

KNOWLEDGE, ATTITUDE AND PRACTICES OF COVID-19 PROTOCOLS AMONG UNDERGRADUATES IN OSUN STATE UNIVERSITY, OSOGBO CAMPUS, NIGERIA

^{1,2}Muritala Adewale Ibrahim, ¹Ruth Ibukunoluwa Aromolaran, ^{*1}Waliu Adesegun Tajudeen, ¹Oluwadamilola Rebecca Oyewale, ¹Chinyere Favour Onuoha, ¹Stella Oyediran, ¹Zainab Opeyemi Tihamiyu

¹Department of Public Health, Osun State University, Osogbo, Osun State, Nigeria

²Osun State University Teaching Hospital, Osogbo, Osun State, Nigeria

*Corresponding Author Email Address: tajudeenwaliu85@gmail.com

<https://orcid.org/0000-0002-1926-3084>

ABSTRACT

The COVID-19 pandemic remains a major global health challenge requiring strict adherence to preventive protocols. University students, despite their high mobility and social activity, often show inconsistent compliance with these measures. This study assessed knowledge, attitude, and practice (KAP) regarding COVID-19 protocols among undergraduates at Osun State University. A descriptive cross-sectional study was conducted among 350 students selected through multistage sampling. Data were collected using a pretested, self-administered questionnaire that covered socio-demographic characteristics and KAP domains. Analysis employed IBM SPSS version 25, using chi-square tests and logistic regression to identify associations between variables, with significance set at $p < 0.05$. Most respondents were female (62.3%), with a mean age of 20.4 (± 2) years. Although knowledge (89.4%) and attitudes (95.1%) toward COVID-19 were largely favorable, 74.9% exhibited poor preventive practices. Academic level ($p=0.009$), religion ($p=0.001$), and living arrangement (OR=0.042, CI:0.009–0.918) significantly predicted good knowledge. Age ($p=0.021$) predicted positive attitude, while college ($p=0.005$), age ($p=0.002$), faculty ($p=0.024$), religion ($p=0.022$), and family setting ($p=0.024$) predicted good practice. Despite strong knowledge and positive attitudes, a notable practice gap persists. Targeted behavioral interventions that leverage social media and integrate with university health programs are recommended to enhance adherence to COVID-19 preventive measures among undergraduates.

Keywords: Attitude, COVID-19, Knowledge, Protocols, Undergraduate

INTRODUCTION

Coronaviruses are a broad category of viruses that can infect humans and animals, causing respiratory illness ranging from common colds to more serious diseases. The New Coronavirus Disease (COVID-19) spreads quicker than its two forerunners, the Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV) and the Middle East Respiratory Syndrome Coronavirus (MERS-CoV) (Gebbru et al., 2021).

During the first wave of the COVID-19 pandemic, Africa progressed more slowly than the rest of the world, but by December 2020, the second wave had proven far more violent, with far more incidents. By the end of 2020, much of Africa was in the midst of a fast-spreading second wave of the COVID-19 pandemic, with a 30% increase in both weekly incidence and mean daily new cases when compared to the peak of the first wave. In terms of total COVID-19

incidence and mortality, it appears that Africa has not been hit as hard as other continents. (Pragholapati, 2020).

On February 27, 2020, the Federal Ministry of Health confirmed the first case of Coronavirus/ disease in Lagos State. On March 19, 2020, a circular from the Federal Ministry of Education approved the closure of all schools for one month beginning Monday, March 23, 2020, to prevent the spread of COVID-19. (Education in Emergency Working Group (EIEWG), 2020).

The coronavirus disease (COVID-19) pandemic has affected everyone, including students worldwide. In a public health crisis, awareness and understanding of modes of disease transmission, basic hygiene standards, and practices are critical to developing effective control measures. (Ali et al., 2023). The temporary closure of educational institutions in an attempt to contain the spread of COVID-19 negatively affected learning, and this study aims to assess the knowledge, attitudes and practices regarding COVID-19 protocols among Osun State University Undergraduates.

Much is not known about the Knowledge, attitudes and Practices of COVID-19 Protocols among undergraduates generally in Nigeria. Little is also known about it worldwide. Similar studies have been carried out among undergraduate dental students in Pakistan. (Pethani et al., 2020). Also, there has been little research on Knowledge, Attitude and Practices among undergraduates in South West Nigeria. It is, however, important to study the Knowledge, Attitude and Practices among undergraduates in Osun State University.

