



## **Knowledge and perception as critical components in recognition of Covid-19 symptoms**

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### **Abstract**

The knowledge, attitude, and practices (KAP) people hold towards a new disease could play a major role in the way they accept measures put in place to curb its spread as Symptoms of COVID-19 are similar to those of other endemic diseases, especially malaria. A cross-sectional KAP/symptomatology online survey was conducted from August –September 2020 across the six geopolitical regions of Nigeria. Data were entered into Google sheets and analyses performed using SPSS version 20. From the 900 respondents, majority 66% were from the North west while 1.2% were from the North east. By sex and age distribution, 69% were males while females were 31%. Age group 15-25 years were more (32.22%) and the least (11%) among respondents were above 65years. Majority of respondents (57.89%), had not experienced symptoms associated with COVID-19 in the past 3 months before this study, however 96.0% of respondents have heard about COVID-19 prior the time of survey. Hyperthermia (high fever) 636(70.67%) was accurately recognized by respondents as the most common symptoms. Other highly mentioned symptoms were dry or chesty cough, shortness of breath, catarrh and cough, difficulty in breathing at night, painful breathing, and weakness or tiredness, with significant differences in the responses recorded for the recognition of COVID-19 symptoms across the geopolitical zones ( $p=0.00$ ). In terms of preventive measures, 771(85.67%) respondents perceive regular hand washing with soap as the major preventive measure for COVID-19 infection. This was followed by the usage of face mask 659(73.22%). Also, 794(88.22%) respondents accurately recognized hyperthermia as the most common overlapping symptom between malaria and COVID-19. Other highly mentioned overlapping symptoms were weakness or tiredness 591(65.67%), loss of appetite 504 (56.00%), loss of taste and smell 388(43.11%), and catarrh and cough 313(34.78%). We conclude that awareness of COVID-19 symptoms is fairly high in the country. Awareness strategies should target those with limited access to information on the disease.

**Keywords:** COVID-19, Knowledge, Symptoms, Preventive measures

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## Introduction

Coronavirus infection 2019 called COVID-19, a highly lethal viral disease caused by SARS-CoV-2, first emerged in Wuhan China in December 2019. WHO on 11 March 2020, declared the outbreak of SARS-CoV-2 to be a pandemic infection. There have been 51,547,733 confirmed cases of COVID-19 globally, including 1,275,979 deaths. In Africa, 1,374,303 cases with 45,947 deaths while in Nigeria 64,336 cases with 1,160 deaths have been confirmed (1). Clinical manifestations range from hyperthermia, interstitial pneumonia to severe acute respiratory syndrome (2, 3) with some cases exhibiting cardiac, gastrointestinal, neurological or renal manifestations.

Nigeria recorded its first case of COVID-19 in Lagos on 27 February 2020, brought in by an Italian who arrived from Milan, Italy [4]. From this index case, and perhaps other unknown cases, the infection began to crawl into other parts of the country. Early measures taken to contain these cases did not yield the desired results, and transmission continued until individual infections could not be traceable to any known sources. The Nigerian Centre for Disease Control (NCDC) declared that transmission of COVID-19 was at this point at the community level [5]. The rapid spread of the disease is brought about by high human mobility, transmission from human to human by direct contact, apathy and carelessness in observing the COVID-19 prevention protocol, and limited access to health care, among others [6-10].

To achieve the WHO objective of interrupting human-to-human transmission, there is a need to understand the symptoms that could pass for COVID-19 and to seek medical attention promptly. This need applies to both health practitioners as well as members of the community [11,12]. The symptoms have been described as fever, cough, shortness of breath, trouble breathing, myalgia or arthralgia, confusion, bluish lips, or face [13,14]. However, these symptoms are shared with other endemic diseases such as malaria [15,16].

Following her support to the public health space, The Parasitology and Public Health Society sponsored the study with the aim of assessing the understanding of COVID-19 symptoms across the six geopolitical zones of Nigeria.

## Methodology

### *Questionnaire Design, Questionnaire and Administration*

Questions for the questionnaire were pretested to ensure they have a similar meaning in all the geopolitical zones. The questions were then used to populate a Google form. This form has the advantage of being cost-effective, no paper wastage, time economy as well as reliable [17] and has been applied for the survey of COVID-19 with success in Nigeria and elsewhere [18–20]. The questionnaires were administered to the contacts of members of the PPSN through their mobile devices.

