COVID-19 Health Knowledge and Practices among Nigerian Residents during the Second Wave of the Pandemic: A quick online cross-sectional survey

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Summary

BACKGROUND

The COVID-19 pandemic has redefined life as a whole. The lack of knowledge about the safe practices needed to manage the spread of the global pandemic could be detrimental to public health. This dearth of knowledge and inappropriate practices could increase the spread of the coronavirus and lead to high mortality rates in a country like Nigeria where access to healthcare services is limited. The study's objective was to assess the health knowledge and practices of Nigerian residents in the face of the second wave of the COVID-19 pandemic.

MATERIALS AND METHODS

The study adopted a cross-sectional online survey which was conducted from January 2 to February 1, 2021. A self-administered questionnaire was used to collect data on the socio-demographics characteristics of respondents, the knowledge of COVID-19 and health management practices related to the virus. The reliability of the instrument yielded 0.72 internal consistency and the data were analyzed using descriptive and logistic regression at $p<0.05$.

RESULTS

A total of 1,988 respondents participated in the study; 49.3% of this number were urban residents, 63.0% were males, 58.1% were married, and 67.4% had tertiary education. Overall, the mean score was 9.44±1.8 (72.6%) for knowledge and 6.72±3.1 (56%) for appropriate practices. Rural residence (OR = 0.552, 95% CI 0.351–0.868), female gender (OR = 4.494, 95% CI 3.264–6.187), aged 50 years and above (OR = 0.137, 95% CI 0.071-0.261), married status (OR = 5.004, 95% CI 3.242–7.724), tertiary education (OR = 7.049, 95% CI 4.362–11.391), Yoruba ethnicity (OR = 2.828, 95% CI 1.292–6.187), and good knowledge of COVID-19 (OR = 1.905, 95% CI 1.376–2.637) significantly predict appropriate practices.

CONCLUSION

A substantial number of our respondents had good knowledge but lacked appropriate practices towards COVID-19. The beliefs of the people influenced inappropriate practices just as adequate practice was associated with good

knowledge. There is a need for adequate sensitization programmes which might require the use of local languages/dialects and Nigerian Pidgin English to reduce the misinformation surrounding the virus.

***Keywords**: COVID-19 Pandemic, Knowledge, Beliefs, Practices, Nigeria*

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Introduction

COVID19, also called coronavirus, is a deadly disease that has changed the world. The disease which is caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) was first identified in Wuhan (a province in China) in December, 2020 [1,2]. Since then, the disease has spread to other parts of the world [3,4], except Antarctica [5,6]. The World Health Organization (WHO) declared COVID-19 a public health emergency of international concern on January 30, 2020 [7], and a global pandemic on 11 March 2020 [8]. As at 24 December 2020, there were 77,530,799 confirmed cases and 1,724,904 confirmed deaths associated with COVID-19 all over the world [9]. The virus infects people of different cultures, races and demographics [10-12]. Managing the spread of the disease requires adequate health knowledge and the right practices with regard to COVID-19 [13-15].

Studies reveal that the successful control of past global pandemics largely required appropriate health knowledge and practices of people [16-18]. Health knowledge here refers to information and skills acquired with regard to health issues [19,20]. It includes factual knowledge about health measures, symptom identification, application of factual knowledge and making of judgement with regard to health-related matters (19,21]. Some of the health measures that were set up to curtail the spread of COVID-19 include enlightenment on symptoms and prevention of the disease, and ensuring that the masses adhere to precautions [22]. Some of the symptoms of COVID-19 are fever, dry cough, tiredness, breathing difficulty, sore throat, diarrhea and vomiting [3,23]. The preventive measures against the disease include regular hand washing, the use of alcohol based hand sanitizers, social distancing (at least 3 feet), covering the mouth and nose when coughing or sneezing, wearing face masks in public places, reduced touch of eyes, nose and mouth, avoiding crowded environments and staying indoors as much as possible [22,24]. The recommended practices to prevent the spread of the virus include adhering to protocols from experts like improved personal hygiene, balanced diet, regular exercise, resting and daily examination of self for likely symptoms of COVID-19 [24,25].

