

KNOWLEDGE, PERCEPTION, PREVENTIVE PRACTICES AND SOCIO-POLITICAL AWARENESS OF COVID-19 AMONG NIGERIANS

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Abstract

Background: The Coronavirus (also known as SARS-CoV-2) causes the respiratory disease known as COVID-19. Research on knowledge, attitude and practice is very important for understanding the level of awareness about the knowledge, attitude, and practice towards a disease.

Objectives: This study aimed to investigate knowledge, perception, preventive practices and socio-political awareness about COVID-19 among Nigerians.

Methods: The study was a descriptive cross-sectional study conducted between August and October 2020. The study used an online self-administered questionnaire distributed to Facebook, WhatsApp, Instagram, and Twitter accounts/groups. The questionnaire consists of five components including sociodemographic data, knowledge and perception, preventive practices, and socio-political awareness of COVID-19 among Nigerians.

Results: A total of 270 respondents were included in this study (71.9% males). Majority of the respondents (51.5%) are health professionals, 97% believed that the severe acute respiratory syndrome 2 (SARS-CoV-2) can be spread from person-to-person, and 97%, 95%, and 97% respectively, agreed that coughing, fever and difficulty in breathing respectively, are common symptoms. Most of the participants agreed that social distancing and avoiding crowded area (93.3%), regular handwashing with soap and using hand sanitizer (91.8%) as well as wearing of face mask (89.6%) could reduce the risk of coronavirus infection. Regarding receiving COVID-19 vaccine, 63.3% accept the vaccine if it is developed in Nigeria, while 48.5% will receive the vaccine if it is developed outside Nigeria. More than half of the respondents (58.1%) believe that there are conspiracy issues surrounding SARS-CoV-2 infection.

Conclusion: Respondents have good knowledge and preventive practices and do not support myths on COVID-19. Vaccine against COVID-19 should be a wake-up call for Nigerian policymakers.

Keywords: Knowledge, COVID-19, Nigeria, Vaccine, Myths.

Introduction

Coronavirus disease 2019 (COVID-19) is a new respiratory illness, caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The world health organization (WHO), named the illness caused by SARS-CoV-2 "coronavirus disease 2019" with the acronym COVID-19. To avoid stigmatizing the virus's origins in terms of populations, location, or animal associations, the name 'COVID'-19 was chosen [2]. It is significantly more infective than Middle East respiratory syndrome coronavirus (MERS-CoV) [3]. It was earlier reported that human coronavirus infections are mild, and patients usually recover without complications or treatment [3]. It

represented the greatest health threat faced by humanity in decades, causing a steep increase in worldwide morbidity and mortality and promoting general fear [1].

Since the first reported case of COVID-19 in China, the world has witnessed severe unprecedented mortality and morbidity due to the virus resulting in serious public health emergencies in most countries [6], including African countries [5]. Infection by SARS-CoV-2 in humans occurs mostly through air droplets, close contact with infected persons, mucus membranes secretions from the nose, mouth, or eyes of infected persons, contaminated surfaces, and some studies even suggest digestive tract transmission [6]. The Centre for Disease Control and Prevention (CDC) has classified persons as high-risk individuals as those in close contacts of infected persons, travelers arriving from locations where local spread has been reported, persons in areas with ongoing local transmission and healthcare workers caring for patients with COVID-19 [2].

Regarding clinical manifestation, COVID-19 presents in different ways ranging from severe illness and mortality to mild symptoms and even being asymptomatic. Epidemiological investigations have shown that the incubation period of the SARS-CoV-2 is between 1 to 14 days [7], while symptoms may develop between 2 to 14 days following exposure to the virus [2]. COVID-19 infection is more common in the elderly with underlying diseases, and the clinical presentations include fever, malaise and acute respiratory distress in some patients, which may lead to death [7]. Other symptoms include dry coughing and fatigue that may lead to serious symptoms, such as difficulty breathing, chest pain, difficulty talking, and moving [8].

There are recently vaccines to control COVID-19, even though there are no proven treatments to control it. This, therefore, poses a threat to health care delivery. Although most countries have applied strict prevention and control measurements to curb the disease [6], the preventive measures taken include but not limited to general lockdown, movement control order (MCO), obligatory home quarantine, ban on public and social gatherings, ban on worshipping centres, international flights restrictions and raising awareness on proper hand wash, hygiene, and sanitation as well as social distancing.