### *Study Participants*

Study participants included everyone who volunteered to fill the form. These were community leaders, existing native health service providers, and community members.

### *Data collection*

A team of researchers per state collected data during the period of this study from August-October 2020. Interview guides were tailored for different participant groups and consisted of three sub-sections,

- i) socio-demographic characteristics of the participants;
- ii) a structured and pretested short questionnaire to assess the knowledge of participants on key symptoms used in self-diagnosis or self-recognition of malaria and COVID-19 disease; and
- iii) semi-structured guide to exploring participants' opinion on overlapping symptoms, accurate recognition of both diseases, communal based remedies for the management of both disease, challenges, and solutions towards increasing demand for COVID-19 laboratory testing.

The interview guides were translated into local languages to fit the context of study communities and pretested before data collection. All interviews were conducted in either Native or English language, as preferred by the interviewee by three data collectors trained in social sciences and experienced in qualitative and mixed methods research. Before the commencement of interviews, the study was explained to all participants in their preferred language and both informed verbal (and audio-recorded) and written consent was obtained where applicable. The study participants were guaranteed

the confidentiality and anonymity of their data. Data from forms were entered into computers by the research team and were held in secure databases. Electronic copies of all data were sent to PPSN central data manager and stored on a computer protected with a password. This was maintained throughout the study. Once the study has ended, the data was stored in a safe location, and only authorized people had access to the data files. Each interview lasted approximately 30 minutes and was audio-recorded with the consent of each participant.

*Data processing, Validation, and Analysis*

All interviews were transcribed verbatim and translated into English for analysis. Quantitative data were analyzed using descriptive statistics in SPSS 20.0, while qualitative data were analyzed thematically using N-vivo software, following standard data analysis steps, reading transcripts, initial coding, developing a coding framework, coding all transcripts, data synthesis across different themes.

*Ethics*

Participation was voluntary and all the respondents were assured that the survey was purely for research purposes and that the information provided and the identity of the providers would be treated with the utmost confidentiality.

**Results**

*Distribution of study participants per geopolitical zones in Nigeria*

A total of 900 respondents across six geopolitical

zones in Nigeria participated in this study. By States, 33 (89.2%) states, across the six geopolitical zones were represented, with majority of the respondents from the North-west zone, 591(65.67%), followed by south-west with 99(11.0%), South-south 97(10.78%), South-east with 66(7.33%), North-central, 36(4.0%) and North-east with 11(1.22%). There were significant differences in the number of respondents per geopolitical zones (p=0.000)(Table 1).

**Table 1:** Distribution of study participants per geopolitical zones in Nigeria

Geopolitical Zones	Number of States Sampled (%)	Number of respondents (%)	P-value
South-west	6 (18.18)	99(11.0)	0.000
South-east	5 (15.15)	66(7.33)	
South-south	6 (18.18)	97(10.78)	
North-east	4 (12.12)	11(1.22)	
North-west	6 (18.18)	591(65.67)	
North-central	6 (18.18)	36(4.0)	
Total	33 (100)	900(100)	

*Sex and Age characteristics of study participants*

By sex distribution, a total of 623 (69.22%) were males, and 277(20.78%) were females. There exist significant differences in sex category of the study participants (p=0.00). In addition, by age category, majority of the study participants 290(32.22%) were within 15-25 years age category. This was followed by those within the age category 26-45 years representing 229(25.44%) of the study population. Participants above 66years of age were the least sampled with 99(11.0%). There exist significant difference in age category of the study participants (p=0.00)(Table 2).

