

Acceptance of COVID-19 vaccination among doctors in the Federal Medical Centre, Yenagoa, South-South, Nigeria

Allagoa DO¹, Oriji PC^{1*}, Oguiche OI², Ozori SE¹, Tekenah ES¹, Obagah L¹

¹Department of Obstetrics and Gynaecology, Federal Medical Centre, Yenagoa, Bayelsa State, Nigeria

²Department of Community Medicine, Federal Medical Centre, Yenagoa, Bayelsa State, Nigeria

*Correspondence: Dr. Oriji, Peter Chibuzor; +234 803 067 7372; chibuzor54@gmail.com

Abstract

Background: COVID-19 was declared a pandemic on March 11, 2020 by the World Health Organisation. It is a respiratory disease caused by Severe Acute Respiratory Syndrome Corona Virus-2 (SARS-CoV-2).

Objective: To assess the reasons behind the low turnout of doctors for COVID-19 vaccination in the Federal Medical Centre, Yenagoa, Bayelsa State, Nigeria.

Materials and Method: This study was a descriptive cross-sectional study that was carried out at the Federal Medical Centre, Yenagoa between 1st and 23rd April, 2021. The study population consisted of 182 doctors from all departments/units in the hospital.

Written informed consent was obtained. The data were collected with a predesigned questionnaire, and were analysed using IBM SPSS 23.0 version.

Results: Ninety-four doctors (51.6%) were males and 88 (48.4%) were females. Most were married (65.4%) and Christians (98.4%) while very few were aged greater than 45-year-old (2.7%). Slightly above half (51.9%) of the doctors who refused the vaccine, did so because the vaccine has not gone through enough clinical trials. Other reasons for refusal of the COVID-19 vaccine include side effects (37.0%) and lack of trust in government (29.6%) and the manufacturers of the vaccine (23.5%).

Conclusion: Doctors who are averse to COVID-19 vaccine may not recommend the vaccine, transmit this aversion to their patients, which will subsequently influence their patients' attitude to vaccination. Therefore, education and enlightenment campaigns on the safety and efficacy of COVID-19 vaccine should be carried out to change the mindset of people for the better.

Keywords: COVID-19; SARS-CoV-2; Pandemic; Doctors; COVID-19 vaccination; Yenagoa.

Date of Submission: 06-05-2021

Date of Acceptance: 19-05-2021

I. Introduction

COVID-19 was declared a pandemic on March 11, 2020 by the World Health Organisation.¹ It is a respiratory disease caused by Severe Acute Respiratory Syndrome Corona Virus-2 (SARS-CoV-2). In Nigeria, the case fatality rate is presently 1.2%, with a recovery rate of 82%,² and prevalence of 12.2%.³ This pandemic has caused significant morbidity and mortality worldwide, including disruption of social life, education and the economy of Nations. This is the reason Scientists all over the world have been working tirelessly to produce vaccines that will prevent and control the further spread of this disease.

The COVID-19 is the fifth reported pandemic in history since the 1918 Spanish flu, which is also known as the 1918 influenza pandemic.⁴ It was caused by the H1N1 Influenza A virus. It was between February 1918 and April 1920. In four successive waves, about 500 million people (about one-third of the world's population at that time) were affected.⁵ The third wave of the COVID-19 is presently ongoing in France, Spain and Germany. The Indian strain seems to be more virulent, as it has been associated with more morbidity and mortality.

The B.1.351 variant of the coronavirus that was first found in South Africa, has now been found in 23 African countries. The affected countries are Kenya, Cameroon, Cote D' Ivoire, Malawi, Mauritius, Togo, Botswana, Comoros, Lesotho, Madagascar, Mozambique, Namibia, Zambia, Zimbabwe, Angola, Ghana, South Africa, Democratic Republic of Congo, Rwanda, Equatorial Guinea, Seychelles and Tanzania. The B.1.617 variant

that was first found in India has also been found in at least one country in Africa. With the new variants in circulation and low vaccination coverage, our attitude towards prevention and control including COVID-19 vaccination should change for the better in order to improve our chances of winning the war against COVID-19.