Nigeria confirmed first coronavirus case on the 27th of February 2020 from an Italian citizen who works in Nigeria and returned from Milan, Italy to Lagos, Nigeria on the 25th of February 2020. In the period between the first confirmation in February 2020 and the time this article was written (June, 2021), the Nigeria Centre for Disease Control (NCDC) reported over 167,000 confirmed cases, with over 1,400 active cases and over 2,000 deaths from over 2,000,000 samples tested [5].

Previous studies show that in time of crisis, research on knowledge, attitude, and practice (KAP) is vital for understanding the public's level of awareness about the knowledge, attitude, and practice toward a disease [8]. Carrying out survey studies on KAP can collect information on what is known, believed, and done by a specific population. Such information is necessary as unclear information and negative attitude toward the community's infectious diseases may lead to distress and panic [8]. For example, knowledge of a disease by a healthcare worker may influence attitudes and practices, where incorrect attitudes and practices directly increase infection risk [9]. It is paramount to understand the public knowledge, reactions, adherence to, and acceptance of such measures that affect their daily life in several ways, especially psychologically, socially, physically [6], and even politically. The information generated from such studies and extensive reviews and recommendations could help fight against COVID-19 and similar future threats by improving the awareness level of the citizens and encouraging positive attitudes that are necessary to beat the pandemic [6]. Therefore, this study aimed to investigate knowledge, perception, preventive practices and socio-political awareness of COVID-19 among Nigerians.

Methods

Study design

The study was a descriptive cross-sectional study conducted between August and October 2020. The study was conducted using an online self-administered questionnaire distributed to Facebook, WhatsApp, Instagram, and Twitter accounts/groups in line with STROBE and Checklist for Reporting Results of Internet E-Surveys (CHERRIES) [10].

Inclusion criteria

Nigerian of any gender ≥ 18 years living in Nigeria with a Facebook, WhatsApp, Instagram, or Twitter account were selected for the study.

Exclusion criteria

Gender of any nationality apart from Nigerian or responded outside the study period.

Sample size estimation and sampling technique

To calculate the sample size for this survey, we hypothesized that at a 90% confidence interval (CI), 38% outcome factor in the respondents' population would have a satisfactory knowledge level of COVID-19. Using the Open Source Epidemiologic Statistics for Public Health (OpenEpi), v.3.01 (updated 2013/04/06), the needed sample size was 255 respondents. A 10% contingency was added to the sample size. Although due to 10% contingency, the total respondents was 281. We could only get 270 respondents at the end of the survey period. A total of 255 respondents were needed for the study, and 270 were gotten, we proceeded with the analysis. ***Questionnaire and data collection***

The questionnaire was validated by independent reviewers (public health experts, pharmacists, and sociologists). A pilot test of the questionnaire was conducted with ten persons (not included in the main study). After the validation, the questionnaire was formatted into the Google forms internet-based software for data collection. After adding the questionnaire into the Google forms, the questionnaire link was generated, and invitation messages to participants were sent out electronically among Facebook, WhatsApp, Instagram, and Twitter accounts/groups.

To ensure a wider distribution of the questionnaire, participants were told to share and forward the questionnaire. Persons who clicked the link were directed to the Google forms. Participants were asked to fill all the items in the online questionnaire to proceed to the next page. The Google form was made in such a way that participants were also able to review and change their responses, suspend and resume later, or quit the survey at any point in time. Participants that decline to consent are taken to the end page and were excluded in the final analysis. Upon completing the questionnaire, participants were directed to click the submit option, and finally, the online questionnaire was sent to the drive. Respondents who would like to get a copy of the survey findings as feed-back were informed to share their email address.

Before attempting the survey, consent and age of the respondents were sought for. The survey questionnaire comprised of five components, with a total of 73 questions. The questionnaire's five components included; sociodemographic data, knowledge on COVID-19, perception on COVID-19, preventive practices, and sociopolitical awareness of COVID-19 amongst Nigerians.

The sociodemographic data elicited information on gender, age, tribe, level of education, marital status, profession/occupation, and State of residence. On the knowledge of the infection, the survey sought participants' knowledge of COVID-19 as virus and pandemic. Preventive practice sought for participants' preventive measures. On social, economic and political considerations, participants were sought to bare their minds on COVID-19 in terms of social, economic, and political aspects at the local, national and global level.

The questionnaire combined true or false questions and multiple-choice questions with predefined answers were offering participants the possibility to choose the grade on a "Yes" to "No" scale.

Ethical consideration

The "declaration of Helsinki ethical principles for medical research" was followed throughout the study. The principles of voluntary participation, privacy, confidentiality and anonymity of subjects were considered and adhered to. This study does not seek for any institutional review board's permission to be carried out, since it was an online study.

