(RESEARCH ARTICLE)

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Knowledge of COVID-19, the practice of preventive measures, and their predictors among the residents of an LGA in Port Harcourt, Rivers State, Nigeria

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Abstract

Background: Knowledge is said to determine a behavioral change as well as the practice of good health. Was the knowledge of COVID-19 able to bring about positive behavioral changes and practices among the populace? This study assessed the knowledge of COVID-19, the practice of preventive measures as well as their predictors.

Methodology: Self-administered questionnaires were used to collect data on knowledge of COVID-19 and the practice of WHO COVID-19 preventive measures. Data were analyzed using IBM Statistical Package for the Social Sciences (SPSS) version 25. Categorical data were analyzed and reported as means, standard deviation, and frequency. Binary logistic regression was done to determine predictors.

Results: Nine out of ten participants knew that a virus caused COVID-19 and that it could be transmitted by close contact; however, 3% felt it was a spiritual attack. Most participants knew COVID-19 is transmittable through talking (83.2%), coughing (95%), sneezing (93.2%), and directly through contaminated surfaces. Over 80% knew the most common symptoms of fever, cough, and fatigue. One-third of participants knew a change or loss of taste and smell are less severe symptoms and that the inability to speak or complete a sentence is a severe symptom. Though, 7 out of 10 participants knew all the preventive measures for COVID-19, a third was not practicing physical distancing. Age group, education, tribe, and religion were predictors of COVID-19 knowledge and that of practice was age group.

Conclusion: Though many participants had good knowledge of COVID-19, etiology, transmission, and prevention, the knowledge about common symptoms and the severity of associated symptoms was poor. Their knowledge did not translate to practice because only 4 out of 10 practiced preventive measures.

Keywords: COVID-19; Knowledge; Practice; Predictors

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1. Introduction

The prevention of transmission of diseases during any pandemic depends on people being able to support and implement the measures put in place by their government to curb such.

COVID-19 is caused by a virus named SARS-CoV-2 and is spread directly by close contact with those infected through saliva and respiratory secretions and droplets from speaking, coughing, sneezing, singing; aerosol-producing procedures, and indirectly from contaminated surfaces.[1,2] COVID-19's commonest symptoms are fever, chills, and sore throat while other symptoms less common are muscle aches, severe fatigue or tiredness, runny or blocked nose, or sneezing, headache, sore eyes, dizziness, new and persistent cough, tight chest or chest pain, shortness of breath, hoarse voice, heavy arms/legs, numbness/tingling, nausea, vomiting, abdominal pain/ belly ache, or diarrhea, loss of appetite, loss or change of sense of taste or smell and difficulty in sleeping.[3,4]

COVID-19 had mild, moderate, and severe symptoms. Symptoms of severe COVID-19 which require immediate medical intervention are difficulty in breathing especially at rest, inability to speak in sentences, confusion, drowsiness or loss of consciousness, persistent pain or pressure in the chest, cold or clammy skin, or turning pale or bluish colour, loss of speech or movement.[3,4]

During the COVID-19 pandemic, World Health Organization suggested preventive measures to curb its spread and this resulted in the governments of different nations putting certain measures in place to prevent its spread within the communities.[4] For the actions and preventive measures to be effective, people needed to change their behaviors.

The health belief theory predicts that a person's specific health behavior is based more or less on the individual's perception of the disease, its severity as well as their susceptibility to the disease in addition to their perceived benefits and barriers to behavior.[5-7]

Thus, for individuals to change their behavior, they need to first understand the etiology, severity as well as complications, and effects of being infected with COVID-19. Individuals who think COVID-19 results from the introduction of the 5G network, or a spiritual attack from demons, or world leaders' conspiracy will never see the need for the non-pharmaceutical measures put in place to curb it.[8-10]

Studies have shown positive but slight correlations between overt behavior and an individual's information level, beliefs, and perceptions.[11-16] The knowledge-attitude-behavior model divides human health-related behaviors into three (3) continuous processes namely knowledge acquisition, belief generation, and behavior formation.[17-18]

This study assessed COVID-19 knowledge, practice of preventive measures, and predictors of both.

2. Methodology

This was a quantitative study done in the Ozuoba community in Obio-Akpor local government area in Port Harcourt. A self-administered questionnaire was used to collect data on the knowledge of COVID-19 etiology, transmission, common symptoms, the severity of symptoms, and the practice of WHO preventive measures.

Data was entered on Microsoft Excel 2010 (Microsoft Corp, Washington, USA) and analyzed with the Statistic Package for Social Sciences (SPSS) version 25 (IBM, Armonk, New York, USA). The binary logistics of the knowledge and practice of preventive measures for COVID-19 was done using the practice of preventive measures as the dependent variables and COVID-19 knowledge and the socio-demographic factors of the participants as the independent variables.

The knowledge questions were 59 in total: 11 were on the etiology, incubation period, and means of transmission, 20 each assessed the knowledge about the symptoms and severity of symptoms, and 8 assessed the preventive measures for controlling the spread of COVID-19. All correct responses were assigned 1 point each, and wrong responses were assigned 0. The total score of knowledge was between 1 and 59. Score greater than or equal to 30 were deemed good knowledge, and scores less than 30 poor knowledge. Similarly, the questions for the practice of preventive measures were 5, and those who practiced at least 3 of them were deemed to have a good practice, and those who scored less than 3 had poor practice.