Based on this new development, the Federal Government of Nigeria, on May 10, 2021 imposed midnight curfew and reintroduced restriction on mass gathering. This is because the new variant of COVID-19 expands, becomes lighter and more infectious at reduced temperature. The environmental temperature drops at night. Therefore, restriction of movement at the critical time when people are most vulnerable at night, reduces the spread of the virus. To prevent a repetition of the 1918 flu, the world population will have to be vaccinated against COVID-19.

For the world to return to normal as far as COVID-19 is concerned, the world population will require herd immunity against COVID-19. Herd immunity is the resistance to the spread of disease based on pre-existing immunity of a large population of people which is acquired from a previous infection or vaccination. The level of vaccination needed to acquire herd immunity against SARS-COV-2 has been estimated to be about 80 – 90%.⁶

For herd immunity to be possible, the world population will need to accept and receive the COVID-19 vaccine. Despite having a number of COVID-19 vaccines available and approved for public use, the uptake appears to be low. Some of the reasons for this low uptake may include: level of trust in the healthcare system, educational background, presence of conspiracy theories, social, traditional and religious beliefs, social media, fear of untoward side effects, personal risk perception, etc.^{7,8} Vaccine hesitancy is widely recognised, as the World Health Organisation in 2019, included vaccine hesitancy in the list of top ten threats to global health.⁹ Some of the approved COVID-19 vaccines presently in use are summarised in Table 1.

Table 1: Approved COVID-19 vaccines presently in use.

Developer	Type	Doses
Oxford/AstraZeneca (UK, Sweden)	Viral vector	2 doses; 4 – 12 weeks apart
Pfizer/BioNTech (USA, Germany)	mRNA	2 doses; 3 weeks apart
Moderna (USA)	mRNA	2 doses; 4 weeks apart
Sinopharm (China)	Inactivated virus	2 doses; 3 – 4 weeks
Sinovac (China)	Inactivated virus	2 doses; 3 weeks apart
Gamaleya Sputnik V (Russia)	Viral vector	2 doses; 2 weeks apart
Janssen/Johnson & Johnson (USA)	Viral vector	1 dose
Bharat Biotech Covaxin (India)	Inactivated virus	2 doses; 4 weeks apart
Novavax (USA)	Protein subunit	2 doses; 4 weeks apart

To combat COVID-19, affordable vaccines will have to be developed; the world will have to be vaccinated; and to be vaccinated against COVID-19, global distribution of vaccines should be even. According to the World Health Organisation, ‘no one is safe until everyone is safe’. For this reason, COVAX was launched in 2020.

Used to be known as COVID-19 Vaccines Global Access Facility, COVAX is a worldwide initiative with the main aim to develop, manufacture and distribute COVID-19 vaccines fairly and evenly around the world. COVAX is coordinated by the World Health Organisation in collaboration with the Vaccine Alliance (Gavi) and the Coalition for Epidemic Preparedness Innovations (CEPI).¹⁰ COVAX is a part of Access to COVID-19 Tools (ACT) Accelerator. ACT Accelerator was launched in April 2020 in partnership with the European Commission and France in response to the COVID-19 pandemic.¹⁰

Apart from enhancing the production and worldwide distribution of the COVID-19 vaccines, COVAX funds the access to the COVID-19 vaccine for under-developed countries, thereby bridging the gap between the developed and under-developed Nations of the world. COVAX aims to provide two billion vaccine doses to people in 190 countries in 2021, ensuring at least 20 percent of populations are vaccinated.¹⁰ The most important aim of COVAX is to send vaccines to 92 less-wealthy countries at no cost.¹⁰ Nigeria is one of these less-wealthy countries.