MATERIALS AND METHODS

The study was conducted among undergraduate students of Osun State University, Osogbo Campus (Coordinates: 7°45'42"N, 4°36'04"E). Osun State University is a non-profit public higher education institution situated in the suburbs of Osogbo, the state capital. It was founded in December 2006. Osogbo is the Local Government Area where the University's main campus (Osogbo) is located, and the area where the school is situated is Oke-Baale. Osun State University's unique nickname "3080" stems from the institution's status as the 30th State University and the 80th University in Nigeria. The University operates a multi-campus structure with its main campus (College of Health Science, Engineering, and Technology) and its other campuses located at Ikire Campus (College of Humanities and Culture), Okuku Campus (College of Management and Social Sciences), Ejigbo Campus (College of Agriculture), Ipetu-Ijesa Campus (College of Education), and Ifetedo Campus (College of Law). The administration of the institution is located at the main campus, Osogbo. It has a student population of over 12,000 spread across

the six campuses. (Onanuga et al., 2017).

The study used a descriptive cross-sectional design and was carried out at the Osogbo campus between October and December 2021. A multi-stage sampling technique was used. The study population comprised undergraduates at Osun State University, and respondents had to be registered at the university-

The sample size was calculated using Leslie Fischer's formula $n = z^2 \cdot pq/d^2$ for a descriptive study, with $(P = 0.72)$ being the proportion of respondents with knowledge of COVID-19 protocols from previous studies. (Hasan et al., 2021) and $Z = 1.96$, corresponding to a 95% confidence level. The sample size derived from this calculation was approximately 310 and 341 after adjusting for a 10% non-response rate ($310 \times 1.1 = 341$); it was then rounded up to 350 for ease of recruitment.

A multistage sampling technique was employed to select respondents. At the first stage, the two colleges within the Osogbo campus were purposively selected. At the second stage, one faculty was selected from each of the two colleges using simple random sampling by balloting. At the third stage, six departments were selected from each of the two selected faculties, also by simple random sampling via balloting. At the fourth stage, students were selected from each department using proportional allocation based on the student population per level of study. Finally, within each level, individual students were selected using systematic sampling, where a sampling interval was calculated and applied to the class register to achieve the required number of participants per class.

The study questionnaire was designed based on the review of previous literature and was self-administered (Christopher et al., 2021; Sirat et al., 2023) The self-administered questionnaire allowed respondents to feel free to express their perspectives and opinions regarding the study being carried out. It consisted of four sections; section "A" sought the socio-demographic characteristics/variables of the respondents, section "B" assessed the knowledge level of COVID-19 protocol among undergraduates in Osun state university, main campus, section "C" determined the attitude of undergraduates in Osun state university, main campus towards COVID-19 protocol and section "D" determine the practices of COVID-19 protocols among undergraduates in Osun state university main campus.

The data analysis for this study was conducted using IBM SPSS Version 25.0 and presented with appropriate tables and charts. Statistical significance was determined using chi-square tests and logistic regression, with $P < 0.05$ considered at the 95% confidence level.

The knowledge assessment consisted of 32 statements with a maximum possible score of 32. Each correct answer earned one point, while incorrect answers earned zero. Respondents scoring 17 or above were classified as having good knowledge, while those scoring below 17 were classified as having poor knowledge. Attitudes were measured using 13 questions, with scores ranging from 0 to 13; scores of 7 or above indicated a positive attitude, while scores below 7 indicated a negative attitude. Practices were measured using 11 questions, with scores ranging from 0 to 11; scores of 6 or above indicated good practices, while scores below 6 indicated poor practices. (Ajonina-Ekoti et al., 2022)

RESULTS

A total of 350 questionnaires were administered, with 350 returned, giving a response rate of 100%, and 350 were retained for analysis.