In as much as there are medical recommendations against COVID-19, there are also myths that inhibit said knowledge and practices with regard to the virus [26]. Some are: the belief that coronavirus was created to reduce the human population, the assumption that the coronavirus infects only the rich, the belief that having the Holy Spirit or holy water offers immunity against the virus, and the assumption that drinking local herbs prevent or cure COVID-19 [6,26,27]. Interestingly, while these myths might be non-conspicuous in the developed countries (that is if they exist), they are common in the developing world, especially in Africa [28-31]. Generally, Africa, has a prolonged history of cultural and religious beliefs that often counteract medical recommendations. These beliefs turn manageable diseases to endemic proportions in spite of the measures and efforts of government and non-government organizations [32,33]. Some of these diseases

include HIV/AIDS, malaria, cholera, measles, and the novel coronavirus infection [34-37]. As at 13 May 2020, all the countries on the African continent recorded cases of COVID-19 [38]. By 23 December, 2020, Africa recorded 2,573,328 confirmed cases and 60,906 confirmed deaths associated with COVID-19 pandemic [38].

Nigeria has the largest population on the continent with over 208 million people [39]. It has attracted global concern over the likely spread of the virus due to its large population and poor health care system [40]. The first case of COVID-19 was recorded in Nigeria on 18 February 2020 [41,42]). On 30 March, 2020, the federal government of Nigeria declared a national lockdown to forestall the increase of the disease, particularly in three high-risk states: Lagos, Abuja, and Ogun. Consequently, several state governments in Nigeria also imposed lockdown in their jurisdictions, leading to a national lockdown by March, 2020. However, by July 2020, the national lockdown was relaxed after a reduction in the new cases of COVID-19, (less than 200 new cases per day) across the entire country [14,40].

The second wave of coronavirus began in Nigeria around December 2020 and the cases soon skyrocketed from less than 200 confirmed new cases per day to 1,133 confirmed new cases per day [43]. This amounted to 80,922 total confirmed cases and 1,236 deaths by 23 December 2020 [43]. With the sudden rise in COVID-19 cases, the federal government of Nigeria officially announced the emergence of the second wave of COVID-19 pandemic in December 2020 [43,44]. The Nigerian government also promises to enforce the strict compliance of COVID-19 protocols among residents in a bid to control the spread of the virus [45]. This spread of the new wave of COVID-19 in Nigeria cannot be disassociated from knowledge and practices of the people. Given that there is currently a dearth of research on the subject in the second wave of the virus, this study examined COVID-19 health knowledge and practices of Nigerian residents during the second wave of the pandemic.

Materials and Methods

Study design and setting

A cross-sectional study was conducted from January 2, 2021 to February 1, 2021 in Nigeria. The country hit the second wave of the COVID-19 pandemic in December 2020. It recorded over 1000 confirmed new cases when compared to less than 200 confirmed new cases per day as of November 2020 [43]. According to Worldometer [39] Nigeria also has the largest population on the African continent (over 208 million people).

Study population and sample

The target population for this study are Nigerian adult residents, aged 19 years and above. Half of Nigeria's population is aged 19 years and above [46]. As such, 104 million of the Nigeria's total of 208 million are aged 19 years and above. In the light of this fact, the Taro Yamane' [47] formula was used to determine the study's sample size.

$$n = \frac{N}{1 + N(e^2)}$$

Where:

n = Sample size

N = Population size (104 million - estimated population)

1 = Constant

e = error of sampling (0.05).

$$n = \frac{104{,}000000}{1+104{,}000000\,(0.05^2)} = \frac{104{,}000000}{1+104{,}000000\,(0.0025)} = 399$$

*n= 399*6 = 2394 (estimate for six geopolitical zones of Nigeria)*

The above indicates that 2394 copies of the questionnaire were expected. However, only 1,988 copies were retrieved and found

valid for analysis, accounting for an 83% response rate.

Study instrument and data collection procedure

Self-administered questionnaire was the instrument used for data collection. The instrument was shaped by similar studies conducted in Pakistan [3] and Ethiopia [48]. Also, the World Health Organization's [49] COVID-19 Questions and Answers Updates guided the design of the instrument. The questionnaire was designed in Google form and administered to respondents online via a link sent to their emails and social media networks (Twitter, WhatsApp, Facebook and Instagram).