Descriptive statistics were reported as frequencies, percentages, means, and standard deviations. The association between participants' characteristics and knowledge, and practices were analyzed using the chi-square test or Fisher's exact test for categorical variables. Predictors of both knowledge and practice were done using multinomial statistics. Ethical approval was sought from the Ethics Committees of the Rivers State Ministry of Health Board, Port Harcourt.

3. Results

Table 1 Participants' demographics based on sex

Variables	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	p
Sex	Male		Female		Total		
Age Group							0.9
11-20	39	21.0	41	19.2	80	20.0	
21-30	83	44.5	103	48.1	186	46.5	
31-40	38	20.4	46	21.5	84	21.0	
41-50	15	8.1	15	7.0	30	7.5	
51-60	7	3.8	5	2.3	12	3.0	
61-70	4	2.2	4	1.9	8	2.0	
Tribe							0.46
Ijaw	18	9.7	17	7.9	35	8.8	
Ikwerre	37	19.8	50	23.4	87	21.7	
Igbo	55	29.6	70	32.7	125	31.2	
Yoruba	12	6.5	15	7.0	27	6.8	
Hausa	5	2.7	1	0.5	6	1.5	
Ibibio	26	14.0	22	10.3	48	12.0	
Others	33	17.7	39	18.2	72	18.0	
Religion							0.37
Christianity	181	97.3	206	96.3	387	96.7	
Islam	4	2.2	8	3.7	12	3.0	
Traditionalist	1	0.5	0	0.0	1	0.3	
Education							<0.01*
No formal	7	3.8	23	10.7	30	7.5	
Primary	9	4.8	8	3.7	17	4.3	
Secondary	49	26.4	76	35.6	125	31.3	
Post-Secondary	32	17.2	30	14.0	62	15.5	
Tertiary	89	47.8	77	36.0	166	41.4	
Profession							0.003*
Housewife	1	0.5	17	7.9	18	4.5	
Artisan	10	5.4	8	3.7	18	4.5	
Self-employed	112	60.2	125	58.5	237	59.2	
Civil-servants	21	11.3	9	4.2	30	7.5	

Retiree	1	0.5	2	0.9	3	0.8	
Professionals	2	1.1	3	1.4	5	1.3	
Others	39	21.0	50	23.4	89	22.4	
Total	186	46.5	214	53.5	400	100.0	

Table 1 shows the participants' demographic based on gender, The association between gender and education and between gender and profession were statistically significant.

Table 2 Participants' knowledge of COVID-19

Variables	Frequency	Percentage
Cause of COVID-19		
Bacteria	22	5.5
Virus	367	91.7
Fungus	1	0.3
Helminthic	10	2.5
COVID-19 Transmission		
Spiritual Attack by demons	12	3.0
Mosquito bite by mosquitoes who bit infected people	10	2.5
5G Network	7	1.8
Close contact with those infected	371	92.7
COVID-19 mode of spread		
Saliva, respiratory secretions and droplets from coughing		
Yes	380	95.0
No	20	5.0
Saliva, respiratory secretions and droplets from sneezing		
Yes	373	93.2
No	27	6.8
Saliva, respiratory secretions and droplets from talking		
Yes	333	83.2
No	67	16.8
Saliva, respiratory secretions and droplets from singing		
Yes	620	65.0
No	140	35.0
Procedures that generate water sprays or particles (aerosols)		
Yes	202	50.5
No	198	49.5
Indirect contact through contaminated surfaces		
Yes	244	61.0

No	156	39.0
Direct contact through contaminated surfaces		
Yes	345	86.2
No	55	13.8
COVID-19 Incubation period		
2-6days	110	27.5
7-14 days	251	62.7
4-8weeks	36	9.0
12-16weeks	3	0.8
Who to see when infected with COVID-19		
Medical doctor	378	94.5
Native doctor	15	3.7
Herbalist	2	0.5
Pastor	5	1.3
Total	400	100.0

Table 2 shows participants' knowledge of COVID-19. Nine out of ten participants knew that the virus caused COVID-19 and that it can be transmitted by close contact with the infected. However, 3% felt it was a spiritual attack. Most participants knew COVID-19 can be transmitted through talking (83.2%), coughing (95%), sneezing (93.2%) and directly through contaminated surfaces.

Table 3a Participants' knowledge of COVID-19 symptoms

Variables	Frequency	Percentage
Fever		
Most common symptom	376	94.0
Less common symptom	17	4.3
Not a symptom	7	1.7
Dry cough		
Most common symptom	329	82.2
Less common symptom	59	14.8
Not a symptom	12	3.0
Tiredness		
Most common symptom	260	65.0
Less common symptom	104	26.0
Not a symptom	36	9.0
Body aches		
Most common symptom	228	57.0
Less common symptom	129	32.2
Not a symptom	43	10.8
Sore throat		

Most common symptom	226	56.5
Less common symptom	130	32.5
Not a symptom	44	11.0
Diarrhoea		
Most common symptom	117	29.3
Less common symptom	121	30.2
Not a symptom	162	40.5
Conjunctivitis		
Most common symptom	142	35.5
Less common symptom	90	22.5
Not a symptom	168	42.0
Headaches		
Most common symptom	304	76.0
Less common symptom	63	15.7
Not a symptom	33	8.3
Loss of taste		
Most common symptom	222	55.5
Less common symptom	136	34.0
Not a symptom	42	10.5
Loss of smell		
Most common symptom	197	49.2
Less common symptom	130	32.5
Not a symptom	73	18.3
Skin rash		
Most common symptom	119	29.8
Less common symptom	134	33.5
Not a symptom	147	36.7
Total	400	100.0