Table 1: Sociodemographic Characteristics of the Respondents

Variables	Frequency (n=350)	Percentage
Age in years (Mean=20.4 ± SD =2)		
16–20	196	56.0
21–25	145	41.4
26–30	9	2.6
College		
College of Health Sciences	204	58.3
College of Science, Engineering and Technology	146	41.7
Sex		
Male	132	37.7
Female	218	62.3
Level		
100	116	33.1
200	57	16.3
300	54	15.4
400	117	33.4
500	6	1.8
Faculty		
FABAMSSA#	192	54.9
Engineering	55	15.7
FABASSA*	103	29.4
Department		
Anatomy	110	31.4
Physiology	88	25.1
Civil engineering	32	9.1

Electrical engineering	27	7.8
Microbiology	40	11.4
Industrial Chemistry	53	15.2
Ethnicity		
Yoruba	307	87.7
Igbo	28	8.0
Hausa	10	2.9
Others	5	1.4
Religion		
Christianity	265	75.7
Islam	83	23.7
Traditionalist	2	0.6
Parent occupation		
Government worker	168	48.0
Self employed	182	52.0
Family type		
Monogamous	290	82.9
Polygamous	60	17.1
Family setting		
Nuclear	300	85.7
Extended	50	14.3
Who do you live with		
Parents	261	74.6
Relatives	19	5.4
Friends	7	2.0
Alone	63	18.0

#FABAMSSA: Faculty of Basic Medical Sciences, *FABASSA: Faculty of Basic and Applied Sciences

Table 1 above shows the socio-demographic characteristics of the

respondents (n=350); the mean age of respondents is 20.4. The 16-20 age group had the highest number of respondents (56.0%); 37.7% were male. The majority of the respondents (33.4%) were in the 400 level. Regarding the department, most respondents (31.4%) were from the Department of Anatomy. The majority of respondents (87.7%) were Yoruba, while most of the respondents (75.7%) were Christians. More than half of the respondents (52.0%) were self-employed. Almost all respondents (82.9%) were from monogamous settings. More than half of the respondents (85.7%) were from a nuclear family setting. Most of the respondents (74.6%) live with their parents.

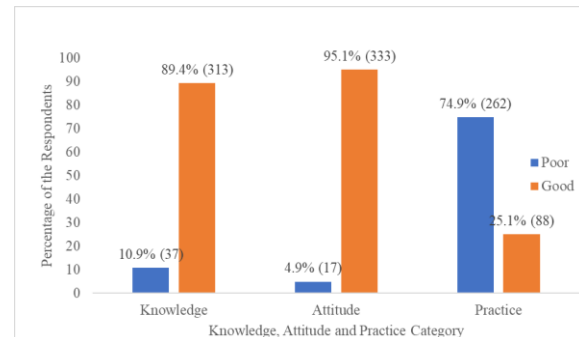


Figure 1: Shows the categorized knowledge, Attitude and Practice of the respondents.

The majority of the respondents (89.4%) had good knowledge, while (10.6%) were found to have poor knowledge of COVID-19 protocols. The majority of the respondents (95.1%) had a positive attitude, while (4.9%) had a negative attitude towards COVID-19 protocols. The majority of the respondents (74.9%) had poor practice, while (25.1%) had good practice towards COVID-19 protocols.

Table 2: Relationship between respondents' socio-demographic characteristics and knowledge of COVID-19

Variable	Sub-Variable	Knowledge Category		Statistics χ^2, p
		Poor (%) (n=37)	Good (%) (n=313)	
College	Health sciences (CHS)	16 (7.8)	188 (92.2)	$\chi^2 = 3.850$ $P=0.050$
	Science, Technology and Engineering (SET)	21 (14.4)	125 (85.6)	
Age	16-20	25 (12.8)	171 (87.2)	$\chi^2 = 2.437$ $P=0.296$
	21-25	11 (7.6)	134 (92.4)	
	26-30	1 (11.1)	8 (88.9)	
Sex	Male	11 (8.3)	121 (91.7)	$\chi^2 = 1.123$ $P= 0.289$
	Female	26 (11.9)	192 (88.1)	

