



## Factors Associated with COVID-19 Vaccine Hesitancy among a Rural Sample in Benue State, Nigeria: A Qualitative Study

\*<sup>1</sup>Orfega Zwawua, <sup>2</sup>Emmanuel Kor

<sup>1,2</sup>Department of Human Kinetics & Health Education, Benue State University, Makurdi

### \*Correspondence:

Orfega Zwawua

Department of Human Kinetics & Health Education, Benue State University, Makurdi,  
Nigeria. Phone: 08155632216 Email: zwawuaorfega@gmail.com

### Abstract

*Considering the level of COVID-19 vaccine hesitancy in Benue State as evidenced by the people's low turn-up for vaccination, this study explored the factors associated with COVID-19 vaccine hesitancy among a rural sample in Benue State. The study employed a qualitative design, and a total of 16 participants were purposively sampled for the study. In-depth interviews were used for data collection. Thematic analysis was used for data analysis. Three main themes emerged from the results of the study: religious factors, political factors, and contextual factors. It was revealed that COVID-19 vaccines were regarded as 'mark of the devil' and as weapon of destruction of Africans by the western countries. Other factors include perceived less severity of COVID-19 and less vulnerability to the disease. The study recommends that interventions geared towards clearing the misconceptions about COVID-19 vaccination should involve religious leaders like pastors, reverend fathers, and imams to help educate their followers about the importance of COVID-19 vaccination and the falsehood about conspiracy theories regarding COVID-19. Traditional rulers and other influential people in the communities should also be involved for the purpose of persuading their subjects to take COVID-19 vaccination.*

**Keywords:** COVID-19, Vaccines, Hesitancy, Factors, Qualitative study

### Introduction

Vaccination has remained the most effective human intervention in the control of infectious diseases. This is because the prevention protocols such as physical distancing and other hygienic practices against infectious diseases are not practicable under some conditions and are rarely observed by humans. Greenwood (2014) observed that the development of vaccines against infectious diseases has made the greatest contribution to global health than any other human intervention. Vaccination has proven to be successful in curtailing the mortality from smallpox, measles, and other deadly infectious diseases in the past (Rodrigues & Plotkin, 2020).

Coronavirus disease, 2019 (COVID-19) is a deadly infectious disease against which vaccines have been developed in recent times. COVID-19 is caused by severe acute respiratory syndrome coronavirus 2 (SARS-COV-2), a virus that attacks and damages the lungs and other vital organs resulting in respiratory difficulty (Chaplin, 2020). Since the outbreak of COVID-19 in Wuhan City, China, the search for a vaccine to curb the spread of the disease began. It was not until December 2020 that Pfizer-BioNTech (pharmaceutical and biotechnological companies based in the US and Germany) first announced the discovery of COVID-19 vaccine with 95% efficacy. Since then, various COVID-19 vaccines including



Pfizer-BioNTech, Moderna, Astrazeneca, Johnson & Johnson, and Sinopharm have received approval from the World Health Organization and distributed to many countries of the world to fight the COVID-19 pandemic. Nigeria got her first delivery of 3.94 million doses of Astrazeneca COVID-19 vaccines on 2<sup>nd</sup> March 2021 (WHO, 2021) for onward distribution to the constituent states of the country.

The success of the global fight against the COVID-19 pandemic depends on people's acceptance and uptake of the vaccines. The acceptance and uptake of the vaccines could build herd immunity among the population thus, minimizing the chances of COVID-19 transmission (Chaplin, 2020). It is, however, worrisome that despite the availability of COVID-19 vaccination services even at the primary health facilities in Nigeria, the uptake of the vaccines has been low. Vaccination data as at the time of this research showed that out of the 6.2 million doses of vaccines supplied to Nigeria, only 1.78 million doses have been utilized (representing 0.9% of the population fully vaccinated) while countries like Spain, Canada, United Arab Emirates, Portugal, and Singapore have vaccinated 77.3%, 70.8%, 83.0%, 83.6% and 80.0% of their populations respectively (Richie et al., 2021).