Table 3b Participants' knowledge of COVID-19 symptoms

Variables	**Frequency**	**Percentage**
Finger discoloration		
Most common symptom	98	24.5
Less common symptom	108	27.0
Not a symptom	194	48.5
Toe discoloration		

Most common symptom	103	25.8
Less common symptom	96	24.0
Not a symptom	201	50.2
Shortness of breath		
Most common symptom	317	79.2
Less common symptom	41	10.3
Not a symptom	42	10.5
Chest pain		
Most common symptom	288	72.0
Less common symptom	68	17.0
Not a symptom	44	11.0
Loss of speech		
Most common symptom	106	26.5
Less common symptom	129	32.3
Not a symptom	165	41.2
Loss of Movement		
Most common symptom	114	28.5
Less common symptom	119	29.8
Not a symptom	167	41.7
Blindness		
Most common symptom	62	15.5
Less common symptom	80	20.0
Not a symptom	258	64.5
Abdominal pain		
Most common symptom	123	30.8
Less common symptom	123	30.8
Not a symptom	154	38.4
Loss of hearing		
Most common symptom	57	14.3
Less common symptom	76	19.0
Not a symptom	267	66.7
Total	400	100.0

Tables 3a and 3b show participants' knowledge about COVID-19 symptoms. Over 80% knew the most common symptoms of fever, cough, and fatigue. Two-thirds of participants didn't know that diarrhea (40.5%), skin rash (36.8%), and conjunctivitis (42%) are COVID-19 symptoms. One in 5 participants did not know that loss of smell is a symptom and half felt discolorations on the hands and toes are not symptoms. Two-thirds of participants knew that blindness and hearing loss are not symptoms of COVID-19 but sequelae.

Table 4a Participants' knowledge of the severity of COVID-19 symptoms

Variables	Frequency	Percentage
Fever		
Most severe symptom	360	90.0
Less severe symptom	31	7.7
Not a symptom	9	2.3
New presentation of Dry cough		
Most severe symptom	322	80.5
Less severe symptom	68	17.0
Not a symptom	10	2.5
Tiredness		
Most severe symptom	242	60.5
Less severe symptom	123	30.7
Not a symptom	35	8.8
Body aches		
Most severe symptom	208	52.0
Less severe symptom	149	37.2
Not a symptom	43	10.8
Sore throat		
Most severe symptom	209	52.2
Less severe symptom	144	36.0
Not a symptom	47	11.8
Diarrhoea		
Most severe symptom	87	21.8
Less severe symptom	132	33.0
Not a symptom	181	45.2
Conjunctivitis		
Most severe symptom	118	29.5
Less severe symptom	120	30.0
Not a symptom	162	40.5
Headaches		
Most severe symptom	267	66.7
Less severe symptom	90	22.5
Not a symptom	43	10.8
Loss of taste		
Most severe symptom	209	52.2
Less severe symptom	125	31.3

Not a symptom	66	16.5
Loss of smell		
Most severe symptom	188	47.0
Less severe symptom	140	35.0
Not a symptom	72	18.0
Skin rash		
Most severe symptom	109	27.3
Less severe symptom	139	34.7
Not a symptom	152	38.0
Total	400	100.0

Table 4b Participants' knowledge of severity of COVID-19 symptoms

Variables	**Frequency**	**Percentage**
Finger discoloration		
Most severe symptom	93	23.3
Less severe symptom	100	25.0
Not a symptom	207	51.7
Toe discoloration		
Most severe symptom	98	24.5
Less severe symptom	106	26.5
Not a symptom	196	49.0
Shortness of breath		
Most severe symptom	311	77.7
Less severe symptom	56	14.0
Not a symptom	33	8.3
Chest pain		
Most severe symptom	260	65.0
Less severe symptom	83	20.7
Not a symptom	57	14.3
Loss of speech (inability to speak or complete a statement)		
Most severe symptom	116	29.0
Less severe symptom	103	52.8
Not a symptom	181	45.2
Loss of Movement		
Most severe symptom	116	29.0
Less severe symptom	107	62.8
Not a symptom	177	44.2

Blindness		
Most severe symptom	58	14.5
Less severe symptom	72	18.0
Not a symptom	270	67.5
Abdominal pain		
Most severe symptom	106	26.5
Less severe symptom	114	28.5
Not a symptom	180	45.0
Loss of hearing		
Most severe symptom	65	61.3
Less severe symptom	73	18.2
Not a symptom	262	65.5
Total	400	100.0

Tables 4a and 4b show the participants' knowledge about the severity of Covid-19 symptoms. Over 80% of participants knew fever is a severe symptom of COVID-19. Only one-third of participants knew change or loss of taste and smell are less severe symptoms. Table 4a.

Two-thirds and four-fifths of participants knew chest pain and breathlessness respectively are the most severe symptoms of COVID-19. One-third knew inability to speak or complete a sentence is a very severe symptom. Table 4b.

Table 5 Participants' knowledge of the preventive measures of COVID-19

Variables	Frequency	Percentage
Use of face masks		
Yes	384	96.0
No	16	4.0
At least 1meter physical distance		
Yes	313	78.2
No	87	21.8
At least 2meters physical distance		
Yes	379	94.0
No	24	6.0
Handwashing		
Yes	391	97.8
No	9	2.2
Use of sanitizers		
Yes	387	96.7
No	13	3.3
Contact tracing		
Yes	352	81.2

No	75	18.8
Isolation of those infected		
Yes	381	95.2
No	19	4.8
Lockdown		
Yes	338	84.5
No	62	15.5
Total	400	100.0

Table 5 shows the participants' knowledge of COVID-19 preventive measures. Most of the participants knew about the preventive measures.

