HESITANCY PREVALENCE AND SOCIOCOGNITIVE BARRIERS TO CORONAVIRUS VACCINATIONS IN NIGERIA

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Abstract

This study examined the prevalence, socioeconomic and cognitive barriers of coronavirus vaccinations in Nigeria. The study used an ex-post facto design. 526-participants were sampled using snowball sampling technique. A questionnaire pack containing socio-demographics and a 13-item adapted scale of SYKES was used. Findings revealed the prevalence of COVID-19 vaccination hesitancy (61.7%). Adolescents (83.8%) recorded more hesitancy than participants in early-adulthood (62.7%), middle-adulthood (53.1%), and late-adulthood (53%). Males (83.8%) showed hesitancy than the females (33.3%). More so, the primary (62.5%) and secondary school certificate holders (41.4%) scored more on hesitancy than tertiary certificate holders (36.0%). The identified perceived barriers to vaccinations are: safety (91%); government distrust (75.5%) and coerciveness (65.7%), vaccines efficacy (62.5%), complacency (65.7%), and constraints to vaccination center (55.5%). Conclusively, vaccination hesitancy was found more among males and younger respondents. Safety and efficacy of the vaccines, government distrust, coercive approach, and complacency were found as major barriers.

Keywords

cognitive barriers, socio-economic factors, COVID-19 vaccination, Nigeria, vaccines hesitancy

Background

The Coronavirus disease 2019 (COVID-19) pandemic has caused lasting wounds on the global world. Among these wounds are the scores of deaths and health-related challenges recorded during the first, second, and third waves in Nigeria. Consequently, many citizens are physically and emotionally affected (Agberotimi et al., 2020). Confirmed cases of the disease reached more than a 35 million by September 2021, and it has caused more than 1 million mortalities, particularly among the higher-risk population (WHO 2021a). More so, the pandemic has impacted Nigerians in significantly negative ways such as health, economic, familial, and workforce challenges (Nicola et al., 2020; Oguntayo et al., 2020).

To reduce the spread of the virus, strict preventive measures were imposed, such as hands hygiene, physical and social distancing, the compulsory use of face masks and gloves by the general public, and government imposition of stay-at-home orders at a point (Centers for Disease Control and Prevention 2021; World Health Organization (WHO) 2020a). Despite all these government efforts, a study from Nigeria has revealed that there is still low adherence to COVID-19 precautionary measures among citizens (Iorfa et al., 2020), while evidence abounds that the precautionary behavior is not strong enough to curtail the virus, the alternative mean of

curtailing the virus was suggested to be a pharmacological method (vaccination) so that people could be immune to the disease (Iorfa et al., 2020; WHO 2020b).

Recently, the Centre for Disease Control reported that up to 63-million doses of the COVID-19 vaccine had been supplied to United State residents so far, and over 43.2 million doses of the vaccine have been received (Centers for Disease Control and Prevention 2021a). A country like the UK has vaccinated a total number of 12,844,193 individuals too (Centers for Disease Control and Prevention 2021b). Africa countries were not left out as the rollout of COVAX vaccines progresses; the first COVID-19 vaccination campaigns were done in Côte d'Ivoire and Ghana using COVAX doses (UK COVID-19 vaccination uptake plan 2021). So also, West Africa's largest country – Nigeria - has got its first batch of coronavirus vaccines, to make the third country to receive the vaccines in Africa and receive the shots through COVAX (UNICEF, 2021). Other African nations notwithstanding are awaiting the distributing agencies to dispatch theirs (Aljazeera, February 3rd, 2021).

Despite that the COVID-19 pandemic's risk has exacerbated the awareness and the need for an effective vaccine (Iorfa et al., 2020), the vast majority of people may still not accept the vaccines, for instance, a recent study revealed that newer vaccines bring about an increase in hesitancy (WHO 2021b). Another survey conducted in the United States reported that when COVID-19 vaccines are available to the public, up to 49% of the respondents accept to receive it, while 31% of them were indifferent, and 20% displayed signs of hesitancy (Brunson & Schoch-Spana, 2020). These referred studies, together with the fact that a great number of people are seeking alternative vaccination timelines or hesitating vaccination as a whole, have provided evidence that COVID-19 vaccine hesitancy has turned into a serious concern that needed to be addressed globally (AP-NORC poll, 2021). Consequently, one could conclude that vaccine resistance represents a global threat to health, that can seriously destroy the implementation and achievement expected, such as public acceptance of coronavirus vaccines.

