COMPLIANCE TO COVID-19 PREVENTIVE STRATEGIES: A COMPARATIVE STUDY AMONG RESIDENTS OF SOUTH WEST REGION NIGERIA

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ABSTRACT

Change in behaviors of the public is important in outbreak management, and to combat the rate at which the coronavirus is spreading; effective infection control is the key. Compliance with these strategies goes a long way in retarding the outbreak. A cross-sectional online survey study was carried out among the residents of Southwest geopolitical zone of Nigerian during the lock down period using a snowball sampling technique. A total of 821 participated in the study. Majority 774 (94.7%)engage in regular hand washing, Social distancing was said to be un-African, hence just 83 (10.2%) complied with avoiding social gathering. Over half of the participants, 479 (58.6%) do not find it comfortable to use a face mask when going outside. The level of compliance with some of the preventive strategies varies among the residents of each state. Lagos state residents had the highest level of compliance with 69% while Ekiti state residents had the poorest compliance level of 48.3%. There is low compliance with some of the preventive strategies such as maintaining social distancing and wearing a face mask. The identified gap needs to be addressed by each state Government and ensure enforcement. The health authorities should carry out a regular massive campaign using all available means.

Keywords: Knowledge; compliance; COVID-19, preventive measures

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INTRODUCTION

A new strain of coronavirus disease (COVID-19) has been identified in humans which was not previously identified and it is a zoonotic disease (Ye *et al.,* 2020). This new strain of coronavirus disease (COVID-19) has resulted in a global health threat, starting from the epidemic in China, since the severe acute respiratory syndrome (SARS) outbreak which occurred 18 years ago, this has been the largest outbreak of atypical pneumonia. The clinical disease termed COVID19 is caused by SARS-CoV-2 also known as novel beta-corona virus, (Hawryluck *et al*., 2004). At the prodromal phase the common signs and symptoms resulting from 2019-nCoV infection, including fever, dry cough, and malaise (Wang *et al*., 2020).

In Wuhan, Hubei province, China several cases of pneumonia of unknown etiology has been reported since Dec 8, 2019, which has increased intense globally(Mahase, 2020; Wang *et al*., 2020). In response to the exponential rise in the COVID-19 confirmed cases, the World Health Organization (WHO) declared the 2019-20 Coronavirus outbreak as a pandemic on 11th March 2020 and the unprecedented swift, global spread and severity of the outbreak, was a deep concern to WHO (Chen *et*

al., 2020).Most human Corona viruses cases were transmitted mainly by the respiratory route or via contact which could be transmitted through droplets of different sizes. COVID-19 may be spread by people who are not showing symptoms this has been suggested by some recent studies. In addition, transmission may be spread through contact with contaminated surfaces or objects that has the virus on it (Zhang & Ma, 2020). In response, extraordinary public health measures were put in place within China and elsewhere to reduce further spread of the virus. Non-pharmaceutical interventions were the most important cost-effective response in the absence of vaccines or medications, hence strategy based on community interventions such as person-to-person distancing, mask-wearing, isolation and good personal hygiene (hand-washing) were outlined to combat the spread of COVID-19 (Cvetković*et al*., 2020). The pandemic had a fundamental impact on all socioeconomic sectors, with significant disruptions to national and international travel, market indexes, industrial and service activities, education, and employment (Zhang & Ma, 2020).

The first confirmed case of COVID 19 in Nigeria was reported on Friday 28 January 2020, the country's National Coronavirus Emergency Operation Centre was activated (Adepoju, 2020). Since then, the Federal Government of Nigeria has been swift in response to an unparalleled move to retard the spread of the virus. Strategies were put in place to further prevent the advancement of COVID-19, also enlightenment campaigns for good hygiene and social distancing was embarked on by the civil societies and government agencies. Also, some other non-pharmaceutical public health interventions which were implemented such as control and closure of border, fourteen days quarantine and testing of all incoming travellers or returnees, massive reverse-transcription polymerase chain reaction (RT-PCR) testing for case detection, contact tracing and quarantine of suspected cases, frequent hand hygiene, and cancelation of all mass gatherings measures including school closure, work from home, and all socioeconomic activities were put on hold except essential services. The six geopolitical zones of the country adopted these measures at different degrees to decrease the risk of community transmission in the country (NCDC, 2020a and Cheng *et al* 2020).

