

RESEARCH ARTICLE

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Perception of COVID-19 vaccine among people living with HIV in Ogun-state, Nigeria; a cross-sectional study

Olu-Abiodun OO¹[ID](#), Sodimu JO²[ID](#), Anokwuru RA³[ID](#), Okafor NA⁴[ID](#)

¹Ogun College of Nursing Sciences, Ijebu-Ode, Ogun State, Nigeria

²Ogun College of Nursing Sciences, Abeokuta, Ogun State, Nigeria

³Department of Maternal and Child Health, School of Nursing, Babcock University, Ilishan-Remo, Ogun State, Nigeria

⁴Department of Community Health Nursing, School of Nursing, Babcock University, Ilishan-Remo, Ogun State, Nigeria

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Abstract

Objective: This study was carried out to determine the perception and vaccine-related concerns of People Living with HIV towards the COVID-19 vaccine.

Methods: A cross-sectional, descriptive research design was adopted. A computer-generated randomization scheme was used to select 236 participants who attended HIV support group meetings. A structured questionnaire was used for data collection. Frequency and percentages were adopted to categorize the data collected.

Results: The study revealed that the majority of the respondents believe that getting the COVID-19 vaccine will protect themselves, their families, or their patients (87.3%) and that it will help prevent the transmission of the disease (83.9%). There is also a large percentage of respondents who believe that the vaccine is effective (77.1%) and safe (82.6%) and that it confers long-term immunity (75.4%). These results suggest that the majority of respondents have a good perception towards the COVID-19 vaccine.

Conclusion: COVID-19 vaccination of PLWHV is important because of their already immunocompromised state. Since perception and misconceptions are known to affect vaccine coverage, it is therefore recommended that vaccine education and more awareness to clarify misconceptions and misinformation as regards vaccine development be addressed.

Keywords: Perception, Vaccine, HIV, Vaccine-related concerns, Uptake

Plain English Summary

Since there is no specific treatment for COVID-19 infection, vaccination is still one of the most effective means of reducing the severity of the disease. Despite the rollout of COVID-19 vaccines, evidence has reported low vaccine acceptance, especially among PLWHV, which is associated with perception towards the vaccine. The study adopted a cross-sectional, descriptive research design to assess the perception of PLWHV towards the COVID-19 vaccine. The study revealed that most respondents believe that getting the COVID-19 vaccine will protect themselves, their families, or their patients (87.3%) and that it will help prevent the transmission of the disease (83.9%). There is also a large percentage of respondents who believe that the vaccine is effective (77.1%) and safe (82.6%) and that it confers long-term immunity

Correspondence:

Olu-Abiodun, Oluwatosin O

Ogun College of Nursing Sciences

Ijebu-Ode, Ogun State, Nigeria

+2348061992744, tmtosin@yahoo.co.uk

(75.4%). These results suggest that most respondents have a good perception towards the COVID-19 vaccine.

Introduction

The COVID-19 pandemic has had a profound impact on individuals, communities, and health systems worldwide. However, certain populations have been disproportionately affected by the pandemic, including People living with HIV (PLWHV) (1). This is due to several factors, including the fact that many people living with HIV face additional challenges, such as stigma, discrimination, and limited access to healthcare, which can exacerbate the impact of the pandemic on their health and well-being.

PLWHV are unique due to their dysregulated immune system from their history of chronic HIV infection and their use of antiretroviral therapy, some of which have been used experimentally to treat COVID-19 infection (2). Apart from immunosuppressed individuals, people living with HIV are at risk of more severe COVID-19 infection as a result of overlapping demographic and medical characteristics that are known risk factors for severe COVID-19 diseases (3). In a systematic review conducted by Ssentongo et al, (4), it was found that people living with HIV have a higher risk of SARS-CoV-2 infection and mortality risk from COVID-19 than people without HIV.