Level	100	15	101	$\chi^2 = 13.592$ P= 0.009
		(12.9)	(87.1)	
	200	6	51	
		(10.5)	(89.5)	
	300	8	46	
Faculty		(14.8)	(85.2)	$\chi^2 = 3.552$ P=0.169
	400	5 (4.3)	112	
		(95.7)		
	500	3 (50)	39 (50)	
Ethnicity	FABAMSA	15	177	$\chi^2 = 4.649$ P=0.199
		(7.8)	(92.2)	
	Engineering	7	48	
		(12.7)	(87.3)	
	FABASSA	15	88	
Religion		(14.6)	(85.4)	$\chi^2 = 15.00$ P= 0.001
	Yoruba	28	279	
		(9.1)	(90.9)	
	Igbo	6	22	
		(21.4)	(78.6)	
Parent Occupation	Hausa and Others (Edo & Fulani)	3 (20)	12 (80)	$\chi^2 = 0.070$ P=0.791
	Christianity	18	247	
		(6.8)	(93.2)	
	Islam	18	65	
		(21.7)	(78.3)	
Family type	Traditional	1 (50)	1 (50)	$\chi^2 = 0.584$ P=0.445
	Government work	17	151	
		(10.1)	(89.9)	
	Self-employed	20	160	
		(11)	(89)	
Family setting	Monogamous	29	261	$\chi^2 = 1.818$ P= 0.178
		(10)	(90)	
	Polygamous	8	52	
		(13.3)	(86.7)	
	Nuclear	29	271	
Who do you live with		(10)	(90)	$\chi^2 = 8.047$ P=0.045
	Extended Parent	8 (16)	42 (84)	
		(12.3)	(87.7)	
	Relative	1 (5.3)	18	
		(28.6)	(94.7)	
	Friend	2	5 (71.4)	$\chi^2 = 1.455$ P=0.483
		(28.6)		
	Alone	2 (3.2)	61	
		(96.8)		

Table 2 above shows the association between the respondent's knowledge and their socio-demographic characteristics. The majority of the respondents (92.4%) between 21-25 years of age have good knowledge, compared to respondents (11.1%) aged 16-20 years who have poor knowledge. Almost all male respondents (91.7%) have good knowledge, compared with female respondents (11.9%) who have poor knowledge of COVID-19 protocols. Almost all respondents (95.7%) at the 400 level have good knowledge of COVID-19 protocols, compared to half (50%) at the 500 level, who have poor knowledge; this difference was statistically significant ($p=0.009$). Furthermore, there was a statistically significant association

between respondents' knowledge and religion, and almost all Christian respondents (93.2%) had good knowledge compared to Muslims (78.3%) ($p=0.001$). Respondents who live alone were found to have good knowledge (96.8%), compared with respondents who live with their parents (71.4%).

Table 3: Relationship between respondents' socio-demographic characteristics and attitude towards COVID-19

Variable	Sub-Variable	Attitude category		Statistics χ^2, p
		Negative (%) (n=17)	Positive (%) (n=333)	
College	Health sciences (CHS)	8 (3.9)	196 (96.1)	$\chi^2 = 0.926$ P=0.336
	Science, Technology and Engineering (SET)	9 (6.2)	137 (93.8)	
Age in years	16-20	14 (7.1)	182 (92.9)	$\chi^2 = 7.747$ P=0.021
	21-25	2 (1.4)	143 (98.6)	
	26-30	1 (11.1)	8 (88.9)	
Sex	Male	8 (6.1)	124 (93.9)	$\chi^2 = 0.664$ P= 0.415
	Female	9 (4.1)	209 (95.9)	
Level	100	6 (5.2)	110 (94.8)	$\chi^2 = 3.325$ P= 0.505
	200	4 (7)	53 (93)	
	300	3 (5.6)	51 (94.4)	
	400	3 (2.6)	114 (97.4)	
	500	1 (16.7)	5 (83.3)	
Faculty	FABAMSA	7 (3.6)	185 (96.4)	$\chi^2 = 1.455$ P=0.483
	Engineering	3 (5.5)	52 (94.5)	
	FABASSA	7 (6.8)	96 (93.2)	
Ethnicity	Yoruba	15 (4.9)	292 (95.1)	$\chi^2 = 1.770^*$ P=0.621
	Igbo	2 (7.1)	26 (92.9)	
	Hausa and Others (Edo & Fulani)	0	15 (100)	
Religion	Christianity	15 (5.7)	250 (94.3)	$\chi^2 = 1.862^*$ P=0.394
	Islam	2 (2.4)	81 (97.6)	
	Traditional	0 (0.0)	2 (100)	
Parent	Government	7 (4.2)	161	