Table 6 Participants' awareness and practice of COVID-19 preventive measures

Variables	Frequency	Percentage
Awareness of WHO hand washing techniques		
Yes	365	91.3
No	35	8.8
Practice WHO hand washing techniques		
Yes	338	84.5
No	62	15.5
Avoid handshaking		
Yes	278	69.5
No	122	30.5
Practice physical distancing		
Yes	293	73.2
No	107	26.8
Handwashing after returning home		
Yes	316	79.0
No	84	21.0
What changed in handwashing?		
Frequency of washing	49	12.3
Method of washing	48	12.0
Frequency & washing	208	52.0
Nothing	95	23.7
Wear facemask		
Yes	304	76.0
No	96	24.0
Effective COVID-19 preventive measures		

Wash hands before touching mouth, eyes and nose	294	73.5
Take vitamins to boost immunity	33	8.3
Use mouthwash	6	1.5
Take influenza vaccine	39	9.7
Avoid contact with people with non-communicable disease	28	7.0
Total	400	100.0

Though 9 out of 10 participants knew of WHO hand washing techniques, only 8 of them practice it. A third of them did not practice physical distance and didn't avoid handshake. A quarter of participants did not wear face masks. 73.5% knew washing hands before touching mouth, eyes and nose is effective preventive measures against COVID-19. Table 6.

Table 7 Demographic characteristics of participants and knowledge score of COVID-19

Variables	Frequency	Percentage	Knowledge score		P
			Mean	SD	
Gender			31.24	4.218	0.96
Male	186	46.5	31.23	3.860	
Female	214	53.5	31.25	4.515	
Age Group			31.24	4.218	0.71
11-20	80	20.0	31.49	3.955	
21-30	186	46.5	30.99	4.236	
31-40	84	21.0	31.54	4.405	
41-50	30	7.5	31.70	4.435	
51-60	12	3.0	29.92	3.777	
61-70	8	2.0	31.75	4.683	
Tribe			31.24	4.218	0.82
Ijaw	35	8.8	31.66	3.597	
Ikwerre	87	21.7	31.22	4.694	
Igbo	125	31.2	31.06	4.020	
Yoruba	27	6.8	32.33	4.234	
Hausa	6	1.5	30.17	4.535	
Ibibio	48	12.0	30.98	4.076	
Others	72	18.0	31.24	4.375	
Religion			31.24	4.218	0.11
Christianity	387	96.7	31.32	4.246	
Islam	12	3.0	28.92	2.353	
Traditionalist	1	0.3	28.00	.	
Education			31.24	4.218	0.006*
No Formal	30	7.5	29.80	4.012	
Primary	17	4.3	30.29	4.427	

Secondary	125	31.2	30.78	3.929	
Post-Secondary	62	15.5	30.73	3.663	
Tertiary	166	41.5	32.14	4.493	
Profession			31.24	4.218	0.71
House wife	18	4.5	28.33	4.602	
Artisan	18	4.5	31.06	3.171	
Self-employed	237	59.2	31.18	4.371	
Civil-servants	30	7.5	31.27	4.017	
Retiree	3	0.8	31.33	1.528	
Professionals	5	1.3	31.96	3.919	
Others	89	22.3	32.40	2.702	
Total	400	100.0			

Table 7 shows that the knowledge scores significantly differed across genders, age-groups, tribes, educational levels, and professions.

Table 8 Association between some demographics and Knowledge of COVID-19 aetiology, transmission and incubation period

Variables	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	χ²	P
COVID-19 aetiology	Education																27.76	0.01*
	Non-formal		Primary		Secondary		Post- Secondary		Tertiary		Total							
Bacteria	4	13.3	3	17.7	5	4.0	7	11.3	3	1.8	22	5.5						
Virus	24	80.0	13	76.4	115	92.0	53	85.5	162	87.6	367	91.7						
Fungal	0	0.0	0	0.0	0	0.0	0	0.0	1	0.6	1	0.3						
Helminthic	2	6.7	1	5.9	5	4.0	2	3.2	0	0.0	10	2.5						
Total	30	100.0	17	100.0	125	100.0	62	100.0	166	100.0	400	100.0						
COVID-19 aetiology	Profession																72.65	<0.0001*
	House wife		Artisan		Self-employed		Civil servant		Retiree		Professionals		Others		Total			
Bacteria	2	11.1	0	0.0	15	6.4	1	3.3	0	0.0	0	0.0	4	4.5	22	5.5		
Viral	13	72.2	13	72.2	220	92.8	28	93.4	3	0.0	5	100.0	85	95.5	367	91.7		
Fungal	0	0.0	0	0.0	1	0.4	0	0.0	0	100.0	0	0.0	0	0.0	1	0.3		
Helminthic	3	16.7	5	27.8	1	0.4	1	3.3	0	0.0	0	0.0	0	0.0	10	2.5		
Total	18	100.0	18	100.0	237	100.0	30	100.0	3	100.0	5	100.0	89	100.0	400	100.0		
COVID-19 Transmission	Tribe																41.82	0.001*
	Ijaw		Ikwerre		Igbo		Yoruba		Hausa		Ibibio		Others		Total			
Spiritual attack	6	17.1	1	1.1	3	2.4	0	0.0	1	16.7	1	2.1	0	0.0	12	3.0		
Mosquito bite	1	2.9	1	1.1	6	4.8	0	0.0	0	0.0	2	4.2	0	0.0	10	2.5		
5G network	0	0.0	2	2.3	3	2.4	0	0.0	0	0.0	0	0.0	2	2.8	7	1.7		
Close contact	28	80.0	83	95.5	113	90.4	27	100.0	5	83.3	45	93.7	70	97.2	371	92.8		
Total	35	100.0	87	100.0	125	100.0	27	100.0	6	100.0	48	100.0	72	100.0	400	100.0		
COVID-19	Education																43.42	<0.0001*

