



COVID-19-related risk perception, anxiety and protective behaviours among Nigerian adults: a cross-sectional study

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Abstract

Background Pandemics such as the current COVID-19 pandemic are often associated with heightened fear and significant adjustments in health behaviours.

Aim This study aimed to assess perceived risk, anxiety and protective behaviours of the general public during the early phase of the coronavirus disease (COVID-19) pandemic in Nigeria.

Methods An online cross-sectional study among 1197 respondents aged 18 years and above between 27 April to 16 May 2020.

Result More than half (61.9%) of the respondents had high risk perception towards COVID-19, and high anxiety level was found in 37.2%. Male gender, being a Christian, having more than 12 years of formal education and high risk perception were positively associated with observance of more than one protective measure against COVID-19. The predictors of COVID-19-related anxiety were high risk perception and being a Muslim.

Conclusions This study showed that risk perception has an influence on both anxiety and observance of protective behaviours. Being a novel experience, this research has implications to support current and future responses to a pandemic experience.

Keywords COVID-19 · Nigeria · Perceived risk · Anxiety · Protective behaviour, religion

Introduction

Undoubtedly, one event that will define the year 2020 for a long time to come is the coronavirus disease (COVID-19) pandemic. The respiratory disease which was first discovered in the Chinese city of Wuhan in December of 2019 shares similarities with Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS)—two other previously known coronavirus infections in humans (WHO 2020a). The core symptoms of the disease, according

to the World Health Organisation (WHO), are dry cough, fever and fatigue (WHO 2020b).

On 30 January 2020, WHO declared SARS-CoV-2, which is now renamed COVID-19, a Public Health Emergency of International Concern (WHO 2020c). Becoming a global crisis on 11 March 2020, WHO characterized COVID-19 as a pandemic, thus becoming the first ever coronavirus to be declared a pandemic (WHO 2020c). As of 29 April 2020, the virus had spread exponentially with over 3 million confirmed cases, and 200,000 deaths in more than 200 countries. On 27

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February 2020, Nigeria confirmed its COVID-19 index case—an Italian citizen—and as of 29 April 2020, the Nigeria Centre for Disease Control (NCDC) had reported over 1500 laboratory-confirmed cases of COVID-19 in Nigeria with 307 discharges and 51 deaths (NCDC 2020).

According to WHO, the infection has no proven treatment or vaccine yet, but it can be properly managed even to the point of recovery (WHO 2020b). Therefore, parallel to efforts aimed at identifying, isolating and treating cases, WHO and other scientific communities have been emphasising the need for individuals to adopt practices aimed at preventing and reducing the spread of the disease. These recommendations which are similar to previous pandemic containment strategies include using tissues when sneezing, washing hands regularly with soap and water, and social distancing (Rubin et al. 2009). Owing to the severity and spread of the virus, severe measures have been taken which involve forcing people to stay at home, closing of businesses and offices, exempting only essential workers. The majority of the Nigerian population, however, belongs to the informal economy, and their livelihoods are consequently being threatened by the lockdown because much of their activities and businesses involve face-to-face contact.

According to the Health Belief Model, a set of core beliefs are at the root of the adoption or otherwise of preventive health behaviours (Rosenstock 1966). One of these core beliefs is ‘perceived susceptibility’—an individual’s perception of their likelihood of developing a certain health condition. Therefore, the more likely people believe they are to contract a disease, the more likely they are to adopt behaviours meant to prevent the disease. Currently in Nigeria, there are those who strongly believe that the novel coronavirus is a hoax and therefore all the measures being put in place by the authorities are unwarranted. Another group of Nigerians (approx. 26%), as reported by the Ngozi Okonjo-Iweala (NOI) poll, believe that they are shielded from the virus owing to their religious dispositions, viable genes and the hot weather of the country (NOI Polls 2020). In addition, there are those who hold the position that COVID-19 is a disease of affluence of some sort and therefore only the rich (especially those who could afford to travel overseas) could be infected with it. Even though the aforementioned assertions are obviously unfounded, the fact that some people hold such beliefs about the disease shows clearly that there are many who believe that they cannot contract the virus. Therefore, given the huge public health implications of these erroneous dispositions (such individuals are more likely to be careless and propagate the spread of the disease), it became expedient to investigate the perceptions of Nigerians about their vulnerability to COVID-19. Such knowledge is needed in the development of health messages that are relevant to the peculiarities of this society.