**Table 2:** Sex and Age characteristics of study participants

	Geopolitical Zones						Total	$\chi^2$ value, Df, p - value
	SW	SE	SS	NW	NE	NC		
<b>Sex</b>								
Male	52 (52.5)	34(51.5)	40(41.2)	6(54.5)	472(79.9)	19(52.8)	623(69.22)	95.42,5,0.00
Female	47 (47.5)	32(48.5)	57(58.8)	5(45.5)	119(20.1)	17(47.2)	277(20.78)	
Total	99 (100)	66(100)	97(100)	11(100)	591(100)	36(100)	900(100)	
<b>Age (in years)</b>								
15-25	12(12.1)	9(13.6)	8(8.2)	0(0)	253(42.8)	2(5.6)	290(32.22)	732.19, 20, 0.00
26-45	43(43.4)	28(42.4)	48(49.5)	6(54.5)	81(13.7)	24(66.7)	229(25.44)	
46-65	39 (39.4)	25(37.9)	34(35.1)	5(45.5)	44(7.4)	9(25.0)	156(17.33)	
>66	2 (2.0)	4(6.1)	90(92.8)	0(0)	3(0.5)	0(0)	99(11.00)	
No response	3 (3.0)	-	7(7.2)	0(0)	210(35.5)	1(2.8)	221(24.56)	
Total	99 (100)	66(100)	97(100)	11(100)	591(100)	36(100)	900(100)	

SW-South-west; SE-South-east; SS-South-south; NW-North-west; NE-North-east; NC- North-central

*Knowledge about COVID-19, history of associated symptoms and preventive measures among study participants*

A total 864 (96.0%) respondents have heard about COVID-19 prior the time of survey. All of the respondents 11(100%) from the North-west geopolitical zone affirms to this, followed by respondents in the North-central zone, 35(97.2), south-east zone, 64(97.0%), South-west 95(96.0%), South-south 93(95.9%) and North-east 566(95.8%). There were no significant differences in respondent knowledge about COVID-19 across the six geopolitical zones ( $p=0.00$ ) (Table 3).

However, majority of the respondents surveyed 521(57.89%), had not experienced symptoms associated with COVID-19 before in the past 3 months. This was the case with five geopolitical

zones, except in the South-west, with majority of the respondents 71(71.7%) affirming that they had experienced at least one of the symptoms of COVID-19 in the past three months. There exist significant differences in history of COVID-19 symptoms among the age category of the study participants ( $p=0.00$ ) (Table 3).

Furthermore, a total 773(85.89%) respondents affirms to knowing how to prevent COVID-19 infection. All of the respondents 11(100%) from the North-west geopolitical zone affirms to this, followed by respondents in the south-east zone, 64(97.0%), South-west 95(96.0%), South-south 93(95.9%), North-central 33(91.7%) and North-east 477(80.7%). There were significant differences across the six geopolitical zones ( $p=0.00$ ) (Table 3).

**Table 3:** Knowledge about COVID-19, history of associated symptoms and preventive measures among study participants

	Geopolitical Zones						Total (%)	$\chi^2$ value, Df, p - value
	SW	SE	SS	NW	NE	NC		
<b>Have you heard of COVID-19 before</b>								
Yes	95 (96.0)	64(97.0)	93(95.9)	11(100)	566(95.8)	35(97.2)	864(96.00)	10.14,10, 0.43
No	1 (1.0)	1(1.5)	4(4.1)	0(0)	7(1.2)	1(2.8)	14(1.56)	
No response	3 (3.0)	1(1.5)	-	0(0)	18(3.0)	0(0)	22(2.44)	
Total	99	66(100)	97(100)	11(100)	591(100)	36(100)	900(100)	
<b>Have you experienced any of COVID-19 symptoms before in the past 3-months*</b>								
Yes	71 (71.7)	16(24.2)	15(15.5)	1(9.1)	181(30.6)	7(19.4)	291(32.33)	127.64, 10, 0.00
No	24 (24.2)	50(75.8)	80(82.5)	10(90.9)	329(55.7)	28(77.8)	521(57.89)	
No response	4 (4.1)	-	2(2.1)	0(0)	81(13.7)	1(2.8)	88(9.78)	
Total	99 (100)	66(100)	97(100)	11(100)	591(100)	36(100)	900(100)	
<b>Do you know how to prevent COVID-19</b>								
Yes	95 (96.0)	64(97.0)	93(95.9)	11(100)	477(80.7)	33(91.7)	773(85.89)	40.71,10,0.00
No	3 (3.0)	1(1.5)	2(2.1)	0(0)	60(10.2)	3(8.3)	69(7.67)	
No response	1 (1.0)	1(1.5)	2(2.1)	0(0)	54(9.1)	0(0)	58(6.44)	
Total	99 (100)	66(100)	97(100)	11(100)	591(100)	36(100)	900(100)	

SW-South-west; SE-South-east; SS-South-south; NW-North-west; NE-North-east; NC- North-central

\*List of symptoms as detailed under the questionnaire sub-section in the methodology were presented to each respondent.