Transmission	Non-formal		Primary		Secondary		Post- Secondary		Tertiary		Total							
Spiritual attack	2	6.7	0	0.0	9	7.2	1	1.6	0	0.0	12	3.0						
Mosquito bite	0	0.0	2	11.8	4	3.2	3	4.8	1	0.6	10	2.5						
5G network	0	0.0	2	11.8	2	1.6	3	4.8	0	0.0	7	1.7						
Close contact	28	93.3	13	76.4	110	88.0	55	88.8	165	99.4	371	92.8						
Total	30	100.0	17	100.0	125	100.0	62	100.0	166	100.0	400	100.0						
COVID-19 Transmission	Profession																50.00	<0.0001*
	House wife		Artisan		Self-employed		Civil servant		Retiree		Professionals		Others		Total			
Spiritual attack	2	11.1	5	27.8	3	1.3	0	0.0	0	0.0	0	0.0	2	2.2	12	3.0		
Mosquito bite	1	5.6	1	5.6	6	2.5	1	3.3	0	0.0	0	0.0	1	1.1	10	2.5		
5G network	0	0.0	0	0.0	5	2.1	1	3.3	0	0.0	0	0.0	1	1.1	7	1.7		
Close contact	15	83.3	12	66.6	223	94.1	28	93.4	3	100.0	5	100.0	85	95.6	371	92.8		
Total	18	100.0	18	100.0	237	100.0	30	100.0	3	100.0	5	100.0	89	100.0	400	100.0		
COVID-19 incubation	Age group																28.48	0.02*
	10-20		21-30		31-40		41-50		51-60		61-70		Total					
2-6 days	25	31.3	44	23.7	22	26.2	10	33.3	4	33.3	5	62.5	110	27.5				
7-14 days	47	58.8	129	69.3	53	63.1	17	56.7	3	25.0	2	25.0	251	62.7				
4-8 weeks	7	8.7	12	64.5	8	9.5	3	10.0	5	41.7	1	12.5	36	9.0				
12-16 weeks	1	1.2	1	0.5	1	1.2	0	0.0	0	0.0	0	0.0	3	0.8				
Total	80	100.0	186	100.0	84	100.0	30	100.0	12	100.0	8	100.0	400	100.0				
COVID-19 incubation	Education																35.89	<0.0001*
	Non-formal		Primary		Secondary		Post- Secondary		Tertiary		Total							
2-6 days	13	43.3	7	41.2	30	24.0	18	29.0	42	25.3	110	27.5						
7-14 days	8	26.7	9	52.9	79	63.2	38	61.3	117	70.5	251	62.7						

4-8 weeks	9	30.0	1	5.9	14	11.2	6	9.7	6	3.6	36	9.0						
12-16 weeks	0	0.0	0	0.0	2	1.6	0	0.0	1	0.6	3	0.8						
Total	30	100.0	17	100.0	125	100.0	62	100.0	166	100.0	400	100.0						

Table 9 Association between some demographics and Knowledge of COVID-19 preventive measures

Variables	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	χ^2	P
Hand washing	Education																41.96	<0.0001
	Non-formal		Primary		Secondary		Post- Secondary		Tertiary		Total							
Yes	29	96.7	13	76.5	125	100.0	59	95.2	165	99.4	391	97.7						
No	1	3.3	4	23.5	0	0.0	3	4.8	1	0.6	9	2.3						
Total	30	100.0	17	100.0	125	100.0	62	100.0	166	100.0	400	100.0						
Sanitizer	Education																13.91	0.01
	Non-formal		Primary		Secondary		Post- Secondary		Tertiary		Total							
Yes	29	96.7	14	82.4	121	96.8	59	95.2	164	98.8	387	96.7						
No	1	3.3	3	17.6	4	3.2	3	4.8	2	1.2	13	3.3						
Total	30	100.0	17	100.0	125	100.0	62	100.0	166	100.0	400	100.0						
Contact tracing	Age group																27.83	<0.0001
	10-20		21-30		31-40		41-50		51-60		61-70		Total					
Yes	53	66.3	146	78.5	78	92.9	29	96.7	12	100.0	7	87.5	325	81.3				
No	27	33.7	40	21.5	6	7.1	1	3.3	0	0.0	1	12.5	75	18.7				
Total	80	100.0	186	100.0	84	100.0	30	100.0	12	100.0	8	100.0	400	100.0				
Contact tracing	Sex																4.09	0.04*
	Male		Female		Total													
Yes	159	85.5	166	77.6	325	81.3												