The document was accompanied with a kind request that they should fill the survey form and also forward the designated link to their social media contacts (friends, colleagues and family members) to increase responses. The instrument had three sections: socio-demographics (residence, sex, age, education, religion and ethnicity); knowledge of COVID-19 (13 items); and practices of COVID-19 precautions (6 items). The items on knowledge of COVID-19 were coded: "Yes =2", "Don't know = 1" and "No = 0". During the analysis, these were re-coded as: "1" for every correct answer and "0" for every incorrect answer and don't know response. The possible score ranges from 0-13. Scoring ≥10 indicates good knowledge and scoring <10 denotes poor knowledge. Items on practices towards COVID-19 prevention were coded thus: "Yes = 2", "Sometimes = 1" and "No = 0". Possible score ranges from 0-12.

After computation, scores <7 were referred to as inadequate practices and ≥7 adequate practices. The scores <7 were also further re-coded into "0" for inappropriate practices and ≥7 into "1" for appropriate practices.

Validity and reliability of the instrument

Before data collection, the instrument was reviewed by four senior faculty members from the University of Ibadan and Afe Babalola University Ado-Ekiti to ascertain the content's validity. Three items were excluded for being irrelevant and unduly repeated. Two items were rephrased for being double-barreled, ambiguous questions. Subsequently, a pilot study was conducted among 30 respondents who were excluded from the main study, to check for the reliability of the instrument. Cronbach's alpha reliability of the instrument yielded an internal consistency of 0.72.

Data processing and analysis

The responses from participants of the online survey were automatically saved in the Google form after submission. The data gotten from the pilot study were not included in the main analysis. The submitted responses were downloaded into an Excel spreadsheet for cleaning after which it was imported into SPSS version 25 for analysis. The data were analyzed at descriptive (frequency and percentage), bivariate (chi-square) and multivariate (binary logistic regression) levels. The demographic characteristics of respondents and knowledge of COVID-19 were the predictor variables, while the practice of COVID-19 precautions was the dependent variable. The level of significance was set at $p<0.05$ at a confidence interval of 95%.

Ethical consideration

The study was approved by the Institutional Review Board (IRB) of Afe Babalola University Ado-Ekiti (ABUAD) Ethical Committee (Reference No. AB/EC/21/01/120). The Helsinki Declaration and the national ethical guidelines of research were also adhered to. All participants consented to voluntarily participate in the

study after reading and understanding the purpose of the study. The consent form was also clearly written on the cover page of the online survey. It was designed with two options 'Yes" or "No", prepared in a way that participants were to consent before they could proceed to the survey questions. Prospective respondents who did not consent or opted for the "No" option, were automatically restricted from proceeding to the main survey sections. Participants were also given the option of withdrawing at any stage of the study without penalty by not submitting their responses. Any survey which was not submitted at the end were automatically deleted from the Google form. The information gathered from respondents were treated with utmost confidentiality and used only for this research purpose.

Results

Background characteristics of respondents

A total of 1,988 respondents were sampled for this study. About 49% were urban dwellers and more than half of the respondents were males (63.0%). One-third of the respondents were aged 25 years and below (31.2%). More than half of the total respondents were married (58.1%), had tertiary education (67.4%) and were Christians (68.2%). (Table 1).

Responses on covid-19 health knowledge and practices questionnaire

All the participants of the study had heard of the novel coronavirus, called COVID-19. 72% thought that COVID19 was an airborne disease. A total of 36% were not aware that the COVID-19 infection could be contracted from a person who had shown no symptoms of the virus but had recently visited an infected area. About 73% believed that gaggling saltwater and/or exposure to heat and sun could protect against COVID-19, 79% thought that taking a deep breath for more than 10 seconds is an effective way to self-check for COVID-19 infection. However, a good number of the respondents knew that fever, tiredness, dry cough, vomiting, sore throat and difficulty in breathing were possible symptoms of the COVID-19 infection (90.9%), and that a person could contract the virus by touching infected surfaces (97.4%).

The responses on the precautionary practice shows that 67% of the respondents did not wear face masks when leaving their homes, 63% did not avoid crowded places, 86% did not avoid shaking hands with people, and 54% did not maintain social distancing. (Table 2).

