Journal of Infrastructure, Policy and Development 2024, 8(8), 4770.
https://doi.org/10.24294/jipd.v8i8.4770

Article

Factors associated with poor perceptions of the COVID-19 pandemic in Africa

Adeyinka Oluwabusayo Abiodun[1], Kingsley Eghonghon Ukhurebor[2,*], Femi Alamu[3], Ibitoye Ayodeji[4], Adetoye Adeyemo[5], Ozichi N. Emuoyibofarhe[5], Lucky Evbuomwan[6], Oseremen Ebhote[7], Williams Omokhudu Odiwo[7], Grace Egenti[1], Adedoyin Abiodun Talabi[1]

[1] Africa Centre of Excellence on Technology Enhanced Learning (ACETEL), National Open University of Nigeria, Abuja 900001, Nigeria
[2] Department of Physics, Edo State University Uzairue, P.M.B. 04, Auchi 312001, Nigeria
[3] Department of Computer Science, University of Lagos, Akoka 100213, Nigeria
[4] University of Greenwich, Old Royal Naval College, Park Row, Greenwich, London SE10 9LS, United Kingdom
[5] Department of Computer Science and Information Technology, Bowen University, Iwo 232101, Nigeria
[6] Department of Microbiology, Edo State University Uzairue, P.M.B. 04, Auchi 312001, Nigeria
[7] Department of Business Administration, Edo State University Uzairue, P.M.B. 04, Auchi 312001, Nigeria
*** Corresponding author:** Kingsley Eghonghon Ukhurebor, ukeghonghon@gmail.com, ukhurebor.kingsley@edouniversity.edu.ng

CITATION

Abiodun AO, Ukhurebor KE, Alamu F, et al. (2024). Factors associated with poor perceptions of the COVID-19 pandemic in Africa. Journal of Infrastructure, Policy and Development. 8(8): 4770. https://doi.org/10.24294/jipd.v8i8.4770

ARTICLE INFO

Received: 20 February 2024
Accepted: 2 April 2024
Available online: 12 August 2024

Abstract: This study examines factors associated with an increasingly poor perception of the novel coronavirus in Africa using a designed electronic questionnaire to collect perception-based information from participants across Africa from twenty-one African countries (and from all five regions of Africa) between 1 and 25 February 2022. The study received 66.7% of responses from West Africa, 12.7% from Central Africa, 4.6% from Southern Africa, 15% from East Africa, and 1% from North Africa. The majority of the participants are Nigerians (56%), 14.1% are Cameroonians, 8.7% are Ghanaians, 9.3% are Kenyans, 2% are South Africans, 2.1% are DR-Congolese, 1.6% are Tanzanians, 1.2% are Rwandans, 0.4% are Burundians, and others are Botswana's, Chadians, Comoros, Congolese, Gambians, Malawians, South Sudanese, Sierra Leoneans, Ugandans, Zambians, and Zimbabweans. All responses were coded on a five-point Likert scale. The study adopts descriptive statistics, principal component analysis, and binary logistic regression analysis for the data analysis. The descriptive analysis of the study shows that the level of ignorance or poor "perception" of COVID-19 in Africa is very high (87% of individuals sampled). It leads to skepticism towards complying with preventive measures as advised by the WHO and directed by the national government across Africa. We adopted logistic regression analysis to identify the factors associated with a poor perception of the virus in Africa. The study finds that religion (belief or faith) and media misinformation are the two leading significant causes of ignorance or poor "perception" of COVID-19 in Africa, with log odd of 0.4775 (resulting in 1.6120 odd ratios) and 1.3155 (resulting in 3.7265 odd ratios), respectively. The study concludes that if the poor attitude or perception towards complying with the preventive measures continues, COVID-19 cases in Africa may increase beyond the current spread.

Keywords: Africa; COVID-19; logistic regression; media misinformation; poor perception; religion

1. Introduction

Towards the end of 2019, the world was alarmed by the emergence of a novel and seemingly fatal infectious disease that originated in Wuhan, China (Paladhi et al., 2022; Ukhurebor et al., 2022). The COVID-19 (2019-nCoV) is a member of the coronavirus (SARS, MERS, etc.) family. However, it is more dangerous and spreads

unnoticed due to a "longer" incubation period before it can be detected (Ukhurebor et al., 2021). The disease was code-named COVID-19 or 2019-nCoV. Considering the rate at which the virus spreads, WHO declared the virus a public health emergency of international concern on 30 January 2020 (Ukhurebor et al., 2021).

Unlike SARS which killed majority of its victim in 2003, the incubation period of COVID-19 may range between 2 and 14 days (Ukhurebor, Singh, et al., 2021; Ukhurebor et al., 2022). However, the incubation period is much shortened now for the variants. It means that an infected person can spread the disease unnoticed before having any symptoms of the infection. It must be the reason it caught the whole world unnoticed (Aidonojie et al., 2022). Even when it was declared an epidemic in China in late December 2019, global leaders, travelers, and nations took it for granted.

Many have died, and many nations are still battling to contain the spread of the pandemic. It has travelled proportionately, and its victims have grown exponentially in the most hit countries, with deaths rising daily and new infections increasing by 100%–200% per day. Italy alone has lost more than 0.015% of her total population to the cold hands of the novel COVID-19 (Deblina et al., 2020). Unfortunately, the quest to develop a vaccine for the virus has proven abortive. Due to the nature of the virus, many global health experts have expressed grave concern over Africa. A continent is known for its poor leadership, poor healthcare services, and decades of total reliance on global aid. If the pandemic hits Africa (which is already spreading), the spread might be totally out of proportion, and the number of deaths might total all other continents put together. The current low figure or statistics about the novel COVID-19 in Africa are considered due to limited test facilities (Akintande et al., 2022). Hence, it is most likely that many people have already been infected and keep spreading the disease unnoticed.

Meanwhile, WHO has highlighted some preventive measures for the novel COVID-19, for example, the prevention of infectivity (e.g., engaging in precautionary behaviours such as avoiding handshakes, handwashing hygiene, isolation, social distancing, the lockdown of public gatherings or places, etc.). Many nations have put these measures in place, and they have helped contain the spread to some extent. Also, WHO has initiated online courses for healthcare workers globally about the awareness of the virus and how best to address it (Deblina et al., 2020).