Statistical analysis

Data retrieved from the online survey were entered into Microsoft Excel (2013) and then imported into IBM Statistical Package for Social Sciences IBM SPSS Version 24.0 (SPSS Inc., Chicago, IL, USA) for analysis. Numbers and percentages were presented for all variables. Variables were represented as simple frequency (N) and percentage (%).

Results

A total of 270 respondents were included in this survey (28.1% females, 71.9% males). The vast majority of respondents had university education (45.9%, 124/270) and 33.3% were between 34-41 years of age. Most of the respondents (51.5%, 139/270) are health professionals. Table 1 summarized respondents' socio-demographic characteristics.

Table 1: Socio-demographic characteristics of respondents (N = 270)

Variables	Description	Frequency (%)
Gender	Male	194 (71.9)
	Female	76 (28.1)
Age	18 – 25	52 (19.3)
	26 – 33	79 (29.2)
	34 – 41	90 (33.3)
	42 – 49	34 (12.6)
	50 – 57	11 (4.1)
	58 – 65	3 (1.1)
	66 and above	1 (0.4)
Tribe	Hausa/Fulani	118 (43.7)
	Non-Hausa/Fulani	152 (56.3)
Level of education	Bachelors	124 (45.9)
	MSc/PhD	101 (37.4)
	OND/ND/HND	25 (9.3)
	Secondary	13 (4.8)
	Others	7 (2.6)
Marital status	Married	170 (63.0)
	Single	97 (35.9)
	Others	3 (1.1)
Profession/Occupation	Health professional	139 (51.5)
	Non-health professional	50 (18.5)
	Students	52 (19.3)
	Others	29 (10.7)
Geopolitical zones	North-central	97 (35.9)
	North-east	10 (3.7)
	North-west	93 (34.3)
	South-east	17 (6.3)
	South-south	16 (5.9)
	South-west	37 (13.7)

Key: OND = Ordinary National Diploma, ND = National Diploma, HND = Higher National Diploma, FCT = Federal Capital Territory

Knowledge of COVID-19 among Nigerians

General knowledge on COVID-19 has shown that 100% of the participants have heard of the disease, and the majority (97%) believe it can be spread from person-to-person. Table 2 showed the prevalence of knowledge of COVID-19 among respondents.

Table 2: Prevalence of knowledge of COVID-19 (N= 270)

Variable	Yes (%)	Maybe (%)	No (%)
Heard of coronavirus disease (COVID-19)	270 (100.0)	0	0

Spread from person-to-person	262 (97.0)	7 (2.6)	1 (0.4)
Spread when an infected person cough	251 (93.0)	12 (4.4)	7 (2.6)
Spread when an infected person sneezes	259 (95.9)	9 (3.3)	2 (0.7)
Spread through air droplets.	241 (89.3)	20 (7.4)	9 (3.3)
Contracted from the infected hand through eyes.	241 (89.3)	14 (5.2)	15 (5.6)
Contracted from the infected hand through the mouth.	253 (93.7)	11 (4.1)	6 (2.2)
Contracted from infected hand through nose.	256 (94.8)	12 (4.4)	2 (0.7)
Spread more in crowded places like markets, mosques, churches and schools.	261 (96.7)	8 (3.0)	1 (0.4)

Knowledge of symptoms of COVID-19

Regarding respondents' knowledge of COVID-19, 97% agreed that coughing is one of the symptoms, while 95.2% and 97.4% agreed that fever and shortness/difficulty in breathing are common symptoms. A lower percentage of the respondents (6.3%) agreed that drinking bleach or hand sanitizer would kill Coronavirus in the body, whereas 16.7% agreed to add garlic, ginger or pepper inside hot tea food can cure COVID-19 infection.

Prevention and treatment

On prevention, only 2.2% of the respondents agreed that taking alcohol or palm oil will protect against COVID19 infection. Some respondents (4.8%) believe that bathing and rinsing of nose and mouth with salt water will prevent coronavirus infection. Majority of the respondents accepted that social distancing and avoiding crowded area (93.3%), regular handwashing with soap and using hand sanitizer (91.8%) as well as wearing of face mask (89.6%) can reduce the risk of coronavirus infection. Table 3 lists respondents' knowledge about symptoms, awareness of measures for the prevention and treatment of COVID-19 infection.