*Recognition of COVID-19 symptom among study participants*

Of the 900 study participants, a total 636(70.67%) accurately recognized hyperthemia (high fever) as the most common symptoms of COVID-19. Other highly mentioned symptoms were dry or chesty cough, 578(64.22%), shortness of breath, 549(61.00%), catarrh and cough, 456(50.67%), difficulty in breathing at night 375(41.67%), painful breathing, 365(40.56%) and weakness or tiredness, 360(40.00%). There exist no significant differences in the responses recorded for the recognition of COVID-19 symptoms across the geopolitical zones

( $p=0.00$ ) except for difficulty in breathing at night ( $p=0.33$ ) and painful breathing ( $p=0.23$ ) (Table 4).

Furthermore, by geopolitical zones, high fever was the most recognized symptoms of COVID-19 in the south-west 76(76.77%), south south 70(72.16%), north-west 8(72.73%), and north central 27(75.0%) region. While dry or chesty cough was the most recognized symptoms in the north-east 358(60.57%) and both symptoms high fever 48(72.73%) and dry or chest cough 48(72.73%) were equally recognized as the common symptoms for COVID-19 in the south-east region (Table 4).

**Table 4:** Recognition of COVID-19 symptom among study participants

Variables	Geopolitical Zones						Total	$\chi^2$ value, Df, p - value
	SW (n=99)	SE (n=66)	SS (n=97)	NW (n=11)	NE (n=591)	NC (n=36)		
High fever	76(76.77)	48(72.73)	70(72.16)	8(72.73)	407(39.26)	27(75.0)	636(70.67)	21.87,5,0.000
Dry or chesty cough	72(72.73)	48(72.73)	69(71.13)	7(63.64)	358(60.57)	24(66.67)	578(64.22)	10.727,5,0.05
Shortness of breath	73(73.74)	33(50.0)	59(60.82)	6(54.55)	354(39.26)	24(66.67)	549(61.00)	11.09,5,0.04
Difficulty in breathing at night	33(33.33)	33(50.0)	45(46.39)	4(36.36)	245(41.46)	15(41.67)	375(41.67)	5.73,5,0.33
Weakness or tiredness	54(54.55)	2(3.03)	50(51.55)	6(54.55)	232(59.90)	16(44.44)	360(40.00)	52.95,5,0.00
Painful breathing	47(47.47)	29(43.94)	44(45.36)	3(27.27)	232(59.90)	10(27.78)	365(40.56)	6.87,5,0.23
Catarrh and cough	41(41.41)	35(53.03)	46(47.42)	4(36.36)	316(53.47)	14(38.89)	456(50.67)	8.701,5,0.12
Painful joint muscles	25(25.25)	15(22.73)	27(27.84)	4(36.36)	171(28.93)	5(13.89)	247(27.44)	5.40,5,0.37
Sudden High Blood Pressure	9(9.09)	8(12.12)	14(14.43)	2(18.18)	84(14.21)	2(5.56)	119(13.22)	4.25,5,0.51
Frequent Diarrheic Stooling	17(17.17)	11(16.67)	19(19.59)	3(27.27)	52(8.80)	3(8.33)	105(11.67)	18.23,5,0.002
All of the above	14(14.14)	14(21.21)	18(18.56)	3(27.27)	101(17.09)	10(27.78)	160(17.78)	4.80,5,0.44
Insomnia	1(1.0)	1(1.5)	2(2.06)	0(0)	0(0)	0(0)	4(0.44)	11.01,5,0.051
Loss of taste	2(2.0)	1(1.5)	1(1.03)	0(0)	0(0)	1(2.8)	5(0.56)	11.92,5,0.03
Loss of smell	0(0)	2(3.0)	0(0)	0(0)	1(0.2)	0(0)	3(0.33)	15.74,5,0.007
Loss of taste and smell	3(3.0)	5(7.6)	7(7.22)	0(0)	3(0.5)	1(2.8)	19(2.11)	29.84,5,0.000
Stomach and body pain	1(1.0)	1(1.5)	0(0)	0(0)	2(18.18)	2(0.3)	6(0.67)	53.71,5,0.000
Cold and sneezing	1(1.0)	0(0)	1(1.03)	0(0)	0(0)	0(0)	2(0.22)	7.201,5,0.206
Sore throat	3(3.0)	0(0)	0(0)	0(0)	1(0.2)	0(0)	0(0.44)	16.55,5,0.005
Loss of Appetite	1(1.0)	0(0)	0(0)	0(0)	1(0.2)	0(0)	2(0.22)	3.31,5,0.65
Fatigue	1(1.0)	0(0)	0(0)	0(0)	1(0.2)	0(0)	2(0.22)	3.31,5,0.65

