Knowledge, Attitude and Practices Related to COVID-19 Prevention among Health Care Workers in Sokoto Metropolis, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. Authors OMO and HA conceived the initial idea for the manuscript. Authors MY, IAR, HGI, ZAK, AMD, AI, AW, HY and AA took part in the design of the questionnaire, supervised the data collection and wrote the first draft of the manuscript under the supervision and guidance of authors OMO and HA. All the authors contributed to the revision of the manuscript and approved the final manuscript.

Original Research Article

ABSTRACT

Aims: This study aims to assess the knowledge, attitude, and practices related to coronavirus pandemic among health care workers in Sokoto metropolis of Sokoto State, Nigeria.
Study Design: A cross-sectional study
Place and Duration of Study: The study was conducted in Sokoto metropolis, northwest Nigeria between July and October 2020

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Methodology: Four hundred and twenty-seven respondents were selected using a multi-stage sampling technique. Data were collected manually using a self-administered questionnaire entered into the computer for analysis using IBM SPSS version 25 for statistical analysis. Descriptive statistics, chi-square tests, and frequencies of the various variables were tabulated.
Results: The mean age was 35.16+- 9.25 years, with those aged 30-39 years constituting 38% of the respondents. There were 53.2% males, 47.3% nurses, and 27.2% doctors, and 71.6% of the respondents were from tertiary health institutions, out of which 42% had 1-5 years of work experience. Up to 99% were aware of coronavirus 2019 (COVID-19), and overall, 78.2% had good knowledge, and 91% of all the respondents had positive attitudes towards the pandemic (p-value 0.001). Overall, 68.4% of the health workforce had appropriate practices towards preventing COVID-19, and 83% were willing to be posted to isolation centers with adequate personal protective equipment (PPE).
Conclusion: The study demonstrated significant awareness and knowledge of COVID-19 amongst the health workforce in Sokoto with significant positive attitudes towards the pandemic and appropriate practices towards preventing the pandemic and willingness to work in isolation centers to support the prevention of the pandemic.

1. INTRODUCTION

Coronavirus is a newly (novel) identified virus, severe acute respiratory syndrome coronavirus 2 (SARS-COV-2). The causative agent is called Severe Acute Respiratory Syndrome Corona Virus 2 (SARS CoV2). It belongs to the same group of coronaviruses responsible for Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS)— responsible for two separate epidemics. SARS reported from China between 2002 to 2003 where more than 8000 people affected with 916 deaths, and MERS reported from Saudi Arabia in 2012 where 2494 individuals were affected and with 858 deaths [1-2,3-4]. The novel coronavirus (COVID-19), the third global epidemic, just like SARS and MERS, is believed to be zoonotic; however, transmission from person to person through respiratory droplets and by direct contact via body secretions is possible [1].

The pulmonary manifestations of COVID-19 are evolving and include cough, dyspnea, fever, sore throat, sputum production, and pneumonia with acute respiratory distress syndrome, acute hypoxic respiratory failure and or death in severe form, like SARS and MERS [5]. Other extra-pulmonary symptoms include gastrointestinal symptoms such as abdominal pain, nausea, vomiting, anorexia, acute pancreatitis and colitis, diarrhea, elevated liver Aspartate transaminase, Alanine transaminase, and bilirubin [3,5-8]. Cardiovascular manifestations include cardiac arrythmias, myocarditis, pericarditis, acute cardiac syndrome, heart failure, shock, and cardiac arrest [5]. Other manifestations include acute kidney failure, rashes, lesions, urticaria, headaches, dizziness, cerebro-vascular disease, conjunctivitis, retinitis, uveitis and optic neuritis [5]. Men tend to be at risk of severe infection and mortality related to COVID-19 more than women. Also, the severity and mortality due to the pandemic differ between ethnic groups due to lack of access to health care services and the presence of medical comorbidities. African Americans and Hispanic communities have shown higher rates of infection and hospitalization in the presence of medical conditions such as diabetes, hypertension, obesity, asthma, and heart diseases among the minority groups compared with the Caucasians [9]. The current global data shows more than 1.7million deaths and has infected more than 81 million people as of December 2020 [9].