Before the end of April 2021, WHO reported that COVAX has delivered about 38.4 million doses of COVID-19 vaccines to 102 countries and economies across six continents of the world.¹⁰ Ghana was the first country in Africa to receive the Oxford/AstraZeneca COVID-19 vaccine through COVAX in February, 2021. Nigeria received 3,924,000 doses of the Oxford/AstraZeneca COVID-19 through COVAX on March 2, 2021. Vaccination commenced at the Federal Medical Centre, Yenagoa, Bayelsa State, Nigeria on March 15, 2021. However, the turnout of doctors was low, necessitating extension of vaccination by three weeks. Therefore, this survey was undertaken to assess the reasons behind the low turnout of doctors for COVID-19 vaccination.

II. Materials and Methods

This survey was carried out among doctors in all the departments of the Federal Medical Centre, Yenagoa, Bayelsa State, South-South, Nigeria between 1st and 23rd April, 2021. It was a descriptive cross-sectional study.

The participants were counselled and enrolled in the study after giving a written informed consent. An explanation of the nature of the study and the likely benefits preceded the administration of written consent. All doctors were included in the study. Doctors who declined consent/incompletely filled the consent form were excluded from the study.

The sample size for this study was calculated using the formula:

$$n = z^2pq/d^2 \quad 11$$

Where

n = minimum sample size

z = normal standard deviation set at 95% confidence limit = 1.96

p = prevalence of COVID-19 in a previous study.

q = 1 – p (complementary probability).

d = margin of error = 5% = 0.05

Prevalence of COVID-19 in a previous study is 12.2% ³

Therefore:

$$p = 0.122$$

$$q = 1 - 0.122 = 0.878$$

$$n = (1.96)^2 \times 0.122 \times 0.878 / (0.05)^2$$

$$n = 3.8416 \times 0.122 \times 0.878 / 0.0025$$

$$n = 164.5$$

$$n \sim 165$$

Adding a non-response of 10% = 182

Therefore, 182 doctors were recruited for this study.

Data Analysis

The information in the filled questionnaire were entered into the IBM SPSS 23.0 version, which was also used for data analysis. Categorical variables are expressed in frequencies and percentages while continuous variables are summarized in mean and standard deviation. Results are presented in figures and tables as appropriate.

III. Results

Sociodemographic characteristics of doctors.

A total of 182 doctors completed the study questionnaire, out of which 94 doctors (51.6%) were males and 88 (48.4%) were females (Table 2). Most were married (65.4%) and Christians (98.4%) while very few were aged greater than 45-year-old (2.7%).

Table 2: Sociodemographic characteristics of doctors.

Characteristics	Frequency N =182	Percent (%)
Sex		
Male	94	51.6
Female	88	48.4
Age group		
≤ 35years	90	49.5
36 – 45years	87	47.8
>45years	5	2.7
Marital status		
Single	57	31.3
Married	119	65.4
Separated/Divorced/Widowed	6	3.3
Religion		
Christian	179	98.4
Islam	3	1.6

Chronic illnesses and COVID-19 related features among doctors.

Hypertension, Diabetes mellitus and Bronchial asthma were present in 8.2%, 3.8% and 2.7% of respondents, respectively (Table 3).

Table 3 also revealed that half of the doctors who participated in the study have come in contact with COVID-19 infected individuals (50.0%), while about 17.0% have tested positive for COVID-19 in the past. A little above one-fifth of doctors (23.1%) think they may have been infected with COVID-19, though were not tested. Less than a tenth (8.8%) have lost someone to COVID-19 infection (Table 3).

Table 3: Chronic illnesses and COVID-19 related features among doctors.

Characteristics*	Frequency N = 182	Percent (%)
Chronic illnesses		
Hypertension	15	8.2
Diabetes mellitus	7	3.8
Bronchial Asthma	5	2.7
COVID-19 related features		
Respondents have tested positive for COVID-19	31	17.0
Possibly infected with COVID-19	42	23.1
History of loss of taste and smell	32	17.6
History of contact with someone diagnosed of COVID-19	91	50.0
Has lost someone due to COVID-19 infection	16	8.8

*More than one option is applicable.