Past studies have revealed that more people disparage vaccination generally (Blume, 2006). For instance, people are skeptical about some vaccines and sometimes, because of that, hesitate to accept vaccination either for their children, relatives, or self (Dubé et al., 2013). Also, some citizens are afraid of the reactions or side effects of a vaccine, and some citizens have the view that vaccine-preventable ailments are not serious, they lack trust in government and have no belief in herd immunity (Benin et al., 2006; Blume 2006; Corey et al., 2020; UNICEF, 2021). Meanwhile, government trust has been found to influence vaccination acceptance, vaccination effectiveness, healthcare experts, and healthcare delivery (Centers for Disease Control and Prevention, 2012b).

Despite the negative dispositions of the public towards vaccines, it has been proven as a successful measure of disease prevention for many years (WHO, 2020c). Vaccine refusal and hesitancy are a globally concern especially during the COVID-19 pandemic (WHO, 2020c). This makes WHO declare vaccine refusal and hesitancy in 2019 as one of the top 10 threats to health (WHO, 2020). The determinants of vaccine unacceptance, as found in diverse studies, include conspiracy theories, religious beliefs, infodemic, individual beliefs, and anxiety of vaccine safety as a result of myths (Al-Qerem & Jarab, 2021; Iorfa et al., 2020).

According to Al-Qerem et al. (2021), associations exist between vaccines, beliefs, economics, and social values of any society. Unfortunately, in Nigeria no sufficient studies have been conducted to assess the Nigerian population's dispositions to COVID-19 vaccination. To the best of our knowledge, no past published study has examined the intent of Nigerian citizens to be vaccinated against COVID-19, nor a study to evaluate the current vaccine acceptability and possible socio-cognitive barriers to the vaccines' acceptance after its availability to the citizens. Therefore, this study is timely to create evidence-based policies that will guide the government and non-governmental organizations on how to tackle vaccine hesitancy (UNICEF,

2021). The objective of this study is to investigate the prevalence of the COVID-19 vaccines hesitancy and acceptance, socio-economic and cognitive barriers to vaccine acceptance among some selected Nigerians.

Data and Methods

Design

This study adopted a cross-sectional blend of ex-post-facto design, which allowed effortlessly the engagement of the Nigerian population across stratum of social classifications to report barriers or dispositional factors to acceptance of vaccinations during delta wave declaration in Nigeria. This survey is necessary to implement appropriate policy plans to respond appropriately to hesitancy determinants that are peculiar to Nigerians.

Setting and Participants

The study was conducted evenly across the six geopolitical zones of the country. Nigeria is a large, densely populated West Africa Country, segmented into six geo-political zones and two regions (the Southern and Northern Nigeria). The country was assumed to have over 196 million population as of 2018. According to World Health Organization, the country had reported over 200.884 cases, 206 newly reported incidents, and 2.128 confirmed deaths due to coronavirus infections. The general population of the study covered participants aged 18 years and above among the 36 states in Nigeria, as well as the Federal Capital Territory of the country.

Participants of this study were five hundred and twenty-six (n=526) Nigerians (58.5% males and 41.6% females), with diverse dispositions to acceptance of COVID-19 vaccination.

Instruments

The questionnaire was made up of two sections: Section A and B. Section A was comprised of socio-demographics of respondents' data, such as age, gender, marital status, highest educational attainment, state of residence, occupation, religion among others. Section B was an open-ended questionnaire meant to identify the socio-economic and cognitive barriers to acceptance of COVID-19 vaccinations. This assessment tool is a 13-item with a Likert-type scale, adapted from SYKES United States Survey (2020); it assesses vaccine acceptance (items 1 and 2), acceptance to participate in clinical trials (items 3 and 4), risk perception of COVID-19 vaccine (items 5, 6, 7, 8 and 9), and other local content of socioeconomic factors that could moderate the reception of the vaccines (items 10, 11, 12 and 13). Items were reworded to make them fit for the aims of this study (for example: "Now that government of Nigeria is to provide free COVID-19 vaccine, would you accept to be vaccinated?", and "Are you worried about accepting the Coronavirus vaccination injection?"), acceptance to participate in clinical trials (e.g., "If approached, would you accept to participate in COVID-19 vaccine trial?"), risk perception of COVID-19 vaccine (e.g., "I worry about the vaccine that it could cause another health complications"), other local content psychosocial moderators (e.g., "If an employer makes the reception of vaccine prerequisite to retaining or gaining a job, would receive the vaccine?"), etc. Participants rated these items on a 3-point Likert-type scale (yes=2, Don't know=1, and no=0.). A reliability coefficient (Cronbach's alpha) of 0.71 was obtained during the pilot testing of the scale, while the current data set yielded 0.75.