No	27	14.5	48	22.4	75	18.7													
Total	186	100.0	214	100.0	400	100.0													
Isolation for the infected	Education																	10.16	0.04*
	Non-formal		Primary		Secondary		Post- Secondary		Tertiary		Total								
Yes	28	93.3	14	82.4	120	96.0	57	91.9	162	97.6	381	95.2							
No	2	6.7	3	17.6	5	4.0	5	8.1	4	2.4	19	4.8							
Total	30	100.0	17	100.0	125	100.0	62	100.0	166	100.0	400	100.0							
Aware of WHO handwashing	Age group																	13.12	0.02*
	10-20		21-30		31-40		41-50		51-60		61-70		Total						
Yes	73	91.2	177	95.2	71	84.5	27	90.0	9	75.0	8	100.0	365	91.2					
No	7	8.8	9	4.8	13	15.5	3	10.0	3	25.0	0	0.0	35	8.8					
Total	80	100.0	186	100.0	84	100.0	30	100.0	12	100.0	8	100.0	400	100.0					
Aware of WHO handwashing	Education																	38.80	<0.0001*
	Non-formal		Primary		Secondary		Post- Secondary		Tertiary		Total								
Yes	23	76.7	10	85.8	114	91.2	56	90.3	162	97.6	365	91.2							
No	7	23.3	7	41.2	11	8.8	6	9.7	4	2.4	35	8.8							

Table 10 Association between some demographics and practice of COVID-19 preventive measures

Variables	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**χ²**	**P**
Follow WHO handwashing	Education																25.60	<0.0001*
	Non-formal		Primary		Secondary		Post- Secondary		Tertiary		Total							
Yes	21	70.0	9	52.9	104	83.2	51	82.3	153	92.2	338	84.5						
No	9	30.0	8	47.1	21	16.8	11	17.7	13	7.8	62	15.5						
Total	30	100.0	17	100.0	125	100.0	62	100.0	166	100.0	400	100.0						

Avoid Handshaking	Age group													11.43	0.04*
	10-20		21-30		31-40		41-50		51-60		61-70		Total		
Yes	54	67.5	139	74.7	51	60.7	22	73.3	5	41.7	7	87.5	278	69.5		
No	26	32.5	47	25.3	33	39.3	8	26.7	7	58.3	1	12.5	122	30.5		
Wash hands on Returning home	Age group													12.78	0.03*
	10-20		21-30		31-40		41-50		51-60		61-70		Total		
Yes	60	75.0	158	84.9	62	73.8	21	70.0	7	58.3	8	100.0	316	79.0		
No	20	25.0	28	15.1	22	26.2	9	30.0	5	41.7	0	0.0	84	21.0		
Total	80	100.0	186	100.0	84	100.0	30	100.0	12	100.0	8	100.0	400	100.0		
Wash hand on Returning home	Education													10.92	0.03*
	Non-formal		Primary		Secondary		Post- Secondary		Tertiary		Total				
Yes	23	76.7	9	52.9	100	80.0	45	72.6	139	83.7	316	79.0				
No	7	23.3	8	47.1	25	20.0	17	27.4	27	16.3	84	21.0				
Total	30	100.0	17	100.0	125	100.0	62	100.0	166	100.0	400	100.0				

Table 11 Predictors for COVID-19 Knowledge

Variable	Bivariate analysis			Binary logistic regression			
	N (%)	χ2	p	AOR	95% Confidence Interval		P
Knowledge of COVID-19							
Poor	147 (36.7)	36.200	0.52				
Good	253 (63.3)						
Age group (years)		3.150	0.677				0.000*
10-20	80 (20.0)			1.044	0.188	5.803	0.960
21-30	186 (46.5)			1.215	0.236	6.254	0.816
31-40	84 (21.0)			0.746	0.141	3.939	0.730
41-50	30 (7.5)			0.840	0.149	4.724	0.843
51-60	12 (3.0)			0.720	0.100	5.182	0.744
61-70	8 (2.0)			.	.	.	.
Sex		0.630	0.427				
Male	186 (46.5)			1.200	0.764	1.885	0.428
Female	214 (53.5)			.	.	.	.
Tribe		5.677	0.460				
Ijaw	35 (8.8)			0.653	0.259	1.645	0.366
Ikwerre	87 (21.7)			0.819	0.413	1.622	0.566
Igbo	125 (31.2)			0.918	0.493	1.712	0.788
Yoruba	27 (6.8)			0.310	0.100	.963	0.043*
Hausa	6 (1.5)			0.506	0.068	3.781	0.506
Ibibio	48 (12.0)			0.874	0.398	1.922	0.738
Others	72 (18.0)			.	.	.	.
Religion		3.060	0.217				
Christianity	387 (96.7)			3.745E-8	8.716E-9	1.609E-7	0.000*
Islam	12 (3.0)			1.205E-7	1.205E-7	1.205E-7	.
Others	1 (0.3)			.	.	.	.
Education		5.955	0.203				
Informal	30 (7.5)			1.183	0.423	3.307	0.749
Primary	17 (4.3)			1.774	0.607	5.191	0.295
Secondary	125 (31.3)			1.323	0.774	2.262	0.307
Post Secondary	62 (15.5)			2.115	1.124	3.979	0.020*
Tertiary	166 (41.5)			.	.	.	.
Profession		14.676	0.023*				
Housewife	18 (4.5)			9.367	0.710	123.625	0.089
Artisan	18 (4.5)			2.307	0.190	28.032	0.512
Self-employed	237 (59.2)			2.473	0.257	23.788	0.433
Civil servant	30 (7.4)			2.906	0.272	31.027	0.377
Retiree	3 (0.8)			3.990E-8	0.000	.c	0.997
Professionals	5 (1.3)			1.169	0.115	11.889	0.895
Others	89 (22.3)			.	.	.	.
Total	400 (100.0)			1.044			

