

# COVID-19 Experiences and Vaccine Confidence among Health Workers and Non-health Workers

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## Abstract

**Background:** The severe acute respiratory syndrome coronavirus 2 virus has been associated with unprecedented morbidity and mortality globally. This has resulted in the development of prevention protocols aimed at controlling the viral pandemic. Vaccine development and vaccination were also initiated to achieve herd immunity against the virus. High vaccine confidence levels are required to mitigate vaccine hesitancy and increase the uptake of the COVID vaccines and successful control of the pandemic. **Aim:** The researchers in this study set out to investigate COVID-19 experiences and public confidence in COVID-19 vaccination. **Materials and Methods:** A survey using both online and hard copy validated questionnaires was carried out among 431 consenting research participants in 6 countries across 3 continents (Africa, North America, and Europe). Results were analysed using SPSS version 23. **Results:** Fifty (11.6%) of the participants had COVID-like symptoms in the last one year though only one-fifth (10, 20%) of these were tested. Hydroxychloroquine was taken by 72 (16.7%) in the past 12 months. Two hundred and sixty-five (65.5%) expressed willingness to take the COVID vaccine. Recommendations by health workers and departments were significantly associated with vaccine confidence and uptake. More than half (249, 57.8%) of the participants acknowledged the presence of rumors against the vaccine. Suggestions to increase COVID-19 vaccine confidence include: vaccines should be available in all testing centres; government should address other welfare issues first before vaccination and increased efforts toward confidence-building on the vaccine. **Conclusion:** Majority of the study participants were positively disposed to accepting the COVID-19 vaccine however the presence of rumors concerning the vaccine still poses a significant threat to COVID-vaccine confidence.

**Keywords:** COVID-19, hydroxychloroquine, rumors, vaccine confidence, vaccine hesitancy

## INTRODUCTION

Building and maintaining confidence in vaccines had been a public health challenge before the onset of coronavirus disease-19 (COVID-19) pandemic.<sup>[1,2]</sup> With the outbreak of the severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2 virus), there have been up to 4.5 million deaths with about 2.9 million cases globally (as at month/year).<sup>[3,4]</sup> These figures cascaded a series of protocol aimed at stemming the pandemic. These protocols include increased emphasis on hand washing, social distancing, staying at home, and wearing a face mask when in public. Vaccine development against the virus and mass vaccination was also initiated as a way of achieving herd immunity against the virus.

Vaccination programmes have been instrumental in the reduction of morbidity and mortality from vaccine-preventable diseases

worldwide. For a vaccination programme to be effective there must be trust in the vaccine and all the processes involved in its administration by the intended recipient population.<sup>[5]</sup> Achievement of herd immunity with the COVID-19 vaccine requires an understanding of the willingness or otherwise of people to be vaccinated and the reasons behind their decisions. The speedy development of the vaccines, the rapid mutation of the virus, and lately, the compulsory vaccination stance

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of some governments' demands that the trust of the public is obtained for a successful implementation of the vaccination programme and to effectively mitigate the rise in vaccine hesitancy. Vaccine confidence is the trust that patients, their families, and providers have in recommended vaccines, providers who administer vaccines, processes, and policies that lead to vaccine development, licensure or authorisation, manufacturing, and recommendations for use<sup>[6]</sup> Many factors influence vaccine decision-making, including cultural, social, and political factors, individual and group factors, and vaccine-specific factors. Governments are therefore expected to intensify benefit/risk communication on vaccination and to ensure safe and effective delivery of vaccines. Studies have shown that one of the drivers of vaccine hesitancy is a lack of trust in the public.<sup>[1,5]</sup> Moreover, building vaccine confidence is needed to reduce vaccine hesitancy.

The devastation brought by the pandemic in many countries accelerated the search for medications and vaccines.<sup>[7]</sup> The use of hydroxychloroquine (HCQ) for the treatment and prevention of COVID pneumonia was one of the results of these searches.<sup>[8,9]</sup> This has however remained controversial. This study also investigated the HCQ habits of the study participants.

In Nigeria on November 1, 2021, just about 1.6 million persons have been fully vaccinated with about 4.3 million doses available<sup>[10]</sup> This suggests some degree of vaccine hesitancy toward the vaccine which may be due to a lack of vaccine confidence, among other reasons. This is similar to findings from other countries too.<sup>[11,12]</sup> This study, therefore, set out to explore the experiences of the responders with coronavirus disease and the level of confidence in COVID-19 vaccination.