COVID-19 vaccine hesitancy among doctors.

Figure 1 showed that 44.5% of doctors refused to take the vaccine when it was brought to the hospital. Of the 55.5% that were vaccinated, 86.1% would have preferred a ‘one-dose’ vaccine, while 13.9% did not mind the ‘two-dose’ vaccine they will receive.

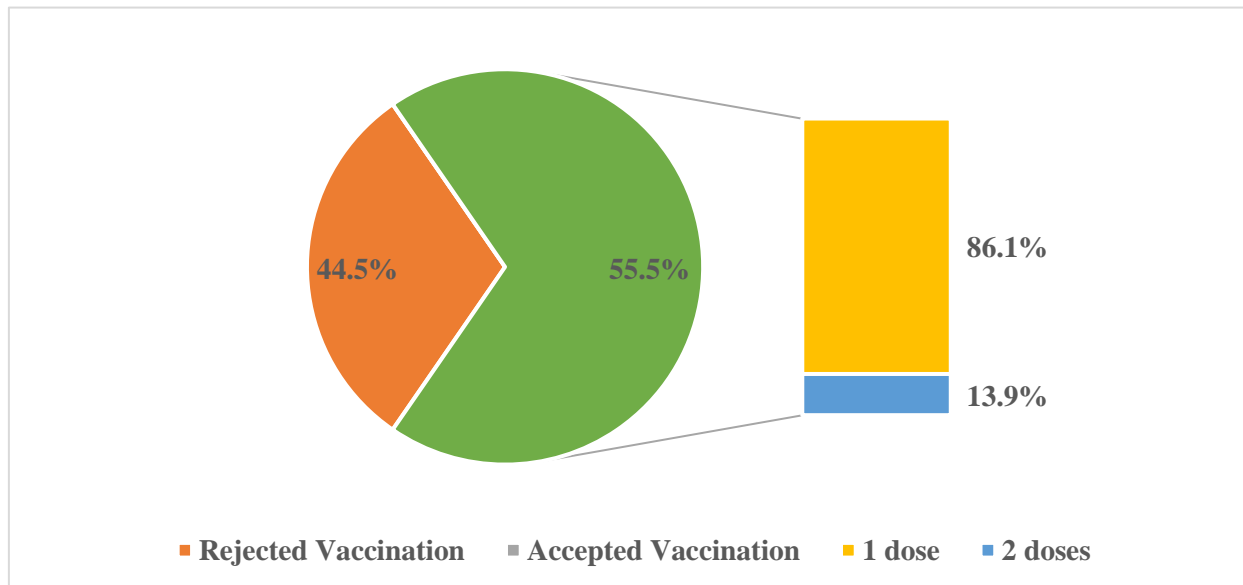


Figure 1: Acceptance of COVID-19 vaccination and number of dose(s) preferred.

Reason for COVID-19 Vaccine hesitancy among doctors.

Slightly above half (51.9%) of the doctors who refused the vaccine, did so because the vaccine has not gone through enough clinical trials (Table 4). About the same proportion (48.1%) refused to take the vaccine because they wanted to observe what would happen to those who took it. Other reasons for refusal of the COVID-19 vaccine include side effects (37.0%), lack of trust in government (29.6%), other sicknesses may result from vaccine (27.2%) and the vaccine is not safe (25.9%). Some doctors do not trust the manufacturers of the vaccine (23.5%), and only one doctor (1.2%) refused the vaccine on grounds of religion and the belief that COVID-19 is a harmless infection (Table 4).

Table 4: Reason for COVID-19 Vaccine hesitancy among doctors.