Table 3: Knowledge about symptoms, treatments, and prevention of COVID-19

Variables	Number (%)
Symptoms	
Cough	262 (97.0)
Fever	257 (95.2)
Shivering	183 (67.8)
Body ache	174 (64.4)
Fatigue/tiredness	231 (85.6)
Headache	225 (83.3)
Sore throat	245 (90.1)
Diarrhoea/ abdominal pain	134 (49.6)
Shortness/difficulty in breathing	263 (97.4)
The recent loss of smell	212 (78.5)
Catarrh	211 (78.1)
Treatment of COVID-19 infection	
Drinking bleach or hand sanitizer will kill coronavirus infection in the body	17 (6.3)
Taking hydroxychloroquine can cure coronavirus infection	96 (35.6)
Garlic, ginger or pepper inside hot tea or food can cure coronavirus infection	45 (16.7)
Taking a high quantity of vitamin C will cure coronavirus infection	54 (20.0)
Prevention of COVID-19 infection	
Taking antibiotics like Ampiclox® can prevent coronavirus infection	25 (9.2)
Garlic, ginger or pepper inside hot tea or food can prevent coronavirus infection	58 (21.5)
Taking a high quantity of vitamin C will prevent coronavirus infection	88 (32.6)
Drinking of alcohol will protect from coronavirus infection	6 (2.2)

Drinking palm oil can prevent against coronavirus infection	6 (2.2)
Bathing and rinsing of nose and mouth with salt water will prevent coronavirus infection	13 (4.8)
Steam inhalation with local herbs can prevent coronavirus infection	34 (12.6)
Regular handwashing with soap and using hand sanitizer is the best way to prevent coronavirus infection	248 (91.8)
Social distancing and avoiding crowded area can reduce the risk of coronavirus infection	252 (93.3)
Wearing of face mask prevent coronavirus infection	242 (89.6)

Note: (Only 'yes' is noted)

Preventive practices and personal responsibilities

In the self-reported preventive practices and personal responsibilities, 97% often practice handwashing with soap and water or hand sanitizer as a veritable means of prevention against coronavirus infection. Regarding maintaining a safe distance from anyone who is coughing or sneezing, 96.3% agreed, while 94.8% wear a face mask while in public places. The majority of the respondents (85.1%) seek medical attention when they have a fever, cough, or difficulty breathing. The other items on respondents' preventive practices and personal responsibilities are listed in Table 4.

Perception, awareness or myth and socio-political and economic considerations

In the section of perception, awareness or myth (Table 4), 95.1% are aware there are cases of COVID-19 in Nigeria, while 92.6% perceived that older people have a higher risk of contracting Coronavirus. As low as 2.6% of the respondents agreed that Coronavirus affects only white men, not black people. On receiving COVID-19 vaccine, 63.3% accept the vaccine if it is developed in Nigeria, while 48.5% will receive the vaccine if it is developed outside Nigeria.

More than half of the respondents (58.1%) believe that there are conspiracy issues surrounding coronavirus infection, 42.6% considered coronavirus infection is a man-made biological weapon. More than half (53.3%) perceived deliberate hesitance in assessing and eliciting local or existing remedy or treatment of COVID-19. A very low percentage (5.6%) of the respondents believed that COVID-19 is an elite infection only in rich countries. 49.6% thought that response to COVID-19 is more profit-driven than humanitarian-driven globally (Table 4). On the spot response on the estimate in percentage level of compliance with personal protective equipment (PPE), only four respondents each have 100% compliance with a face mask on and maintenance of social/physical distance. Regarding obeying "no handshake" or "no hugging" guidelines, only two respondents have 100% compliance on social/physical distancing maintained. In comparison, 12 respondents have 100% access to running water and soap or hand sanitizer.

Table 4: Preventive practices, awareness, socio-economic and political considerations

Variables	Number (%)
COVID-19 preventive practices and personal responsibilities	
I will seek medical attention when I have fever, cough, or difficulty in breathing	238 (85.1)
Hand washing often with soap and water, or hand sanitizer	262 (97)
Maintain a safe distance from anyone who is coughing or sneezing	260 (96.3)
Ensure physical distancing (3-6 feet) away from other people	235 (87)
I avoid public spaces, gathering and crowds	227 (84.1)
Wearing of face mask while in public places	256 (94.8)
Practice non-contact greeting (not shaking hands)	214 (79.3)
Coughing and sneezing on my elbow or tissue paper	233 (86.3)
I stay at home when I am not feeling well	230 (85.2)
Awareness, Perception or Myth	
There are cases of COVID-19 in Nigeria	258 (95.6)
There are cases of COVID-19 in your State of residence	236 (87.4)