Health knowledge and practices of COVID-19 precautions

The suburban dwellers had good knowledge and appropriate practice of COVID-19 precautions than others ($p<0.001$). The females had good knowledge and appropriate practice of COVID-19 precautions than males ($p<0.001$). The respondents who were aged 42-49 years had good knowledge and appropriate practice towards COVID-19 than others ($p<0.001$). The unmarried had good knowledge and appropriate practice of COVID-19 precautions than married ($p<0.001$). The respondents with tertiary education had good knowledge and appropriate practice towards COVID-19 than those with secondary education ($p<0.001$). The Christians had good knowledge and appropriate practices of COVID-19 precautions than Muslims ($p<0.001$). While the Igbos had good knowledge of COVID-19 than other ethnic groups, the Yorubas had the highest score on appropriate practice of COVID-19 precautions ($p<0.001$). Good knowledge of COVID-19 was significantly associated with appropriate practices towards

COVID-19. Those with good knowledge of COVID-19 scored significantly higher than those with poor knowledge ($p<0.001$). (Table 3).

The logistic regression of respondents' likelihood of practicing COVID-19 precautionary measures is shown in Table 4. The results indicate that rural dwellers were 55% less likely to practice appropriate COVID-19 precautions compared to urban residents (OR = 0.552, 95% CI 0.351–0.868) when controlled for other variables. Females were 4.5 times more likely to practice appropriate COVID-19 precautions than males (OR = 4.494, 95% CI 3.264–6.187). Respondents aged 26-33 years (OR = 0.362, 95% CI 0.244-0.538) and 50 years and above (OR = 0.137, 95% CI 0.071-0.261) were 36% and 13% respectively less likely to practice appropriate COVID-19 precautions than aged ≤25 years. Those aged 42-49 years were 2 times more likely than the reference category (OR = 1.990, 95% CI 0.989–4.005). The married respondents were 5 times more likely to practice appropriate COVID-19 precautions than unmarried (OR = 5.004, 95% CI 3.242–7.724). The respondents with tertiary education were 7 times more likely to practice appropriate COVID-19 precautions than those with secondary education (OR = 7.049, 95% CI 4.362–11.391). While the Yoruba were 2.8 times more likely to practice appropriate COVID-19 precautions (OR = 2.828, 95% CI 1.292–6.187), other ethnic groups were 0.37 times less likely (OR = 0.365, 95% CI 0.152–0.880) when compared to Hausas. Respondents with a good knowledge of COVID-19 were 2 times more likely to practice appropriate COVID-19 precautions than those with poor knowledge (OR = 1.905, 95% CI 1.376–2.637).

Discussion

This was a cross-sectional study conducted to assess COVID-19 health knowledge and practices among Nigerian residents during the second wave of the pandemic. Overall, the findings revealed that participants had 73% good knowledge and 56% appropriate practice scores on COVID-19. Earlier studies which were conducted among health workers in Nepal and China reported 81.5% and 89% sufficient knowledge on COVID-19 respectively [15,22]. The high knowledge score on COVID-19 in our study is associated with the literacy level of the respondents. All the participants in our study had at least secondary education, with 67.4% having tertiary education.

In particular, all the participants had heard of the novel coronavirus, called COVID-19. A good number of them thought that COVID19 was an airborne disease (72%). At the moment, COVID-19 has not yet been proven to be an airborne disease as it remains an inconclusive debate among health professionals [50-52]. Although over 200 scientists have argued that COVID-19 is an airborne disease, the World Health Organization is yet to agree to their assertion [51,53]. Studies have revealed that COVID-19 is a droplet that may survive in the air for few minutes and could infect anyone who is exposed to it within that period [50,52]. At the moment the argument remains that COVID-19 is transmitted through a respiratory droplet from an infected person [54-56]. Although the World Health Organization has recommended airborne precautions for circumstances and settings in which aerosol generating procedures and support treatment are performed, it has insisted that COVID-19 is transmitted via respiratory droplets [56].