According to the Data as received by WHO from national authorities by 10:00 CEST, 27 April 2020, globally there were 2,878,196 confirmed cases with 198,668 reported deaths. Cases of corona virus confirmed across the African region were 21,470 (WHO, 2020). Nigeria had 1,337 confirmed cases, and 40 reported deaths in 32 states and the Federal Capital Territory (FCT) (NCDC, 2020b)

As reported cases of COVID-19 increased exponentially the Nigerian Federal Government declared a two-week lockdown starting from 13th March 2020 in two states of the nation: Lagos, Ogun, and the Federal Capital Territory, Abuja meanwhile some other States' Governors also imposed a lockdown at their discretion. Despite the lockdown, the confirmed cases did not cease to increase hence the lockdown was extended for another two weeks in the previously stated two states and Abuja. As the numbers of confirmed cases reached over a thousand at the end of the second round of the lockdown, the Federal Government had to extend the lockdown for another one week subject to review. To prevent being infected many stayed at home and socially isolated themselves. (Adepoju, 2020; Ahmed, 2020; Benson, 2020)

The cases identified in Nigeria in the early stages of the global COVID-19 spread, were mostly travellers already infected from the high-risk countries. But unfortunately, community transmission of COVID-19 has begun in the country; there have been reported cases with no travel history outside the country(Onyeaghala&Olajide, 2020; UNICEF, 2020). Despite the economical situation of most middle and lower class Nigerians, the degree of compliance with the preventive measures has so far been encouraging. Some Nigerians have been engaging in withe few measures such as regular hand washing, observing person-person distancing and avoiding going to work, school, or crowded areas. In addition most religious leaders have agreed to stop physical gatherings, and avoiding hands shaking. (Olapegba *et al*., 2020). However, so many Nigerians are still defying the essence of lockdown and the social distancing regulations hence security agents had to step up enforcement of compliance (Aliyu *et al*., 2020). The report from a study conducted the UK majority 93 % were said to have engage in at least one precautionary measures to protect themselves against COVID-19

and limit the spread where washing of hands has become a regular practice than pre-COVID period, (83 %) Hand washing, (63%) and social distancing measures (avoiding going out (31%) (Atchison *et al*., 2020). Practice of face-masking was reported to well adhere to at an early stage of the pandemic by the Hong Kong Special Administrative Region (HKSAR) (Cheng *et al*., 2020). Another study carried out in Hong Kong also during the early phase of the Hong Kong of COVID-19 outbreak revealed that frequent hand washing, and observing of various forms of social distancing were complied to at 96 % and 30–70 % respectively. (Kwok *et al*., 2020). Another study conducted in Norway showed that the adult Norwegian adopted various measures to prevent and limit the spread of COVID-19, 92 % practiced frequent hand washing (Zickfeld *et al*., 2020).

To flatten the exponential rising of the COVID-19 curve, in Nigeria, there is an immediate need to assess the knowledge, compliance and public response to preventive strategies of COVID-19 at this early stage of COVID-19 pandemic in Southwest, Nigeria, since all the Southwest State (Ekiti, Lagos, Ogun, Ondo, Osun, Oyo) have reported at least a case of COVID 19 in which the epicenter of the COVID-19 in Nigeria is Lagos State, also South West states account for 870confirmed cases of the 1337 reported case (Table 1).

The assessment of participants compliance with the outlined preventive measures, majority 774 (94.7%)engage in regular hand washing and few of the participants 124 (15.2 %) have hand sanitizer and use it often while Social distancing was said to be un-African, hence just 83 (10.2%) complied with avoiding social gathering. Over half of the participants, 479 (58.6%) do not find it comfortable to use a face mask when going outside. In the case of a suspected case of COVID-19, only 127 (15.5%) knew the contact of the authority to notify. Participant's compliance with preventive measures was graded and 9(1.1%) had poor compliance 284 (34.8%) fair compliance and 524 (64.1%) had good compliance. Each states compliance as shown in Figure III-XII