In Benue State, the Action Committee on COVID-19 reported that only 4800 persons had received the Oxford Astrazeneca vaccine against COVID-19 out of the 73000 doses allocated to the state as of July 2021 (Duru, 2021). This figure represents only 15% of number of persons expected to receive the 73000 doses. This is an indication of vaccine hesitancy among the population in Benue State. According to the World Health Organization (2020), vaccine hesitancy is the delay in acceptance, reluctance, or refusal of vaccination despite the availability of the vaccination services. Vaccine hesitancy is complex and context-specific, varying across time, place, and vaccines (Nossier, 2021). Even though COVID-19 vaccines have proven to be highly efficacious at preventing infections and serious illnesses from COVID-19 (Xing et al., 2021), a high percentage of the population still express unwillingness to have COVID-19 vaccine jab (Kumari et al., 2021). The reasons for COVID-19 vaccine hesitancy may be multifaceted, ranging from religious faith (Echoru et al., 2021; Afolabi & Illesanmi, 2021), through the belief in the conspiracy theories (Tulloch et al., 2021) to the misconception that Africans are naturally immune against COVID-19 (Echoru et al., 2021).

It is, therefore, crucial that as the vaccination programme against COVID-19 continuous in Benue State, an investigation of the current situation and the militating factors against vaccine acceptance among the population be undertaken to ensure that proper action is taken to achieve sufficient vaccination coverage. This study was therefore, conducted to unravel those factors associated with COVID-19 vaccine hesitancy among a rural sample in Benue State of Nigeria.

## Methods

### Study Design

A qualitative descriptive research design was employed for this study. This is exploratory research used to gain deeper understanding of a phenomenon by providing clear insights into a problem (Pathak, Jena, & Kalra, 2013). The qualitative descriptive design was applied to unravel those factors associated with COVID-19 vaccine hesitancy in Benue State.

### Study Setting

The study was conducted in Konshisha, Buruku and Agatu Local Government Areas of Benue State. The Local Government Areas represent North-east, North-west and South Senatorial Districts of the State respectively. Each Local Government Area has a General Hospital and other public health facilities at the grassroot where COVID-19 vaccines were distributed. The choice of one Local Government Area from each Senatorial District was to



ensure that the findings of the study represent the true situation regarding COVID-19 vaccine hesitancy among the rural populace across the state.

### **Sample and Recruitment**

Some studies have suggested that qualitative studies should not employ more than 50 participants so that researchers are able to manage the complexity of the analytic task (Britten, 1995; Ritchie, Lewis, & Elam, 2003). Other scholars have however, argued that there is no need for a priori sample size for qualitative studies, that the number of participants should be based on the principle of data saturation (Bowen, 2008; Charmaz, 2006; Malterud, Siersma, & Guassora, 2016; Vasileiou, Barnett, Thorpe, & Young, 2018). In the light of this, sample size for this study was not predetermined but based on the principle of data saturation (the point at which no further dimensions, nuances, or insights of issues are identified during data collection).

Purposive sampling was used to recruit participants from the selected three Local Government Areas in Benue State. People were eligible to participate if they were up to 18 years old (the minimum age limit for Astrazeneca vaccine) and were considered socially active. Only those who indicated unwillingness to take the COVID-19 vaccine jab were included in the study.

### **Method of Data Collection**

The interview guide validated by experts in qualitative research was used for data collection. The questions were open-ended and were based on the objectives of the study. Probes and prompts were used where necessary. Some of the questions asked were as follows: (1) Do you believe COVID-19 is real? (2) Do you think there is COVID-19 in Benue State? (3) Do you think you can become a victim of COVID-19? If no, why? (4) Do you believe in the efficacy of COVID-19 vaccines? (5) Are you willing to take COVID-19 vaccine jab? If no, why? The interview recordings were later transcribed and translated into English Language for easy coding and analysis.

Individual interviews were held with participants at homes or anywhere a participant felt comfortable. The interviews were conducted in Tiv and Idoma Languages (local dialects in the selected communities) and were later translated into English Language by the researchers with the help of language experts. Data were collected through in-depth interviews with the participants. Each interview was conducted with the use of a digital voice recorder after obtaining the consent of the participant. Notes were also taken to back-up the audio record. To ensure confidentiality and protect the identities of the participants, each participant was given a pseudo name that was used during the interview. Each interview lasted for approximately 30 minutes (Jamshed, 2014).