The prevalence of HIV in COVID-19 patients and associated mortality vary across the world (4, 5). Many researchers have highlighted the urgent need for PLWHV to be vaccinated against COVID-19 (4, 5, 6). A study in South Africa reported that PLWHV especially those not on antiretroviral therapy (ART) were at risk of severe infection from COVID-19 and vaccination should be a priority for them (7). Immunity is already compromised as a result of HIV infection, now having a dual combination of viral infection with COVID-19 may lead to a more severe medical burden on the affected individual. Since there is no specific treatment for COVID-19, vaccination is still one of the most effective means of preventing the disease (8).

Across the world, there have been so many rumours and misinformation circulating the globe concerning COVID-19 vaccines. It has been reported that people who were fully vaccinated died of COVID-19-associated symptoms, which has deepened public uncertainty about the safety and effectiveness of the vaccines. About 37.7 million people were reported to be living with HIV globally (9). There are currently 1.8 million PLWHV in Nigeria, 1.5 million of whom are on ART (10). Since COVID-19 vaccination began, only about 3% of the

eligible population has been fully vaccinated (11). COVID-19 vaccination among people living with HIV has been reported to be low (12). In a study carried out among PLWHV (13), it was reported that COVID-19 vaccination uptake was low and stated that PLWHV will probably not get vaccinated as a result of vaccine safety and side effects. A study carried out on the acceptance of COVID-19 vaccination in China also reported a relatively low COVID-19 vaccine acceptance rate among PLWHV compared to the general population (14). In another study conducted among PLWHV in Nigeria, COVID-19 vaccine acceptance was low and was associated with respondents' faith, risk perception, perception of the protective effects of antiretroviral treatment, concerns about COVID-19-HIV co-infection, and infertility-related misconceptions (9).

There is little evidence as regards the perception of PLWHV in Nigeria towards COVID-19 vaccine which will be an important determinant in vaccine acceptance and uptake. Hence, this study aims at determining the perception of COVID-19 vaccines among People living with HIV in Ogun state, Nigeria.

Methods

Design

The study is a quantitative design, adopting a descriptive, cross-sectional approach to determine the perception of COVID-19 vaccines among people living with HIV in Ogun state, Nigeria.

Setting and Participants

The study was conducted among people living with HIV who attended HIV support groups in selected Local Government Areas (LGAs) (Sagamu and Ijebu-ode LGAs, selected based on criterion) in Ogun State. There are between three and four active support groups per LGA, each with an average population of about 330 regular members and an estimated total study population of 660 regular members across the two selected LGAs in Ogun State. The target population is the people living with HIV between the ages of 18-64 years old and are registered members of HIV support groups in Ogun State, Nigeria

Sample size determination

The sample size was determined using Charan's formula (15), a 95% confidence interval, 5% margin of error and estimated proportion of 82.94% representing the proportion of PLWHV with a

positive attitude toward COVID-19 vaccine in a similar study (16). After adjusting the minimum sample size (218) for a 10% non-response rate, a sample size of 243 was derived. Samples were selected through a three-staged probability sampling scheme. In the first stage, two LGAs were selected purposively, and two support group each was selected by simple random sampling out of the three HIV support groups in each LGA. In the second stage, a list of all duly registered members of the selected support groups (sampling frame) was obtained and a computer-generated randomization scheme was used to select study participants.

Data collection

The study data were collected using an interviewer-administered structured questionnaire with closed-ended questions. The study adapted items from previous research and literature review to assess the perception of COVID-19 vaccines among People living with HIV (17,18). Section A consists of questions that assessed participant characteristics, including sociodemographics. Section B assessed the COVID-19 vaccines related concerns and Section C assessed the perception of PLWHV towards COVID-19 vaccines.

Recruitment and training of research assistant

Five research assistants who were graduates of health and related disciplines and spoke both English and Yoruba languages fluently were recruited for data collection. The researcher conducted two days of training each lasting five hours on the objectives and processes of the research for the research assistants. The training also included ethical conduct of research and all

study staff passed the Nigerian National Code for Health Research Ethics online course.

Validity and Reliability

The questionnaire was first assessed by two epidemiologists who determined that the scales had both face and content validity. The questionnaire was then pre-tested among people living with HIV in Oyo State, Nigeria based on the assumption that PLWHV in southwest Nigeria have similar characteristics. The goal of pretesting was to assess the acceptability and ease of answering the questions, as well as their tendency to elicit appropriate answers.