Probable Reasons for Vaccine Hesitancy*	Frequency N = 81	Percent (%)
The vaccine has not gone through enough clinical trials.	42	51.9
I want to observe what happens to those who received it for now	39	48.1
The vaccines will have side effects.	30	37.0
I do not trust the government.	24	29.6
The vaccine can make one sick.	22	27.2
The vaccine is unsafe.	21	25.9
I do not trust the manufacturers.	19	23.5
The vaccine will not work.	7	8.6
I do not have time to take any vaccine.	5	6.2
I have other medical condition(s) that would not allow me to take it.	3	3.7
The vaccine is designed to reduce the world population.	2	2.5
My religion does not allow vaccination.	1	1.2
The vaccines we are taking are already too much.	1	1.2
The vaccine is not needed because the infection is harmless.	1	1.2

*More than one option is applicable.

Factors influencing acceptance of the COVID-19 vaccination.

Male doctors are 2 times more likely to take the vaccine than female doctors (OR – 2.02; p-0.020), and the odds that older doctors would take the vaccine is higher than odds in doctors less than 35 years of age (Table 5). This odd is 78.0% higher in doctors aged between 36 and 45 years (OR – 1.78; p-0.047). Although, the odd was 4 times higher in doctors older than 45 years, this was not statistically significant (OR – 4.37; p-0.195) due mainly to the population of the older doctors in the study. Table 5 also showed that other features that influenced acceptance was the presence of hypertension (OR – 5.84; p-0.023) and a previous positive test for COVID-19 virus among doctors (OR – 2.36; p-0.044).

Table 5: Factor influencing acceptance of the COVID-19 vaccination.

Characteristics (Reference group)	B	OR	95%CI		p-Value
			Min	Max	
Sex (Female)					
Male	0.71	2.02	1.12	3.66	0.020*
Age group (≤35years)					
36 – 45 years	0.58	1.78	1.02	3.26	0.047*
>45 years	1.46	4.37	0.47	40.66	0.195
Marital Status (Married)					
Single	0.10	1.10	0.59	2.05	0.745
Religion (Islam)					
Christianity	0.93	2.53	0.23	28.43	0.452
Hypertension (Absent)					
Present	1.76	5.84	1.28	26.66	0.023*
Diabetes (Absent)					
Present	0.53	1.69	0.37	7.81	0.497
Bronchial Asthma (Absent)					
Present	-0.19	0.83	0.14	5.07	0.837
Positive for COVID-19 (No)					
Yes	0.86	2.36	1.02	5.43	0.044*
Possible infection (No)					
Yes	0.52	1.69	0.82	3.46	0.153
Loss smell and taste (No)					
Yes	0.04	1.04	0.48	2.24	0.925
Contact with COVID positive persons (No)					
Yes	0.40	1.49	0.83	2.69	0.180
Lost a relative to COVID-19 (No)					
Yes	0.03	1.03	0.37	2.91	0.949

*Statistical Significance

IV. Discussion

COVID-19 pandemic has ravaged the world; adversely affecting lives and economies of Nations. Since a proven treatment is not yet available, various means of prevention/control of COVID-19 have been developed, and they include, hand and respiratory hygiene, social distancing, quarantine and isolation.¹² The COVID-19 vaccine has been added to this list of preventive measures.⁸

Vaccination of any kind has been historically met with some aversion, and COVID-19 vaccine is not an exception. Accepting the COVID-19 vaccine with subsequent development of herd immunity will bring about success in the fight against the pandemic.¹³ A large percentage of the population has to be vaccinated to achieve herd immunity.¹³ COVID-19 vaccination among healthcare workers is paramount as they are in the forefront of the management of the disease, and are at higher risk of being infected.¹⁴ They are also in a better position to recommend the vaccine to the public. These are the reasons health workers were prioritised to be the first group of individuals to receive the COVID-19 vaccine.

A total of 182 doctors were involved in this study, out of which 94 doctors (51.6%) were males and 88 (48.4%) were females. This explains the fact that male and female doctors are almost evenly distributed in our Centre. Male and female doctors play equal roles in this health facility. Age (36 – 45 years) was statistically significant. Doctors in this age-group are more likely to accept COVID-19 vaccination when compared to doctors of other age-groups.

Half (50%) of the respondents have had contact with COVID-19 infected individuals. This shows that doctors are greatly exposed to this virus than any other group of individuals. Therefore, COVID-19 vaccination is a necessity for them.