Occupation	work		(95.8)	χ^2	=
	Self-employed	10 (5.5)	172 (94.5)	0.333	P=0.564
Family type	Monogamous	13 (4.5)	277 (95.5)	χ^2	=
	Polygamous	4 (6.7)	56 (93.3)	1.149	P=0.699
Family setting	Nuclear	12 (4.0)	288 (96)	χ^2	=
	Extended	5 (10.0)	45 (90)	1.020	P=0.141
Who do you live with	Parent	12 (4.6)	249 (95.4)	χ^2	=
	Relative	1 (5.3)	18 (94.7)	1.020	P=0.796
	Friend	0 (0.0)	7 (100)		
	Alone	4 (6.3)	59 (93.7)		

***Likelihood Ratio**

Table 3 shows the association between the respondents' attitude towards COVID-19 protocols and their socio-demographic characteristics. Almost all of the respondents (98.6%) between ages 21-25 have a positive attitude compared to respondents between 26-30 (11.1%), and this was statistically significant (P=0.021).

Table 4: Relationship between respondents' socio-demographic characteristics and practice of COVID-19 protocols among the Respondents

Variable	Sub-Variable	Practice category		Statistics	
		Poor (%)	Good (%)		
		(n=262)	(n=88)		
College	Health sciences (CHS)	164 (80.4)	40 (19.6)	χ^2	=
	Science Technology and Engineering (SET)	98 (67.1)	48 (32.9)	7.960	P=0.005
Age	16-20	140 (71.4)	56 (28.6)	χ^2	=
	21-25	119 (82.1)	26 (17.9)	12.350	P=0.002
	26-30	3 (33.3)	6 (66.7)		
Sex	Male	104 (78.8)	28 (21.2)	χ^2	=
	Female	158 (72.5)	60 (27.5)	0.664	P=0.415
Level	100	82 (70.7)	34 (29.3)	χ^2	=
	200	41 (71.9)	16 (28.1)	4.168	P=0.384
	300	40 (74.1)	14 (25.9)		

		400	95 (81.2)	22 (18.8)		
		500	4 (66.7)	2 (33.3)		
Faculty	FABAMSA	154 (80.2)	38 (19.8)	χ^2 7.469	=	
	Engineering	35 (63.6)	20 (36.4)	P=0.024		
	FABASSA	73 (70.9)	30 (29.1)			
Ethnicity	Yoruba	232 (75.1)	75 (24.9)	χ^2 4.639	=	
	Igbo	18 (65.3)	10 (34.7)	P=0.200		
	Hausa and Others (Edo & Fulani)	7 (70.0)	3 (30.0)			
Religion	Christianity	207 (78.1)	58 (21.9)	χ^2 7.625	=	
	Islam	53 (63.9)	30 (36.1)	P=0.022		
	Traditional	2 (100)	0			
Parent Occupation	Government work	129 (76.8)	39 (23.2)	χ^2 0.638	=	
	Self-employed	133 (73.1)	49 (26.9)	P=0.424		
	Family type	Monogamous	223 (76.9)	67 (23.1)	χ^2 3.738	=
	Polygamous	39 (65)	21 (35)	P=0.053		
Family setting	Nuclear	231 (77)	69 (23)	χ^2 2.150	=	
	Extended	31 (62)	19 (38)	P=0.024		
Who do you live with	Parent	195 (74.7)	66 (25.3)	χ^2	=	
	Relative	13 (68.4)	6 (31.6)	2.150		
	Friend	4 (57.1)	3 (42.9)	P=0.542		
	Alone	50 (79.4)	13 (20.6)			

Table 4 presents the bivariate analysis of the relationship between respondents' socio-demographic characteristics and their adherence to COVID-19 safety protocols. Statistically significant associations were observed across age (p = 0.002), college (p = 0.005), faculty (p = 0.024), religion (p = 0.022), and family setting (p = 0.024). Specifically, higher rates of good practice were recorded among respondents aged 26–30 years (66.7%), those from the College of Science, Technology and Engineering (32.9%), Engineering faculty (36.4%), Muslim respondents (36.1%), and individuals from extended family settings (38.0%).

Table 5: Relationship between respondents' knowledge of and their attitude towards COVID-19 protocols

Variable	Sub variable	Attitude category	Statistics
			χ^2, p

		Negative (n= 17)	Positive (n=333)
Knowledge	Poor Knowledge	6 (16.2)	31 (83.8)
	Good Knowledge	11 (3.5)	302 (96.5)

*** Continuity correction**

Table 5 shows that (96.5%) of the respondents who have good knowledge have a positive attitude towards COVID-19 protocols, and this was statistically significant (p=0.003).