Due to the fact that the COVID-19 infection is a highly contagious disease, it has affected a large population, causing more deaths than its predecessors (SARS and MERS). The virus is already causing psychological burden which has increased both the general population's distress and led to an increase in domestic violence (Morena et al., 2022; Penninx et al., 2022) and devastating effects globally, based on its emergence and spread, confusion, anxiety, and fear among the general public, resulting in hatred and social stigma, as well as accusations from various corners, leading to some nationals being targeted as the reason for the virus outbreak (Deblina et al., 2020). Some believe that COVID-19 is a biological weapon, and some also think it's the 5G network. Some have even raised concerns that some foundations invented the virus to gain global economic power (Abiodun and Ogundunmade, 2022). Many speculations have been going around since the outbreak became a global pandemic. However, these beliefs can create skepticism among the populace and promote the high spread of the virus. More so, if stigmatization prevails, infected people might

hide their illness and fail to seek healthcare when they should, thereby infecting others in the process (Abiodun and Ogundunmade, 2022).

Media have also played some degree of misinformation role due to the much misinformation about COVID-19 that has been circulating on social media and online news outlets daily. It has become so difficult to know what is true. According to Vosoughi et al. (2018), defining what is true and false has become a common political strategy, promoting debates based on a mutually agreed set of facts. Unsurprisingly, media misinformation has also gained roots in this pandemic era. Thus, there is worldwide concern over media misinformation and the possibility that it can impact political, economic, health, and social well-being (Vosoughi et al., 2018). Unfortunately, the effect of this media misinformation can be dramatic and cause unbearable regrets in all spheres of individual lives, depending on which sphere is under attack (Rapoza, 2017). In this pandemic era, misinformation can motivate misleading beliefs and promote poor "perception" about the true nature of the COVID-19 epidemic. WHO has warned against the consequences of a pernicious "infodemic." The WHO further asserts that rumours contribute to triggering unnecessary panic during the pandemic. Hence, internet users are targeted by and purveyors of false information. Therefore, fighting an epidemic also involves tackling misinformation from all sources (Aidonojie et al., 2023).

Apart from media, religion (belief or faith) also promotes skepticism and the poor attitude of COVID-19 in Africa. In Africa, people tend to be more religious in moments of any political, social, environmental, or ecological crisis (Paras et al., 2021). There is a distinction between religiosity, spirituality, and superstitious practices. However, this study will not delve into the prevalence of religions on the African continent. There are indeed various religions, each with a different way of dealing with the negative aspects of human existence. Hence, it is not surprising that Africans attribute everything, such as disease outbreaks or unfortunate circumstances, to the devil. Supposedly, only God has power over the devil. Even though God has given humans the wisdom to solve problems via scientific and technological advancement that is presently witnessed globally, some Africans still take it back to God, as we have witnessed from the numerous religious activities within the Africa region. It has unsurprisingly played out on COVID-19. Although this ignorance about God is a global issue, it is more of a practice in Africa. Although some stringent measures are in place, the attitude of people toward COVID-19 remains questionable (Akintande and Olubusoye, 2020). Hence, this study examines the factors associated with increased "poor" beliefs or perceptions of the novel COVID-19 in Africa.

2. Fighting the infodemic about COVID-19

As the world battles the novel COVID-19, much misinformation about the virus has been in continuous circulation on the internet and other social media outlets daily. It has become so difficult to know what is even true. Hence, defining what is true and false has become a common political strategy, promoting debates based on a mutually agreed-upon set of facts. Our economies are not immune to the spread of falsity either (Vosoughi et al., 2018). Unsurprisingly, it has also gained roots in this pandemic era. Thus, there is worldwide concern over media misinformation and the possibility that

it can impact political, economic, health, and social well-being (Vosoughi et al., 2018).

Fake news or media misinformation is a global menace. Unfortunately, the majority of this misinformation thrives unchecked in Africa due to its media density and rumour-mongering syndrome among the people. Generally, human responses to everything, such as natural disasters (earthquakes, epidemics, pandemics, etc.) and human-induced disasters (terrorist attacks, accidents, even our politics, etc.), have been drastically altered by the spread of media misinformation via social media and online news outlets (Akintande and Olubusoye, 2020). Unfortunately, the effect of this media misinformation can be dramatic and cause unbearable regrets in all spheres of individual lives, depending on which sphere is under attack (Paras et al., 2021). It could be economics, business, or investment misinformation affecting stock prices and motivating large-scale misinformed investments, causing losses in stock and economy value (Rapoza, 2017).

Misinformation can be promoted for political gains, social relevance, or dominance. Or aim to misguide or target a set of people or groups (Akintande and Olubusoye, 2020). Thus, to understand the spread of misinformation, it is fair to examine the spreading after recognizing or validating the true and false scientifically and true or false scheme-theory stories and controlling for the topical and stylistic differences between the categories themselves (Vosoughi et al., 2018). Quite relevantly, social media technologies have been the most appropriate means to facilitate rapid information sharing and large-scale information streams (which can reach millions within an hour or less) and can be the devil's tool in the spread of misinformation. Notwithstanding, it could also be the saving angel if used appropriately. However, the former could be disastrous in this trying time of the COVID-19 pandemic. WHO has warned against the consequences of a pernicious "infodemic" (Muñoz-Sastre et al., 2021). The WHO further asserts that rumours contribute to triggering unnecessary panic during the pandemic. Therefore, fighting an epidemic also involves tackling misinformation from all sources (Nneji et al., 2022).