The willingness to accept the COVID-19 vaccine was on the average in this study, as 55.5% of the studied population received the vaccine. This finding was similar to study findings by Ameerah et al¹⁵ and Yasir et al,¹⁶ but at variance with findings from studies by Kabamba et al¹⁷ and Martin et al.¹⁸ This shows that there is a geographical disparity in vaccine acceptance, and this could be linked to varying and/or better information dissemination tools between various regions. This disparity can also result from the people that make up the study population, their educational background, beliefs and societal advancement. A study carried out by Orijji et al revealed that only about one-quarter (27.4%) of health workers accepted the COVID-19 vaccine when it was brought to the hospital.¹⁹ The main reasons for this poor turnout bordered around safety of the COVID-19 vaccine.

As with any medication, safety is a concern. Concerns about vaccine safety borders around short- or long-term side/adverse effects. From our findings in this study, the reason militating against COVID-19 vaccine acceptance stemmed mainly from safety. Safety reasons include: the vaccine has not gone through enough clinical trials (51.9%), has side effects (37.0%), lack of trust in government (29.6%) and manufacturers of the vaccine (23.5%), other sickness may result from the vaccine (27.2%) and the vaccine is not safe (25.9%). These reasons were similar to the findings in various other studies,^{7,8,16,19,20} and in contrast to a study by Quinn et al.²¹ These safety concerns are bothersome, as the populace may lose faith in the vaccine if such fears are entertained. The disparities in safety concerns showed that developed countries had stronger trust in their government when compared to that of developing countries. Conspiracy theories have played a negative role in acceptance of COVID-19 vaccine worldwide, especially in the developing countries. The earlier these conspiracy theories are dispelled and the populace reassured, the better the acceptance of the COVID-19 vaccine.

In our study, the male gender significantly influenced the uptake of COVID-19 vaccine positively. Male doctors were 2 times more likely to take the vaccine than female doctors. This finding is comparable to the report by Allagoa et al⁸ and Kabamba et al,¹⁸ but in contrast with some other similar studies.^{16,17} This finding in our study is quite significant in the African society where decision-making in the family lies mostly on the man irrespective of his profession and social status.

Advanced age and hypertension also significantly influenced the uptake of the vaccine positively in this study. The knowledge that advanced age and medical comorbidity increased the morbidity and mortality associated with COVID-19 may have influenced the increased uptake of the vaccine.²² A previous positive test for COVID-19 among doctors was also statistically significant for vaccination. This is similar to the report by Allagoa et al.⁸ This suggests that people who have had personal experiences with the disease have a better understanding of the gravity of the situation and hence are more likely to accept vaccination against the disease.

Majority (86.1%) of the respondents who took the COVID-19 vaccine preferred a single-dose vaccine. This observation was also noted in the study by Orijji et al and Olomofe et al.^{7,23} The number of vaccine doses could negatively affect the uptake of vaccination.^{24,25,26}

V. Conclusion

Doctors who are averse to COVID-19 vaccine may not recommend the vaccine, transmit this aversion to their patients, which will subsequently influence their patients' attitude to vaccination. Therefore, education and enlightenment campaigns on the safety and efficacy of COVID-19 vaccine should be carried out through the media, communities, market places, schools, Churches, Mosques and other places of worship and gathering, as this will help tackle COVID-19 conspiracy theories and change the misconceptions about the COVID-19 vaccine. By so doing, the uptake of the vaccine will improve, herd immunity will be achieved, and the battle against COVID-19 won.²⁷

Limitation

The results obtained from this hospital-based study may not reflect what is obtainable in other tertiary health institutions in the West-African sub-region and around the world.

Acknowledgement

The authors appreciate all the doctors that participated in this research, and **Dr. Adesina Adedotun Daniel** for analysing the data for this research. Drs Gordon Atemie, Iteido Noel Orukari, Gift Godfrey, Walson Daudeigha, Ikhuria Nosadebe and Akpobome Biakolo are appreciated for distributing the questionnaires for this research work.