Table 6: Relationship between respondents' knowledge and the practice and relationship between respondents' attitude and the practice of COVID-19 protocols

Variable	Sub-variable	Practices category		Statistics χ^2, p
		Poor Practice (n=262)	Good Practice (n=88)	
Knowledge	Poor Knowledge	17 (45.9)	20 (54.1)	$\chi^2 = 18.374$ P=0.001
	Good Knowledge	245 (78.3)	68 (21.7)	
Attitude	Negative attitude	14 (82.4)	3 (17.6)	$\chi^2 = 0.197^*$ P=0.657
	Positive attitude	248 (74.5)	85 (25.5)	

***Continuity correction**

Table 6 shows that 54.1% of respondents with poor knowledge have good practices, compared with 78.8% of those with good knowledge who have poor practices towards COVID-19 protocols; this was statistically significant (p=0.001).

Table 8: Binary logistic regression for the outcome variable knowledge and the selected socio-demographic predictors

Variable	Sub-Variable	p-value	Odds ratio	95% Confidence interval	
				Lower	Upper
Level	100	1	-	-	-
	200	0.017	8.438	1.460	48.768
	300	0.021	9.089	1.391	59.374
	400	0.038	7.030	1.116	44.276
	500	0.001	22.66	3.391	151.427
Religion	Traditional	1	-	-	-
	Islam	0.052	29.35	0.969	888.802
	Christianity	0.22	8.127	0.269	245.66

Who do you live with	y	8		5	
		1	-	-	-
P=0.003	Friend	0.08	0.250	0.053	1.177
	Relative	0	0.85	0.785	11.402
	Parent	0.042	0.092	0.009	0.918

In Table 8, binary logistic regression results showed that year of study significantly predicted knowledge of COVID-19 protocols. Compared with 100-level students, all other levels had significantly higher odds of poor knowledge (22 times more likely), with 500-level students showing the strongest association (OR = 22.660, 95% CI: 3.391-151.427).

In addition, respondents living with their parent had 91% lower odds of having poor knowledge compared to others (OR=0.093, CI=0.009-0.918).

DISCUSSION

COVID-19 is an emerging infectious disease that poses a significant threat to public health. Given the serious threats posed by COVID-19, adherence to COVID-19 protocols is essential to reducing infection rates and controlling the spread of the disease. This indicates the necessity of students' adherence to COVID-19 protocols, which is affected by their Knowledge, Attitudes, and Practices (KAP). Thus, this study assessed the KAP regarding COVID-19 protocols among undergraduates at Osun State University, Osogbo Campus.

The survey was dominated by younger respondents aged 16 to 20 years, with the majority being female and from the College of Health Sciences. The highest proportions by level of study were from the 400 and 100 levels. All respondents had heard of COVID-19, and the vast majority identified social media as their primary source of information. This is consistent with findings from Indonesia, where more than three-quarters of participants reported social media as their primary channel for acquiring knowledge. (Chavarria et al., 2020). In Nigeria, social media platforms such as WhatsApp, Facebook, and YouTube have become major sources of information for the populace, driven largely by the widespread availability of affordable smartphones. (Obi-Ani et al., 2020). By 2019, Nigeria recorded approximately 98.39 million internet users, over half (54%) of whom accessed the web daily, with youths aged 18–35 forming the primary user demographic. (Oji & Erubami, 2020) This population comprises the main focus of this study.

The majority of study respondents have good knowledge of COVID-19. In agreement with our findings, previous studies conducted in different states in Nigeria, among Nigerian undergraduate dental students (Umeizudike et al., 2021), in Rivers State among Clients at Primary Healthcare Facilities (Edet et al., 2020), among Hausa Muslim society in Kano State (Abdulrazaq et al., 2021) and among individuals with access to the internet in North-Central Nigeria (Christopher et al., 2021) indicated high COVID-19 knowledge among the population. The high level of COVID-19 knowledge recorded in this study could be attributed to the fact that the majority of the study participants have heard about COVID-19, are youth and have access to the internet/social media, which is their major source of information.