It is only expected that a health crisis of this magnitude, which has significantly disrupted the normal lives of people in

Nigeria, would create anxieties and fear in different categories of people. Drastic measures such as the lockdown have put significant strain on businesses and livelihoods of many in the country, leading to palpable apprehension about both the present and the future. Also, fake news and conspiracy theories have been having a field day, thriving, especially on social media. Therefore, given the fact that Nigeria has over 25 million smartphone users with access to various social media platforms, this puts an appreciable number of people at an increased risk of being exposed to unverified information that can trigger panic (Statista 2020). Additionally, constant exposure to news and updates about the pandemic, even when they are accurate, can instil fear and panic in some individuals, especially children and people who may have pre-existing mental health conditions (Omigbodun and Abdulmalik 2020). In addition, individuals who have been infected by the virus, as well as their families, may also be on edge owing to the uncertainty about the outcome of the disease (Omigbodun and Abdulmalik 2020).

Given the significant interlink between human psychological and behavioural factors, therefore, it is important to assess the role risk perception plays in the development of COVID-19-related anxiety and adoption of protective behaviours in Nigeria. Understanding the role of specific perceptions in people may help health communicators to improve their messages about outbreaks of new infectious diseases generally and COVID-19 specifically. For the majority across the world, this is the first pandemic experience and thus there is limited evidence on reactions to prior pandemic experience—in Nigeria especially. Additionally, we are unaware of any data of this kind on the current COVID-19 pandemic in Nigeria. This study was carried out to assess perceived risk, anxiety and protective behaviours of the general public during the early phase of the coronavirus disease (COVID-19) pandemic in Nigeria.

Methods

Sampling

The study was a cross-sectional study. Owing to the lockdown and restriction imposed by the government to curb the spread of the virus, an online Google form questionnaire was created, and the link was shared using snowballing sampling technique to respondents across the six geo-political zones of the country. The semi-structured anonymous online questionnaire took about 15 min to complete. In a bid to ensure representativeness of the data, five (5) online data officers were recruited from across the country to oversee the data collection process. The strategies adopted in sharing the questionnaire included direct and group broadcast on social media platforms such as WhatsApp, Facebook and Telegram. The survey was carried

out during the first phase of COVID-19 in Nigeria from 27 April to 16 May 2020. The questionnaire was completed in the English language. A 1216 responses were received, 1197 of which were valid.

Inclusion criteria

Any individual who is 18 years and above with access to internet and who gave their consent.

Exclusion criteria

Children were excluded from the study due to their inability to give direct consent.

Instrument

The questionnaire comprised four sections. The first section obtained socio-demographic information including sex, age at last birthday, marital status, highest level of education, employment, religion, current state of residence and country of origin.

Level of anxiety was assessed using the 7-item General Anxiety Disorder (GAD-7) scale. Our study assessed respondents' anxiety symptoms over the period of two weeks using a 4-point likert scale. The total score (0 to 21) was calculated from their response 'not at all (0), several days (1), more than half a day (2), and nearly every day' (Spitzer et al. 2006). Using the median, the presence of anxiety was defined as GAD-7 total score of 8 points or greater (Li et al. 2020).

Questions on perceived risk of COVID-19 were adopted from a previous pandemic questionnaire by Rubin et al. (2009), which consists of six questions measured on a 4-point likert scale (1-strongly agree, 2-agree 3-strongly disagree and 4-disagree). The total score on the risk perception questionnaire ranged from 0 to 24 and a median score of 16 was used in this study to dichotomize respondents into high and low risk perception categories.

Protective behaviour was assessed with questions on protective behaviour in the last 7 days and family protective measures against COVID-19. Observance of protective behaviour was assessed using the following questions: avoidance of crowded place, wearing of face mask before leaving home, ensuring everyone who visits wash their hands before entering and having a personal sanitizer or easy access to sanitizer use. Participants were subsequently categorized into two: practicing no or one protective behaviour and more than one protective behaviour.