Table 12 Predictors of Practice of preventive measures for COVID-19

Variable	Overall practice of preventive measures		Bivariate analysis		Binary logistic regression			
	Good, n (%)	Poor, n (%)	χ²	P	AOR	95% Confidence Interval (CI)		p
						Lower	Lower	
Age group (years)			12.33	0.31				
	317 (79.3)	83 (20.7)						
10-20	60 (18.9)	20 (24.1)			0.000	0.000		0.031*
21-30	159 (50.2)	27 (32.5)			0.000	0.000		0.295
31-40	61 (19.3)	23 (27.7)			0.000	0.000		0.004*
41-50	21 (6.6)	9 (10.9)			0.000	0.000		0.092
51-60	8 (2.5)	4 (4.8)			0.000	0.000		0.194
61-70	8 (2.5)	0 (0.0)			0.000	0.000		0.275
Sex			1.79	0.21				
Male	142 (44.8)	44 (53.0)			1.000			0.182
Female	175 (55.2)	39 (47.0)			0.782	0.457	1.337	
Tribe			5.76	0.45				
Ijaw	28 (8.8)	7 (2.2)			1.000			0.450
Ikwerre	66 (20.8)	21 (6.6)			0.573	0.188	1.741	0.909
Igbo	100 (31.4)	25 (30.0)			0.675	0.297	1.539	0.378
Yoruba	24 (7.6)	3 (3.6)			0.775	0.357	1.680	0.803
Hausa	3 (0.9)	3 (3.6)			1.804	0.454	7.162	0.201
Ibibio	37 (11.7)	11 (13.3)			0.213	0.035	1.317	0.075
Others	59 (18.6)	13 (15.7)			0.670	0.261	1.724	0.693
Religion			5.06	0.08				0.550

			χ²	p	OR	AOR	CI	p
Christianity	309 (97.5)	78 (94.0)			1.000			1.000
Islam	8 (2.5)	4 (4.8)			0.000	0.000		1.000
Others	0 (0.0)	1 (1.2)			0.000	0.000		1.000
Education			7.508	0.11				
Informal	23 (7.3)	7 (8.5)			1.000			0.111
Primary	11 (3.5)	6 (7.2)			0.376	0.246	69.213	0.717
Secondary	99 (31.2)	26 (31.3)			0.229	0.268	77.464	0.131
Post Secondary	44 (13.9)	18 (21.7)			0.667	0.140	13.856	0.987
Tertiary	140 (44.1)	26 (31.3)			0.453	0.076	9.493	0.080
Profession			3.57	0.74				
Housewife	15 (4.7)	3 (3.6)			1.000			0.735
Artisan	16 (5.1)	2 (2.4)			4.278	0.264	69.213	0.662
Self-employed	188 (59.3)	49 (59.1)			4.560	0.268	77.464	0.302
Civil servant	21 (6.6)	9 (10.8)			1.394	0.140	13.856	0.964
Retiree	3 (0.9)	0 (0.0)			0.852	0.76	9.493	0.194
Professionals	4 (1.3)	1 (1.2)			1.000	0.000		0.374
Others	70 (22.1)	19 (22.9)			1.049	0.000		0.875
Knowledge of COVID-19			0.408	0.30				
Good	203 (64.0)	50						
Poor	114 (35.9)	33			1.447	0.521	4.018	<0.001*

*$p<0.05$, χ²: chi square, AOR: Adjusted Odd Ratio, CI: Confidence interval

The association between education and participants' knowledge of COVID-19 etiology and that with profession was statistically significant. Likewise, education, profession, and tribe had statistical significance in the knowledge of COVID-19 transmission. Age group and education were significantly associated with knowledge of COVID-19 incubation. Table 8.

Table 9 shows the association between education, age group, sex, and knowledge of COVID-19 preventive measures. The association between sex, religion, age group, profession, education, and participants' knowledge of COVID-19 preventive measures was statistically significant

The association between age group, education, and practice of COVID-19 preventive measures was statistically significant. Table 10.

Age group, Yoruba tribe, post-secondary education, and Christian religion were predictors of high COVID-19 knowledge. Table 11.

Eight (8) out of 10 participants [317 (79.3%)] had good practice of preventive measures of COVID-19. The predictor of practice was age group. Table 12.

Table 13 Mean values of the knowledge of COVID-19 and practice of its preventive measures

Variables	Number of questions	Mean + SD	Overall rate (%)
Knowledge of COVID-19 aetiology, incubation, and dissemination	11	8.58±1.67	78.0
Knowledge of COVID-19 common symptoms	20	8.33±2.42	41.7
Knowledge of the severity of COVID-19 symptoms	20	7.65±2.45	38.3
Knowledge of COVID-19 preventive measures	8	6.70±0.94	83.8
Total Knowledge of COVID-19	59	24.5 ±4.00	35.8
COVID-19 practice of preventive measures	5	1.79±0.41	43.1

The mean (SD) knowledge score of COVID-19 aetiology, incubation and dissemination was 8.58 (1.67) with a range of 0-11 indicating an overall correct rate of 78.0% (8.58× 100/11).

The mean (SD) knowledge score of COVID-19 common symptoms was 8.33 (2.42) with a range of 0-20 indicating an overall correct rate of 41.7% (8.33× 100/20).