Table 1: GENERAL FACT SHEET – DATA AS AT APRIL 27TH 2020
States with reported laboratory-confirmed COVID-19 cases, recoveries, and deaths

STATES	CONFIRMED CASES		DISCHARGED CASES		DEATHS		TOTAL ACTIVE CASES
	Cumulative	New	Cumulative	New	Cumulative	New	
Lagos	764	34	143	15	19	0	602
FCT	157	15	36	1	3	0	118
Kano	77	0	0	0	1	0	76
Borno	41	11	0	0	2	0	39
Gombe	37	2	0	0	0	0	37
Ogun	35	0	5	0	1	0	29
Osun	34	0	18	0	2	0	14
Katsina	30	0	0	0	2	0	28
Edo	25	0	8	0	3	0	14
Oyo	21	0	9	0	2	0	10
Kaduna	15	0	6	0	0	0	9
Bauchi	14	0	6	0	0	0	8
AkwaIbom	12	0	9	0	1	0	2
Kwara	11	0	2	0	0	0	9
Sokoto	10	0	0	0	0	0	10
Ekiti	8	0	2	0	1	0	5
Ondo	8	0	2	0	0	0	6
Taraba	8	2	0	0	0	0	8
Delta	6	0	0	0	1	0	5
Rivers	6	0	2	0	2	0	2

Abia	2	0	0	0	0	0	2
Enugu	2	0	2	0	0	0	0
Jigawa	2	0	0	0	0	0	2
Niger	2	0	0	0	0	0	2
Zamfara	2	0	0	0	0	0	2
Adamawa	1	0	0	0	0	0	1
Anambra	1	0	1	0	0	0	0
Bayelsa	1	0	0	0	0	0	1
Benue	1	0	0	0	0	0	1
Ebonyi	1	0	0	0	0	0	1
Imo	1	0	0	0	0	0	1
Kebbi	1	0	0	0	0	0	1
Plateau	1	0	0	0	0	0	1
TOTAL	**1337**	**64**	**251**	**16**	**40**	**0**	**1046**

Source: NCDC, 2020 www.covid19.ncdc.gov.ng it was retrived 27th April 2020

Figure I: CoronaViruus Disease (COVID-19) Prevention.

Source: Nigeria Center for Disease and Contol, Federal Ministry of Health Nigeria
www.covid19.ncdc.gov.ng it was retrived 20th April 2020

MATERIALS AND METHOD

This is a cross-sectional survey conducted among the residents of southwest Nigeria. To recruit respondents for this study a snowball sampling technique was employed to those living in the Southwest Geopolitical Zone during the COVID-19 pandemic in the country. Link was purposively sent to potential respondents via different media; Whatsapp, Telegram, Twitter, Facebook and Instagram posts to requesting for willing participation in the designed online survey. Google forms was used to represent the semi-structured questionnaire. The online survey was carried out during the end of the second week of the second round of lockdown in Nigeria (April 29 to May 2, 2020).

Inclusion criterion

The study was carried out among the residents of South West Region, Nigeria; hence the inclusion the criterion was those that currently reside in Ekiti, Lagos, Ogun, Ondo, Osun, Oyo (Southwest States) as at the period the online the survey was carried out. Also individuals who understood English language, who have access to the internet and those who were 18 years old and above.

Procedure

In compliance with the Federal Government of Nigeria directives to maintain social distancing and minimize physical interaction, potential respondents were contacted through an online survey platform (Google form)electronically. The sampling method was purposeful and convenient which means that the sample is not necessarily a full representative of the South West region of Nigeria population. Informed consent was obtained from all respondents and participation was completely consensual, anonymous, and voluntary. Study was conducted by following the 1964 Declaration of Helsinki and its subsequent amendments. Ethical committee Ladoke Akintola University of Technology Teaching Hospital Osogbo, Osun State gave the Approval with reference number LTH/REC/2020/04/29/456. Respondent's anonymity and confidentiality were ensured.