Procedures and Sampling Technique

Respondents were invited via social media (WhatsApp and Facebook posts) to complete an online survey on the socio-economic and cognitive barriers to the acceptance of COVID-19 vaccination during delta variant declaration, using Google form website and printed questionnaires. Participants were recruited online through a snowball sampling technique with a consent form attached to it. The snowball technique was considered appropriate due to the partial social restrictions enforced during the study in Nigeria. Some individual adults on researchers' social media contacts across geo-political zones, States, local governments, cities, and towns in Nigeria have shared the Google link. Prospective participants were then driven to share the link with other residents in their contacts in other parts of the country. Citizens with access to the internet, who can read and understand the English Language, and were ready to sign the informed consent, were the only ones included in this study. This helped in the collection of five hundred and twenty-six (n=526) responses through the Google link.

Ethical review and approval were not made compulsory for the study on human participants following the local legislation and institutional requirements. However, written informed consent was implied via the completion of the questionnaire/survey. Other ethical considerations, such as participants' confidentiality and autonomy, were strictly observed with informed consent embedded in the questionnaire.

Statistical Analyses

Data were properly checked and subjected to statistical analysis using the Statistical Package for the Social Sciences (SPSS 20). Descriptive statistics and inferential statistical (chi-square) were used to analyze the formulated objectives.

Results

Objective 1: Prevalence of vaccine acceptance and hesitancy in Nigeria

Graph 1 Showing the Prevalence of Acceptance-Hesitancy of COVID-19 Vaccination among Nigerians

Graph 1 above revealed that 61.7% of the study participants show hesitancy towards being vaccinated in Nigeria, while 38.3% exhibit acceptance to COVID-19 vaccination in Nigeria.

Objective 2: Justify the socio-demographic (age categories, sex, marital status, education qualification, locality of settlement) factors influencing hesitancy of COVID-19 vaccine

Table 1 showing the influence of socioeconomic status on COVID-19 vaccination among Nigerians						
Socio-Economics	COVID-19 Vaccination		95% CI	df	χ^2	η_p^2
Age	Acceptance (%)	Hesitance (%)				
Adolescents	16.2	83.8	0.014 - 0.020	3	10.09**	0.138
Early Adults	62.7	37.3	0.015 – 0.022			
Middle Adults	46.9	53.1	0.014 – 0.021			
Late Adults	53.0	47.0	0.028 – 0.037			
Gender						
Male	49.5	50.5	0.00 - 0.000	1	15.32**	0.171
Female	66.7	33.3	0.00 - 0.000			
Education						
Primary	37.5	62.5	0.170 - 0.192	2	07.89**	0.122
Secondary	58.6	41.4	0.205 - 0.290			
Tertiary	64.0	36.0	0.161 – 0.181			
Marital Status						
Married	57.5	42.5	0.157 - 0.176	2	05.12	NA
Unmarried	55.4	45.6	0.172 - 0.192			
Separated	16.7	83.3	0.285 - 0.309			
Location						
Rural	56.7	43.3	0.12 - 0.139	1	.001	NA
Urban	56.6	43.4	0.28 - 0.029			

Table 1 showing the socio-economic relationship between socio-economic status and COVID-19 vaccination revealed a significant association between participants' age and COVID-19 vaccination, such that the 13.8% variance observed in the decision towards vaccination was accounted for by respondents' age categories ($\chi^2 = 10.09$; $p < .01$; $\eta_p^2 = 0.138$). It was further revealed that respondents in adolescent (83.8%) and middle adulthood (53.1%) classifications exhibited hesitancy towards vaccination, while the majority of the respondents in early adulthoods (62.7%) and late adulthoods (53%) exhibited acceptance towards vaccination.