Up to date, many researchers have endeavoured to address the global misinformation menace. And these efforts have promoted or given rise to fact-checking organizations and media houses. For example, Friggeri et al. (2014) examines rumours spreading on Facebook and investigates how fact-checking affects rumour spreading and how misinformation travels faster than the truth. Essentially, their work focuses on how fact-checking might help reduce rumour or misinformation spreading. Vosoughi et al. (2018) also investigates the disparity in the spread of true, false, and mixed (partially true, partially false, or simply doctored fact) news stories on Twitter between 2006 and 2017. They find that human behaviour contributes more to the differential spread of falsity and truth than automated robots do. Besides these authors, many fact-checking organizations have developed various algorithms to track and trace misinformation on social media. Also, Nwankwo and Ukhurebor (2020) emphasise how web forums and social media contribute to global misinformation as fake media. They recommended a model for the automatic removal of fake media using multilayered neural networks. Despite these efforts, misinformation remains a threat to our information gathering and assimilation, as one hardly knows what is true or false (Paras et al., 2021). The clairvoyance to fact-check information is quite difficult in an environment where information gathering or dissemination relies on

what another person learned or heard (who could also be misinformed) and then says or informs others. These misinformation schemes are rampant in Africa due to many factors, such as high poverty levels, illiteracy, poor leadership, low infrastructural development, etc. Thus, misinformation in Africa promotes poor perceptions.

3. Methodology

Opinion polls (oral engagements) were conducted on the Kenyatta University (KU) Campus in Nairobi (between 1 and 25 February 2022) as the first point of contact to access general beliefs and perceptions about the COVID-19 pandemic. KU like other African higher institutions has a large population of international students from all across Africa (making up to 90% foreigners) and other foreign nationals, including Europeans, Asians, and Americans.

By the end of March 2022, an online, semi-structured questionnaire using Google Forms had been developed. The link to the questionnaire was sent through emails, WhatsApp, and other social media. The questionnaire was also shared with individuals on various international WhatsApp groups and appealed to them to share it with their countrymen and women to gain coverage. The questionnaire is restricted to only people of African descent. Participation was voluntary and consented to. Questions about socio-demographic variables were asked, as well as cover questions about beliefs and perceptions about COVID-19. The questions were validated by experts, and the ethics committee of the Department of Mass Communication, Edo State University, Uzairue, Edo State, Nigeria, granted approval for this research/study.

3.1. Question module

All responses are categorized on a five-point Likert scale. Response options for all questions were “strongly agree,” “agree,” “neutral,” “disagree,” and “strongly disagree.” Strongly agree or agree is poor belief or perception, and strongly disagree or disagree is good belief or perception. We assume being “neutral” means undecided and could go either way. Hence, each response was scored on a scale of 4, 4, 1, 0, and 0, respectively. With this, the turning point is 1. Thus, values above “1” were scored as having poor belief or perception, and values below “1” were considered to have good belief or perception. The perception levels are dichotomized as poor perception = 1 and good perception = 0.

Such that:

- Score above 1 (i.e., score > 1) = 1 → Poor belief/perception
- Score below 1 (i.e., score ≤ 1) = 0 → Good belief/perception

Then, two main factors that determine perceptions about the COVID-19 pandemic are:

- Personal experience with COVID-19
- Demographic item

Questions on [a] cover if the respondent(s) know or have seen anyone infected with the COVID-19 code as “experience” (yes = [1] or no = [0] response) and the media. (b) Includes the age class of the respondent, religion, gender, educational attainment, country of origin, media, source of information, and region (West Africa, East Africa, Central Africa, North Africa, and Southern Africa).

Logistic regression analysis was adopted to identify the factors significantly associated with the increasingly poor perceptions of the COVID-19 pandemic in Africa. The aim is to examine how the factors predict the categorical outcome (i.e., either poor belief or perception or good belief or perception).

3.2. Logistic regression analysis

Logistics regression (LR) analysis covers a form of regression analysis in which the dependent or output variable is dichotomous; in this case, to predict the probabilities of having poor or good belief or perception about a particular disease (COVID-19) based on a set of explanatory variables of any form (either discrete, binary, categorical, or continuous).

The maximum likelihood estimation (MLE) method is preferable because it maximizes the coefficients of the log-likelihood function and provides a statistic that summarizes the information about the predictor variables. In LR, the log odd is modelled; thus, the logistic regression function (LR) is represented by:

$$Z_i = \ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 y_{i1} + \beta_1 y_{i2} + \cdots \beta_k y_{ik} \tag{1}$$

where β_j is the coefficient value of the j-th explanatory variable, $j = 1, \ldots, k$, y_{ij} is the j-th explanatory variable or predictor, and P_i is the probability of an event. Since we are more interested in the probability of the event than the log odds of the event. So, the predicted values from the above model, i.e., the log odds of the event, can be converted to a probability of an event as follows:

$$P_i = 1 - \left(\frac{1}{1+e_i^z}\right) \tag{2}$$

Hence, the two groups are those that poor belief/perception—group 1 and good belief/perception—group 2. Thus, the categorization as:

$$Y_i \epsilon \begin{cases} \text{group } 1, \text{if } y = 1 \\ \text{group } 2, \text{if } y = 0 \end{cases} \tag{3}$$

4. Results and discussion

The sample space of the respondents covers all the regions of Africa. We received 66.8% of responses from West Africa, 12.7% of the respondents are from the Central Africa region, 4.6% are from Southern Africa, 15% from East Africa, and only 1% from North Africa. The majority of our respondents (93.4%) have a tertiary education (mostly postgraduate; 54.5%), compared to 5.9% of high school leavers, 0.4% of primary school leavers, and 0.4% of persons without formal education. Similarly, the age distribution shows that 21.6% are between 18 and 24 years; 21% are between the ages of 25 and 29 years; and 17.8% are between 30 and 34 years. 13.4% are between 35 and 39 years old. 15.2% are between 40 and 49 years old; 8.2% are between 50 and 59 years old. 1.6% are between 60 and 69 years old, and 0.7% are 70 years and older. Among these are 66% males and 34% females. The majority of respondents (56%) are Nigerians, 14.1% are Cameroonians, 8.7% Ghanaians, 9.3% Kenyans, 2% South Africans, 2.1% DR-Congolese, 1.6% Tanzanians, 1.2% Rwandans, 0.4% Burundians, and others (Gambians, South Sudanese, Zimbabweans, Chadians, Zambians, Congolese, Botswana's, Sudanese, Comoros, Tanzanians, Sierra Leoneans,

Malawians, and Ugandans).