## MATERIALS AND METHODS

This was an online survey of 431 consenting study participants. The calculated minimum sample size using the formula for infinite population was 316, a total of 441 questionnaires were distributed while 431 were retrieved. The Study tool was a semi-structured 39-item questionnaire. The tool was developed by the researchers after an extensive literature review. The study tool was given to experts (an epidemiologist, infectious disease physician, and a social scientist) to review for clarity, relevance, and coverage. Cognitive interviews were done using the tool with caregivers and medical students in the pediatric ward. This was followed by a pilot study with health workers within the hospital and a group of teachers in a nearby community school. After necessary adjustments were made, the tool was administered online (email and Google forms), paper copies of the study tool were distributed to the research participants in 6 countries across 3 continents Africa, North America, and Europe. A convenient sampling method was used to recruit study participants. The study tools were distributed in the ratio of 1:2 for the health workers and non-health workers, respectively.

Majority (103, 70%) of the health workers were given paper copies of the study tool in the four tertiary centres in Enugu while soft copies were sent to others (44, 30%) both inside and Nigeria. The non-health workers were selected from patients and caregivers, secondary school teachers, religious bodies, and randomly selected members of some non-health professional bodies. Two hundred and thirty-four (80%) hard copies were given to non-health workers while 60 (20%) study tools were sent online. Responses were anonymous and participants were given 48 h to respond. Four hundred and forty-one questionnaires were distributed and 431 were retrieved giving a response rate of 97.8%. Results analysed using IBM SPSS Statistics for Windows, Version 23 (IBM Corp., Armonk, NY, USA). Data were analysed and results represented in simple frequencies and charts.

The inclusion criteria for the study participants were adult <21 years and consent to participate. The questionnaire themes included biodata/demographics, hesitancy-related questions, chloroquine- and hydroxychloroquine-related questions, COVID-19 illness/testing-related questions, and COVID-19 vaccine-related information.

## RESULTS

Fifty (11%) of the respondents had COVID-19-like symptoms in the past one year, however, only 10 persons (20%) among these were tested for SARS-CoV-2 virus. Among those screened for the virus, one (10%), tested positive, seven (70%) were negative to the virus while the results of two (20%) participants were not disclosed to them. Four (8%) of those who had COVID-19-like symptoms were treated by doctors in a regular hospital. The one (10%) respondent who tested positive to the virus was managed in a home setting also by a doctor. One was treated in a pharmacy while others did not disclose where they were managed. All recovered without complications. A higher proportion of the health workers (23, 18.1%) had the COVID-19-like symptoms when compared to the non-health workers (25, 8.2%) [ $P < 0.001$ , Table 1].

Among participants that experienced COVID-19-like symptoms, 14 (28%) took HCQ as part of treatment for SARS-CoV-2. Another 36 persons who never had symptoms similar to COVID-19 also took HCQ for prophylaxis. Similarly, 22 persons admitted taking HCQ but did not disclose their symptom status. These 72 (16%) persons took HCQ for periods varying between 1 and 12 weeks and none had a prescription.

**Table 1: Health workers and non-health workers with signs of COVID**

	Signs of COVID			P
	Yes, n (%)	No, n (%)	Missing, n (%)	
Health worker	23 (18.1)	98 (77.2)	6 (4.7)	<0.001
Non-health worker	25 (8.8)	246 (86.9)	12 (4.2)	
Missing	2 (9.5)	14 (66.7)	5 (23.8)	

HCQ was taken by 23 (24.4%) and 46 (15.1%) of the health workers and to non-health workers, respectively ( $P = 0.385$ ).

More than half (265, 61.5%) of the study participants expressed willingness to take COVID-19 vaccine although 19% (82) were not sure if they would accept the vaccine. Similar proportions 78 (61.5%) and 177 (58.2%) of the health workers and the to non-health workers respectively were willing to accept the COVID-19 vaccine. Willingness to take the COVID-vaccine was slightly affected by factors such as having to pay for the vaccine, recommendations by different bodies/institutions and presence of any side effects [Figure 1].

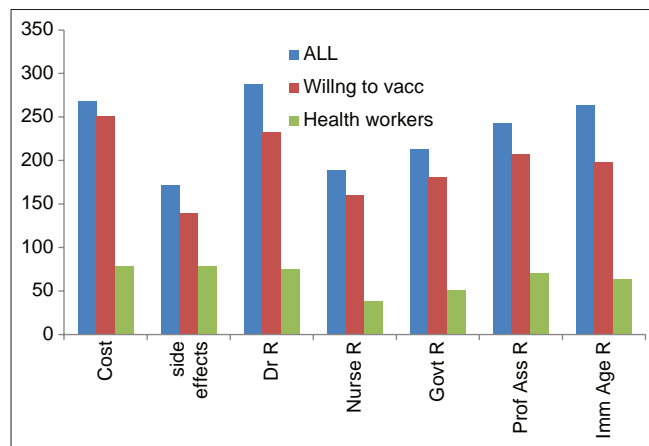
More than half (47, 65%) of those who took the HCQ were willing to take the COVID-vaccine, 10 (13.9%) were unwilling while 11 (15.3%) were undecided.