### **Data Analysis**

The interview data were analysed using inductive thematic analysis. This is a method of identifying, analysing, and reporting patterns (themes) within data (Castleberry & Nolen, 2018). The verbatim transcripts were managed using computer aided qualitative data analysis (CAQDA) software known as NVIVO version 12 plus (QSR International Pty Ltd, 2012). The respondents were identified by pseudonyms to maintain the confidentiality of the findings. The analysis was done using the six (6) steps of qualitative data analysis by Braun and Clarke (2006) as follows:

(i) Familiarization: the transcripts were read and re-read to familiarize the researchers with the information and were thereafter imported into the Nvivo software (ii) Generation of initial codes: phrases or sentences in the transcripts that contained information relevant to the objectives of the study were highlighted and coded at related labelled nodes (iii) Searching for themes: codes with similar characteristics or meaning were combined to create subthemes



(subcategories) that were later condensed to general themes (iv) Reviewing themes: to make sure that the themes were useful and accurate representations of the data, the researchers returned to the data set and compared the themes against it. There was no need for splitting, combining, or discarding the themes as all the themes were true representations of the data (v) Defining and naming the themes: meanings were formulated for the themes. The main themes were named based on the consensus of the researchers by choosing concepts that embraced all the subthemes in each main theme (vi) Producing the report: this is where the researchers presented the results of the study by using analytic narratives and the extracts from the transcripts in which vivid examples were chosen to demonstrate the essence of a point.

## Results

Sixteen adults who indicated unwillingness to take COVID-19 jab were interviewed. Their ages ranged from 27 to 58 years, and their mean age was 39 years. Ten out of the 16 participants (62.5%) were males and six were females (see Table 1). Out of the 16 participants, 4 (25%) had tertiary education, 10 (62.5%) had secondary education, and two participants had primary education. Regarding religion, all the participants were Christians except 4 (18.8%) that were Muslims. All the participants interviewed had not received vaccination against COVID-19 as at the time of this research.

**Table 1: Participants' Characteristics (n = 16)**

Participant ID	Age	Gender	Level of education	Occupation	Religion	COVID-19 vaccination status
001	35	Male	Tertiary	Civil service	Christianity	Not vaccinated
002	28	Male	Secondary	Farming	Christianity	Not vaccinated
003	47	Female	Primary	Farming	Christianity	Not vaccinated
004	44	Male	Secondary	Business	Christianity	Not vaccinated
005	58	Male	Secondary	Farming	Christianity	Not vaccinated
006	36	Male	Tertiary	Business	Christianity	Not vaccinated
007	42	Female	Secondary	Business	Christianity	Not vaccinated
008	45	Male	Tertiary	Civil service	Islam	Not vaccinated
009	33	Female	Secondary	Farming	Christianity	Not vaccinated
010	39	Female	Secondary	Farming	Christianity	Not vaccinated
011	27	Male	Secondary	Transportation	Islam	Not vaccinated
012	50	Male	Tertiary	Civil service	Islam	Not vaccinated
013	48	Male	Secondary	Farming	Christianity	Not vaccinated
014	36	Female	Primary	Farming	Christianity	Not vaccinated
015	29	Female	Secondary	Business	Christianity	Not vaccinated
016	27	Male	Secondary	Construction	Christianity	Not vaccinated



## Themes

Three main themes emerged from the thematic analysis: religious factors, political factors, and contextual factors with seven subthemes (see Table 2).

**Table 2: Results of the Thematic Analysis**

Initial codes	Subthemes	Themes
Associating COVID-19 vaccine with mark of the devil	1.1 Fear of receiving the devil's mark	1. Religious factors
Regarding COVID-19 vaccine as a sign of initiation into number 666		
Perception that COVID-19 vaccine is a mark to go to hell fire	1.2 Fear of going to hell fire	
Associating COVID-19 vaccine with the government of antichrist		1.3 Fear of being punished by religious leaders
Permission from religious leaders before taking COVID-19 jab		
Religious leaders against COVID-19 jab		
Associating COVID-19 vaccine with the plan of the western world to depopulate Africa	2.1 Distrust in the western countries	2. Political factors
Associating COVID-19 vaccine with conspiracy theories		
Perception that fake vaccines are being supplied to African countries		
A feeling that COVID-19 vaccine is not important that is why it is made free	2.2 Distrust in the political leaders	3. Contextual factors
A feeling that political leaders should first take COVID-19 jab		
A belief that COVID-19 figures are being fabricated		
Perception that COVID-19 is not a serious disease	3.1 Perceived less severity of COVID-19	3. Contextual factors
Belief that COVID-19 could be prevented by taking alcoholic drinks		
Belief that COVID-19 is a disease of the white people	3.2 Perceived less vulnerability to COVID-19	
Belief that COVID-19 is a disease of the rich people		3. Contextual factors
Belief that COVID-19 is a disease of the elderly		