Since its discovery in December 2019 in Wuhan city of Hubei Province in China, the pandemic has spread globally as a result of human-to-human contact, and due to its widespread capacity, it was declared a pandemic by the World Health Organization in March 2020. Everyone is at risk if exposed; however, older adults and those with underlying medical conditions are at increased risk [10]. In Nigeria, as of December 2020, more than 84,811 cases have been reported with more than a thousand deaths recorded [10-12], and the case fatality rate is 1.5% and recovery rate of 84.1% of the total cases [13]. The cases are widespread, but the states with the highest number of cases include Lagos, Abuja, Oyo, Edo, Rivers, Kano, Kaduna, Delta, Plateau, Ogun, and Ondo [10]. Other countries with the devastating impact of COVID-19 include the United States, Brazil, Italy, United Kingdom, India, Mexico, France, among

others [1-2,14-19], and in Africa, the pandemic has affected 47 countries with more than 1.5 million cases and 24,000 deaths as of December 2020 [16,10-12]. Current preventive measures in practice include active surveillance, early detection, isolation and case management. Other measures at community and individual levels include restricted public gatherings, social distancing, the use of face mask, and regular handwashing with water and soap.

COVID-19 is an emerging disease; thus, a lot is yet to be understood regarding its dynamics of transmission, prevention, and treatment as yet there is no known vaccine or drug approved for its prevention or treatment. COVID-19 has created substantial global public health challenges [20], and as the world still strives to look for effective vaccines or drugs for its treatment, healthcare workers continue to render the necessary care for the survival of the patients. Given the rate at which people are getting infected and the dearth of knowledge about the disease, healthcare workers being in the frontline, are at very high risk of contracting the disease, moreover, several doctors and nurses across the globe have become infected while caring for COVID-19 patients; with mortality recorded among healthcare workers in the UK, Spain, and Italy and other countries in Europe and America [14-16,18], in Nigeria, records have shown that more than 800 health workers were infected, and at the global level, WHO noted that health workers account for 10% of the infections [21-22]. Currently, there are 183 confirmed cases in Sokoto [23], and to the best of our knowledge, there is no known record of any study that looked at health workers' knowledge and practices related to COVID-19. Therefore, it becomes imperative to research to understand what healthcare workers know about the disease, its treatment, and prevention. This study, therefore, aims to assess the knowledge, attitude, and practices related to coronavirus pandemic among health care workers in Sokoto metropolis of Sokoto State, Nigeria.

2. METHODOLOGY

2.1 Study Area

This study was conducted within Sokoto metropolis in Sokoto State, one of the 36 States in Nigeria. It is located to the extreme Northwestern part of Nigeria between longitudes 4Â°8′E and 6Â°54′E and latitudes 12Â°`N and 13Â°58`N. It has a total of 23 LGAs. The metropolis is made up of four local government areas (LGAs) which include Sokoto North (SN), Sokoto South (SS), Wamakko (WMK) and Dange-Shuni (DGS). Health services in Sokoto state are provided by the Federal, State and Local government authorities operating synergistically at three different levels in the provision of services with support from development partners and the Civil Society organizations. The metropolis has one tertiary health institution, Usmanu Danfodiyo University Teaching Hospital (UDUTH) that provides highly specialized medical care, six (6) secondary health facilities and 48 Primary Health Centers. Other hospitals in the state include those operated by the Nigerian Army and the Police and over 38 private health facilities. There are 1308 clinical staff in UDUTH, 601 in Specialist hospital whereas, SN, SS, WMK and DGS have 137, 142, 77 and 66 respectively.

The state has two (2) COVID- 19 isolation centers; one in the Infectious Disease Hospital Amanawa located at the outskirts of the state capital and the other in Usmanu Danfodiyo University Teaching Hospital, Sokoto (UDUTH). Presently, there is one Covid-19 testing centre at the Centre for Advanced Medical Research and Training (CAMRET) domiciled at the College of Health Sciences of Usmanu Danfodiyo University, Sokoto.

2.2 Study Population

The study population comprised of Doctors, Nurses, Pharmacists, Medical Laboratory Scientists and Community Health Extension Workers, working in the selected health facilities.