Data analyses

Data from the online Google forms were downloaded as a Microsoft Excel document before exporting it into the

Statistical Package for Social Sciences (SPSS) version 24.0 and analysed using the same software. Descriptive statistics (frequency and mean) were used to describe the socio-demographic characteristics, risk perception, anxiety and practice of protective behaviours of the respondents. Logistic regression analyses were performed to explore the predictors of anxiety and protective behaviours during the COVID-19 outbreak. Level of statistical significance was set at $p < 0.05$.

Ethical consideration

Ethical approval was received from Oyo State Ethical Review Board, Nigeria (AD 13/479/1791^B) for the study. Participation was completely voluntary (responses that were not accompanied by consent were rendered invalid). Ethical principles of anonymity and non-maleficence were adhered to in the conduct of the study.

Results

A total of 1197 valid responses were identified between 27 April and 16 May 2020. The mean age was 28.85 ± 7.57 years and more than half (57.9%) were within the 24–34 years age group. More than half (57.1%) were male and 67.9% were single. Most (92.2%) participants attained more than 12 years of education, 67.1% were Christians and 43.4% were from the South West region of Nigeria (Table 1).

Perceived risk, anxiety and protective behaviours

Table 2 shows the questions on perceived risk of COVID-19 and their associated responses. The results show that approximately 61.9% of respondents had high levels of perceived risk about COVID-19 from the general score categorisation, while 42.1% perceived that the nature of their job increased their chances of contracting the virus. Almost all (88.4%) perceived that the virus was very dangerous to their health. The majority (69.6%) trusted the government's response to be effective in overcoming COVID-19 and 42.3% felt that COVID-19 was exaggerated (Table 2).

A total of 445 (37.2%) scored 8 and above using the seven-item General Anxiety Disorder scale, indicating anxiety about COVID-19.

Table 3 contains participants' response on measures taken to protect themselves. Wearing a face mask (67.9%) was the commonest response followed by use or access to hand sanitizer (57.6%) and the least practiced behaviour was avoidance of crowded places (9.1%). On measures taken to protect family members against the COVID-19 pandemic, regular hand washing or use of hand sanitizer was reported by less than half (44.7%), a few (2.2%) reported taking chloroquine

Table 1 Socio-demographic characteristics (N= 1197)

Variables	Frequency	Percentages (%)
Age group(n =1184)		
18–24	318	26.6
25–34	686	57.9
35–54	164	13.9
55 and Above	16	1.4
Sex		
Male	694	57.1
Female	522	42.9
Marital status		
Single	813	67.9
Married	359	30.0
Separated/divorce/widowed	25	2.1
Level of education		
12 years and below	93	7.8
Above 12 years	1104	92.2
Religion		
Christianity	803	67.1
Islam	389	32.5
Traditional	5	0.4
Employment status		
Unemployed	455	38.0
Employed	742	62.0
Geopolitical zone(n =1188)		
South West	515	43.4
North West	92	7.7
North Central	357	30.1
North East	52	4.4
South East	96	8.1
South South	76	6.4

n<1197 indicates missing value

regularly and a little below one-quarter (23.6%) reported practicing physical distancing.

Out of the 1197 study participants, 741 (61.9%) were classified as having high perceived risk of COVID-19 infection. Probable anxiety was found in 445 (37.2%) of study

participants, while 505 (42.2%) of the study participants reported to have adopted at least two of the COVID-19 protective behaviours (see Table 4).

Predictors of anxiety and protective behaviours

Table 5 shows the results of logistic regression analyses carried out to identify the independent predictors of anxiety and protective behaviours among respondents. Having more than 12 years of formal education (OR = 1.69; 95%CI = 1.02–2.78; *p* = 0.040) and high risk perception (OR = 1.34; 95%CI = 1.04–1.72; *p* = 0.024) were both positively associated with observance of more than one protective behaviour. Female gender (OR = 0.77; 95%CI = 0.60–0.98; *p* = 0.036) and being a Muslim (OR = 0.56; 95%CI = 0.43–0.73; *p* < 0.001) were, however, negatively associated with observance of more than one protective behaviour. In addition, high risk perception (OR = 1.34; 95%CI = 1.04–1.72; *p* < 0.001) and being a Muslim (OR = 1.75; 95%CI = 1.35–2.28; *p* < 0.001) predicted probable anxiety.