SW-South-west; SE-South-east; SS-South-south; NW-North-west; NE-North-east; NC- North-central;

\*:List of symptoms as detailed under the questionnaire sub-section in the methodology were presented to each respondents

*Perception of participants about preventive measures for COVID-19*

Of the 900 study participants, a total 771(85.67%) perceives regular hand washing with soap as the major preventive measure for COVID-19 infection. This was followed by usage of face mask 659(73.22%), practicing social/physical distancing 572(63.56%), Avoidance of crowded places 524(58.22%), usage of hand sanitizers 517(57.44%), sneezing in elbow or tissue and proper disposal 452 (50.22%) and not touching others or hugging 308(34.22%) among others. There exist no significant differences in the responses recorded across the geopolitical zones ( $p=0.00$ ) except for practicing of social distancing ( $p=0.07$ ) difficulty in breathing at night ( $p=0.33$ ) and not touching others or

hugging ( $p=0.80$ ) (Table 5).

However, by geopolitical zones, usage of face masks, was the most mentioned preventive measures for COVID-19 infection in the south-west 71(71.72%), south-south 75(77.32%), south-east 54(81.82%) and north-east 424(71.74%). While usage of face mask 8(72.73%) and avoidance of crowded places 8(72.73%) was recognized as the most perceived preventive measure in north-west, and regular hand washing with soap 27(75.00%) and usage of face mask 27(75.00%) were equally recognized as the most perceived preventive measure for COVID-19 in the north-central zone. (Table 5)

**Table 5 :** Perception of participants about preventive measures for COVID-19 infection

Variables	Geopolitical Zones						Total	$\chi^2$ value, Df, p-value
	Number of respondents (%)							
	SW (n=99)	SE (n=66)	SS (n=97)	NW (n=11)	NE (n=591)	NC (n=36)		
Regular Hand washing with soap	65(65.66)	51(72.27)	2(2.06)	7(63.64)	366(61.93)	27(75.00)	771(85.67)	144.7,5, 0.00
Social/ Physical Distancing	61(61.62)	47(71.21)	73(75.26)	7(63.64)	359(60.74)	25(69.44)	572(63.56)	10.12,5,0.071
Use of Face mask	71(71.72)	54(81.82)	75(77.32)	8(72.73)	424(71.74)	27(75.00)	659(73.22)	4.15,5,0.527
Use of hand sanitizers	0(0)	45(68.18)	70(72.16)	7(63.64)	369(62.44)	26(72.22)	517(57.44)	154.7,5,0.00
Eating good food	43(43.43)	33(50.00)	56(57.73)	7(63.64)	30(50.8)	20(55.56)	189(21.00)	270.6,5,0.000
Avoiding crowded places	62(62.63)	49(74.24)	73(75.26)	8(72.73)	309(52.28)	23(63.89)	524(58.22)	29.3,5,0.000
Taking supplements such as vitamins	45(45.45)	26(39.39)	52(53.61)	6(54.55)	80(13.54)	21(58.33)	230(25.56)	137.4,5,130.5
Eating Garlic and other herbs	45(45.45)	26(39.39)	52(53.61)	6(54.55)	94(15.91)	22(61.11)	245(27.22)	118.8,5,0.000
Sneezing in elbow or tissue and proper disposal	49(49.49)	38(57.58)	68(70.10)	6(54.55)	291(49.24)	0(0)	452(50.22)	53.41, 5, 0.000
Avoiding people who are sick	38(38.38)	28(42.42)	52(53.61)	4(36.36)	139(23.52)	11(30.56)	272(30.22)	45.73,5, 0.000
Not touching others	47(47.49)	40(60.61)	60(61.86)	6(54.55)	134(22.67)	21(58.33)	308(34.22)	2.31,5, 0.80
Staying outside in the morning sun	10(10.10)	13(19.70)	15(15.46)	2(18.18)	47(7.95)	6(16.67)	93(10.33)	14.91, 5, 0.01
All of the above	25(25.25)	10 (15.15)	30(30.93)	3(27.27)	121(20.47)	10(27.78)	199(22.11)	8.56,5, 0.127