One-third of the respondents in our study did not know that they could be infected by the virus if they inhaled a droplet from an infected person who showed no symptoms of the virus. This ignorance could prevent many people from adhering to the COVID-19

preventive measures, especially when they are with people who show no symptoms of the virus [57]. However, studies have revealed that COVID-19 could be transmitted by those who showed no symptoms of the virus [54,58]. Our finding showed that 73% of the respondents believed that drinking warm water, gurgling saltwater and/or exposure to heat and sun protects against COVID-19. This assumption is wrong. Drinking warm water is good for the body because it improves digestion, reduces metabolic waste and enhances the immune system. However, these practices do not protect against COIVID-19 [59]. Drinking or gurgling saltwater may relieve throat discomfort but it does not kill the virus. As a matter of fact, it could expose consumers to high blood pressure and cardiovascular diseases [60,61]. The spread of COVID-19 may be easier in colder environments but the belief that the sun or heat protects against the virus lacks a scientific base [62]. The lack of clarity on these wrong assumptions will not only increase the spread of the virus, it may expose a lot of people to health risks.

About 79% of our respondents thought that taking a deep breath for more than 10 seconds is an effective way to self-check for COVID-19 infection. Taking deep breaths for self-check is not bad per se but it has been debunked severally as an ineffective method for COVID-19 diagnosis [62]. The fact is, some individuals may breathe well but are either asymptomatic or pre-symptomatic, and during this period, they may also infect others [58]. Our study found that more than half of the respondents did not avoid crowded places (63%) nor wear face masks when leaving their homes (67%). Majority did not avoid shaking hands with people (86%). More than half of the participants did not maintain social distancing (54%). These nonchalant attitudes and practices are dangerous to public health and indicate that more than half of the respondents were not observing COVID-19 protocols. Ignoring these relevant precautionary measures could lead to a spread of the virus with attendant consequences on the health of the people, especially in the case of Nigeria where there is a lack of adequate health care services and utilization [63,64].

Our findings showed that rural dwellers were less likely to practice appropriate COVID-19 precautions than urban dwellers. Although the rural areas may be less crowded than the urban areas, appropriate information and sensitization programmes against COVID-19 is needed in the rural areas [65]). The implication of ignoring rural people who have less access to health care services in the fight against COVID-19 pandemic is that there might be outrageous mortality rates. Females were more likely to practice appropriate COVID-19 precautions than males. This finding supports the studies conducted in China, Saudi Arabia and Uganda that females had good knowledge and practices towards COVID-19 than males [66-68]. However, our findings deviated from that of a study conducted in Cameroon which showed that women had lower scores compared to men on COVID-19 practices [69].

Those respondents aged 50 years and above were less likely to practice appropriate COVID-19 precautions than those aged ≤25 years. The practice of COVID-19 precautions was higher among the respondents aged 42-49 years. This supports an earlier study that those aged 21–30 years had significantly higher knowledge of COVID-19 than others [14]. The implication is that the older population needs to be educated on appropriate knowledge of COVID-19 to improve their health practices due to their age and attendant vulnerability. The married were more likely to practice appropriate COVID-19 precautions than unmarried. While the Yorubas were more

likely to practice appropriate COVID-19 measures than Hausas, other ethnic groups were less likely compared to Hausas. Our findings showed that respondents with good knowledge of COVID-19 were more likely to also practice appropriate COVID-19 precautions than those with poor knowledge. The mean score was 73% for good knowledge and 56% for appropriate practices. This finding supports existing studies that there is an association between knowledge and practices towards COVID-19 [48,68].

The first limitation of our study was the inability to capture the non-educated population who could not read. Secondly, those with no access to Internet and social media could not participate in the study because the survey was online. Future research should focus on these non-educated members of society and those with limited access to the Internet and social media networks to assess their views on the subject matter.

Conclusion and Recommendations

A substantial number of our respondents had good knowledge but lacked appropriate practices towards COVID-19. This was strongly associated with beliefs and attitudes towards the infection. More than half of the respondents did not avoid crowded places nor wear mask when leaving their homes. Majority did not avoid shaking hands with others nor maintained social distancing.

The practice of COVID-19 precautions was significantly associated with residence, sex, age, marital status, education, ethnicity and knowledge of the virus. Adequate sensitization programmes, in some cases, the use of local languages/dialects and Nigerian Pidgin English would improve the spread of undiluted information regarding the virus, especially among people in rural settings. The strict monitoring of the adherence to COVID-19 protocols should be executed and monitoring teams should be set up in every locality. Local government chairmen, councilors and traditional rulers should lead these monitoring teams in their locales. The monitoring process should focus on encouraging and improving protocols compliance than obtaining financial benefits from offenders.