4.1. Exploratory data analysis

The first question queries if the respondents or participants know anyone or have seen anyone infected with the novel COVID-19. Only 19.6% have seen or know someone infected. The majority (80.4%) of our respondents have not seen or known anyone infected. To assess their sources of information about the virus and that which might contribute to their level of belief and perceptions, a multi-choice response question was asked, and the result reveals that respondents receive information from many sources, and the majority rely on social media (WhatsApp; 78.1%, Facebook; 60.6%, e-media outlet; 54.2%, and Twitter; 39.8%). Also, 62.2% receive information through the WHO website, 68.4% via local television stations, and 64.7% via cable stations (e.g., CNN, BBC, etc.).

4.2. Belief/perception of COVID-19

The first question is whether COVID-19 is a "man-made" virus that aims to reduce the human population. 40.3% believe that COVID-19 is a "man-made" virus to reduce the human population. 33% are neutral, and 26.8% disagree. Similarly, 39.8% believe that China created COVID-19 to disrupt the global economy and be a global power. The majority (38.5%) chose to be neutral; only 22.7% disagreed.

On social distancing, lockdown, and other measures, 47.8% believe that social distancing is not practicable in Africa, 15% chose to be neutral, and 30% believe it is possible. The majority (77.6%) believe that a total lockdown in Africa will result in a hunger outbreak. 9.4% chose to be neutral, and only 13% believe that it cannot lead to a hunger outbreak. 53.3% believe that hunger kills more than COVID-19.

Assessing the social beliefs of Africa with regards to religion, 21.9% believe that COVID-19 is a divine punishment from God for humanity, and 87.2% believe that the COVID-19 experience will cause or draw many people back to God. Thus, 9.7% believe that COVID-19 cannot affect believers, and 17.5% believe that being immune to COVID-19 as a believer depends on one's level of faith. Similarly, 10.7% are of the opinion that if religious believers rob anointing oil (or prayer ablution) on their body, it can prevent or resist COVID-19, and 19.8% also believe that faith in the use of anointing oil (or prayer ablution) can prevent or resist COVID-19. Consequently, about 3.4% believe that COVID-19 cannot spread in the mosque or church, and 5.5% believe that faith in worship together can also prevent or resist COVID-19. On whether COVID-19 is a big deal, 67.4% believe that malaria, cancer, etc., are more dangerous than COVID-19, and 10.2% neither agree nor disagree.

Following some misinformation across social media spaces about COVID-19, 27.6% believe that COVID-19 is a bioweapon engineered by the Bill Gate Foundation, and 44% chose to be neutral. Similarly, 18.7% believe that COVID-19 is digital contagion or a 5G network, and 45.5% are neutral. **Table 1** presents the overall summary of social beliefs and perceptions of the COVID-19 pandemic.

Table 1. Descriptive summary.

S/N	Question	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree	Strongly disagree	Faith
1	Coronavirus (COVID-19) is a man-made virus to reduce the human population	124 (22.1)	102 (18.2)	185 (33)	89 (15.9)	61 (10.9)	
2	China made the novel Coronavirus (COVID-19) to become the global power	99 (17.6)	119 (21.2)	216 (38.5)	79 (14.1)	48 (8.6)	
3	Social distancing in Africa is in theory, it cannot be practice.	71 (12.7)	197 (35.1)	84 (15)	164 (29.2)	45 (8)	
4	Total lockdown in Africa will cause a more dangerous hunger outbreak than the COVID-19 itself.	212 (37.8)	223 (39.8)	53 (9.4)	55 (9.8)	18 (3.2)	
5	Coronavirus (COVID-19) is a divine punishment from God to humanity.	46 (8.2)	77 (13.7)	230 (41)	84 (15)	124 (22.1)	
6	Coronavirus (COVID-19) has taught us humility and draw humanity closer to GOD.	243 (43.3)	246 (43.9)	45 (8)	18 (3.2)	9 (1.6)	
7	Rubbing of Anointing Oil (or prayer ablution) on the body can prevent/resist COVID-19.	15 (2.7)	45 (8)	98 (17.5)	147 (26.2)	145 (25.8)	111 (19.8)
8	Coronavirus (COVID-19) cannot affect believers.	18 (3.2)	25 (4.5)	54 (9.6)	152 (27.1)	214 (38.1)	98 (17.5)
9	Coronavirus (COVID-19) cannot be contracted in the Church/Mosque.	11 (2)	8 (1.4)	33 (5.9)	161 (28.7)	317 (56.5)	31 (5.5)
10	COVID-19 is a Bioweapon engineered by the Chinese/US or Bill Gate Foundation.	44 (7.8)	111 (19.8)	247 (44)	100 (17.8)	59 (10.5)	
11	COVID-19 is a Digital contagion (the result of a 5G, 60 GHz network)	29 (5.2)	77 (13.7)	255 (45.5)	128 (22.8)	72 (12.8)	
12	Hunger kills more than COVID-19.	133 (23.7)	166 (29.6)	101 (18)	130 (23.2)	31 (5.5)	
13	There are many other dangerous diseases (e.g., Malaria, Cancer, etc.) that kill more people daily than COVID-19	161 (28.7)	217 (38.7)	57 (10.2)	84 (15)	42 (7.5)	
14	African Blood compositions resist COVID-19.	18 (3.2)	86 (15.3)	119 (21.2)	215 (38.3)	123 (21.9)	
15	Africa Weather and humid system prevent the spread of COVID-19.	36 (6.4)	153 (27.3)	106 (18.9)	188 (33.5)	78 (13.9)	
16	Africans are naturally resilient and resistant to most diseases.	41 (7.3)	174 (31)	91 (16.2)	178 (31.7)	77 (13.7)	
17	Black skin resists COVID-19.	18 (3.2)	42 (7.5)	101 (18)	248 (44.2)	152 (27.1)	
18	Older people are most prone to the danger of COVID-19, younger people are less prone.	172 (30.7)	290 (51.7)	47 (8.4)	39 (7)	13 (2.3)	
19	Alcohol consumption can prevent/resist/kill COVID-19.	16 (2.9)	48 (8.6)	100 (17.8)	199 (35.5)	198 (35.3)	
20	Drinking hot water, garlic, etc. can prevent/resist/kill COVID-19.	51 (9.1)	224 (39.9)	134 (23.9)	102 (18.2)	50 (8.9)	
21	Smoking weeds (Cannabis) can prevent/resist/kill COVID-19.	8 (1.4)	13 (2.3)	94 (16.8)	231 (41.2)	215 (38.3)	
22	High-temperature cure COVID-19.	34 (6.1)	142 (25.3)	147 (26.2)	148 (26.4)	90 (16)	

About whether Africa's blood composition can resist or prevent COVID-19, 18.5% perceived or believed that having Africa's blood composition could prevent or resist COVID-19, and 21.2% chose to be neutral. Similarly, 33.7% perceived that Africa's weather and humid system prevented the spread of COVID-19, while 18.9%

chose to be neutral. Besides, 31.4% perceived those high temperatures cure COVID-19, and 26.2% neither agreed nor disagreed.