2.2.1 Inclusion criteria

Only doctors, nurses, pharmacists, medical laboratory scientists and community health extension workers who have worked for at least six months before the study and currently in clinical practice were included in the study.

2.2.2 Exclusion criteria

Health workers already working in isolation centers of the selected health facility(ies).

2.3 Study Design

Cross-sectional study design.

2.4 Sample Size Determination

The sample size was calculated using the Cochrane formula for estimating sample size in descriptive studies [24]:

$$n = z^2 pq/d^2$$

Where

n=Minimum sample size in a population greater than 10,000
z=Standard normal deviate at alpha probability (95% CI) =1.96
p=Prevalence of the factor under study (0.5 was used since there was no available prevalence of good knowledge of COVID-19 infection from a previous study within the study area) [25]
q=Complementary factor=1-0.5
d=Precision= 5% (0.05)

Using the above formula, a sample size of 384 was obtained

Allowing for a 90% response rate
Adjustment for non-response was done by using anticipated response rate of 90% as follows: ns = n/0.9 =384/0.9 = 426.8
Therefore **427** respondents were recruited into the study.

2.5 Sampling Technique

All the health facilities in the four metropolitan LGAs were identified and listed to provide the sampling frame. Multi-stage sampling technique was used to select respondents as follows:

Stage 1: The health facilities were first stratified into tertiary (1) secondary (6) and primary healthcare centers (48). One secondary health facility and 12 PHCs within the metropolis were selected from each of the stratum by simple random sampling (by balloting procedure). The tertiary health facility was automatically selected being the only one in the metropolis.

Thereafter, proportionate allocation of questionnaires was made to each selected health facility, based on the population size.

Stage 2: For each of the selected health facilities, proportionate allocation of the questionnaire was done based on population of each cadre of heath care workers to whom the questionnaires will be administered. Thereafter, stratified sampling technique was used to select the respondent based on their rank.

2.6 Instrument of Data Collection

A set of structured pretested self-administered questionnaire was used to obtain relevant information from the study participants. The questionnaire had five sections as follows:

Section A: Sociodemographic characteristics of respondents
Section B: Knowledge of respondents regarding COVID-19 pandemic
Section C: Attitude of respondents towards COVID-19 pandemic
Section D: Preventive practices of respondents regarding COVID-19 pandemic
Section E: Willingness of the healthcare workers to work at an Isolation Center

Internal consistency (using Cronbach's alfa) of the instrument (for the Likert scale items) was 0.72.

2.7 Method of Data Collection

Data was collected by Questionnaire survey where each respondent was given a copy of the questionnaire to fill and return; respondents were anonymous in filling the questionnaire.

2.8 Personnel

Seven Resident Doctors of the Department of Community Medicine of Usmanu Danfodiyo University Teaching Hospital, Sokoto were used as research assistants for the data collection. They were trained by the Principal Researcher for two days; each training session lasted for 2 hours. The training covered epidemiology of COVID 19, general principles of research, objectives of the study, conduct of research, interpersonal communication skills and administration of research instruments.

2.9 Pretest

The questionnaire was pretested in other health facilities outside the metropolis. Necessary amendments were made thereafter.

2.10 Data Analysis

Data collected were manually checked for completeness and then entered into the computer for analysis using IBM SPSS version 25. Knowledge, attitude and practice variables were marked electronically using Ms Excel 2016; one mark was awarded to each correct answer on knowledge, attitude and practice while zero mark was awarded to wrong or negative response. The scores were converted to percentages and graded. For the knowledge

variables, scores < 50 was graded as poor knowledge, 50-69 as fair and scores ≥70 was graded as good knowledge; less than and more than the mean scores for the attitude questions were graded as negative and positive attitude respectively; whiles scores <60 and ≥ 60 was adjudged as inappropriate and appropriate practices of prevention. Continuous variables were summarized as mean and standard deviation, whereas categorical variables were summarized as frequencies and percentages. Inferential statistical analysis was done where necessary, using chi square test and logistic regression. Level of statistical significance was set at 5% (p<0.05)

3. RESULTS

Four hundred and twenty-seven questionnaires were administered to eligible respondents, out of which 408 questionnaires were filled, retrieved, and analyzed, thus giving a response rate of 95.5%.