Victims of the virus, including those who have recovered, should be encouraged to attest on social media about how they felt or feel when they were sick and mention the possible ways through which they could have contracted the infection. The faces of these persons should not be covered to convince the masses that COVID-19 is real and could affect anyone. Covering the faces of victims could make many to believe that the virus is a scam. Social media should also be utilized for this campaign because it serves as a major hub of information for a lot of people today. In addition, COVID-19 testing should be encouraged and also carried out among people in the lower socio-economic rungs of society to confirm more cases and improve appropriate practices. Those that refuse to wear masks, with their noses and mouths covered, should be restricted from accessing public places like markets, schools and religious centres.

Competing Interests

The authors declare that they have no competing interests.

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Appendix

Table 1: Background Characteristics of Respondents (n = 1,988)

Variables	N	%
Residence		
Urban	980	49.3
Suburban	360	18.1
Rural	648	32.6
Sex		
Male	1252	63.0
Female	736	37.0
Age		
≤25	620	31.2
26-33	292	14.7
34-41	232	11.7
42-49	208	10.5
50+	636	32.0
Marital status		
Unmarried	832	41.9
Married	1156	58.1
Education		
Secondary	648	32.6
Tertiary	1340	67.4
Religion		
Christianity	1356	68.2
Islam	632	31.8
Ethnicity		
Hausa	536	27.0
Yoruba	700	35.2
Igbo	440	22.1
Other	312	15.7

Table 2: Responses on COVID-19 Knowledge and Practice Questionnaire (n = 1,988)

	Knowledge Questions	**'Correct Answers' N (%)**
K1	Have you heard about the novel coronavirus, also called COVID-19?	1988 (100%)
K2	Are fever, tiredness, dry cough, vomiting, sore throat and difficulty in breathing possible symptoms of COVID-19 infection?	1808 (90.9%)
K3	Can someone contract the COVID-19 virus from touching surfaces such as staircases, doors, chairs and objects?	1936 (97.4%)
K4	Is there any laboratory test to confirm the presence of COVID-19 infection?	1896 (95.4%)
K5	Is COVID19 an airborne disease?	540 (27.2%)
K6	Does COVID-19 spread through respiratory droplets of an infected person?	1776 (89.3%)
K7	Can COVID-19 infection be caught from a person who presents no symptoms and has recently visited the affected area?	1268 (63.8%)
K8	Is antibiotic a cure for COVID-19 infection?	932 (46.9%)
K9	Are people with a low immune system, and the elderly at more risk of contracting COVID-19 virus?	1976 (99.4%)
K10	Are people in crowded places at more risk of being infected by the COVID-19 virus?	1908 (96.0%
K11	Can wearing a mask prevent a person from being infected by the COVID-19 virus?	1820 (91.5%)
K12	Can drinking warm water, gargling saltwater and/or exposure to heat and sun protect against COVID-19?	532 (26.8%)
K13	Is taking a deep breath and holding your breath for more than 10 seconds an effective way to self-check for COVID-19 infection?	424 (21.3%)
	Practice Questions	**Wrong practices 'No responses' N (%)**
P1	In recent days, do you wear mask when you go out of your home?	656 (33.0%)
P2	In recent days, do you regularly wash your hands with soap and water or rub an alcohol-based hand sanitizer?	68 (3.4%)
P3	In recent days, do you avoid going to crowded places?	748 (37.6%)
P4	In recent days, do you avoid touching your eye, nose and mouth?	812 (40.8%)
P5	In recent days, do you avoid shaking hands with people?	276 (13.9%)
P6	In recent days, do you maintain social distancing of at least 3 feet from others	924 (46.5%)

Note: Overall mean score: good knowledge = 9.44±1.8 (72.6%); appropriate practice = 6.72±3.1(56%)

Table 3: Chi-Square Analysis on Health Knowledge and Practices of COVID-19 Precautionary Measures by Socio-Demographic Variables (n = 1,988)