Survey Development

Validated tools used in previous surveys on the knowledge and compliance of COVID-19 outbreaks were reviewed and adopted, (Abdelhafiz *et al*., 2020; Nooh *et al*., 2020), the outlined NCDC preventive strategies were adopted (Figure1)and additional questions related to the public response to COVID-19 outbreak were included by the authors. The questionnaire consists of three sections. Section A: Socio-demographic data; Section B: Knowledge about COVID-19 and Section C: Compliance/ public response to preventive strategies of COVID-19.

Information obtained from the socio-demographic data were gender, age, marital status, ethnicity, educational qualification, religion, present location and perceived financial status. Assessment of knowledge on COVID-19: (what is Coronavirus, mode of transmission, clinical presentation, preventive measures, and sources of information). Responses were outlined as 'correct', 'incorrect', and 'I do not know'. 1 point was assigned to correct answer, while 0 point was assigned to both wrong answers and 'I do not know' responses. Each respondents' responses were summed and the aggregate of each were represented as follows: 11-15, good knowledge; 6–10, moderate knowledge; 0–5, poor knowledge. Compliance with the preventive measures was elicited with ten questions that were graded to assess the level of compliance of each respondent. Correct answers were assigned 1point and wrong answer 0 points. The results were represented as 7-10, Good compliance, 6-4 Fair compliance and 0-3 Poor compliance.

Data Analysis

All data analyses were performed using Statistical Package for the Social Sciences (SPSS) software, version 21. Socio-demographic characteristics and responses to questions concerning knowledge, compliance, and public response to COVID-19 were summarized using descriptive statistical method The comparison of both the knowledge score and compliance were done using crosstab.

RESULT

Participants Socio-demographic characteristics

821 respondents' participated in the online survey questionnaire, 3 respondents who did not complete the survey were excluded, a total of 817 participants were analysed. Most participants were

above 29 years of age (n=558, 68.6%); 336 (41.1%) were male and 481 (58.9%) were female. Majority of the participants 554 (67.8%) held a bachelor's degree/ polytechnic degree. Over one third (38.1%) of the respondents resides in Ogun state, and the majority (88%) are of the Yoruba ethnic group. 295 (36.1) are government workers and less than one-tenth unemployed respondents. 110 (13.5) financial status lives comfortably. (Table 2)

Table 2: Socio-demographic characteristics

Categories		Frequency n=817	Percentage
Age	< 19years	29	3.5
	20 - 29years	230	28.2
	30-39 years	245	30.0
	40-49 years	165	20.2
	50 - 59 years	110	13.5
	60 >	38	4.7
Gender	Male	336	41.1
	Female	481	58.9
Educational level	Primary	7	0.9
	Secondary	30	3.7
	University / Polytechnic	554	67.8
	Postgraduate	226	27.7
State of residence	Ekiti	29	3.5
	Lagos	226	27.7
	Ogun	311	38.1
	Ondo	49	6.0
	Osun	79	9.7
	Oyo	123	15.1
Religion	Christianity	686	84.0
	Islam	121	14.8
	Traditional	8	1.0
	Others	2	.2
Ethnicity	Yoruba	719	88.0
	Hausa	17	2.1
	Igbo	38	4.7
	Others	43	5.3
Occupation	Schooling	130	15.9
	Unemployed	72	8.8
	Government	295	36.1
	Non-government	282	34.5
	Retired	38	4.7
Financial Stability	do not meet needs	128	15.7
	Just meet needs	275	33.7
	Needs met with little saving	304	37.2
	Living comfortably	110	13.5

Knowledge on COVID-19

Mean score of Participants' on COVID-19 knowledge 11.8 (SD: 2.09 range: 0-15), suggesting an overall 78.6% (11.8/15*100) knowledge rate of the respondents and the knowledge score reveal that majority 694 (84.9%) had good knowledge of COVID-19 (Figure II).

Figure II: Knowledge scores of participants

State versus Knowledge Grading: Finding from this study reveals the knowledge of respondents with regards to each state in South West. Table 3 reveals that of the six states of the southwest region of Nigeria, Oyo state residents that partook in this study had the lowest awareness on COVID-19 with 5.7% poor knowledge, 14.6% fair knowledge and 79.7% good knowledge while Lagos residents that participated in the study had the overall brilliant knowledge of COVID-19 with the following statistics 0.9% poor knowledge, 9.3% fair knowledge, and 89.8% good knowledge.