Source of funding

The research was funded by the authors.

Conflict of interest

The authors declare that there are no conflicts of interest.

Authors' contributions

DOA wrote the protocol of the study. PCO conceptualised and designed the study, managed literature searches, collated data and wrote the first draft of the manuscript. OOI supervised data collection and participated in writing the discussion. SEO wrote the discussion and participated in literature searches. EST wrote the results. LO participated in writing the results, discussion and literature searches. All authors read and approved the final manuscript.

Consent

Written informed consent was obtained from every doctor that participated in this study.

Ethical approval

The research work was examined and approved by the hospital research and ethics committee.

References

- [1]. Shigemura J, Ursano RJ, Morganstein JC, Benedek DM. Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: Mental health consequences and target populations. *Psych Clin Neurosci*. 2020;74:277–283.
- [2]. Nigeria overview. Corona Tracker. <https://www.coronatracker.com/country/nigeria/> Accessed February 11, 2021.
- [3]. Amzat J, Aminu K, Kolo VI, Akinyele AA, Ogundairo JA, Danjibo MC. Coronavirus outbreak in Nigeria: Burden and socio-medical response during the first 100 days. *Int J Infect Dis*. 2020;98:218-224
- [4]. Liu YC, Kuo RL, Shih SR. COVID-19: The first documented coronavirus pandemic in history. *Biomed J*. 2020;43(4):328-333.
- [5]. Wikipedia. Spanish flu. Available from: https://en.m.wikipedia.org/wiki/Spanish_flu Accessed May 1, 2021.
- [6]. Health Care. COVID-19 Vaccine Key to Reaching 'Herd Immunity' Available from: <https://www.muhealth.org/our-stories/covid-19-vaccine-key-reaching-herd-immunity> Accessed March 24, 2021.
- [7]. Oriji PC, Allagoa DO, Obagah L, Tekenah ES, Ohaeri, OS, Atemie G. Perception about Covid-19 vaccine among patients at the Federal Medical Centre, Yenagoa, South-South Nigeria. *Int J Res Med Sci*. 2021;9(5):1281–1287.
- [8]. Allagoa DO, Oriji PC, Tekenah ES, Obagah L, Njoku C, Afolabi AS, Atemie G. Predictors of acceptance of Covid-19 vaccine among patients at a tertiary hospital in South-South Nigeria. *Int J Community Med Public Health*. 2021;8(5):2165–2172.
- [9]. World Health Organization. Ten threats to global health. Available from: <https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019> Accessed May 14, 2021.
- [10]. COVAX explained: What you need to know about COVID-19 vaccine global access. Wego travel blog. Available from: <https://blog.wego.com/covax-explained/> Accessed May 14, 2021.
- [11]. Araoye MO. Subjects Selection. In: *Research Methodology with statistics for Health and Social sciences*. Ilorin, Nigeria: Nathadex publishers, 2003:115–129.
- [12]. Rahmet G, Imran H, Firdevs A. COVID-19: Prevention and control measures in community. *Turk J Med Sci*. 2020;50(SI-1):571-577.
- [13]. Linda T, Madison A, David F, Stephen CN. Hesitancy towards a covid-19 vaccine and prospect for herd immunity. 2020. Available from: SSRN: <https://ssrn.com/abstract=3593098> Accessed May 14, 2021.