It was further found that there is a significant association between participants' sex and COVID-19 vaccination, such that the 17.1% variance observed in the decision towards vaccination was accounted for by respondents' affiliated sex ($\chi^2 = 15.32$; $p < .01$; $\eta_p^2 = 0.171$). It was further revealed that male respondents (83.8%) show more hesitancy towards vaccination than their female counterparts (33.3%).

The study further revealed a significant association between participants' level of education and COVID-19 vaccination, such that the 12.2% variance observed in the decision towards vaccination was accounted for by respondents' academic qualification ($\chi^2 = 07.89$; $p < .01$; $\eta^2 = 0.122$). It was further revealed that primary school certificates holders (62.5%) show more hesitancy towards COVID-19 vaccination compared to counterparts with secondary (41.4%) and tertiary education qualifications (36.0%).

However, on the contrary, it was revealed that marital status ($\chi^2 = 05.12$; $p > .05$) and respondents' location ($\chi^2 = 0.001$; $p > .05$) are not significantly associated with COVID-19 vaccination.

Objective 3: Examine the prevailing analyses of cognitive barriers towards hesitancy behavior to the COVID-19 vaccine.

Chart 2 showing the Prevailing Cognitive Barriers to COVID-19 Vaccination

Chart 2 above revealed that the majority of the participants identified concern for safety (91%) as the cognitive reason for hesitating to accept COVID-19 vaccination. Other implicated factors are distrust in government (75.5%), doubt of efficacy (62.5%), coercive approach (65.7%), complacency (65.7%), and constraints or convenience to centers (55.5%).

Discussion

The present study examined the socio-economic determinants and cognitive barriers towards coronavirus vaccination among Nigerians. Findings revealed that a high number of the participants showed hesitancy towards being vaccinated in Nigeria. The results revealed 61.7% of the participants' hesitancy towards being vaccinated in Nigeria. This is similar to data obtained in certain countries; for instance, UK, Kuwait, Saudi Arabia, Russia, and Italy (Abedin et al., 2021; WHO, 2020c; Danchin et al., 2020). However, some studies contradicted our results such as studies conducted in China, Malaysia, Indonesia, French, Ecuador, and Brazil (Abedin et al., 2021; Sarasty et al., 2020; Wang et al., 2020; Ward et al., 2020; WHO, 2020c). In sub-Saharan Africa, the COVID-19 is a novel disease, as a result the observed mistrust and

distorted beliefs about the vaccine, as well as the distrust of government, and information gaps may be reasons for results obtained in the current study.

There was a significant association between participants' age and COVID-19 vaccination, such that, the respondents in adolescence and middle adulthood classifications exhibited hesitancy towards vaccination, while the majority of the respondents in early adulthoods and late adulthoods exhibited acceptance towards vaccination. More so, results showed that there is a significant association between participants' sex and COVID-19 vaccination, such that, the male respondents showed more hesitancy towards vaccination than the female counterparts. So also, the participant's level of education and COVID-19 vaccination was associated; participants with primary school certificates showed more hesitancy towards COVID-19 vaccination compared to counterparts with secondary and tertiary education qualifications. This is in line with a study conducted in Bangladesh - it was found that there was an association between gender (male gender), age, and lower educational status, and coronavirus vaccine acceptance (Abedin et al., 2021). Precisely, the current study showed that the male gender was more likely to hesitate to be vaccinated and as the age of participants decreases so also the tendency for vaccine hesitancy. Acceptability by age in our study was recorded among the participants between ages 51–60 years, and low education was a positive factor in vaccine hesitancy, which is inconsonant with some other previous studies (Malik et al., 2021; Nolna et al., 2018). On the contrary, it was revealed that marital status and respondents' location were not significantly associated with COVID-19 vaccination acceptance. However, the current result contradicted a past study (Abedin et al., 2021). This contradiction could be that both participants (in a relationship or not, married or not, in rural or urban locations) have adequate or equal awareness of coronavirus. Also, maybe their sources of information about the coronavirus vaccine are equal, which initiates a similar disposition towards the vaccines. This indicates a need to focus all populations across different geographical regions, and marital statuses.