The mean age of the respondents is 35.16 ±9.25 years, and those aged between 30-39 years constituted the highest proportion [132(38.2%)]. The proportion of male respondents was slightly higher than that of their female counterparts [210(53.2%)] and [185(46.82%)] respectively. Nurses were the highest represented group among the different cadres of respondents [174(47.3%)] followed by Doctors [100(27.2%)]. Regarding the place of work, most of the respondents were from the tertiary health institutions, 237(71.6%). Close to half of the respondents [136(42.2%)] had 1-5 years of work experience with the mean years of work experience of 9.75±8.89 years (Table 1).

Almost all, (99.0%) of the respondents were aware of COVID –19 (Fig. 1).

A majority [309(78.6%)] of the respondents obtained information concerning the COVID -19 pandemic through the electronic media (Radio and TV), followed by social media [29(7.4%)] (Fig. 2).

A significant proportion of the participants responded correctly to most of the questions on knowledge of Covid-19 (Up to 90%). Only 188(48.6) knew that symptoms of COVID 19 could appear within three days of infection, and 132(34.5) knew that chest X-ray is not generally required to make the diagnosis of COVID 19. Only 96(24.2% knew there is no drug that can cure the disease while 171(44.8% knew chloroquine is not an approved treatment for COVID- 19 (Table 2).

Overall, up to 319(78.2%) of the respondents had good knowledge of COVID -19, 77(19%) had fair knowledge, and 12(3%) had poor knowledge. Among the different cadres, Doctors had the highest proportion with good knowledge (92%), followed by Medical Laboratory Scientist and Nurses with 76.7% and 75.9% respectively (Fig. 3).

Regarding the attitude of respondents towards COVID -19 prevention, 346(84.8%) of the respondents strongly agreed that the disease is a serious public health problem, 232(57.1%) strongly agreed it is important for people to avoid leaving home unnecessarily while 292(71.6%) strongly agreed that government should restrict travels from infected areas. Regarding social distancing, up to 172(42.1%) of the respondents agreed religious gatherings should be excluded from places where it should be maintained; 134(33.1%) of the respondents agreed since COVID -19 has low fatality in Nigeria it is, therefore, not a priority disease (Table 3).

The overall attitude of the respondent towards COVID -19 prevention was impressive with 366(91.0%) of the respondent having a positive attitude towards the pandemic (Fig. 4).

Among all the different cadres of Regarding the attitude of respondents according to their cadre, more than 80% of all the different cadres of respondents had an overall positive attitude towards COVID- 19 prevention (Fig. 5).

Up to 257(70%) of the respondents said they always wear facemasks while attending to patients,293 (79%) said they maintain hand hygiene at all times while 171(64.3%) said they avoid touching their eyes with unwashed hands (Table 4).

More Nurses [140(81.0%)] compared to other cadres of the health workers carried out appropriate practices of prevention of Covid-19 while the Pharmacists showed the least appropriate preventive measures. Overall, 279(68.2%) of the health workers had appropriate practices with regards to the prevention of Covid-19 (Fig. 6).

Factors significantly associated with preventive practices of respondents were sex (p=.011), knowledge of COVID 19 (p=.004), attitude towards COVID 19 prevention (p<.001)

and category of respondent (p=.012) [Table 5]

Less than half of the respondent 149(46.3%) expressed their willingness to work in a COVID-19 isolation center and for those that were not willing, the main reason was lack of enough personal protective equipment 98(56.7%). Most 144(83%)of the respondents were willing to be posted to the isolation center if adequate PPE will be provided (Table 6).