Discussion

More than half of the participants reported wearing face mask when going out in public. A similar report was found among a South Korean population (Lee and You 2020). Findings indicate that hand washing and use of hand sanitizer was practiced by 57.6% of respondents while, notably, social distancing was only observed by 9.1%. This finding is incomparable with the 95.8% and 88.1% level of hand washing and social distancing respectively observed among Hong Kong and Korean populations (Kwok et al. 2020). This relatively low rate of reported compliance with these protective behaviours may be a reflection of a lower perceived risk and severity of COVID-19 among Nigerians. In congruence with our study, however, a study among a populace in South Korea found social distancing to be the least practiced precautionary behaviour compared to wearing face masks, hand washing and use of sanitizers (Lee and You 2020).

Table 2 Perceived risk of acquiring COVID-19 (N= 1197)

	Agree (%)	Strongly agree (%)	Disagree (%)	Strongly disagree (%)
There is likelihood of me acquiring COVID-19.	136 (11.4)	107(8.9)	478(39.9)	476(39.8)
The type of job I do increases the chance of being infected with COVID-19	202(16.9)	302(25.2)	368(30.7)	325(27.2)
COVID-19 affects the elderly and people with comorbidities more than the rest of population	349(29.2)	450(37.6)	251(21.0)	147(12.3)
Coronavirus is very dangerous to the health	284(23.7)	774(64.7)	64(5.3)	75(6.3)
The government will be successful in overcoming COVID-19 in your country	390(32.6)	443(37.0)	234(19.5)	130(10.9)
COVID-19 is highly exaggerated	185(15.5)	321(26.8)	371(31.0)	320(26.7)

Table 3 Protective behaviours towards the COVID-19 pandemic

Response	Frequency	%
Personal protective behaviour last 7 days		
Wearing face mask	797	67.9
Having a hand sanitizer or access to sanitizer	676	57.6
Hand wash by all visitors	336	28.6
Avoidance of crowded places	107	9.1
Ways family was protected (not multiple response)		
Wash hand regularly with alcohol-based sanitizer or soap and water	535	44.7
Avoid close gatherings	283	23.6
Using nose mask	184	15.4
Not having close contact with anyone having a fever	80	6.7
Taking garlic	46	3.8
Sleeping under a mosquito net	32	2.7
Taking chloroquine regularly	26	2.2
Drinking treated water	11	0.9

Results from this study showed that approximately six out of every ten respondents had a high level of perceived risk of contracting COVID-19. This is significantly higher compared to findings among the Myanmar population, where less than one-fourth of respondents had high level of risk perception towards COVID-19 (Mya et al. 2020). The elevated perceived risk level might be attributed to disparity in country experience. As at the time of this study there was a continuous increase in the number of cases and deaths reported across various states in Nigeria, a reality which could have raised people’s perception of their risk of contracting the virus. In addition, obtaining adequate information from public health professionals, government and media platforms has been associated with elevated awareness about risk during a pandemic (Van-der-Weerd et al. 2011; Khosravi 2020). Therefore, aggressive media and government engagement across the country on COVID-19 might be associated with the high risk awareness found in this study.

Approximately two-fifth (37.2%) of the participants in this study reported high level of anxiety, a finding which is consistent with the 37.4% prevalence of anxiety found among

high school students in China (Zhou et al. 2020) and 32.1% among a Nepalese population (Sigdel et al. 2020). This finding is, however, higher than the 28% obtained among Indian adults (Verma and Mishra 2020). This relatively high level of COVID-19-related anxiety may not be unconnected to the daily increase in numbers of COVID-19 confirmed cases and deaths being experienced in the country at the time this study was being carried out.

In this study, participants who were categorized as having high risk perception were almost twice more likely to be anxious about COVID-19 compared to those who had low risk perception. This finding is in tandem with the postulation that a novel risk or threat is usually accompanied with heightened fear compared with a more familiar threat (Cori et al. 2020). Therefore, given the novelty of COVID-19 coupled with the not-yet-successful attempts at getting a vaccine or a cure for it, it is expected that individuals who perceive themselves as being particularly susceptible to the virus would exhibit greater anxiety levels.