## **Theme 1: Religious factors**

The following subthemes emerged under the main theme of religious factors:

### **Subtheme 1: Fear of receiving the devil's mark**

Twelve out of the 16 participants interviewed had a perception that the COVID-19 vaccines were the mark of the devil as chronicled in the Bible. They were of the view that receiving COVID-19 jab is a sign of initiation into number 666 which the Bible talked about in the book of Revelation, Chapter 13, verse 18. They expressed fear that receiving the COVID-19 jab was as good as receiving the devil's mark. One of the participants had the following to say:

COVID-19 is a sign of end times, and the vaccine is a mark of Satan. The Bible warns about this, and we are in for it now. See, the government is forcing people to take COVID-19 vaccine. Satan oversees the government. They are working for the devil. Satan has anointed them to work for him using COVID-19. (P.006)

### **Subtheme 2: Fear of going to hell fire**

Most of the participants who were Christians had a perception that COVID-19 vaccine was a mark to go to hell fire prepared by God for sinners. In their view, receiving COVID-19 vaccination is a symbol of obedience to the government of the antichrist which could lead one to hell fire. The participants had in them, the fear of losing heaven and going to hell fire as a place to spend eternity. A participant had this to say:

I don't want to go to hell fire... I know it is a painful place to spend eternity. I have been obeying the commandments of God. I study my Bible very well and understand the interpretations. The Bible talks about what we are experiencing now. I will not allow COVID-19 vaccine to send me to hell fire. Let it be my bad deeds and not COVID-19 vaccine. (.P014)

### **Subtheme 3: Fear of being punished by religious leaders**

Some of the participants expressed fear that their church leaders or pastors would not be happy with them if they find out they had received COVID-19 jab. They expressed fear that they might be punished by ex-communicating them from the church as their leaders are against COVID-19 vaccines. The following statement made by a participant supports this:

My pastor always preaches against receiving COVID-19 jab. He can do anything possible to stop his members from receiving the jab. He warns that anyone who receives the vaccination has given himself to the devil and can no longer fellowship with the children of God in truth and oneness (.P009)

## **Theme 2: Political factors**

The subthemes that emerged under this main theme include the following:

### **Subtheme 1: Distrust in the western countries**

COVID-19 vaccines were associated with the plan of the western countries to depopulate Africa by some participants. In their view, the increase in the population of Africans is a source of worry to the white people and they had decided to bring COVID-19 and produce a poisonous substance and tag it 'COVID-19 vaccine' to depopulate Africans. According to them, the vaccines supplied to African countries were fake, and they could cause people's death in the nearest future. One of the participants had this to say:

I feel the white people are using this vaccine as a strategy to kill us. I don't trust them. They want to reduce our population. How many people have died of COVID-in Nigeria or Benue State? In my village here, no one has had COVID-19 talk less of



dying of it. Why are they supplying drugs for us? I feel there is something hidden about this whole thing. (P.012)

### **Subtheme 2: Distrust in the political leaders**

Some of the participants were of the view that COVID-19 vaccine is not a valuable thing that was why politicians have allowed it to get to the ordinary man in the village. They considered politicians as self-serving people who used to hijack any good thing for their families. Some of the participants had a perception that COVID-19 vaccines were an avenue for political leaders to amass more wealth from foreign countries and enrich their families. Many of the participants were of the view that government was fabricating COVID-19 figures to get money from foreign donor agencies and enrich their pockets. The following statement from a participant supports this:

They always fabricate figures to make people take COVID-19 vaccines so that they would get money from foreign donors. I know politicians who have not received their COVID-19 jab. Why are they compelling us to receive? These people have hidden agenda that is best known to them. I don't think I will be part of that. Help me tell them that I and my family members will not go for COVID-19 jab. I cannot be voting for people to occupy offices and amass wealth and still be looking for other ways to make money on my head. Never. (P.002)

### **Theme 3: Contextual factors**

This main theme has the following subthemes:

#### **Subtheme 1: Perceived less severity of COVID-19**

A substantial number of participants had the perception the COVID-19 was not a serious disease that should be given much attention. Some of them believed that taking alcoholic drinks could build immunity against COVID-19. They saw no need for COVID-19 vaccine when mere taking of alcoholic drinks could protect them against the disease. The following statement by one of the participants supports this:

COVID-19 is not serious issue. Even witchcraft that is killing people every day here, people not talking about it. I don't need COVID-19 vaccine. The hot drinks I take every day will protect me against the disease. COVID-19 is not my problem. How can I take vaccine against a sickness that is not serious? For what? I don't I will do that. (P.005)

#### **Subtheme 2: Perceived less vulnerability to COVID-19**

Many of the participants had the perception that COVID-19 was a disease of the white people. They believed that the immune system of the black man was too strong for COVID-19. Some of the participants associated COVID-19 with cold weather. They felt the disease was for rich people since they are always using air condition in their homes, offices and cars. The participants seemed not to acknowledge the fact that they too could become victims of COVID-19. Those participants that were young believed that COVID-19 was a disease of the old people. They thought they were too young to receive COVID-19 jab. The following statement was made by a participant to support this:

COVID-19 has nothing to do me. It is a disease of the white people and those that are rich. I'm always working under sun... that heat only can fight COVID-19. Besides, I'm a young man. I have never heard a young man died of COVID-19. No need for me to take COVID-19 jab. Who knows what the vaccine could cause me tomorrow? COVID-19 is not my portion. (P.016)



## Discussion

This study has exposed how religious faith and beliefs were major factors responsible for COVID-19 vaccine hesitancy among the rural populace in Benue State of Nigeria. This hesitancy was more observed in Christians than Muslims. This finding agrees with a study that reported hesitant behaviour about COVID-19 vaccination among churchgoers in Uganda (Echoru et al., 2021). The finding confirms a report that many Christians in Nigeria have referred to COVID-19 vaccine as mark of the beast (Afolabi & Ilesanmi, 2021). This misconception about COVID-19 and its vaccines has created fear in the minds of Christian faithful who think receiving vaccination against COVID-19 has earmarked them for eternal condemnation.

The result of the study has also shown that political factors were also instrumental to the unwillingness to receive COVID-vaccination among the participants. Distrust in the western countries and political leaders were observed among the participants. There were concerns over the genuineness of the COVID-19 vaccines supplied to African countries by the western countries. There was high apprehension among the participants that the western countries might have a hidden agenda of reducing the population of Africans through COVID-19 vaccination. There were also suspicions of collusion between political leaders and the external actors to project COVID-19 vaccination for economic interest. This finding agrees with the result of a survey in Africa which reported concerns of the survey participants that COVID-19 vaccines were developed and manufactured outside Africa (Tulloch, Roldan, & Bardosh, 2021). This could have been influenced by the beliefs in the conspiracy theories about COVID-19 vaccines.

The result of this study has also identified less severity of COVID-19 and less vulnerability to COVID-19 perceptions as important contextual factors in vaccine hesitancy among the rural populace in Benue State. There was a belief that taking alcoholic drinks could provide protection against COVID-19, and a misconception that black people are too strong for COVID-19. This finding agrees with Echoru et al. (2021) who observed that the social media has played a role in giving false information that the African continent is immune to COVID-19 because of its climatic conditions. This has created a false confidence in many Africans that they are naturally protected against COVID-19, thus downplaying the need for vaccination.

## Conclusion and Recommendations

This study has identified religious beliefs, political misconceptions, and contextual issues as contributing factors to COVID-19 vaccine hesitancy among the rural populace in Benue State. There is a serious misconception about COVID-19 and its vaccines which needs to be addressed urgently through community health education. To achieve sufficient vaccination coverage in Benue State, interventions geared towards clearing the misconceptions about COVID-19 vaccination should involve religious leaders like Pastors, Reverend Fathers, and Imams to help educate their followers about the importance of COVID-19 vaccination and to clear the falsehood about conspiracy theories regarding COVID-19. Traditional rulers and other influential people in the communities should also be involved for the purpose of persuading their subjects to accept COVID-19 vaccination.

## References

- Afolabi, A. A., & Ilesanmi, O. S. (2021). Dealing with vaccine hesitancy in Africa: the prospective COVID-19 vaccine context. *The Pan African medical journal*, 38.