Table 1. Socio-demographic characteristics of respondents in Sokoto metropolis

| Variable	Frequency (%) N=408
Age group (years)	
<20 years	4(1.2)
20-29 years	107(30.9)
30-39 years	132(38.2)
40-49 years	65(18.8)
50-59 years	36(10.4)
≥60 years	2(0.6)
Mean ±SD	35.16 ±9.26
Sex	210(53.2%)
Male	185(46.8%)
Female	
Category of health worker(Cadre)	
Doctor	100(27.2%)
Nurse	174(47.3%)
Pharmacist	20(5.4%)
Laboratory scientist	30(8.2%)
Community Health Worker	44(12.0%)
Place of work	
Primary Health Center	30(9.1%)
Secondary Health Facility	64(19.3%)
Tertiary Health Facility	237(71.6%)
Years of service	
1-5 years	136(33.3%)
6-10 years	79(19.3%)
11-15 years	39(9.5%)
16-20 years	26(6.4%)
>20 years	129(31.5%)
Mean ±SD	9.75±8.89
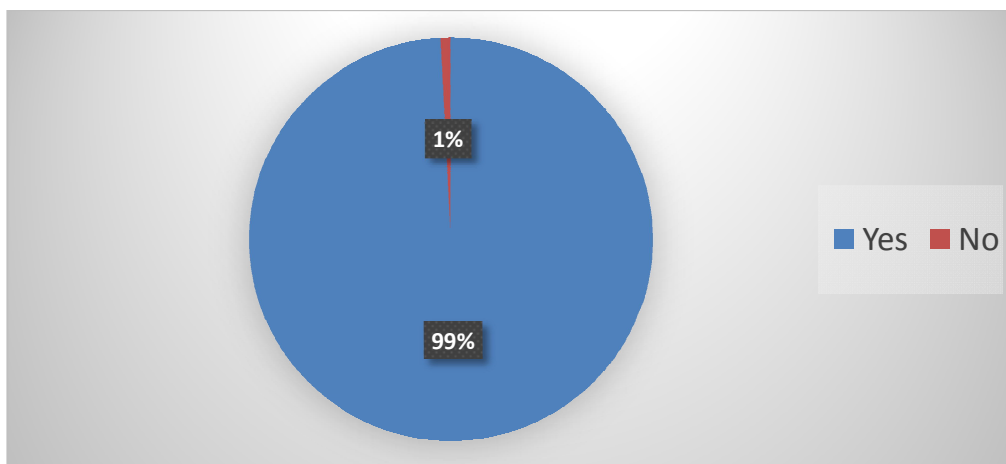
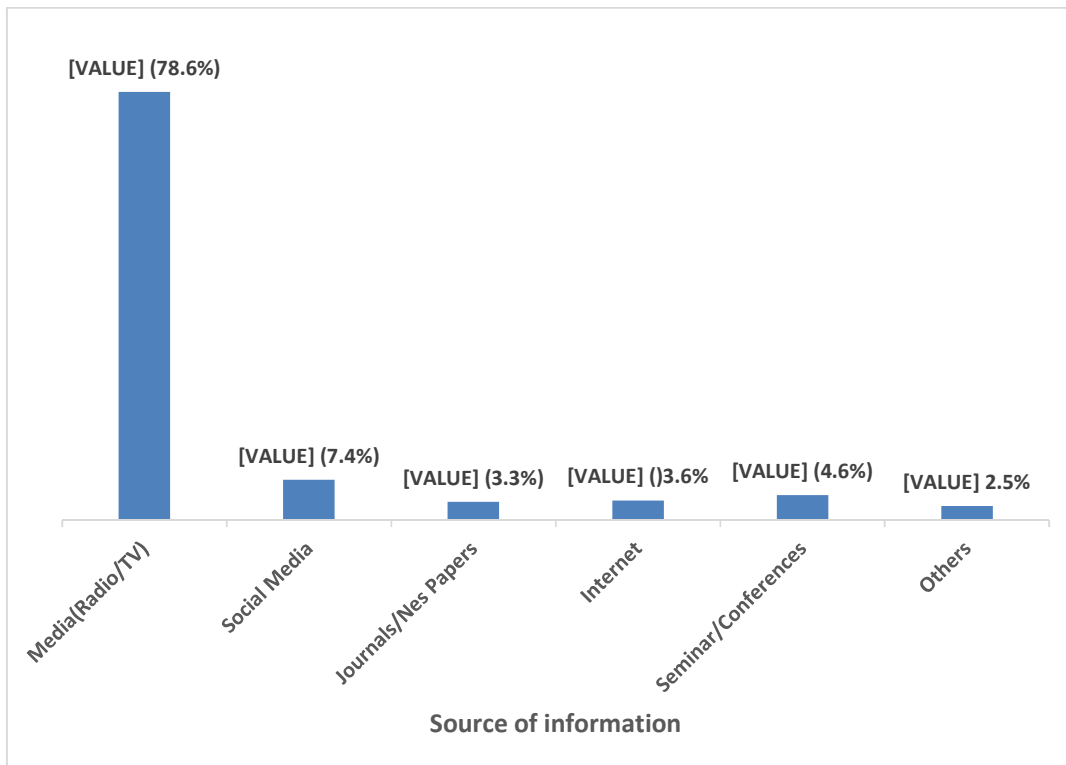**Fig. 1. Awareness of COVID -19 among respondents**