More so, 38.4% perceived they are (as Africans) naturally resilient and resistant to most diseases (of which COVID-19 is just one), 16.2% chose to be neutral, and 45.4% perceived they are not. Thus, 10.7% perceived that black skin naturally resists COVID-19. In terms of susceptibility to the virus due to age, 82.4% perceived that older people are the most prone to the danger of COVID-19, and younger people are less prone. 8.4% neither agree nor disagree.

Furthermore, 11.5% perceived that alcohol consumption prevents, resists, or even kills COVID-19, and 17.8% chose to be neutral. Also, 49% perceived that drinking hot water, garlic, or lemon or ginger slices can prevent, resist, or even kill COVID-19, and 23.9% neither agreed nor disagreed. Lastly, 3.7% perceived that "weed" smoking kills COVID-19, and 16.8% neither agreed nor disagreed. **Table 1** presents the overall summary of the perceptions of the COVID-19 pandemic.

Following our methods (of individual perceptions) in the question module. A summary of the perceptions of respondents is presented in **Figure 1**.

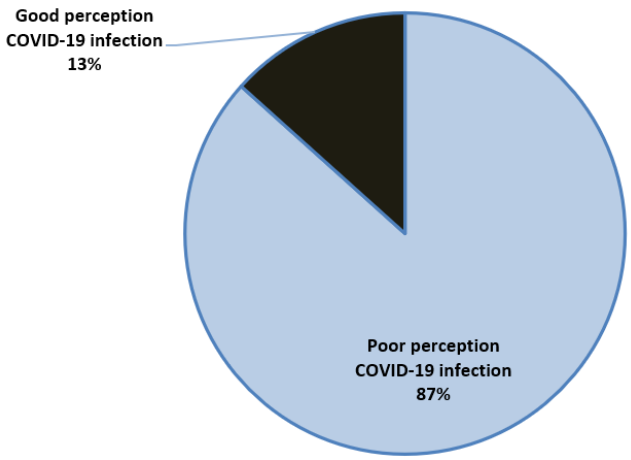


Figure 1. Overall summary of perceptions based on an individual respondent.

4.3. Logistics regression analysis results

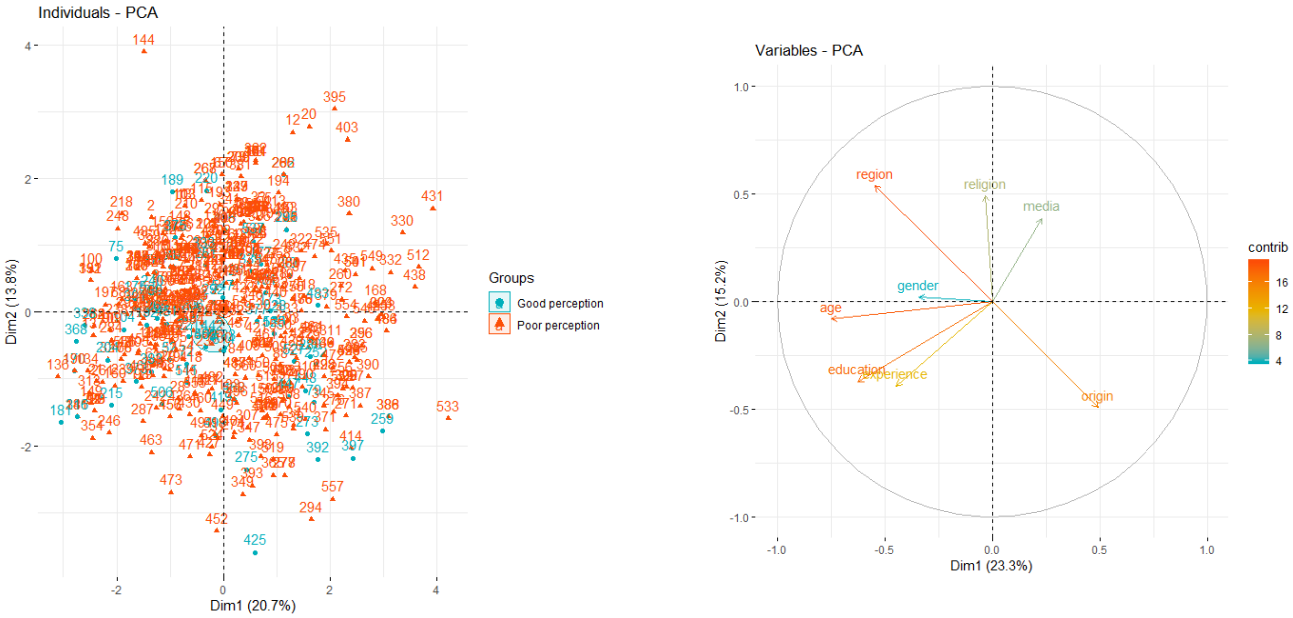
The principal component plot of factors to visualize the contributions was plotted. **Figure 2** shows factor contributions. The "factors" on the positive axis of dim1 have the most significant contribution. As expected, media and religion are on the positive axis and thus are expected to play a role as a cause of poor perception in Africa.

The principal component plot of factors to visualize the contributions was plotted. **Figure 2** (a: scatter plot; b: pie chart) shows factor contributions. The "factors" on the positive axis of dim1 have the most significant contribution. As expected, media and religion are on the positive axis and thus are expected to play a role as a cause of poor perception in Africa.