*Recognition of overlapping symptoms between COVID-19 and Malaria disease among study participants*

Of the 900 study participants, a total 794(88.22%) accurately recognized hyperthemia (high fever) as the most common overlapping symptom between malaria and COVID-19 disease. Other highly mentioned overlapping symptoms were weakness or tiredness 591(65.67%), loss of appetite 504 (56.00%), loss of taste and smell 388(43.11%) and catarrh and cough 313(34.78%). There exist significant differences in the responses recorded for the recognition of overlapping symptoms between

malaria and COVID-19 disease across the geopolitical zones (p=0.00) except for high fever (p=0.33) (Table 6).

Furthermore, by geopolitical zones, high fever, weakness or tiredness and loss of appetite were the most recognized overlapping symptoms between both disease across the six geopolitical zones except in north-central zone, where high fever, loss of appetite and weakness or tiredness were the most recognized overlapping symptoms in order of decreasing magnitude (Table 6).

**Table 6:** Recognition of overlapping symptoms between COVID-19 and Malaria disease among study participants

Variables	Geopolitical Zones						Total	$\chi^2$ value, Df, p-value
	Number of respondents (%)							
	SW (n=99)	SE (n=66)	SS (n=97)	NW (n=11)	NE (n=591)	NC (n=36)		
Cattarrh and cough	42(42.24)	28(42.42)	55(56.70)	2(18.18)	180(30.46)	6(16.67)	313(34.78)	36.21,5, 0.000
High Fever	90(90.91)	63(95.45)	87(89.69)	10(90.91)	512(86.63)	32(88.89)	794(88.22)	5.74,5, 0.33
Loss of Appetite	48(48.48)	34(51.52)	70(72.16)	8(72.73)	318(53.81)	26(72.22)	504(56.00)	19.34,5,0.001
Sudden High Blood Pressure	17(17.17)	1(1.52)	10(10.31)	0(0)	148(25.04)	3(8.33)	179(19.89)	35.62,5,0.00
Weakness or Tiredness	68(68.69)	54(81.82)	80(82.47)	9(81.82)	358(60.58)	22(61.11)	591(65.67)	28.59, 5,0.00
Loss of taste and smell	32(32.32)	19(28.79)	48(49.48)	4(36.36)	272(46.02)	13(36.11)	388(43.11)	14.79,5,0.01
Painful breathing	16(16.16)	4(6.06)	13(13.40)	2(18.18)	180(30.46)	4(11.11)	219(24.33)	37.53,5,0.00
Frequent diarrheic stooling	10(10.10)	7(10.61)	12(12.37)	1(9.09)	112(18.95)	1(2.78)	143(15.89)	13.91,5,0.016

## Discussion

The present study cuts across participants from the six geopolitical zones of Nigeria. The number of respondents that turned up for the study points to the fact that the method used for research was quite efficient in terms of data gathering. It also points to the level of awareness already available on the disease and the willingness of respondents to know more about the novel infection. The result indicates that there is some degree of understanding of the symptoms of COVID-19 among the populace. Such understanding is comparable with the findings of Sengeh *et al.* [10]. Yet, for this knowledge to be useful in mitigating the spread of the disease, it must be coupled with the observance of COVID-19 prevention and control protocols. In a study in Ibadan, Ilesanmi and Afolabi [21] observed that some residents thought the disease was overrated and a good number did not adequately practice the prevention and control protocol even when they were at the risk of contracting the disease.