- [14]. RCOG. COVID-19 vaccines, pregnancy and breastfeeding. 2021. Available from: <https://www.rcog.org.uk/en/guidelines-research-services/coronavirus-covid-19-pregnancy-and-womens-health/covid-19-vaccines-and-pregnancy/covid-19-vaccines-pregnancy-and-breastfeeding/> Accessed May 14, 2021
- [15]. Ameerah MN, Noor A, Omar A, Naseem A, Gowokani CC, Mohammed KA. Acceptability of a COVID-19 vaccine Among Health Workers in the Kingdom of Saudi Arabia. *Front Med.* 2021;8:644300 doi.org/10.3389/fmed.2021.644300.
- [16]. Yasir AME, Azza M, Yusuf AA, Mohammed YE, Haider M, Saddam AA, et al. Intention of Health Care Workers to Receive COVID-19 Vaccine: A Cross sectional Survey in 10 Countries in Eastern Mediterranean Region. *MedRxiv.* 2021. Available from: <https://doi.org/10.1101/2021.03-2021253892>. Accessed May 14, 2021.
- [17]. Kabamba N, Ngombe LK, Mwamba GN, Ndala DBB, Miema JM, Lungoyo CL, et al. Acceptability of Vaccination against COVID-19 Among Health Workers in the Democratic Republic of the Congo. *Pragmat Obs Res.* 2020; 11:103-108
- [18]. Martins WA, Grace FA, Frank KA, Bright A. Acceptability of COVID-19 vaccination among Health Care Workers in Ghana. *Advances in Public Health.* 2021;9998176:1-8. doi.org/10.1155/2021/9998176.
- [19]. Oriji PC, Allagoa DO, Wagio TJ, Obagah L, Tekenah ES, Ozori SE. Hesitancy of COVID-19 vaccination among health workers in a tertiary hospital in South-South, Nigeria. *Asian Journal of Research in Infectious Diseases.* 2021;7(1):21-31.
- [20]. Shekhar R, Sheikh AB, Upadhyay S, Singh M, Kottewar S, Mir H, et al. COVID-19 Vaccine acceptance among health care workers in the United States. *Vaccines (Basel).* 2021;9(2):119. doi: 10.3390/vaccines9020119.
- [21]. Quinn SC, Parmer J, Freimuth VS, Hilyard KM, Musa D, Kim KH. Exploring communication, trust in government, and vaccination intention later in the 2009 H1N1 pandemic: results of a national survey. *Biosecur Bioterror.* 2013;11(2):96-106. doi: 10.1089/bsp.2012.0048.
- [22]. Dubey S, Biswas P, Ghosh R, Chatterjee S, Dubey MJ, Chatterjee S, et al. Psychosocial impact of COVID-19. *Diabetes Metab Syndr.* 2020;14(5):779-788. doi: 10.1016/j.dsx.2020.05.035.
- [23]. Olomofe CO, Soyemi KV, Udomah BF, Owolabi AO, Ajumuka EE, Igbokwe MC, et al. Predictors of uptake of a potential Covid-19 vaccine among Nigerian adults. *J Vaccines Vaccin.* 2021;12(1):442-445.
- [24]. Gust DA, Strine TW, Maurice E, Smith P, Yusuf H, Wilkinson M, et al. Under immunization among children: effects of vaccine safety concerns on immunization status. *Pediatrics.* 2004; 114(1):e16-22. doi: 10.1542/peds.114.1.e16.
- [25]. Bedford H. Achieving immunisation targets: the health visitor's role. *Health Visit.* 1990 Dec;63(12):416-8.
- [26]. Arda B, Durusoy R, Yamazhan T, Sipahi OR, Taşbakan M, Pullukçu H, et al. Did the pandemic have an impact on influenza vaccination attitude? A survey among health care workers. *BMC Infect Dis.* 2011;11:87. doi: 10.1186/1471-2334-11-87.
- [27]. Allagoa DO, Oriji PC, Obagah L, Tekenah ES, Dambo N, Atemie G. Knowledge, Attitudes and Practices towards Covid-19 among Pregnant Women in a Tertiary Hospital in South-South, Nigeria. *International Journal of Research and Reports in Gynaecology.* 2020;3(3):35-41. Available from: <https://www.journalijrrgy.com/index.php/IJRRGY/article/view/30115> Accessed May 14, 2021.

Allagoa DO, et al. "Acceptance of COVID-19 vaccination among doctors in the Federal Medical Centre, Yenagoa, South-South, Nigeria." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(05), 2021, pp. 60-67.