Since our focus is Africa, we examine the poor perception on a regional basis. Thus, we factored in the region and experience of the respondent (i.e., if the respondent knows or has seen someone infected with COVID-19). **Table 2** presents the result.

Table 2. Odds ratio (95% Confidence Interval—CI), for the poor perception of COVID-19.

Outcome variable	Predictors	OR (95% CI)	*P*-value	AUC (Accuracy)
Poor perception (Due to media and experience)	**Media**			
	No	1.00		
	Yes	3.7966 (2.2926, 6.4066)	0.000	0.6697 (0.8663)
	Experience			
	No	1.00		
	Yes	1.5845 (0.8342, 3.2416)	0.18	
Poor perception (Due to demographic items)	**Demographic items**			
	Gender			
	Female	1.0		
	Male	1.0296 (0.5753, 1.8042)	0.993	
	Education			
	No formal Education	1.00		
	Primary	0.4178 (0.000, 1.2470×10^{10})	0.9997	
	Secondary	0.0000 (0.000, 9.874×10^{17})	0.9939	
	Tertiary	0.0000 (NA, 2.0447×10^{107})	0.9931	
	Postgraduate	0.0000 (NA, 3.152×10^{107})	0.9933	
	Religion			
	Others	1.00		
	Islam	1.6120 (1.6812, 1.368×10^{2})	0.00969	
	Christianity	8.095 (0.9251, 6.0834×10^{2})	0.03913	
	Tradition/Africa	1.8760×10^{7} (2.1930×10^{131}, 6.3867×10^{181})	0.9866	
	Region			
	Central Africa	1.00		
	West Africa	0.5405 (0.1725, 1.3876)	0.2385	
	East Africa	0.3357 (0.1006, 0.9597)	0.0534	0.7361 (0.8699)
	North Africa	0.1187 (0.0094, 3.1138)	0.1226	
	Southern Africa	0.3087 (0.0695, 1.4304)	0.1184	
	Information source			
	TV broadcast	1.00		
	Social media	1.009 (0.5915, 1.7158)	0.9636	
	Media			
	No	1.00		
	Yes	3.7265 (2.220, 6.3871)	0.000	
	Age class			
	18–24 years	1.00		
	<18 years	1.271×10^{6} (0.0000, NA)	0.9947	
	25–29 years	1.2844 (0.5090, 3.2568)	0.5944	
	30–34 years	0.9091 (0.3467, 2.3805)	0.8453	
	35–39 years	0.7609 (0.2853, 2.0545)	0.5848	
	40–49 years	0.6362 (0.2370, 1.6992)	0.3656	
	50–59 years	0.5769 (0.1787, 1.9457)	0.3622	
	60–69 years	0.2757 (0.0514, 1.7129)	0.1405	
	70 years +	0.3820 (0.0358, 9.0489)	0.4584	



(a) Scatter plot. **(b)** Pie chart.

Figure 2. Factors visualization.

4.4. Poor perception due to personal experience of COVID-19

Having experience with COVID-19 (knowing someone infected with COVID-19 or who has seen someone) promotes good perception to some extent in Africa. The result shows that not having or knowing someone who has the virus (COVID-19) against someone who has seen or knows someone infected changes the log odd to 0.4603, resulting in an odds ratio of 1.5845 (i.e., exp(0.4603)). It implies that while poor perception is "certainly" among those who have no experience of the virus, there are 58% chances that someone who has experienced the novel COVID-19 might also be ignorant or have a poor perception of the virus. Although having experience with or having no experience with the virus does not significantly influence the poor perception of the virus in Africa, On the other hand, there are 79.7% (log odd of 1.3341, resulting in 3.7966 odd ratios) odds that the media contributes to ignorance or confusion and promotes a poor perception about COVID-19 in Africa. The effect of the media on the poor perception of COVID-19 in Africa is statistically significant. It implies that individuals imbibe poor perceptions due to media misinformation about the prevention or cure of the virus.

4.5. Poor perception due to demographic items

The result in **Table 2** shows that being a female against being a male change the log odd of having poor perception about COVID-19 by 0.0314, resulting in an odd of 1.0296. It implies that there are about 3% more chances that a male adult in Africa has a poorer perception of COVID-19 than a female. Although the gender of individuals does not significantly contribute to poor perceptions of the virus in Africa, Thus, having a good or poor perception is independent of individual gender. Anyone, regardless of being male or female, can be ignorant or have a poor perception of the virus. However, males are likely to possess poorer perception than females.

Similarly, the educational attainment of the individual does not depend on having poor perception. As shown, someone not having any formal education is very likely to have a poor perception of COVID-19 in Africa. Thus, the log odd of someone who has no formal education against someone with primary education changes by −0.8675, resulting in an odd of 0.42. This implies that there are chances that someone who has primary education is also likely to have a poor perception of COVID-19, like someone who has no education. Contrarily, the log odd of no formal education to having secondary school education changes by −12.958, resulting in 0.0000 odd of possessing poor perception. We observed this with those with tertiary and postgraduate education as well. This implies that, while poor perception is very likely among uneducated individuals, there are zero odds or chances that someone who is educated will have a poorer perception than an individual without any formal education. Although education has nothing to do with having poor perception or not, Essentially, poor perception is quite likely among the uneducated. As a result, whether or not people are educated has little impact on how they perceive COVID-19 in Africa.

Religion plays a significant role in promoting the poor perception of the novel COVID-19 in Africa. As shown, practicing other religions besides the known against practicing Islam changes the log odd of having poor perception above COVID-19 in Africa by 0.4775, resulting in 1.6120 odd of poor perception practicing Islam. This implies that there are 61.2% chances that someone who practices Islam is likely to have a poor perception of COVID-19 in Africa. Similarly, the odd changes by 2.091 (resulting in 8.095 odd ratios) against individuals practicing the Christian faith. By implication, there are 9.5% chances that someone has a poor perception of COVID-19 because he or she is practicing the Christian faith. As noted earlier, the two religions have a significant influence on the poor perception of COVID-19 in Africa.