Rumors surrounding the COVID-19 vaccine seemed to be prevalent as more than half (249, 57.8%) admitted to having heard different rumors about it. Majority (190, 76%) of the participants acknowledged that hearing rumors however did not state the rumors they heard about the COVID-19 vaccine. Rumors expressed by some of the participants concerning the vaccine include: “the vaccine still had safety and efficacy issues” (59, 23.5%), “the vaccines are contrary to my religious beliefs” (28, 11.2%). Table 2 shows the distribution of the most commonly expressed rumors about the COVID-19 vaccine among health workers (127) and non-health workers (304).

Suggestions offered by the participants for improving confidence and subsequent uptake of the COVID-vaccine include: safe vaccines should be available in all testing centres (69, 16%) emphasis should be placed more on nonpharmacologic preventive methods (28, 6.5%), government should provide more food than vaccines (5, 2%).

## DISCUSSION

The incidence of confirmed COVID-19 virus among the study participants was quite low (0.002) which is not different from



**Figure 1:** Willingness to accept COVID-Vaccine among health workers and non-health workers

its incidence in Nigeria (the country of most respondents).<sup>[13]</sup> Different hypotheses have been used to explain the lower incidence of COVID-19 in tropical Africa and these include; low seeding rate, favorable weather, preexisting immunity due to previous exposure to other coronaviruses and shared immune dominance between Plasmodium falciparum, Bacille Calmette Guerin (BCG) and SARS-CoV-2,<sup>[14-18]</sup> high Vitamin D levels, as well as the predominance of young population. These theories are however still under investigation.

Only about 20% of study participants with COVID-like symptoms were screened for the virus. This suggests a limitation to access to testing. In Nigeria on October 2021, 3.2 million samples had been tested in a population of about 200 million persons 1.5% of the population.<sup>[19]</sup>

Countries like Egypt and morocco have done a total test of 3.2 million (17%) and 1.4 million (2.4%), respectively.<sup>[20]</sup> Daily testing rates in other countries such as Canada and the United Kingdom range from 2225/million to 12, 367/million, respectively.<sup>[21,22]</sup> Out-of-pocket payment for testing has limited the rate of COVID-19 testing in Nigeria. Testing provides a window into the rate of spread of the pandemic. It is also essential for a better understanding of case management and successful control of the transmission.<sup>[23]</sup> Significant resource allocation is required to make rapid testing available to underserved populations. The finding of one-in-ten confirmed cases of COVID supports the report that symptoms of the SARS-COV-2 could have many differential diagnoses, further strengthening the need for available and affordable testing. A similar study in Morrocco<sup>[24]</sup> reported that about a quarter of participants who presented with COVID-like symptoms were confirmed positive. SARS-CoV-2 pneumonia has similar clinical features to diseases such as Chlamydia pneumonia, Influenza A, and infections with Adenoviruses.

Another possible reason for the low rate of the testing is the fear of stigmatisation as this study revealed that only 10 of the 50 participants who had COVID-like symptoms screened for the infection. Stigmatisation has been documented to delay people from accessing care when they experience COVID-like symptoms, people discriminating against those that need care, and sometimes violence and prejudice against groups and

**Table 2: Rumors on corona virus disease-19 vaccine as expressed by the research participants**

Rumor theme	Health worker-127, n (%)	Non-health workers-304, n (%)
Vaccine is not safe/effective	27 (21.3)	31 (11)
It is a population control strategy	25 (19.7)	47 (15.5)
I have religious concerns	19 (15.0)	9 (3.2)
COVID-19 virus not in Nigeria	9 (7.1)	14 (4.9)
COVID-19 is similar to malaria	7 (5.5)	41 (14.5)
HCQ is used for the treatment	0	6 (2.1)
It is a political disease	1 (0.8)	0

COVID-19: Corona virus disease-19, HCQ: Hydroxychloroquine

populations.<sup>[25,26]</sup> Egyptian physicians reported disclosure of concerns, negative self-image, public attitude, and concerns toward COVID.<sup>[27]</sup> Health-related stigma results from a cycle of complex factors that eventually determine disease outcome in an individual. This complex cycle involves processes from acceptance of disease existence, vulnerability possibility to confidence in available protective measures. People's willingness or otherwise to be screened is a point along the pathway to vaccine confidence which is reached at different times for different persons.