This study revealed that individuals aged below 55 years were less likely to report probable anxiety compared to those aged 55 years and above; this was, however, not statistically significant. This is in contrast to the findings from studies in Canada, the United States, Israel and some other developed countries, where older adults were found to be less likely to meet the threshold for probable anxiety (Nwachukwu et al. 2020; Lee 2020; Barzilay et al. 2020).

The differing finding in our study may be explained partly by the use of different GAD-7 cut-offs in the studies cited: whereas a score of ≥ 8 (the median GAD-7 score) was used as the cut-off for probable anxiety in our study, a more conservative cut-off (≥ 10) was employed by Barzilay et al. (2020) and Nwachukwu et al. (2020). Further investigations are, however, needed to better our understanding of the role of age in predisposing individuals to or protecting them against

Table 4 Distribution of risk perception, anxiety, and reported practice of protective behaviours among study participants (N = 1197)

Variables	Frequency	%
Risk perception		
Low	456	38.1
High	741	61.9
Anxiety		
Normal	752	62.8
High	445	37.2
Protective behaviour		
≤ 1	692	57.8
≥ 2	505	42.2

Table 5 Independent predictors of COVID-19-related protective behaviours and anxiety

Variables	Protective behaviours AOR(95% CI)	Anxiety AOR(95% CI)
Age group		
18–24	0.94 (0.30–2.99)	0.58 (0.19–1.76)
25–34	1.23 (0.40–3.85)	0.49 (0.17–1.47)
35–54	1.09 (0.34–3.46)	0.40 (0.13–1.22)
55 and above	1	1
Gender		
Male	1	1
Female	0.77 (0.60–0.98)*	1.22 (0.95–1.57)
Education level		
12 years and below	1	1
Above 12 years	1.69 (1.02–2.78)*	0.85 (0.54–1.35)
Religion⁺		
Christianity	1	1
Islam	0.56 (0.43–0.73)**	1.75 (1.35–2.28)**
Marital status		
Single	2.54 (0.95–6.78)	0.53 (0.22–1.26)
Married	2.38 (0.91–6.26)	0.69 (0.30–1.62)
Separated/divorced/widowed	1	1
Employment status		
Employed	1.33 (1.00–1.78)	0.81 (0.60–1.09)
Unemployed	1	1
Perceived risk		
Low	1	1
High	1.34 (1.04–1.72)*	1.77 (1.36–2.30)**

*Significant at $p < 0.05$, **Significant at $p < 0.001$; ⁺ The five respondents who indicated practicing traditional religion were excluded from the analysis to avoid problems arising from sparse observations

the psychological impact of COVID-19 in low- and middle-income countries.

We found that respondents who reported being Muslims were almost twice as likely to have probable anxiety when compared to their Christian counterparts, even after taking into account other socio-demographic factors and risk perception. Lee (2020), in a study aimed at validating the Coronavirus Anxiety Scale (CAS) among 774 adults in the United States, found elevated anxiety scores to be positively correlated with negative religious coping. Rosmarin et al. (2014) suggest that it is negative religious coping or spiritual struggle (e.g. anger at God, divine retribution, belief that God is malevolent, etc.) and its accompanying cognitions that result in psychological distress, not religious factors (such as belief in God, religious affiliation, etc). Also noteworthy is the fact that approximately seven in ten of Muslim respondents from this study were from the northern states—many of which are currently being plagued by diverse security and humanitarian challenges such as herdsmen-farmer clashes, banditry and insurgency. It is, therefore, not impossible that the psychological impact of these pre-existing crises had rendered individuals from those states particularly vulnerable to

anxiety during the COVID-19 pandemic. Future studies would do well to explore the interactions between religious affiliation, religious coping (positive and negative) and psychological responses to pandemics such as COVID-19, especially in conflict-ridden contexts.

Contrary to findings from studies in China (Duan et al. 2020), Turkey (Yıldırım et al. 2021) and the United States (Olcaşoy et al. 2020), in this study, males were more likely to report engaging in more than one protective behaviour against COVID-19. Certain cultural and environmental factors may be responsible for the contrasting finding in our study. However, we suspect that social approval bias might have played a role in this finding, as males have been found to overestimate their engagement in rather positive health behaviours (Hebert et al. 1997).