Possession of poor perceptions about the novel COVID-19 is independent of the region where an individual lives in Africa. Poor perception is general in Africa, regardless of the country or region where the individual is. As shown, when an individual lives in the Central African region compared to an individual leaving in West Africa, the odds are insignificant. Thus, poor perception of the novel COID-19 is not regionally concentrated; it is rather an Africa issue. Similarly, changes from one age class (of the individual) to another do not improve the good perception of the novel COVID-19. Individuals possess a poor perception of the virus, regardless of age or class.

Lastly, as we have noted earlier, the media plays a highly significant role in the level of ignorance or poor perception of the novel COVID-19 in Africa. As shown, the log odd of not agreeing (saying no) that media promotes misinformation versus agreeing (saying yes) that media promotes misinformation about the novel COVID-19 in Africa changes by 1.3155, resulting in 3.7265 odd. This implies that there are 72.65% chances of the media misinforming people and promoting poor perceptions of COVID-19 in Africa.

Relatively, there are some studies whose results and findings are comparable to this present study. Such studies include Abu et al. (2021), whose study was on the "Risk perception of COVID-19 among sub-Saharan Africans: A web-based comparative survey of local and diaspora residents"; Akinyemi et al. (2022), whose study was on the "Perceptions of COVID-19 transmission risk and testing readiness

in rural Southwest Nigeria"; Matovu et al. (2022), whose review study was on the "Knowledge, risk perception, and uptake of COVID-19 prevention measures in sub-Saharan Africa"; Silubonde et al. (2023), whose study was on the "Perceptions of the COVID-19 pandemic: A qualitative study with South African adults". Preventive measure adoption was typically poor, despite high levels of awareness and risk perception, particularly at the beginning of the pandemic, according to all of these and other studies, including this recent study. To strengthen the evidence base—which is essential for directing strategic policy—more research is necessary. The constant dissemination of false information necessitates that governments keep a close eye on information sources to make sure the public is receiving accurate and trustworthy information. Lastly, it is suggested that further awareness-raising campaigns be conducted to discourage apathy towards taking preventative action, which poses a serious danger on its own. Promoting preventative measures is imperative; this involves raising awareness of COVID-19 and fostering favourable attitudes towards mitigating interventions like immunisations and education. These kinds of initiatives ought to focus on the less educated, younger, and non-healthcare workforce.

5. Limitation and perspective in the form of facts and food for thought

As a limitation, this study was unable to cover many participants (we received only 561 responses).

If African blood genetic composition resists a virus, A critic will probe to know whether Africans have blood groups or genotypes different from the rest of the world. If not, then if a virus or disease affects any human on earth, Africans cannot be immune to it; at least not all Africans can, and in the same way, not all Europeans or Americans will be infected too.

If Africa's weather or humid system can prevent a virus from spreading, how come the Ebola virus, the Spanish Flu in 1918, and other viruses are known to spread in Africa? If hot temperatures prevent COVID-19, how does it spread in the Middle East? In the first place, the conspiracy theory of Africa's weather or humid system is inaccurate. We must realize that Africa is a continent of about 55 countries, and each country has a different weather or humid system. This theory is either propagated to reduce panic or intentionally promoted to cause havoc in African countries.

Again, Africans are naturally resilient and resistant to diseases. Resilient is not about African people; it is about humans. Every human can gain shape and form back, no matter what happens. And this contradicts the theory of disease. A human can grow resistant to something. Just like mosquitoes grow resistant to mosquito sprays if it's used on them always. Africans can grow resistant to malaria (yet millions still die yearly), but a pandemic new and unknown to the world cannot be resisted, and no amount of resilience except cure or care can save it.

If hot water (or garlic, ginger, lemon slices in hot water, alcohol or weed, etc.) can cure or prevent COVID-19, why are there many deaths in Italy, Spain, China, the USA, the UK, France, etc.? Does it mean they don't have access to hot water, garlic, lemon, weed, alcohol, or ginger?

6. Conclusion

The findings of this work show that there is a very poor (87%) perception of COVID-19 in Africa. There has been a lot of skepticism towards complying with preventive measures as advised by the WHO and directed by the national government across Africa. Up until now, many still believe that they are immune to COVID-19 or have methods to prevent, resist, or cure the virus in the event they are infected. Two major factors contributed immensely to the poor perception of the virus in Africa. These are religion and the media. While the media is causing confusion and promoting various contents about a cure, prevention, or resistance to the virus via various social media outlets, some religious leaders across Africa have downplayed the preventive measures advised to contain the spread of the virus. We have seen cases where people violate the physical/social distancing (in Nigeria, Cameroon, Kenya, etc.) rule to attend weekly prayer at the mosque, club, in-house party, burial, etc., despite the ongoing pandemic and warning against the gathering of any sort.

More so, we have heard cases where some religious leaders claim to have the cure for the virus, and some cases where some media contents are shared on WhatsApp, Facebook, Twitter, etc., about the cure and prevention of the virus. Even though the survival rate is quite high (80%), there is no viable vaccine that can cure the virus as of now. Meanwhile, new cases of infection are recorded daily in Africa, and the infection rate is already gathering momentum. The fact is that African nations are not prepared, a consequence of poor healthcare service, poor infrastructural development and housing systems (one room with many occupants resulting in impossible physical distancing), and poor leadership coupled with African societal ways of life (which promote the easy spread of disease). Thus, if the violation continues and spreads, it will gain more space.

However, as noted in the results and discussion section, this is a brief survey mainly to assess the perception of COVID-19 in Africa. The population sampled is quite small but has very representative coverage (we received responses from 21 countries in Africa). We believe a wider coverage might present a better picture of the issue addressed in this study. This study should serve as a template for a bigger sponsor project in Africa about COVID-19.

Author contributions: Conceptualization, AOA, KEU, FA, IA and AA; methodology, AOA, KEU, FA, IA and AA; software, AOA, KEU, FA, IA and AA; validation, AOA, KEU, FA, IA and AA; formal analysis, AOA, KEU, FA, IA and AA; investigation, AOA, KEU, FA, IA and AA; resources, AOA, KEU, FA, IA and AA; data curation, AOA, KEU, FA, IA and AA; writing—original draft preparation, AOA, KEU, FA, IA, AA, ONE, LE, OE, WOO, GE and AAT; writing—review and editing, AOA, KEU, FA, IA, AA, ONE, LE, OE, WOO, GE and AAT; visualization, AOA and KEU; supervision, AOA and KEU; project administration, AOA and KEU; funding acquisition, AOA and KEU. All authors have read and agreed to the published version of the manuscript.