The majority of the respondents in the study were males. This is similar to the finding of Christopher [22] in North-central Nigeria. Socio-cultural differences may have affected the sex distribution of the respondents. This, therefore, underscores the need to include gender dimensions in creating awareness on COVID-19 [15, 23]. Similarly, participation was highest in respondents within the age bracket 15-25 years. This result tends to mirror the current trend in the country, as very often males are the ones seen to be very active with their mobile devices as well as been current with the news media.

The age bracket 15-25 years represents a very active proportion of the country's population technologically and this might be the reason why they were more involved in the study than the other age groups. This agrees with the findings of Abdelhafiz *et al.* [24] in Egypt that social media was the main source of information for young adults. This explains the reason why there was a decrease in the number of respondents with an increase in age and this could be taken to reflect the complexity of technology on those who are advanced in age. By implication, this could mean that the older age groups have lesser utilization of information than the younger generation and as such could be rendered vulnerable because of such lack of information this finding is also corroborated by the finding of Christopher [22] as such, more sensitization needs to be carried out on this age group. Alternatively, the

younger population who are more engaging with mobile devices can be engaged in sensitization programs through the various social media, and in turn, they can serve as closer contact who would help in educating their community about the symptoms and preventive measures of the COVID-19 disease.

The level of awareness of the COVID-19 and history of associated symptoms as well as prevention of the disease recorded in this study is very high (96.0%) Compared to studies carried out in other parts of the world [20]. Hager [25] also reported a lower knowledge level in both Nigeria and Egypt. Similar findings to the one reported in this study were made by Zhong *et al.* [26]. Even though respondents from the North-west geopolitical zone all affirmed being fully aware of the symptoms of the infection before the study, their level of knowledge on the disease was not so much different from the respondents in the other geopolitical zones who also reported that they were aware of the symptoms of the disease. In a study carried out in Sierra Leone, Sengeh *et al.* [10] reported that there exists a knowledge gap in the awareness of COVID-19 in the different regions of the country. Our finding is attributable to the fact that the media has played a key role in informing the public on the disease [20] since most respondents from 5 out of the 6 geopolitical zones reported that they had not had any signs in the past 3 months, they were still fully aware of the symptoms of the disease. This might also be the reason that accounted for a large proportion of the respondents being aware of how to prevent the disease.

Of the different symptoms associated with COVID-19 infection, a large number of respondents (70.67%) accurately recognized hyperthermia (high fever) as the most common symptoms of COVID-19. The least symptoms mentioned by respondents was weakness and tiredness. High fever was the most recognized symptom of COVID-19 in the south-west, South-south, north-west, and north-central region. While dry or chesty cough was the most recognized symptom in the Northeast and both symptoms high fever and dry or chest cough were equally recognized as the common symptoms for COVID-19 in the South-east region. This is similar to the finding done by Zegarra-Valdivia [27] in Nigeria. However, the different responses recorded in the different geopolitical Zones could be attributed to the fact that different regions could have different symptoms that might be common to them as is common with other endemic diseases.

From the result of the study conducted, participants recognized different preventive measures for the disease. The most perceived preventive measure was regular hand washing with soap and water followed by the use of a facemask. The use of facemask was a popular preventive means in all the zones compared to the other preventive measures. This is similar to the findings of Gohel *et al.* [28] but different from the findings of Geldsetzer[29]. It is, therefore, necessary for task forces to emphasize the combined use of all the preventive measures against the pandemic.

The study also revealed that the distribution of the respondents across the geographic zones was unequal however, an appreciable number was able to point out overlapping symptoms of both malaria and COVID-19 infection. This might be attributed to the role played by the different media outlets in educating the people about the disease. This is also of an advantage to them since they will easily seek medical attention whenever they notice any of the overlapping symptoms instead of assuming what ailment could have caused it [30]. Being a novel disease, identifying its symptoms as well as proper diagnosis and preventive measures could serve to reduce the risk of its transmission [31,32].

### Conclusion

We conclude that the awareness of COVID-19 symptoms is high across the six geopolitical zones of Nigeria but awareness of the symptoms must be matched with applying preventive and control measures. Campaign strategies must include steps to reach groups, which have limited access to information due to socio-cultural barriers.

This study has shown that the location, gender and age of respondents positively correlated with knowledge, practice for COVID 19 and it will be useful for public health policy-makers and health workers to recognize the target population for COVID-19 prevention and sensitization.

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