The respondents' attitude category shows that the majority of the

respondents (95.1%) have a positive attitude towards COVID-19 protocols, which is similar to the study conducted among residents of north-central Nigeria, stating that (94.7%) of the respondents showed a positive attitude towards COVID-19 preventive practices. (Christopher et al., 2021). This study showed a significant ($p < 0.05$) relationship between good knowledge of COVID-19 among undergraduates at Osun State University and a positive attitude towards COVID-19 Protocol.

Nevertheless, our findings on respondents' adherence to COVID-19 protocols showed that the majority of the study participants (74.9%) had poor practices, in contrast to a web-based cross-sectional survey in Saudi Arabia, which reported that 92.5% of the study population had good practices. The poor level of COVID-19 practice recorded in this study could be attributed to the fact that majority of the study participants, 101 (28.9%) disagree and 98 (28.0%) strongly disagree that they are likely to become sick of COVID-19 disease and also probably because they were well knowledgeable and 82.9% believed that older people are more at risk and that young people are at lower risk of contracting the virus. However, this study showed that there is a significant association ($p < 0.05$) between knowledge and attitude of respondents towards COVID-19 protocol, which is consistent with a survey conducted within north-central Nigeria by (Christopher et al., 2021) which showed that, using Pearson's correlation, there was a significant relationship between knowledge of COVID-19 and attitude towards preventive measures ($p = 0.004$). Also, regarding COVID-19 protocols, slightly more than half of the study participants always use a nose cover and always distance themselves from a person who is coughing or sneezing, which is consistent with a study conducted among health workers in Nigeria. (Ejeh et al., 2020) The results showed that 9 out of 10 study participants properly covered their mouths when coughing and sneezing. Also, in the same study among health workers in Nigeria, the practice of COVID-19 protocols was generally poor (59.2%). There was a significant difference ($p = 0.001$) between the study participants' knowledge of COVID-19 and their practices, similar to our study, which showed a significant difference ($p < 0.001$) between the knowledge and practices of COVID-19 protocols among our study participants. Binary logistic regression was used for the outcome variables, Knowledge, Attitude and Practices and their selected potential socio-demographic predictors, respectively.

For some time now, COVID-19 has become a major global public health challenge with no known pharmaceutical treatment; as such, different treatment options are currently being explored. Identifying national, sub-national, or community levels of KAP regarding COVID-19 protocols will enable prompt identification and the design of adequate, cost-effective, viable public health campaigns. The present study underscores the need for more intensive and comprehensive health education programs to help students adopt COVID-19 protocols. With the increasing use of social media, the internet and telecommunications amongst the student population, the school authority would undoubtedly benefit immensely from the use of these technologies for the mass dissemination of accurate information that will encourage students to adhere to the COVID-19 protocols.

Conclusion

This study assessed the knowledge, attitudes, and practices regarding COVID-19 protocols among undergraduates at Osun State University, Osogbo Campus. The findings reveal a notable paradox: while the vast majority of respondents demonstrated good

knowledge and positive attitudes towards COVID-19 protocols, a similarly large majority reported poor preventive practices. Significant predictors of good knowledge included being in a higher academic level (400-level) and being Christian. The primary source of information was social media.

The critical gap between knowledge/attitude and practice underscores a significant public health challenge. To bridge this gap, targeted, sustained, and innovative interventions are required. These should move beyond information dissemination to address the behavioural and contextual barriers to adherence. Educational programs should be integrated into university orientation and the general curriculum. Furthermore, leveraging students' widespread use of social media and telecommunications could be an effective strategy for disseminating persuasive messages and fostering a campus culture of consistent compliance with public health protocols.

Author Contributions

MAI conceptualized the study, served as the principal author, revised the article, and wrote the manuscript. RIA obtained ethics approval and performed data entry, aided in data processing and interpretation, and in manuscript writing. WAT conducted data analysis and contributed to manuscript writing. ORO, CFO, SO and ZOT aided in data collection, data entry, literature review and manuscript writing. All authors reviewed and approved the final manuscript.

Ethical Considerations

Ethical clearance was obtained from the Health Research Ethical Committee (HREC), Osun State University (UNIOSUNHREC 2021/PBH/023). Verbal informed consent was obtained before administering questionnaires, and the data collected were kept strictly confidential.

Data Availability Statement

The dataset that supports this study's findings is available in the OSF (Open Science Framework) repository at <https://doi.org/10.17605/OSF.IO/8XMJW>. The data are publicly accessible in CSV (Comma-Separated Values) format.

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