The majority of the participants identified concern for safety as the highest cognitive reason for hesitating to accept COVID-19 vaccination. This is similar to past results obtained from other countries (Malik et al., 2021; McKee et al., 2018; Ward, 2020; Wang et al., 2020). In this study the biggest concern of the participants was the safety of the vaccine. Some other sample characteristics have significant implications among the participants' cognitive barriers to be vaccinated, such as distrust in government, doubt of the efficacy of the vaccine, resistance to the coercive approach of authority, complacency, and constraints or convenience to centers. From the past studies, the efficacy of a new vaccine is one of the most public concerns (Determann et al., 2014; Kreps et al., 2020), distrust of government, resistance to the coercive approach of authority and doubt of the efficacy of a new vaccine (Al-Qerem, 2020; McKee et al., 2018; WHO, 2021a). This concern could be curbed once the vaccine's adequate evidence of safety is made available through empirical results or published data that would show that the vaccine is reliable and not harmful. Also, lower vaccination intention among male participants was observed in some studies (Wang et al., 2020; WHO, 2020c). The recognition of these factors could probably serve as the limelight to more awareness campaigns directed to these affected populations to increase the vaccination acceptance rate generally.

Strengths and limitations of this study

This study comprehensively assessed the socioeconomic and cognitive barriers of coronavirus vaccine acceptance in Nigeria. The prevalence of vaccine hesitancy was established among the public. Also, the socio-economic determinants of the hesitancy were revealed and the cognitive barriers such as government mistrust, misinformation on vaccine safety, perceived imposition from the government, and doubt on the effectiveness of the vaccines were found as

determinants of the vaccine hesitancy in this study. All these served as strengths of this study. However, this is one of the first studies in Nigeria that has investigated the prevalence of vaccine acceptance considering the socioeconomic and cognitive barriers. To the authors' best of knowledge, it is also the first study to consider implicit factors that could militate against the acceptance of the vaccine globally using an online survey method to collect data. Despite these relevancies, the study needed to be interpreted with care because of these limitations; most internet illiterate citizens were denied participation in this study, and a study like this is prone to selection and responses biases.

Conclusion and recommendations

The present study examined the socio-economic determinants and cognitive barriers towards coronavirus vaccinations among Nigerians. The study concluded that a high number of Nigerians displayed hesitancy towards being vaccinated. Age and COVID-19 vaccination are associated with citizens in late adolescence and middle adulthood classifications, who exhibited more hesitancy towards vaccination, while the majority of the respondents in early adulthoods and late adulthoods exhibited acceptance towards vaccination. More so, the sex of the citizens and COVID-19 vaccination is related; more hesitancy towards vaccination was found in the males compared to the female counterparts. So also, the participant's level of education and COVID-19 vaccination was associated; participants with primary school certificates showed more hesitancy towards COVID-19 vaccination compared to counterparts with secondary and tertiary education qualifications counterparts. However, on the contrary, it was revealed that marital status and respondents' location were not significantly associated with COVID-19 vaccination. In addition, the majority of the participants identified concern for safety as the highest cognitive reason for hesitating to accept COVID-19 vaccination. Other implicated factors are distrust in government, doubt of efficacy, resistance to coercive approach, complacency, and constraints or convenience to centers. Therefore, the study recommends thus:

1. Media and communication experts should structure their message targeting the right audiences effectively, especially the male and young citizens.

2. The government at all levels should take effective measures to develop a focus-based vaccine campaign strategy for young people, especially male citizens. Health promotion officers should take misinformation of coronavirus vaccine among the public generally as a matter of urgency. Especially mistrust of government, the safety of the vaccine, and reinforcement of vaccine acceptance instead of using force against the citizens. This message should be designed in a way that the public will easily understand and be motivated to accept the vaccines; thereby, grow trust in the government and healthcare system.

3. The government and its health agencies should also collaborate with the association of psychologists in Nigeria to get expert-structured-communication channels and be guided on the use of behavioral science methods of presenting or passing messages to the public with less forceful, and non-anxiety provoking manners, but in motivating manners for citizens to gain insight to a positive health care accessibility that will yield convincing and positive feedback on coronavirus vaccines.

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