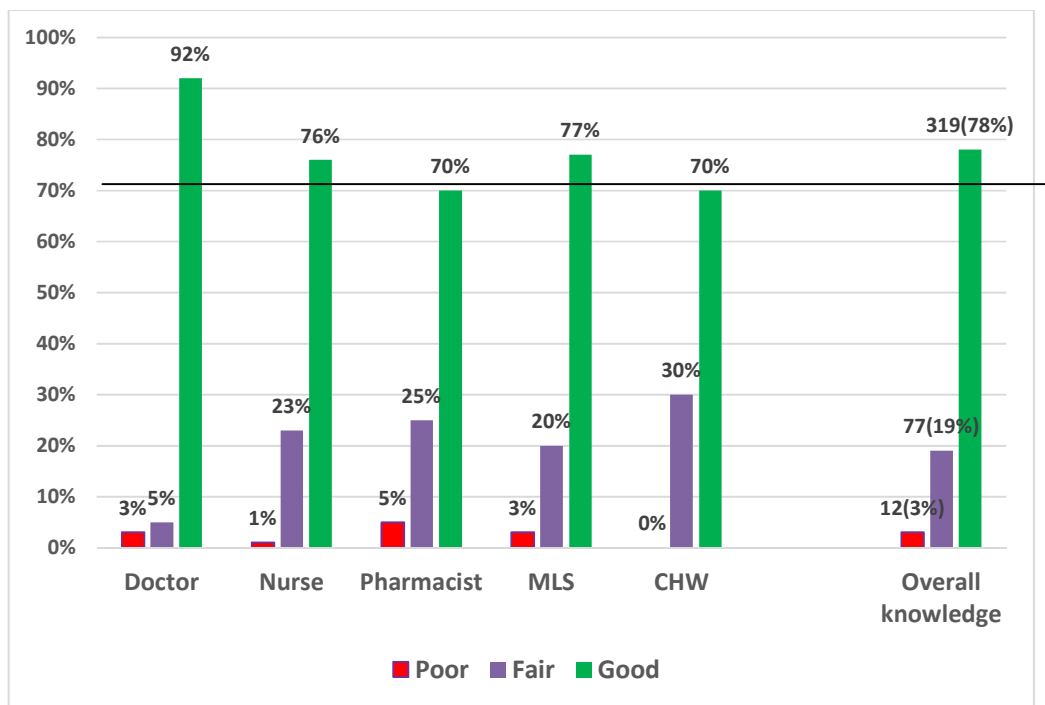**Fig. 2. Sources of information on COVID 19**

Fig. 3. Over-all graded Knowledge of respondents regarding COVID -19 in Sokoto metropolis

Table 2. Respondents with correct responses to some knowledge variables regarding COVID- 19