Older people have a higher risk of contracting COVID-19	250 (92.6)
Only people with respiratory diseases like asthma can contract COVID-19	26 (9.6)
Smokers are more likely to contract COVID-19 than others	112 (41.5)
COVID-19 affect only the white men not black people	7 (2.6)
If COVID-19 vaccine is developed in Nigeria, are you going to receive the vaccine?	171 (63.3)
If COVID-19 vaccine is developed outside Nigeria, are you going to receive the vaccine?	131 (48.5)
Social, Economic and Political considerations	
Do you consider there exist any conspiracy issues around COVID-19?	157 (58.1)
Do you consider COVID-19 a human-made biological weapon?	115 (42.6)
Do you think the spread could have been curbed better without international polity interference	98 (36.3)
Do you perceive a deliberate hesitance in assessing and eliciting local or existing remedy or treatment of COVID-19?	144 (53.3)
Do you think Nigeria is doing enough to harness local solutions to prevention, treatment and cure for COVID-19?	68 (25.2)
Do you believe COVID-19 is an elite infection that exists only in rich countries?	15 (5.6)
Do you think vaccines or treatment would be made equitably accessible to all considering cost and polity?	76 (28.1)
Do you think COVID-19 response is more profit-driven than humanitarian-driven globally?	134 (49.6)

Note: (Only 'yes' is noted)

Discussion

Nigeria announced the occurrence of its first COVID-19 on the 27th of February, 2020 [4]. Since then, there has been an increased number of cases with over 1200 deaths at the time of writing this report. Although this survey aimed to investigate knowledge, perception, preventive practices, and socio-political awareness of COVID-19 among Nigerians, this study gave a picture of the current situation and challenges, perception, and socio-political consideration of COVID-19 among Nigerians. This study may guide policy and decision-makers, particularly from COVID-19 infection, economy, and socio-political perspective. Majority of the respondents have a very sound knowledge of COVID-19 infection, ranging from contracting to means of spreading the virus. This may be attributed to the respondents' level of education. With this, we can deduce that the education level plays a vital role in understanding COVID-19 infection. In addition, more than 50% of the respondents are health professionals. Another possibility is the seriousness of the global pandemic in addition to day-to-day updates from public health agencies. This would have stimulated the rising need to learn and acquire knowledge on COVID-19 [6]. The measures the Nigerian government put in place to curb COVID-19 include but not limited to the limitation of the number of passengers of public transportation, closure of all schools, prohibition of gatherings of more than 20-50 people, closure of land borders and suspension of both local and international flights, restaurants, bars and public places closed for some time of the day. Restriction of movements in some states was placed, and inter-state travel was banned. It culminated to the total lockdown of the whole country. There is the presidential task force (PTF) under the office of the president of Nigeria in collaboration with NCDC shouldered to give daily media briefing on the State of COVID-19 in Nigeria. The briefing usually summarises confirmed new cases collated from the 36 states of the federation, totally confirmed cases, total discharged, and total deaths from the first day Nigeria recorded the first case of COVID-19. In a related study conducted in Nigeria and Egypt, the overall knowledge of COVID-19 was 74% compared to our study, where respondents' overall knowledge was above 85%. As noted, knowledge is a criterion for establishing prevention beliefs, thereby forming positive attitudes and promoting positive behaviours. Individuals' cognition and attitudes towards disease affect the effectiveness of their coping strategies and behaviours to a certain extent [8,9].

Our findings show that majority are aware that symptoms of COVID-19 include coughing, fever, fatigue/tiredness, sore throat, and shortness of breath. Based on our findings, it revealed a good understanding of the symptoms and preventive measures. A similar study conducted in neighbouring Ghana revealed similar results (identifying fever (95.1%), cough (97.4%) and difficulty in breathing (92.3%) as the most common symptoms of COVID-19) [11]. It is believed that a community that has good knowledge about a disease, it effects as well as means of transmission

and how the exposure can occur, about the symptoms and the use of PPE are more prone to develop positive attitudes towards preventive measures [12], and are more likely to prevent themselves from being affected [13]. Sound knowledge on the virus, in most cases, is a predictor of the adherence to preventive health behaviours, thus diminishing the spread of the virus [12]. This study also showed that participants have positive attitudes and adopted regular handwashing with soap and water and hand sanitizer as the best way to prevent coronavirus infection. Studies conducted at the local and international level revealed that one of the best ways to prevent infection by COVID-19 is by careful handwashing [12,14,15] and disinfecting surfaces and objects. Majority of the participants do not believe that drinking palm oil or alcohol will protect from coronavirus infection. Likewise, participants do not believe that bathing and rinsing of nose and mouth with salt water will protect against the virus. Most especially locals believe that by drinking palm oil, or alcohol or rinsing the nose and mouth with saltwater, they protect against COVID-19 infection. They believe there is medicine in palm oil, alcohol, and saltwater. Several studies suggested that maintaining social distance is crucial to curtailing the virus's local transmission [16]. Studies have also shown that both symptomatic and asymptomatic infected persons are infectious and can transmit the virus to other humans [17]. Their findings are in line with findings from our study; social distancing and avoiding crowded area can reduce the risk of coronavirus infection has been accepted as a means of prevention against the virus. It was noteworthy that most of the respondents have a positive attitude towards preventive practices and personal responsibilities like seeking for medical attention when they come up with fever, cough, or difficulty in breathing, hand washing with soap and water, or hand sanitizer, maintaining a safe distance from anyone coughing or sneezing, ensuring physical distancing from other people, wearing of face mask while in public places and practice of non-contact greeting. These positive attitudes could be due to participants' knowledge with respect to the high infection rate of the virus, which are notably transmitted between people by contact with infected persons through respiratory droplets either from the mouth or nose.