Table 3: State versus Knowledge Grading

	Poor Knowledge		Fair Knowledge		Good Knowledge		Total n=817
	n	%	n	%	n	%	
Ekiti	1	3.4	2	6.9	26	89.7	**29**
Lagos	2	0.9	21	9.3	203	89.8	**226**
Ogun	4	1.3	51	16.4	256	82.3	**311**
Ondo	2	4.1	5	10.2	42	85.7	**49**
Osun	2	2.5	8	10.2	69	87.3	**79**
Oyo	7	5.7	18	14.6	98	79.7	**123**

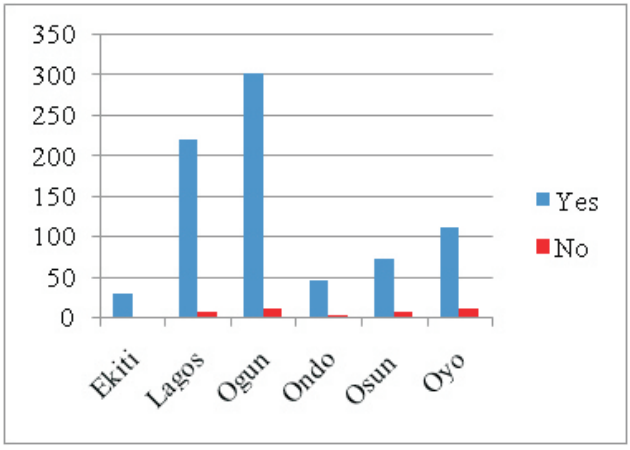

Figure III: Do you regularly wash your hands?

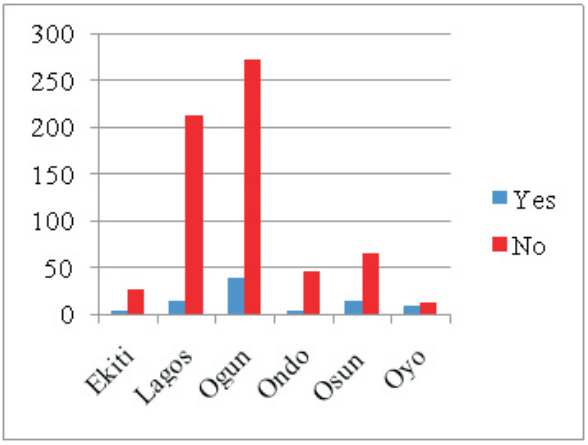

Figure IV: Do you observe social distancing?

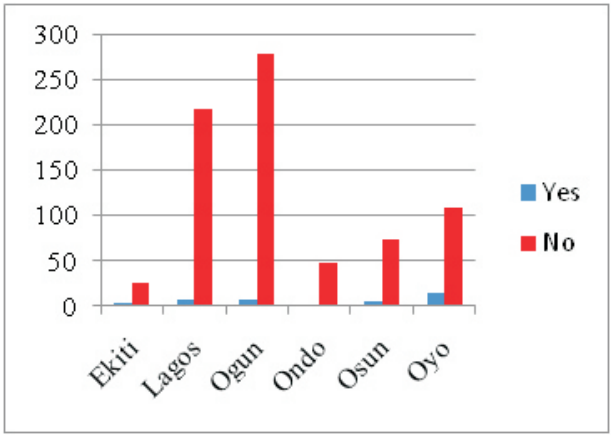

Figure V: Do you still shake hands?

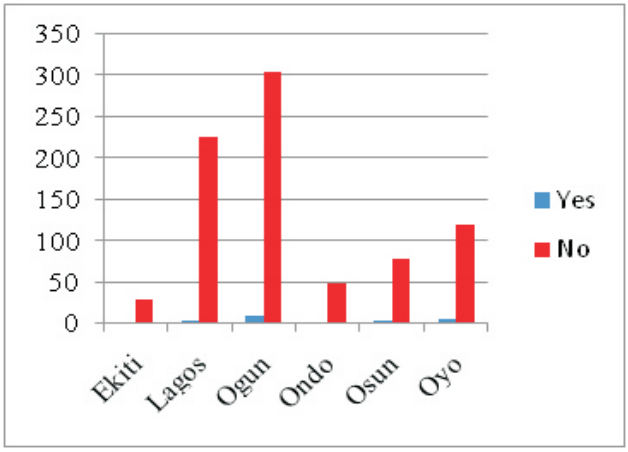

Figure VI: Do you observe the stay at home directive?