COVID-19…	Frequency(%) n = 408
is caused by virus	392(98.5)
is not caused by 5G network	267(76.5)
is believed to have evolved from animals	171(46.7)
Can Spread from person to person	400(99.3)
Can spread from humans to animals	195(51.6)
Can infect someone more than once	266(70.6)
Affects all age groups	382(97.0)
Has more mortality among the elderly	365(93.4)
Is not an inherited disease	53(13.6)
Is transmitted by droplet	389(97.3)
Children are less vulnerable than the elderly	282(73.6)
Mortality rate is up to 10%	267(69.9)
Can be transmitted by shaking hands	378(93.8)
Travel to infected area is a risk factor	397(98.5)
Eating of raw or improperly cooked meat is a risk factor	216(55.7)
Infection is global	373(94.2)
Incubation period is usually 1-14 days	373(95.9)
Symptoms may appear within 3 days of infection	188(48.6)
It is associated with fever and cough	399(99.3)
Sore throat is a presenting symptom	381(96.2)
There is muscle and joint pains	319(82.4)
There is severe difficulty in breathing (Dyspnoea)	399(98.5)
Patients may present with Gastrointestinal symptoms	271(70.6)
It is a form of atypical pneumonia	343(89.1)
Nasal and Oro-pharyngeal swabs required for a diagnosis	356(91.0)
Blood, urine, and faeces can also be used for viral isolation	94(24.8)
Chest X-ray is not a requirement for diagnosis	132(34.5)
It has a distinctive Chest X-ray feature	205(57.4)
There is no approved vaccine for the prevention of the disease	79(19.9)
There is no drug that can cure the disease	96(24.2)
Chloroquine is not approved for the treatment of COVID -19	171(44.8)
Some anti-viral agents are also in use for the treatment of the disease	274(71.4)
Suspected COVID – 19 infection should be notified to the health authorities	387(96.5)
Social distancing is one of the recommended preventive measures	391(98.0)
Being 1-2 meters apart in a gathering is considered as social distancing	371(92.8)
Stay at home is the leading measure for the prevention of the disease	382(95.7)
Regular handwashing with soap and running water is a preventive measure	395(98.3)
Personal Protective Equipments (PPE) are effective in the prevention of the disease among health workers	130(33.5)

Table 3. Attitude of respondents towards COVID 19 prevention in Sokoto metropolis

Variable	Response				
	SD n(%)	D n(%)	N n(%)	A n(%)	SA n(%)
COVID- 19 is a serious public health issue	0(0)	1(0.2)	9(2.2)	52(12.7)	346(84.8)
It is important to avoid leaving home unnecessarily	3(0.7)	7(1.7)	14(3.4)	150(36.9)	232(57.1)
Infected persons should be completely isolated	0(0)	0(0)	10(2.5)	64(15.7)	334(81.9)
Governments should restrict travels to and from infected areas to limit the spread of the disease	0(0)	8(2.0)	17(4.2)	91(22.3)	292(71.6)
Social distancing should exclude religious gathering	66(16.2)	96(23.5)	74(18.1)	89(21.8)	83(20.3)
People with flu-like symptoms should avoid mixing with people	3(0.7)	4(1.0)	26(6.4)	137(33.6)	238(58.3)
Government of Nigeria is doing enough to contain the spread of the disease	42(10.4)	98(24.2)	85(21.0)	112(27.7)	68(16.8)
Since corona virus disease has low fatality in Nigeria it is not a priority disease	80(19.8)	108(26.7)	82(20.3)	91(22.5)	43(10.6)
Government should close all schools and other public places to contain the spread of COVID 19	30(7.4)	78(19.2)	78(19.2)	126(31.0)	94(23.2)
Frequent handwashing with soap and water is necessary in curtailing COVID 19 infection	0(0)	0(0)	16(4.0)	118(29.2)	270(66.8)
Frequent use of alcohol-based hand sanitizers is advisable	1(0.2)	8(2.0)	16(4.0)	108(27.0)	269(66.7)
Direct unprotected contact with live animals and surfaces should be avoided	5(1.2)	37(9.1)	80(19.7)	131(32.3)	153(37.7)
Accepting of assistance in terms of manpower and material from foreign partners is desirable	8(2.0)	35(8.7)	94(23.3)	150(37.2)	116(28.8)