Dror and co-workers asserted that sustained encouragement of particularly vulnerable people to accept the future COVID-19 vaccine could reduce morbidity and mortality while simultaneously releasing valuable healthcare resources to deliver equally main ambulatory support [18]. Despite the majority of the participants accepting the fact of cases of COVID-19 both in their states of residence and the country at large, accepting to receive the vaccine most especially if it is developed outside Nigeria is less than 50%. However, more than 50% of the participants revealed that they would agree to receive the vaccine developed in Nigeria. Here, there seems to be an issue of mistrust, particularly with the source of the vaccine. More so, emotional pain in the face of extensive media coverage of the rising numbers of casualties overstrained health systems, and insufficient government responses to COVID-19 has possibly fostered communal anxieties and distrust in preventive healthcare [18]. A rising suspicion of the safety of a potential COVID-19 vaccine among the public is imminent. Videos are emanating within and outside Nigeria portraying the dangers or harmful effect of COVID-19 vaccine. The risk is that the vast diversity of information available through the internet, including unsubstantiated mischievous information, can spread rapidly and misguide the public [11]. While some videos support the vaccines, these created lots of questions and debates on the integrity of the safety and efficacy of the COVID-19 vaccine. Dror et al. [18], further noted that the vast majority of the responders' concerns in their studies, among healthcare and non-healthcare workers alike, question the speed of development of the COVID-19 vaccine. However, the individual decision of whether or not to vaccinate against COVID-19 is multifactorial and must be well-thoughtout in any vaccination campaign [19]. They further hinted that the willingness to vaccinate against SARS-CoV-2 depends on the availability of an effective vaccine and its country of origin, access to the vaccine, perceived health risk, information on benefits, risks and access pathways, previous experience with other vaccines, and sociodemographic factors [19]. Each country must design its vaccination strategy based on the characteristics of its population and prevalence with a holistic vaccination design that well considers all the factors that influence vaccination decisions [19].

On the social, economic and political aspect of COVID-19, more than 50% of this study think a conspiracy surrounding COVID-19. What led to this assertion by the participants may be connected to the local and international community's sincerity on the virus and prior information, most of them were fed with before now. There are counter-accusations and overload of information from different quarters on the virus from the onset [21]. Some may argue that the information they got from the authorities is inaccurate and contradictory. With that, people feel unease to accept information on the virus and its effects. As noted by Kapiriri and Ross, the evidence is deemed reliable if it is scientifically rigorous and its producer's legitimacy and authority [20]. They further noted in their study that the credibility of the proof used to guide some of the response decisions to SARS was questionable.

Concerning respondents' whether they consider COVID-19 as a man-made biological weapon, our results indicated that 42.6% believe that the virus was developed as a human-made biological weapon. With this, there is always fear and anxiety over the virus because some populations believe that the world superpowers have a target of reducing the world population and some believe is a cold-war among the superpowers. A study conducted in

Yemen reported that fear and anxiety within a population are typically expected given the substantial impact of the pandemic on the community. It could also affect people's mental well-being and influence their behaviour in the broader community [21]. The respondents thought that the spread of the virus could have been curbed better without international polity interference, 36.3% agreed. It may be connected to the earlier assertion made that the virus could be a man-made biological weapon. The question raised by most people is the interest the international community has on the virus. And with this, people always shun testing, probably because of fear of stigmatization or because they suspected international polity interference. Only 25.2% of the participants think the Nigerian government is doing enough to harness local solutions to prevent, treat, and cure Coronavirus. Despite government's effort to fight against the deadly virus using different means such as the media, use of funds, and engaging communities, participants still see the need to put extra effort in finding local solutions. Inferentially, most of the participants are satisfied with level and commitment the Nigeria government put in place to fight Coronavirus.