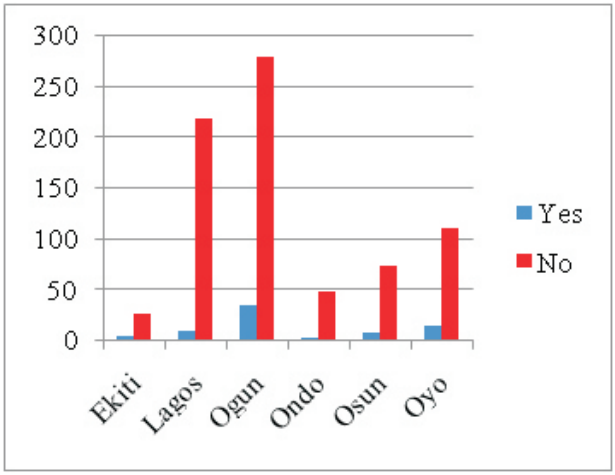

Figure VII: Do you have hand sanitizer and also use it often when sneezing?

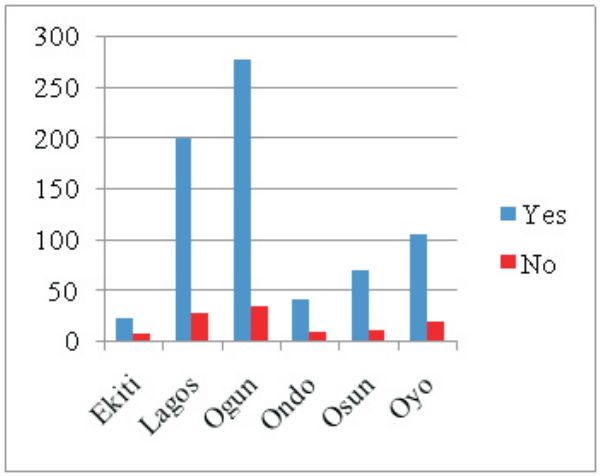

Figure VIII: Do you use the bent of your elbow to cover your nose?

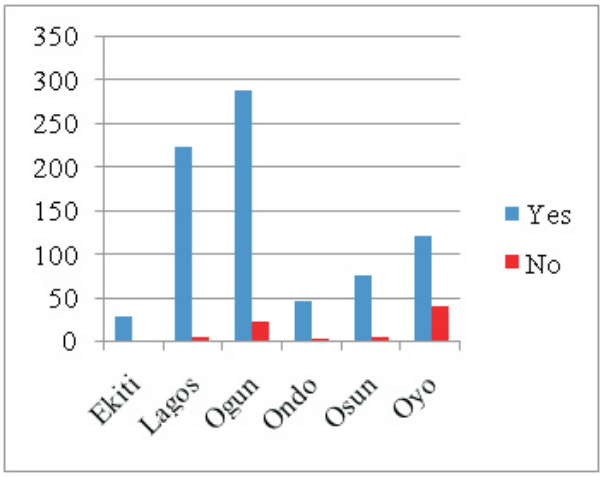

Figure IX: Despite the lockdown do you stay where there is gathering of people ?

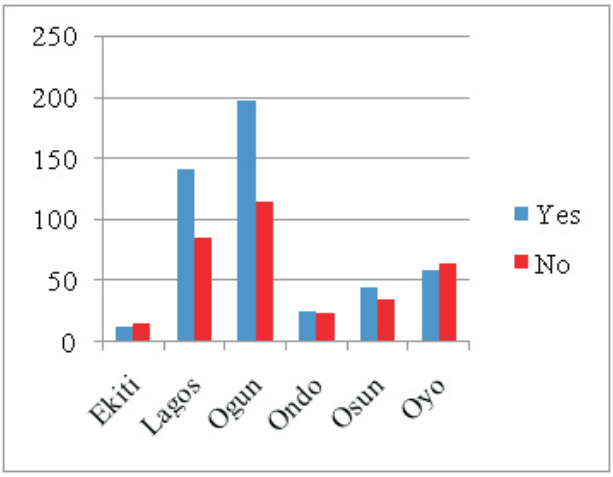

Figure X:Do you find it comfortable to use face mask when going outside?