- Bowen, G. A. (2008). Naturalistic inquiry and the saturation concept: a research note. *Qualitative Research*, 8(1), 137-152.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. doi:10.1191/1478088706qp063oa
- Britten, N. (1995). Qualitative research: qualitative interviews in medical research. *BMJ (Clinical Research ed.)*, 311(6999), 251-253.
- Castleberry, A., & Nolen, A. (2018). Thematic analysis of qualitative research data: Is it as easy as it sounds? *Currents in Pharmacy Teaching and Learning*, 10(6), 807-815. <https://doi.org/10.1016/j.cptl.2018.03.019>
- Chaplin, S. (2020). COVID-19: a brief history and treatments in development. *Prescriber*, 31(5), 23-28. <https://doi.org/10.1002/psb.1843>
- Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*: sage Publishers, London
- Duru, P. (2021, July 31). 4800 receive Astrazeneca COVID-19 vaccine jabs in Benue State. *Vanguard*. <https://www.vanguardngr.com/2021/03/4800-receive-covid-19-vaccine-jabs-in-benue-state/>
- Echoru, I., Ajambo, P. D., Keirania, E., & Bukenya, E. E. M. (2021). Sociodemographic factors associated with acceptance of COVID-19 vaccine and clinical trials in Uganda: a cross-sectional study in western Uganda. *BMC Public Health*, 21(1), 1106. doi:10.1186/s12889-021-11197-7
- Greenwood, B. (2014). The contribution of vaccination to global health: past, present and future. *Philosophical transactions of the Royal Society of London. Series B, Biological Sciences*, 369(1645), 20130433-20130433. doi:10.1098/rstb.2013.0433
- Jamshed, S. (2014). Qualitative research method-interviewing and observation. *Journal of Basic and Clinical Pharmacy*, 5(4), 87-88. doi:10.4103/0976-0105.141942
- Kumari, A., Ranjan, P., Chopra, S., Kaur, D., Kaur, T., Upadhyay, A. D., & Vikram, N. K. (2021). Knowledge, barriers and facilitators regarding COVID-19 vaccine and vaccination programme among the general population: A cross-sectional survey from one thousand two hundred and forty-nine participants. *Diabetes Metab Syndr*, 15(3), 987-992. doi:10.1016/j.dsx.2021.04.015
- Malterud, K., Siersma, V. k., & Guassora, A. D. (2016). Sample size in qualitative interview studies: guided by information power. *Qualitative Health Research*, 26(13), 1753-1760.
- Nossier, S. A. (2021). Vaccine hesitancy: the greatest threat to COVID-19 vaccination programs. *Journal of the Egyptian Public Health Association*, 96(1), 18. doi:10.1186/s42506-021-00081-2



- Pathak, V., Jena, B., & Kalra, S. (2013). Qualitative research. *Perspectives in Clinical Research*, 4(3), 192-192. doi:10.4103/2229-3485.115389
- Richie, H., Mathieu, E., Lucas, R., Appel, C., Giattino, C., Esteban, O., & Roser, M. (2021). Coronavirus pandemic. <https://ourworldindata.org/coronavirus>
- Ritchie, J., Lewis, J., & Elam, G. (2003). *Designing and selecting samples. Qualitative research practice: A guide for social science students and researchers* (pp. 77–108). Thousand Oaks.
- Rodrigues, C. M. C., & Plotkin, S. A. (2020). Impact of Vaccines; Health, Economic and Social Perspectives. *Frontiers in Microbiology*, 11(1526). doi:10.3389/fmicb.2020.01526
- Tulloch, O., Roldan, T., & Bardosh, K. (2021). Data Synthesis: COVID-19 Vaccine Perceptions in Sub-Saharan Africa: Social and Behavioural Science Data, March 2020-April 2021.
- Vasileiou, K., Barnett, J., Thorpe, S., & Young, T. (2018). Characterising and justifying sample size sufficiency in interview-based studies: systematic analysis of qualitative health research over a 15-year period. *BMC Medical Research Methodology*, 18(1), 148. doi:10.1186/s12874-018-0594-7
- World Health Organisation. (2021). *COVID-19 vaccines shipped by COVAX arrive Nigeria*. <https://www.afro.who.int/news/covid-19-vaccines-shipped-covax-arrive-nigeria>
- World Health Organisation. (2020). *Behavioural considerations for acceptance and uptake of COVID-19 vaccines: WHO technical advisory group on behavioural insights and sciences for health, meeting report, 15 October 2020*.
- Xing, K., Tu, X., Liu, M., Liang, Z., Chen, J., Li, J., & Jiang, Y. (2021). Efficacy and safety of COVID-19 vaccines: a systematic review. *Chinese Journal of Contemporary Pediatrics*, 23(3), 221.