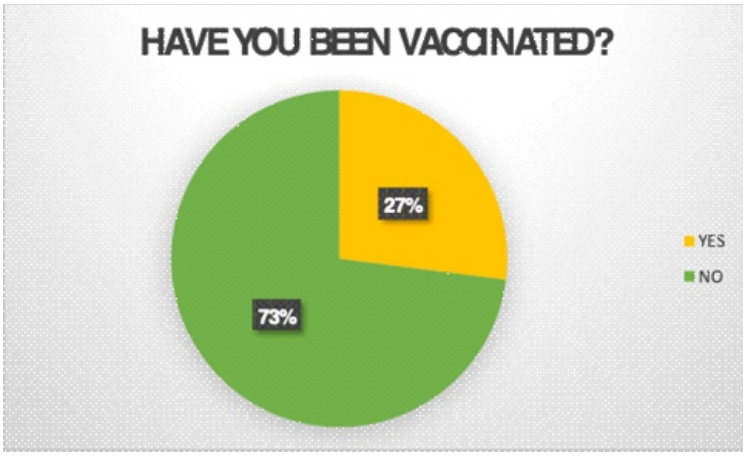

Figure 2: Uptake of Covid-19 Vaccine

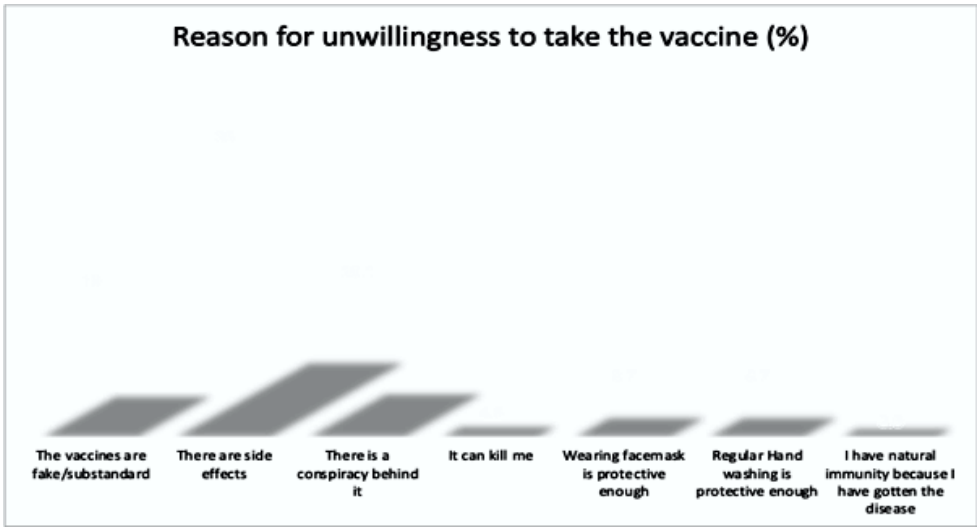

Figure 3: Reasons for unwillingness to take Covid-19 Vaccine among Unvaccinated Respondents

DISCUSSION

This study revealed that the most respondents were between the ages of 21-25years with females constituting more than half of the respondents. This observation is contrary to a previous study in Lagos were about half of the respondents were less than 21 years and majority were males.[21] This could be due to differences in the geographical locations of the studies.

The observation that majority of respondents in this study have good knowledge about covid-19 vaccine is comparable to the findings of previous studies conducted in Nigeria.[1,22] This study also revealed that social media (84%) television/radio (70%) and NCDC web site (43%) were the major sources of information regarding covid-19 vaccine among the respondents. This finding is in agreement with previous studies done in Nigeria

where social media was reported as the primary source of information.[1,23] It is also in consonance with the findings of a study done among university students in Turkey where social media was reported as one of the major sources of information on influenza pandemic.[24] The implication of this finding is that social media can be exploited as a veritable channel for health promotion. This observation supports the trend that majority of young adults get vital information from social media because it easy to access and also because events can be broadcasted in real time.

Contrary to expectation, most respondents know about the Pfizer and Mordena vaccines more than the other vaccines. This finding was in spite of the fact that AstraZeneca vaccine was more popular and available in our locality. This observation could be due to the fact that Pfizer was the first vaccine to be approved for use and it aroused the most controversies mainly on social media.[10] Majority of respondents were aware that covid-19 vaccine requires at least 2 doses. This finding is comparable to the findings of a study conducted in Jordan which showed that two-thirds of participants knew that the covid-19 vaccine should be issued in 2 doses.[25]

The uptake of the covid-19 vaccine observed in this study was poor. Similar findings had also been reported in previous studies.[26,27] This study revealed that fear of side effects and belief in conspiracy theory were the major reasons for unwillingness to take covid-19 vaccine. This finding is in agreement with a similar study done in India.[27] However, it is in contrast with similar studies conducted in Nigeria in which vaccine efficacy and vaccine safety were reported as the main reason for vaccine hesitancy respectively.[1,26] This study observed a statistically significant association between knowledge of covid-19 vaccine and uptake of the vaccine. Similar finding was reported among undergraduates in a tertiary institution in Lagos, and other selected universities in Nigeria.[21,28] This finding implies that knowledge about the vaccine is crucial to mitigating vaccine hesitancy. Although it has been reported that knowledge alone is insufficient to change attitudes and behaviors significantly.[29] In a study to assess vaccination hesitancy and conspiracy belief in United Kingdom during covid-19 pandemic, it was reported that despite high levels of knowledge, vaccine hesitancy persisted due to underlying mistrust and misconceptions.[29] This underscores the need for comprehensive interventions that address both knowledge gaps and attitudinal barriers through strategic health communication and engagement. Furthermore, this study also observed a statistically significant association between those who received information, education, and communication (IEC) on covid-19 and uptake of the vaccine. This observation corroborates previous studies in United Kingdom and United Arab Emirate where lack of information was reported a major reason for not receiving the covid-19 vaccine.[30,31] This finding further highlights the need for strategic health communication as a way of promoting covid-19 vaccination.

This study should however, be interpreted with caution since it focused only on students of tertiary institutions in Oghara; hence cannot be generalized to students in all tertiary institutions in Nigeria.

CONCLUSION

Majority of students of tertiary institutions in Oghara Delta state had good knowledge about covid-19 vaccine with social media been the major source of information. However, Uptake of the vaccine was poor with fear of the side effects being the major cause of vaccine hesitancy. The association between knowledge of the vaccine,

receiving IEC regarding the vaccine and uptake of the vaccine was found to be statistically significant. It is therefore recommended that social media and other veritable sources of communication should be employed by medical professionals; governmental and non-governmental organizations to educate, dispel fear and misconception, and provide correct information regarding covid-19 vaccines. Students should be provided with the right sources of information and encouraged to adopt responsible health behavior and preventive measures like covid-19 vaccination.

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