Variables	Poor knowledge N (%)	Good knowledge N (%)	X^2 (p-value)	Inappropriate Practice	Appropriate Practice	X^2 (p-value)
Residence						
Urban	360(36.7)	620(63.3)	753.096***	412(42.0)	568(58.0)	460.342***
Suburban	60(16.7)	300(83.3)		96(26.7)	264(73.3)	
Rural	616(95.1)	32(4.9)		568(87.7)	80(12.3)	
Sex						
Male	716(57.2)	536(42.8)	34.913***	860(68.7)	392(31.3)	288.942***
Female	320(43.5)	416(56.5)		216(29.3)	520(70.7)	
Age						
≤25	269(43.2)	352(56.8)	626.171***	240(38.7)	380(61.3)	528.023***
26-33	88(30.1)	204(69.9)		148(50.7)	144(49.3)	
34-41	68(29.3)	164(70.7)		88(37.9)	144(62.1)	
42-49	32(15.4)	176(84.6)		32(15.4)	176(84.6)	
50+	580(91.2)	56(8.8)		568(89.3)	68(10.7)	
Marital status						
Unmarried	312(37.5)	520(62.5)	122.427***	392(47.1)	440(52.9)	28.312***
Married	724(62.6)	432(37.4)		684(59.2)	472(40.8)	
Education						
Secondary	520(80.2)	128(19.8)	304.925***	584(90.1)	64(9.9)	501.748***
Tertiary	516(38.5)	824(61.5)		492(36.7)	848(63.3)	
Religion						
Christianity	428(31.6)	928(68.4)	721.751***	540(39.8)	816(60.2)	351.368***
Islam	608(96.2)	24(3.8)		536(84.8)	96(15.2)	
Ethnicity						
Hausa	536(100.0)	-	732.427***	520(97.0)	16(3.0)	609.060***
Yoruba	268(38.3)	432(61.7)		204(29.1)	496(70.9)	
Igbo	88(20.0)	352(80.0)		176(40.0)	264(60.0)	
Other	144(46.2)	168(53.8)		176(56.4)	136(43.6)	
Knowledge						
Poor knowledge				732(70.7)	304(29.3)	238.120***
Good knowledge				344(36.1)	608(63.9)	

*Note: Pearson Chi-Square level of significance at*P<0.05; **P<0.01; ***P<0.001*

Table 4: Logistic Regression Coefficients of Respondents' Likelihood of Practicing COVID-19 Precautionary Measures by Socio-Demographic Variables

Variables	B	S.E.	Wald	p-value	Odds ratio	95% C.I.	
						Lower	Upper
Residence							
Urban (RC)					1.000		
Suburban	0.320	0.194	2.734	0.098	1.377	0.942	2.012
Rural	-0.594	0.231	6.632	0.010	0.552**	0.351	0.868
Sex							
Male (RC)					1.000		
Female	1.503	0.163	84.860	0.000	4.494***	3.264	6.187
Age							
≤25 (RC)					1.000		
26-33	-1.015	0.202	25.320	0.000	0.362***	0.244	0.538
34-41	0.090	0.291	0.096	0.756	1.095	0.618	1.938
42-49	0.688	0.357	3.722	0.054	1.990*	0.989	4.005
50+	-1.991	0.331	36.285	0.000	0.137***	0.071	0.261
Marital status							
Unmarried (RC)					1.000		
Married	1.610	0.221	52.889	0.000	5.004***	3.242	7.724
Education							
Secondary (RC)					1.000		
Tertiary	1.953	0.245	63.598	0.000	7.049***	4.362	11.391
Religion							
Christianity (RC)					1.000		
Islam	0.019	0.256	0.006	0.941	1.019	0.617	1.684
Ethnicity							
Hausa (RC)					1.000		
Yoruba	1.040	0.399	6.771	0.009	2.828***	1.292	6.187
Igbo	-0.757	0.469	2.605	0.107	0.469	0.187	1.176
Other	-1.007	0.449	5.041	0.025	0.365*	0.152	0.880
Knowledge							
Poor knowledge (RC)					1.000		
Good knowledge	0.644	0.166	15.079	0.000	1.905***	1.376	2.637
Overall Model Evaluation							
Omnibus tests:	1126.316***						
Nagelkerke R Square:	0.578						
-2 Log Likelihood:	1616.093						
Hosmer & Lemeshow Test:	0.738						
% classified correctly:	79.5						

*NB: Significance at *P<0.05; **P<0.01; ***P<0.001; RC=Reference category, N=1,988*