The mean (SD) knowledge score of severity of COVID-19 symptoms was 7.65 (2.45) with a range of 0-20 indicating an overall correct rate of 38.3% (7.65× 100/20)

The mean (SD) knowledge score of COVID-19 preventive measures was 6.70 (0.94) with a range of 0-8 indicating an overall correct rate of 83.8% (6.70 × 100/20)

The mean (SD) total knowledge score of COVID-19 was 24.5 (4.00) with a range of 0-59 indicating an overall correct rate of 43.1% (24.5 × 100/59).

The mean (SD) practice of preventive measure score was 1.7 (0.41) with a range of 0–5. Thus, a practice rate of 35.8% (1.79 × 100/5).

4. Discussion

Many studies have proven that knowledge determines practice.[19-22] The human health behaviour undergoes three changes namely the acquisition of knowledge, generation of attitudes and beliefs, as well as the formation of health practices and behaviors. During these three processes, the human health behaviors can be effectively changed.[23-25]

The participants' knowledge of COVID-19 causative agent, incubation period, means of transmission, and preventive measures was good but that of common symptoms and severity of symptoms were poor. How will the populace get early interventions if they do not know the symptoms of the disease, nor seek medical care early enough if they do not know the symptoms that indicate severity? Perhaps, this was the case for those who were infected with COVID-19 in Nigeria who sought medical interventions too late and died from the disease.[26]

The participants' good knowledge of personal preventive measures in the study compares to that reported by studies done in other parts of Nigeria and the world. [27-29] The overall general knowledge of COVID-19 was poor as only 35.8% had good knowledge. Though most had the correct knowledge of the causative agent, incubation period, some of the means of transmission, and preventive measures, many lack the knowledge about common COVID-19 symptoms and severity of symptoms. This is perplexing because two-fifth of the participants had tertiary education and 9 out of 10 participants had at least a secondary education. Does this mean that many, though educated, did not find out more information about the disease? Could it be that many who are educated, do not imbibe the habit of developing the needed sensitivity to the happenings around them once they are out of the education system? Another study done in Kano, Northern Nigeria also reported the irony of discovering that though half of the participants had tertiary education, only a third had good knowledge of COVID-19.[30] Studies done in China, Italy, the United Kingdom, Greece, and the USA reported higher percentages of participants having good knowledge of the disease.[30-34] The difference in reports is probably due to the fact that in these developed countries, the government at all levels of administration released relevant education materials in a timely manner and delivered COVID-19-related content through various channels, such as the television, the internet, and publicity boards during the outbreak. [31-35]

Education, age group, and profession were strongly associated with the knowledge of COVID-19 aetiology, transmission, and incubation period while sex, in addition, was strongly associated with knowledge of preventive measures.

The dissemination of information in Nigeria like in other developing countries was not adequate and all-encompassing as the urban communities had access to more information than the rural communities. Also, a lot of fake information about COVID-19 was circulated among the populace as regards cause, spread, symptoms, preventive and curative measures.[36-38] All these could have influenced the adequacy of knowledge.

Washing hands with soap and running water, wearing of face mask, social distancing of at least 2 meters, and avoidance of handshaking were some of the preventive measures advocated for COVID-19 by WHO.[4,39] In this study, 84.5% practiced handwashing/hygiene, 69.6% avoided hand shaking, 73.3% practiced social distancing and 76% wore face masks. Other studies done in Nigeria and other parts of the world reported varying degrees of compliance with COVID-19 preventive measures.[35, 40-45] A study done in Nigeria reported 80.8% practice of hand hygiene, 54.5% and 55% practice physical distancing and avoidance of crowds, respectively.[43] Other studies reported the following: North-central part of Nigeria (hand washing/hygiene, 96.4%; social distancing, 92.7%), Malaysia (hand hygiene, 87.8%; social distancing/avoiding crowds, 83.4%), China (avoiding crowds, 96.4%), and the Philippines (hand washing, 89.9%; avoiding crowded places, 62.9%; and keeping a distance from people, 65.9%).[35, 40-43] The low practice of physical distancing could be due to the nonchalant attitude of many Nigerians to COVID-19. [43-45]

The participants' overall practice of COVID-19 preventive measures was 43.1%. This is lower than that reported by a study done in Nigeria through social media that reported 67% of practice among their participants.[46] Another study done in the South-Eastern part of Nigeria reported a 53.6% overall good practice.[47]. The reported differences could be due to the study designs, study populations, and poor attitude to COVID-19 by the populace due to false information and misconceptions.

The overall practice of COVID-19 preventive measures in this study was higher than that reported by the Kano study which reported a 25.9% practice.[30] Age group and education were strongly associated with the practice of preventive measures.

The predictors of COVID-19 high knowledge for the participants were age group, post-secondary education, Yoruba tribe, and Christian religion and that of good practice was age groups 10-20 years and 31-40 years. A study done in Saudi Arabia reported male gender and divorced status as predictors of low practice scores, and aged 51–61 years, private-sector jobs, and student status as predictors of high practice scores.[48] Another study done in Portugal reported education as a positive predictor of COVID-19 level of knowledge.[49]

5. Conclusion

Knowledge of the causative agent, incubation period, means of transmission, and preventive measures of COVID-19 as well as practice of the recommended preventive measures by WHO was good. Knowledge of common symptoms and severity of symptoms of the disease was generally poor. The predictors of COVID-19 high knowledge for the participants were age group, post-secondary education, Yoruba tribe, and Christian religion and that of good practice was age groups 10-20 years and 31-40 years.

Compliance with ethical standards

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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