Acknowledgments: The authors acknowledge the immense help received from participants in this voluntary survey and also appreciate the scholars whose articles are cited and included in the references to this article. The authors appreciate the

authors whose articles were used for this study. Also, the authors are grateful to their respective institutions and appreciate the Africa Centre of Excellence on Technology-Enhanced Learning (ACETEL), National Open University of Nigeria, Abuja, for supporting this research.

Data availability statement: Completely, data produced or investigated during this work were involved in this submitted article.

Conflict of interest: The authors declare no conflict of interest.

References

Abiodun, A. O., Ogundunmade, T. P. (2022). Effect of Stigmatization and Discrimination on COVID-19 patients in Africa. International Journal of Advances in Engineering and Management (IJAEM), 4(2), 589–590.

Abu, E. K., Oloruntoba, R., Osuagwu, U. L., et al. (2021). Risk perception of COVID-19 among sub-Sahara Africans: a web-based comparative survey of local and diaspora residents. BMC Public Health, 21(1), 1562. https://doi.org/10.1186/s12889-021-11600-3.

Aidonojie, P. A., Okuonghae, N., Ukhurebor, K. E. (2022). The Legal Rights and Challenges of COVID-19 Patients Accessing Private Healthcare in Nigeria. Bestuur, 10(2), 183–197. https://doi.org/10.20961/bestuur.v10i2.68118

Akintande, J. O., Olubusoye, O. E., Yaya, O. S., Abiodun, A. O. (2022) Explainable Features Responsible for the High or Low Spread of SARS-COV-2: Africa in View. Scientific African, e01301. https://doi.org/10.1016/j.sciaf.2022.e01301

Akintande, O. J., Olubusoye, O. E. (2020). Datasets on how misinformation promotes Immune perception of COVID-19 pandemic in Africa. Data-in-Brief, Elsevier; 2020.

Akinyemi, J. O., Agunbiade, M. O., Salawu, M. M., et al. (2022). Perceptions of COVID-19 transmission risk and testing readiness in rural Southwest Nigeria. Scientific African, 17, e01334. https://doi.org/10.1016/j.sciaf.2022.e01334

Deblina, R., Sarvodava, T., Sujita, K., et al. (2020). Study of knowledge, attitude, anxiety & perceived mental healthcare need in the Indian population during COVID-19 pandemic. Asian Journal of Psychiatry.

Friggeri, A, Adamic, A., Eckles, D., Cheng. (2014). Joint meeting on Advancement of Artificial Intelligence. International Conference on Weblogs and Social Media.

Gulati, P., O., A. Adeyinka., et al. (2021). Automatic Identification and Filtration of COVID-19 Misinformation. Computer and Information Science, 14(4), 57. https://doi.org/10.5539/cis.v14n4p57

Matovu, J. K., Mulyowa, A., Akorimo, R., Kirumira, D. (2022). Knowledge, risk-perception, and uptake of COVID-19 prevention measures in sub-Saharan Africa: a scoping review. Afr Health Sci., 22(3), 542–560. https://doi.org/10.4314/ahs.v22i3.59

Morena, D., Di Fazio, N., La Russa, R., et al. (2022). When COVID-19 Is Not All: Femicide Conducted by a Murderer with a Narcissistic Personality "Masked" by a Brief Psychotic Disorder, with a Mini-Review. International Journal of Environmental Research and Public Health, 19(22), 14826. https://doi.org/10.3390/ijerph192214826

Muñoz-Sastre, D., Rodrigo-Martín, L., & Rodrigo-Martín, I. (2021). The Role of Twitter in the WHO's Fight against the Infodemic. International Journal of Environmental Research and Public Health, 18(22), 11990. https://doi.org/10.3390/ijerph182211990

Nneji, C. C., Urenyere, R., Ukhurebor, K. E., et al. (2022). The Impacts of COVID-19-induced Online Lectures on the Teaching and Learning Process: An Inquiring Study of Junior Secondary Schools in Orlu, Nigeria. Frontiers in Public Health, 10, 1054536. https://doi.org/10.3389/fpubh.2022.1054536

Nwankwo, W., Ukhurebor, K. E. (2020). Web Forum and Social Media: A Model for Automatic Removal of Fake Media using Multilayered Neural Networks. International Journal of Scientific & Technology Research, 9(1), 4371–4377.

Paladhi, A. G., Manohar, M., Pal, K., et al. (2022). Novel electrochemical biosensor key significance of smart intelligence (IoMT & IoHT) of COVID-19 virus control management. Process Biochemistry, 122, 105–109. https://doi.org/10.1016/j.procbio.2022.09.023

Penninx, B. W. J. H., Benros, M. E., Klein, R. S., et al. (2022). How COVID-19 shaped mental health: from infection to pandemic effects. Nature Medicine, 28(10), 2027–2037. https://doi.org/10.1038/s41591-022-02028-2

Rapoza, K. (2017). Can fake news impact stock market? Forbes.

Silubonde, T. M., Knight, L., Norris, S. A., et al. (2023). Perceptions of the COVID-19 pandemic: a qualitative study with South

African adults. BMC Public Health, 23(1). https://doi.org/10.1186/s12889-023-15450-z

Ukhurebor, K. E., Aigbe, U. O., Onyancha, R. B., et al. (2022). Greenhouse Gas Emission: Perception during the COVID-19 Pandemic. BioMed Research International, 2022, 1–12. https://doi.org/10.1155/2022/6166276

Ukhurebor, K. E., Singh, K. R., Nayak, V., et al. (2021). Influence of the SARS-CoV-2 pandemic: a review from the climate change perspective. Environmental Science: Processes & Impacts, 23(8), 1060–1078. https://doi.org/10.1039/d1em00154j

Vosoughi, S., Roy, D., & Aral, S. (2018). The spread of true and false news online. Science, 359(6380), 1146–1151. https://doi.org/10.1126/science.aap9559