Data analysis

Data were analyzed using SPSS Version 22. Means and standard deviations were used to summarize numeric data. Frequencies and percentages were obtained for categorical variables. The proportions of all measured variables were computed and presented with relevant tables and charts.

Results

Participants' sociodemographic characteristics and clinical characteristics.

A total of 236 properly filled responses were received, giving a response rate of 97.1%. Table 1 shows the sociodemographic characteristics of the study participants. The majority (71.2%) of the participants are females, with an average age of (± 17.1), 40.7% are married, 61.4% are Christians and a majority (87.3%) of them are from the Yoruba ethnic group. More than half, (57.2%) of the participants had secondary education. The majority of the study participants (82.6 %) had comorbid medical conditions.

Table 1: Socio-demographic characteristics of respondents (N = 236)

Characteristics	Frequency (%)
Age (years) ^a	40.6 (17.1)
Sex	
Female	168 (71.2)
Male	68 (28.8)
Marital status	
Single, never married	75 (31.8)
Married	96 (40.7)
Divorced	9 (3.8)
Separated	16 (6.8)
Widowed	40 (16.9)
Religion	
Christianity	145 (61.4)
Islam	88 (37.3)
Traditional	3 (1.3)
Ethnicity	

Yoruba	206 (87.3)
Hausa	6 (2.5)
Igbo	19 (8.1)
Others	5 (2.1)
Education	
None	8 (3.4)
Primary	52 (22.0)
Secondary	135 (57.2)
Tertiary	41 (17.4)
Occupation	
Unemployed	42 (17.8)
Unskilled	42 (17.8)
Semi-skilled	53 (22.5)
Skilled	99 (41.9)
HIV chronic morbidity	
Yes	195 (82.6)
No	41 (17.4)
Duration since HIV diagnosis ^a	100.4 (83.5)
Duration on ART ^a	93.3 (84.0)

^a continuous (normal) variable; mean (standard deviation)

Table 2: Vaccine-related concerns of participants as regards COVID-19 vaccine.

Vaccine Concerns	No (%)	Yes (%)
COVID-19 vaccine has serious side effects	161 (68.2)	75 (31.8)
COVID-19 vaccine has long-term side effects	171 (72.5)	65 (27.5)
Vaccine-related information is readily available	54 (22.9)	182 (77.1)
The COVID-19 vaccine is effective	61 (25.8)	175 (74.2)
Covid-19 vaccination can aggravate health conditions	143 (60.6)	93 (39.4)
COVID-19 disease can be gotten from the vaccine	197 (83.5)	39 (16.5)
Better alternatives to the vaccine for tackling COVID-19 exist	170 (72.0)	66 (28.0)
I prefer to acquire COVID-19 immunity by getting the disease than by vaccination	177 (75.0)	59 (25.0)
I am afraid of injections because of the pain	164 (69.5)	72 (30.5)
There are some bad/dangerous types of COVID-19 vaccine	41 (17.4)	195 (82.6)

Table 2 describes Participants' COVID-19 vaccine-related concerns. Frequency distribution of the responses of the participants to COVID-19 vaccine-related concerns presents that, 93 (39.4%) agreed that COVID-19 can aggravate health conditions, 39 (16.5%) agreed that COVID-19

disease can be contracted from the vaccine, 59 (25.0%) prefer to acquire COVID-19 immunity by getting the disease than by vaccination, 72 (30.5%) is afraid of injections because of the pain while 195 (82.6%) thought that there are some bad/dangerous types of COVID-19 vaccine.

Table 3: Perception of respondents towards COVID-19 vaccine

Perception of COVID-19 vaccine	No (%)	Yes (%)
Protection of oneself, family, or patients	30 (12.7)	206 (87.3)
Prevention of disease transmission	38 (16.1)	198 (83.9)
It is effective	54 (22.9)	182 (77.1)
It is safe	41 (17.4)	195 (82.6)
Confers long-term immunity	58 (24.6)	178 (75.4)

The majority of the respondents believe that getting the COVID-19 vaccine will protect themselves, their families, or their patients (87.3%) and that it will help prevent the transmission of the disease

(83.9%). There is also a large percentage of respondents who believe that the vaccine is effective (77.1%) and safe (82.6%) and that it confers long-term immunity (75.4%).