Concerning COVID-19 being an elite infection existing only in rich countries, very few of the respondents (5.6%) agreed to that. The low percentage of response may be due to their level of education and their professional background where they come in contact with patients diagnosed with COVID-19. It could also be that most of them are front-liners in the field with patients of COVID-19. Therefore, the issue of accepting COVID-19 as an elite infection affecting only rich countries in these participants may likely be low as expected.

Whether vaccine and treatment would be equitably accessible to all considering cost and polity, less than 30% of the respondents agreed. Such response is a pointer that the vaccine or treatment when they are ready and available will be given free at no cost to the people. Maybe the government should institute a law that taking the vaccine must be compulsory and free. But the tendency for paying for the vaccine or treatment in the future is possible. In a related case study in Chile, the preliminary results on COVID-19 vaccine perception show that 87% are willing to vaccinate [19]. The circumstance of the condition, such as the context of the pandemic and disease prevalence in a particular population, can impact vaccination intention [19]. With this and the number of cases increasing daily, there is a tendency to have more people ready to take the vaccine even if they are to pay for the vaccine.

Some key limitations of the study are that a limited number of participants were utilized. And considering the population of a country like Nigeria, the larger sample size will better understand the true situation. We also observed the under-representation of the uneducated in our study due to the use of online web data collection. What this means is that the opinion and views of such category of people were left out. The implication is that our findings should be treated with some level of caution. Since generalization could be a challenge, further study should target the uneducated. It can be carried out both online and physical concurrently. In all, the study provided information on the level of awareness of Nigerians on COVID-19.

Conclusion

Majority of the respondents have good knowledge and preventive practices on COVID-19 infection and do not support the associated myths. From the response of respondents on a vaccine against COVID-19, there seems to be an issue of mistrust, particularly with the source of the vaccine. This should be a wake-up call for Nigerian policymakers. Therefore, the need to design vaccination strategy can never be overemphasized, and this can be achieved through educational and communicative campaigns. Attention to developing drugs for standard treatment of COVID-19 infection, due to the growing number of cases of infection should be emphasized.

Author Statement

Ethical approval

The principles of voluntary participation, privacy, confidentiality and anonymity of subjects were considered and adhered to. This study does not seek for any institutional review board's permission to be carried out, because this is an online study

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Conflict of interest

Authors declare no conflict of interest

Author contribution

NT: Conceptualization, design, data management, interpretation of study data, original draft of the first manuscript.

OA: Conceptualization, methodology, review and editing.

ABB: Conceptualization, design, critically review the original draft manuscript, supervision.

MY: Conceptualization, methodology, review and editing.

OTM: Conceptualization, methodology, data management, review and editing of original draft of manuscript, supervision.

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References

1. Usman AB, Ayinde O, Akinyode A, Gbolahan A, Bello B. Epidemiology of coronavirus disease 2019 (COVID-19) outbreak cases in Oyo State South West Nigeria, March-April 2020. *Pan Afr Med J.* 2020;35(Supp 2):1–6.
2. Hoang BX, Shaw DG, Fang W, Han B. Possible Application of High Dose Vitamin C in the Prevention and Therapy for Coronavirus Infection. *J Glob Antimicrob Resist* [Internet]. 2020;23:256–62. Available from: <https://doi.org/10.1016/j.jgar.2020.09.025>
3. Lippold J V., Laske JI, Hogeterp SA, Duke E, Grünhage T, Reuter M. The Role of Personality, Political Attitudes and Socio-Demographic Characteristics in Explaining Individual Differences in Fear of Coronavirus: A Comparison Over Time and Across Countries. *Front Psychol.* 2020;11(September).
4. Hager E, Odetokun IA, Bolarinwa O, Zainab A, Okechukwu O, Al-Mustapha AI. Knowledge, attitude, and perceptions towards the 2019 Coronavirus Pandemic: A bi-national survey in Africa. *PLoS One* [Internet]. 2020;15(7):1–13. Available from: <http://dx.doi.org/10.1371/journal.pone.0236918>
5. Mohammed M, Muhammad S, Mohammed FZ, Mustapha S, Sha'aban A, Sani NY, et al. Risk Factors Associated with Mortality Among Patients with Novel Coronavirus Disease (COVID19) in Africa. *J Racial Ethn Heal Disparities.* 2021;8(5):1267–72.
6. Alzoubi H, Alnawaiseh N, Al-Mnayyis A, Abu- Lubad M, Aqel A, Al-Shagahin H. COVID-19 - Knowledge, Attitude and Practice among Medical and Non-Medical University Students in Jordan. *J Pure Appl Microbiol* [Internet]. 2020 Mar 31 [cited 2020 Sep 29];14(1):17–24. Available from: <https://microbiologyjournal.org/covid-19-knowledge-attitude-and-practiceamong-medical-and-non-medical-university-students-in-jordan/>
7. Sinuraya RK, Abdulah R, Koyama H. Knowledge, Attitude, and Practice During the COVID-19 Pandemic: A Review. *J Multidiscip Healthc.* 2020;13:727–33.
8. Control NC for D. COVID-19 SITUATION REPORT. 2020.
9. Zhang M, Zhou M, Tang F, Wang Y, Nie H, Zhang L, et al. Knowledge, attitude, and practice regarding COVID-19 among healthcare workers in Henan, China. *J Hosp Infect* [Internet]. 2020 Jun [cited 2020 Sep 29];105(2):183–7. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0195670120301870>
10. Eysenbach G. Improving the quality of web surveys: The Checklist for Reporting Results of Internet E-Surveys (CHERRIES). *J Med Internet Res.* 2004;6(3):1–6.
11. NCDC. Presidential Task Force on Covid-19. Vol. 19. 2020.
12. McEachan R, Taylor N, Harrison R, Lawton R, Gardner P, Conner M. Meta-Analysis of the Reasoned Action Approach (RAA) to Understanding Health Behaviors. *Ann Behav Med* [Internet]. 2016;50(4):592–612. Available from: <http://dx.doi.org/10.1007/s12160-016-9798-4>