Similar to what was obtained by Yıldırım et al. (2021) among Turkish adults as well as by Bashirian et al. (2020) among health care workers in Iran, high perceived risk was associated with reported adoption of preventive behaviours in this study. This affirms the position of the Health Belief Model (Rosenstock 1966) and similar health behaviour models, that the higher an individual's estimation of their

susceptibility to a health problem, the more likely they are to adopt behaviours aimed at preventing such problems.

In addition, similar to what was reported by Yıldırım et al. (2021), it was found that lower level of education (not more than 12 years of formal education) was associated with lesser odds of practicing more than one preventive behaviour. Lower level of education may be associated with rejection of the very existence of the coronavirus, lower awareness of the risk of contracting the virus and subsequently the lower need for the adoption of protective behaviours (El-Zoghby et al. 2020).

In this study, being a Muslim was found to be associated with less likelihood of engaging in more than one COVID-19 protective behaviour. Religious leaders have been esteemed as key stakeholders in health promotion, given the significant influence they have on their followers, thus making religion a key factor in the adoption or rejection of health behaviours (Lumpkins et al. 2013; Anshel and Smith 2014; Heward-Mills et al. 2018). The activities of some religious sects have been found to be inimical to the containment of the current coronavirus pandemic in different countries. In South Korea, for example, the Shincheonji church has been blamed for being responsible for approximately 60% of the COVID-19 infections in the country, as members of the church have continued to worship in packed-full halls in defiance of COVID-19 preventive measures (Bostock 2020). Similarly, Muslims in Malaysia (Beech 2020) and the Haredi Jews in Israel (Halbfinger 2020) have also been accused of undermining public health measures at containing the spread of the coronavirus in their respective countries through their idiosyncratic religious practices and beliefs (Dein et al. 2020). All of these findings point further to the centrality of religion to the adoption or otherwise of health behaviours, especially during a pandemic.

This study has limitations. Firstly, the study was conducted during the early period of the lockdown, and because the pandemic is still ongoing, there is a tendency for a change in severity and transmission. Also, the use of convenience sampling for the recruitment of participants and that the responses were limited to people with access to the internet could limit the generalisability of the findings in this study to the entire Nigerian populace. However, to minimise the bias, the survey link was randomly shared through the use of social media adverts to recruit respondents, which has been documented in literature (Baltar and Brunet 2012; Kosinski et al. 2015). The study likewise ensured representation of responses from the six geopolitical zone in Nigeria, including remote communities with internet access, which is deemed a strength of this study.

Conclusion

Findings from this study revealed that an appreciable proportion of the Nigerian population perceive themselves to be at

risk of contracting the coronavirus and are anxious about the situation of the coronavirus. It also highlighted the different adaptive behaviour and psychological responses among the Nigerian population during the COVID-19 pandemic. The study found a very low practice of social distancing among the study population, which is a key preventive measure to curb communal transmission of the virus. High risk perception of contracting COVID-19 was found to have a role in determining both anxiety and observance of protective behaviours. Balanced information will be required during a pandemic season to increase the willingness of the population in taking protective measures without leading to increased anxiety. Also, awareness activities about COVID-19 as well as interventions to mitigate the psychological burden of the pandemic should be tailored to meet the needs of specific demographic groups.

Authors' contribution TPO was involved in concept design, data collection, general manuscript write-up and overall co-ordination of research activities. OAO was involved in data analyses and the write-up of the introduction and discussion sections. TTO was involved in questionnaire design, data collation and sorting. OFO was involved in data analyses and interpretation. FOA was involved in concept design, questionnaire design and data collection. All authors reviewed and approved the final manuscript.

Availability of data and materials Available on request.

Declarations

Ethical approval Ethical approval was received from Oyo State Ethical Review Board, Nigeria (AD 13/479/1791^B) for the study.

Consent to participate Participation was completely voluntary (responses that were not accompanied by consent were rendered invalid) and ethical principles of anonymity and non-maleficence were adhered to in the conduct of the study.

Consent to publish Study participants signed informed consent regarding publishing their data.

Competing interests The authors declare that they have no competing interests.

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