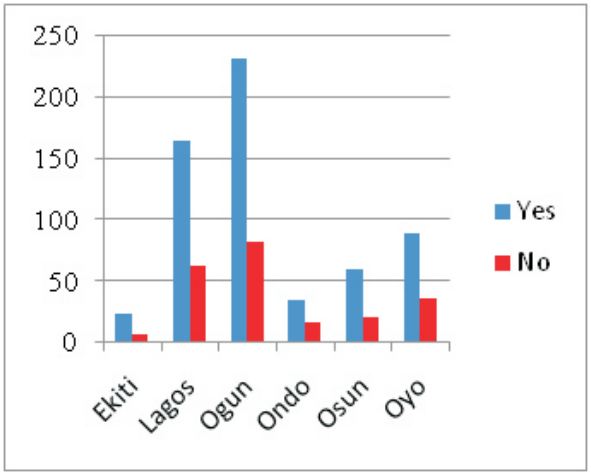

Figure XI: Do you sometimes get carried away with touching? your eyes, nose and mouth?

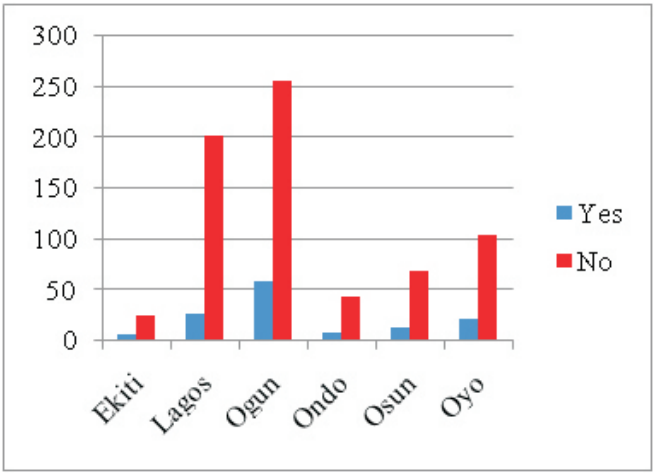

Figure XII: In case of a suspected case of COVID-19, do you know thecontact of the authority to notify?

State Versus Compliance Grading: The level of compliance with some of the preventive strategies vary among the residents of each state. Lagos state residents had the highest level of good compliance with 69% followed by Ogun state with 65.3% while Ekiti state residents had the poorest compliance level of 48.3% (Table 4).

Table 4: State Versus Compliance Grading

	Poor Compliance		Fair Compliance		Good Compliance		Total n=817
	N	%	n	%	N	%	
Ekiti	1	3.4	14	48.3	14	48.3	29
Lagos	0	0	70	31	156	69	226
Ogun	6	1.9	102	32.8	203	65.3	311
Ondo	0	0	18	36.7	31	63.3	49
Osun	1	1.2	30	38	48	60.8	79
Oyo	1	0.8	50	40.7	72	58.5	123

Southwest Nigeria is quite strategic as far as the spread of COVID-19 in the country is concerned. Lagos, a south-western state which is the highest urban population, recorded the index case, and is currently the epicenter of the pandemic in Nigeria. Lagos and Ogun States were two out of the first three States that the President of Nigeria first announced a total lockdown that spanned for five weeks (Ahmed, 2020). The public response to the lockdown in the South West states has far-reaching implications for the country as a whole and as far as we know, this study was among few of the study researching into Public compliance to the preventive measures of COVID-19 among residents of southwest states in Nigeria.