The COVID-like symptoms were significantly more among the health workers ( $P < 0.01$ ) when compared to non-health workers. This is not unexpected as health workers are at a higher risk of contracting infectious diseases when compared to other workers because of increased risks of exposure. An incidence of 5%–15% infection rates have been documented among health workers exposed to COVID-19<sup>[28,29]</sup> Ensuring the safety of health workers against the pandemic is critical in ending the pandemic. This can be achieved by vaccinating them first which would have the added benefit of increasing public confidence in the vaccine.<sup>[30]</sup>

The social distrust for the COVID-19 vaccine,<sup>[31]</sup> the difficulty in accessing health services during the lockdowns<sup>[32]</sup> and the “infodemic” that accompanied the pandemic<sup>[33]</sup> where unverified information was prevalent in the virtual space increased the tendency to self-medicate COVID-like symptoms with HCQ. Slightly more than a quarter of those who took HCQ in this study had COVID-like symptoms while half of those who took HCQ did not report any symptoms and took it for prophylaxis. Gautret *et al.* in France and Liu *et al.*<sup>[34,35]</sup> reported a reduction in viral load in patients who were managed with HCQ while no significant difference was noted in outcome between patients treated with HCQ and those on regular anti-virals, similarly, a number of literature reported a lack of evidence on the effectiveness of HCQ for COVID prophylaxis.<sup>[36-39]</sup> There was no significant difference in the HCQ use between health and non-health workers ( $P = 0.52$ ). The fear caused by the pandemic probably prompted desperate actions by all in search of solution irrespective of any perceived risk. HCQ prophylaxis may not be perceived as high risk by tropical populations as the medication is also used in managing other clinical conditions with minimal side effects at appropriate doses.

The study participants admitted hearing rumors about the COVID-vaccine. This is not unusual following introduction of a new vaccine but was worsened by the accelerated production process of the SARS-CoV-2 Virus Vaccine. The extent of rumors and conspiracy theories associated with a vaccine has been found to predict the level of confidence toward the vaccine.<sup>[40]</sup> The number of rumors following COVID-19 has been large and diverse ranging from safety and efficacy concerns to being a politically motivated disease. The most common rumor and among the health workers in this study was that the vaccines were neither safe nor

effective. Similar rumors on safety and efficacy concerns of the coronavirus vaccine have also been reported previously.<sup>[41]</sup> One of the reasons for the concern was that the virus was rapidly changing and vaccines may not be effective for emerging strains. Among the non-health workers, the more common rumors were that COVID is a population control strategy and that the disease is just like malaria. This rumor would increase COVID vaccine hesitancy and reduce risk perception of the disease, both of which are inimical to the control of COVID-19. Rumors pose challenges to the efforts of governments in improving public health. Therefore, anti-COVID vaccine rumors need to be addressed to improve vaccine confidence and to achieve maximum vaccine coverage and herd immunity.

Willingness to accept COVID-19 vaccine was used to assess hesitancy to COVID-vaccine. The willingness to vaccinate by more than half of the study participants was commendable for a vaccine that has been trailed by so much rumors and conspiracy theories. This rate is slightly lower than that of other countries such as Germany, France, the UK, and France which had acceptance rates above 70%.<sup>[42]</sup> Acceptance rates were higher (>90%) in countries such as Ecuador and Malaysia. In Africa, countries such as Ethiopia (94%), Nigeria (68%), and Tunisia (92%) were reported to have the highest willingness to accept the COVID-19 vaccine while Senegal (65%) and Democratic Republic of Congo (DRC) (59%) had the lowest acceptance rates.<sup>[43]</sup> Concerns on the rapid vaccine production and approval for emergency use were the factors said to affect vaccine confidence in high-income countries,<sup>[44]</sup> while the perceived low risk of getting infected due to lower incidence of COVID-19 cases and mortality may explain the suboptimal willingness to accept the vaccine in low-income countries which was at variance with the reasons reported in this study. Willingness to accept the COVID-19 vaccine is dynamic and continues to fluctuate upward and downward over time.<sup>[45]</sup> This was illustrated in a previous study<sup>[45]</sup> of six African countries where the likely to getting the vaccine five months later was trending in the negative direction. There is a need for sustained health education and provision of information, education, and communication materials to the public to improve the acceptance of COVID-19 vaccine as was seen in the case of the injectable polio vaccine.<sup>[46,47]</sup>

In this study, willingness to accept the vaccine was more commonly affected by factors such as having to pay for the vaccine and recommendations by professional and government bodies as shown in Figure 1.

## CONCLUSION

The experiences of the participants include low levels of testing for COVID-19, more COVID-19-like symptoms among the health workers when compared to non-health workers. Hydroxychloroquine use was still prevalent among the participants. Anti-COVID-19 vaccine rumors were prevalent and this may pose a threat to COVID-19 vaccine



confidence. COVID-19 vaccine confidence was affected by recommendations, costs, and perceived side effects.

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### Conflicts of interest

There are no conflicts of interest.

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