Table 4: Relationship between Participants' Perception and COVID-19 Vaccine Acceptance

Characteristics	Vaccine acceptance		χ^2 (p-values)
	Yes n (%)	No n (%)	
Vaccine-related concerns			
COVID-19 vaccine has serious side effects (True)	48 (64.0)	27 (36.0)	0.57 (0.451)
COVID-19 vaccine has long-term side effects (True)	38 (58.5)	27 (41.5)	3.24 (0.072)
Vaccine-related information is readily available (True)	132 (72.5)	50 (27.5)	9.61 (0.002)
COVID-19 vaccine is effective (True)	140 (80.0)	35 (20.0)	49.11 (<0.000)
Covid-19 vaccination can aggravate health conditions (True)	55 (59.1)	38 (40.9)	4.73 (0.030)
COVID-19 disease can be got from the vaccine (True)	17 (43.6)	22 (43.6)	12.02 (0.001)
There are better alternatives to the vaccine for tacking COVID-19 (True)	40 (60.6)	26 (39.4)	1.91 (0.167)
I prefer to acquire COVID-19 immunity by getting the disease than by vaccination (True)	31 (52.5)	28 (47.5)	7.87 (0.005)
I am afraid of injections because of pain (True)	41 (56.9)	31 (43.1)	5.13 (0.024)
There are some bad/dangerous types of COVID-19 vaccine (True)	25 (51.0)	24 (49.0)	7.52 (0.006)
Perception of COVID-19 vaccine			
Protects oneself, family, or patients (Yes)	147 (71.4)	59 (28.6)	11.72 (0.001)
Prevention of disease transmission (Yes)	143 (72.2)	55 (27.8)	13.16 (<0.001)
It is effective (Yes)	142 (78.0)	40(22.0)	41.04 (<0.001)
It is safe (Yes)	149 (76.4)	46 (23.6)	41.71 (<0.001)
Confers long-term immunity (Yes)	136 (76.4)	42 (23.6)	26.88 (<0.001)

Table 4 presents the relationship between participants' perceptions and COVID-19 vaccine acceptance. This describes the relationship between participants' perception and COVID-19 vaccine acceptance showing that under vaccine-related concerns, COVID-19 vaccination can aggravate health conditions (χ^2 (243, N=244) = 4.73, $p < .030$); COVID-19 disease can be got from the vaccine (χ^2 (243, N=244) = 12.02, $p = .001$); I prefer to acquire COVID-19 immunity by getting the disease than by vaccination (χ^2 (243, N=244) = 7.87, $p = .005$); I am afraid of injections because of pain (χ^2 (243, N=244) = 5.13, $p = .024$) and there are some bad/dangerous types of COVID-19 vaccine (χ^2 (243, N=244) = 7.52, $p < .006$). In addition, perception of vaccine benefits all have a significant relationship with COVID-19 vaccine acceptance

Discussion

COVID-19 vaccines are effective against symptomatic infection and hospitalization (19). We assessed the perception of the COVID-19 vaccine alongside the vaccine-related concerns among PLWHV in Ogun state, Nigeria. We found that the majority of the study participants have a good perception towards the vaccine. Nearly two-thirds of the participants in the study also identified vaccine-related concerns which may have affected the uptake of the vaccine, this may indicate that there is poor knowledge of the dangers associated with COVID-19 infection among PLWHV. Moreover, the vaccine-related concerns reported mostly by the respondents were that the COVID-19

vaccine has serious side effects, and can aggravate health conditions. Less than half of the respondents reported that the virus can be gotten from the vaccine, while a small proportion also prefer to acquire COVID-19 immunity by getting infected with the disease rather than take the vaccine.