More than half (58.9%) of the respondents were female with a higher level of education. This was similar to the study conducted in Serbia (Cvetković *et al*., 2020). The opposite was the case in a study carried out among North Central residence of Nigeria where male 59.6% accounted for the population size of the study with a high level of education attainment (Reuben *et al*., 2020). Most of the respondents reside in Lagos (27.7%) and Ogun (38.1%). Overall, participants who participated in the survey had good knowledge about the COVID-19, the modes of transmission, and preventive measures with the overall rate of 78.6%, this could be compared with the study carried out in Egypt (Abdelhafiz *et al*., 2020), so many other studies carried out on COVID 19 also revealed good knowledge (Kwok *et al*., 2020; Reuben *et al*., 2020; Soest *et al*., 2020). The main source of information varies but the majority of the respondents got theirs from mass media 310 (37.9) and Social media 219 (26.6%), Kwok *et al* reported doctors (84%), media broadcasts (57%) and newspapers (54%)as the most reliable sources of information (Kwok *et al*., 2020). In line with national and community response to COVID-19 guidelines, 34.8% had fair compliance with the preventive measures and 1.1% had poor compliance. This is a huge implication for community transmission (Anyaogu, 2020). Apparently, there is fall out in the compliance as 41.4% of the respondents reported that they do not find the wearing of a facemask in the public comfortable as against the report of a study carried out in Hong Kong where the population had a good practice of community-wide face masking which has been suggested to have contributed to the reduction in the number of COVID-19 cases by reducing the respiratory droplets and saliva from individuals. (Cheng *et al*., 2020).Frequent hand washing has been identified as one of the cost-effective infection control strategies that have been implored in preventing the spread of COVID-19, Majority 774 (94.7%) engage in regular hand washing and few of the participants 124 (15.2 %) have hand sanitizer and use it often, this is the most complied measure, this is similar to the study conducted in Norway, where, 92 % practiced frequent hand washing to reduce the transmission of COVID-19 (Zickfeld *et al*., 2020). Low usage of hand sanitizer could be the effect of the inflated price of hand sanitizer during the outbreak, which may not be affordable by many(AfricaNews, 2020). In managing outbreaks, change in behaviors of the public is important, behaviors such as avoiding social gathering is one of the changes that are expected during this COVID-19 pandemic. 83 (10.2%) finds it difficult with avoiding social gathering, these findings were similar to the investigation carried out in Oslo where fewer respondents reported maintain physical distance (n = 5 859, 50 %). (Soest *et al*., 2020) while in Hong Kong social distancing was observed in various forms with about 30–70 % (Kwok *et al*., 2020). Of the six states of the southwest region of Nigeria, Oyo state residents that partook in this study had the lowest awareness level on COVID-19 with 79.7% good knowledge while Lagos residents had the overall brilliant knowledge of COVID-19 with 89.8% good knowledge. This finding can be supported by the NCDC report at the time of writing which shows that Lagos state had the highest COVID-19 confirmed cases (774) of in the country while Oyo state had just 21 cases (Table 1). These statistics are assumed to have influenced the disparity in the level of awareness. Compliance with some of the outlined preventive strategies varies among the residents of each state. Lagos state residence had the highest level of good compliance with 69% followed by Ogun state with 65.3% while Ekiti state residents had a very poor compliance level with 48.3%, this was corroborated with the report of Oluwatuyi *et al*., where the residents of Ekiti State have refused to adhere to the regulations and disregard the safety tips and instructions that followed the easing of lockdown as people move around like business as usual, residents refused to use a face mask, practice hand washing exercise and

refused the use of hand sanitizer. It was also noticed that social distancing was disregarded in markets, stores, motor parks, etc. (Oluwatuyi *et al*., 2020; Xinhua, 2020). Despite the Federal Government several strategies to reduce the exponential rate of transmission of COVID-19 in Nigeria, the results from this study has revealed low compliance with some of the preventive strategies such as wearing of face mask, and social distancing. The identified gap needs to be addressed by each state Government and ensure enforcement. The health authorities should carry out a regular massive campaign using all available means such as community town criers, fliers, radio jingle, television broadcast, etc. to health educate the masses on the relevance of complying with preventive strategies.

LIST OF ABBREVIATIONS
COVID-19- Corona Virus Disease 2019
FCT- Federal Capital Territory
NCDC- Nigeria Center for Disease Control
SARS- Severe Acute Respiratory Syndrome
WHO- World Health Organization

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