13. Serwaa D, Lamptey E, Appiah AB, Senkyire EK, Ameyaw JK. Knowledge, risk perception and preparedness towards coronavirus disease-2019 (Covid-19) outbreak among ghanaians: A quick online cross-sectional survey. *Pan Afr Med J.* 2020;35(2):1–7.
14. Alves RF, Samorinha C, Precioso J. Knowledge, attitudes and preventive behaviors toward COVID-19: a study among higher education students in Portugal. *J Heal Res.* 2020;ahead-ofp(ahead-of-print).
15. Nwonwu EU, Ossai EN, Umeokonkwo CD, Ituma IB. Knowledge and preventive practice to covid-19 among household heads in enugu metropolis, south-east nigeria. *Pan Afr Med J.* 2020;37(63):1–12.
16. Ngwewondo A, Nkengazong L, Ambe LA, Ebogo JT, Mba FM, Goni HO, et al. Knowledge, attitudes, practices of/towards COVID 19 preventive measures and symptoms: A cross-sectional study during the exponential rise of the outbreak in Cameroon. *PLoS Negl Trop Dis.* 2020;14(9):1–15.
17. Omoronyia O, Ekpenyong N, Ukweh I, Mpama E. Knowledge and practice of covid-19 prevention among community health workers in rural cross river state, nigeria: Implications for disease control in africa. *Pan Afr Med J.* 2020;37(50):1–12.
18. Qiu Y, Chen X, Shi W. Impacts of social and economic factors on the transmission of coronavirus disease 2019 (COVID-19) in China. *J Popul Econ.* 2020;33(4):1127–72.
19. Olusola A, Olusola B, Onafeso O, Ajiola F, Adelabu S. Early geography of the coronavirus disease outbreak in Nigeria. *GeoJournal* [Internet]. 2020;1. Available from: <https://doi.org/10.1007/s10708-020-10278-1>
20. Dror AA, Eisenbach N, Taiber S, Morozov NG, Mizrahi M, Zigran A, et al. Vaccine hesitancy: the next challenge in the fight against COVID-19. *Eur J Epidemiol* [Internet]. 2020;35(8):775–9. Available from: <https://doi.org/10.1007/s10654-020-00671-y>
21. García LY, Cerda AA. Acceptance of a COVID-19 vaccine: A multifactorial consideration. *Vaccine.* 2020;38(48):7587.
22. Mohammed M, Sha'aban A, Jatau AI, Yunusa I, Isa AM, Wada AS, et al. Assessment of COVID-19 Information Overload Among the General Public. *J Racial Ethn Heal Disparities.* 2021;
23. Kaporiri L, Ross A. The Politics of Disease Epidemics: a Comparative Analysis of the SARS, Zika, and Ebola Outbreaks. *Glob Soc Welf.* 2020;7(1):33–45.
24. Alrubaiee GG, Al-Qalah TAH, Al-Aawar MS. Knowledge, attitudes, anxiety, and preventive behaviorstowards COVID-19 among health care providers in Yemen: an online crossectional survey. 2020;1–11.