Perception of COVID-19 vaccine in our study was in contrast with the study carried out among the general population in Nigeria where a poor perception of COVID-19 vaccine was reported among the participants (20). The good perception in our study might be due to increased health education and awareness at HIV clinics about the vaccine's benefits and effectiveness. The reported vaccine-related concerns in our study was similar to the study carried out in China where long time side effect of the COVID-19 vaccine was also reported as a major concern (21). The study carried out among the general public in Nigeria also reported vaccine side effects as a major concern for vaccine acceptance (20). The fact that this concern has been reported across several studies indicates a lack of public awareness about the proven safety and efficacy profile of the COVID-19 vaccine not only among PLWHV but across the general population.

The result of these findings indicates that a good perception alone is not enough predictor for vaccine acceptance or uptake if vaccine-related concerns are not addressed among the target group. It also suggests that people are more likely to vaccinate if they are presented with information from trusted sources that will eradicate their fears

and doubts when rolling out new vaccines. Being responsive to the concerns and information needs of vulnerable groups holds the key to the successful roll-out of vaccines (9), interventions should focus on the provision of essential information about the COVID-19 vaccine.

Study limitations

There were a few limitations in the study. The study design was cross-sectional and the findings could differ over time. Since all COVID-19 preventive measures have been eased out and daily reports of infected people with COVID-19 infection have reduced, this may have changed the perception of the target population compared to when the pandemic was still very active. Since our study was among PLWHV, the findings cannot be generalized to the general population.

Conclusion

One of the most important predictors of vaccine acceptance among PLWHV is the perception of the safety and effectiveness of the available COVID-19 vaccines. The majority of our participants have a good perception towards the COVID-19 vaccine, but not without vaccine-related concerns that may affect the uptake of the vaccine. COVID-19 vaccination of PLWHV is important because of their already immunocompromised state, yet vaccine coverage among them was found to be below recommended targets. Since perception and misconceptions are known to affect vaccine coverage (6, 16), it is, therefore, recommended that vaccine education and more awareness to clarify misconceptions and misinformation as regards vaccine development be addressed to improve the overall COVID-19 vaccine uptake among PLWHV.

List of Abbreviations

ART:	Anti-retroviral therapy
BUHREC:	Babcock University Health Research Ethics Committee
COVID-19:	Coronavirus disease 2019
HIV:	Human Immunodeficiency Virus
NCDC:	National Centre for Disease Control
PLWHV:	People living with HIV
SARS-CoV-2:	Severe acute respiratory syndrome coronavirus 2 of the genus Beta coronavirus
SPSS:	Statistical Package for Social Sciences

Declarations

Ethics approval and consent to participate

Ethical clearance was sought and obtained from Babcock University Health Research Ethics Committee (BUHREC634/22), and necessary permission from the relevant governmental and support agencies involved with HIV care in Ogun State, Nigeria. Trained research assistants took the participants through a comprehensive informed consent process and made full disclosure to them. The research assistants stressed the voluntariness of participation and withdrawal at any point during the study without negative consequences. Data confidentiality was assured and ensured. All study data were de-identified, while the names and addresses of the participants were not required. Instead, everyone was allocated unique identifiers before the commencement of the study.

All the respondents gave written informed consent. All relevant ethical principles were also adhered to.

Consent for publication

All the authors gave consent for the publication of the work under the Creative Commons Attribution-Non-Commercial 4.0 license. We otherwise convey all copyright ownership, including all rights incidental thereto, exclusively to the journal when published.

Availability of data and materials

The data are not publicly available due to their containing information that could compromise the privacy of the research participant. The data generated in this study are available from the authors upon reasonable request.

Competing interests

The authors declare that there are no conflicts of interest.

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Author Contributions

OOO: Conceptualization, Methodology, Investigation, Software, Validation, Formal analysis, Data curation, Writing – original draft, Supervision. SJO: Conceptualization, Methodology, Investigation. ARA: Methodology, Software, Validation, Investigation, Resources, Project administration. ONA: Conceptualization, Methodology, Investigation, Supervision. All authors endorsed the final submission.

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