Key: SD=Strongly disagree, D=Disagree, N=Neutral, A=Agree, SA=Strongly agree
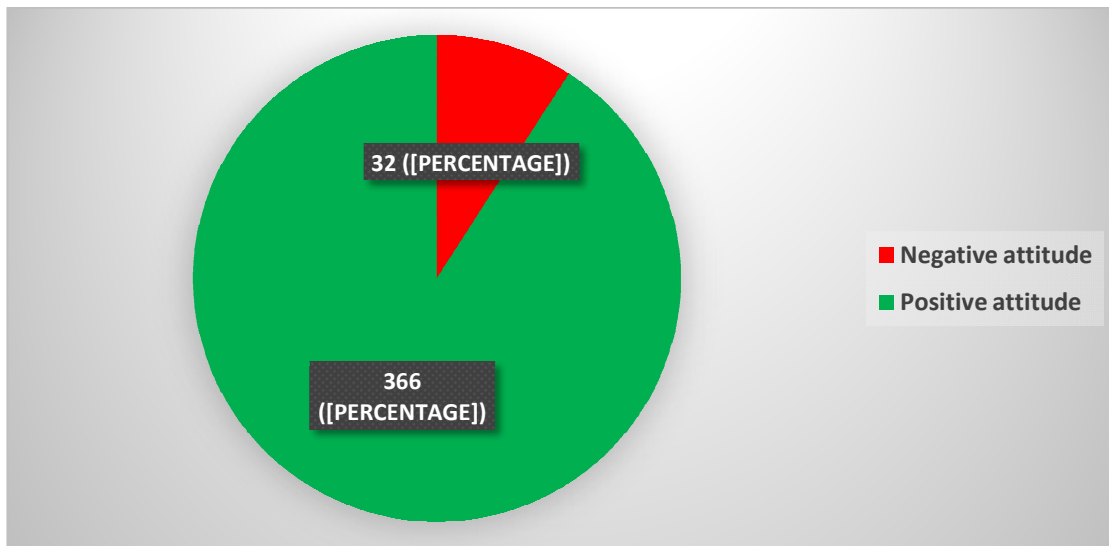
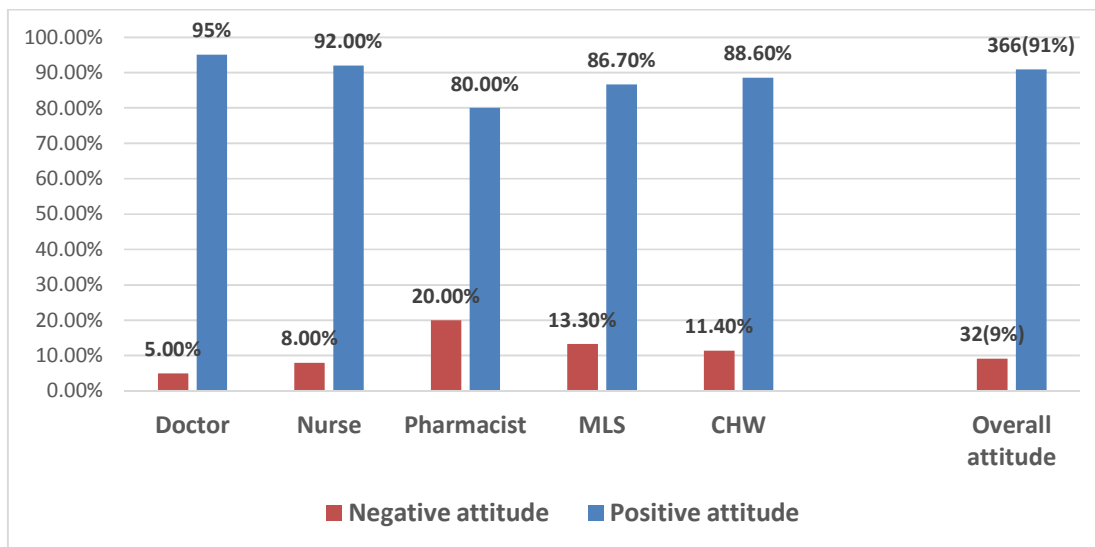**Fig. 4. Overall attitude of respondents towards COVID 19 prevention**

Fig. 5. Attitude of the responders by Cadre

Table 4. Preventive practices of respondents regarding COVID- 19 in Sokoto metropolis

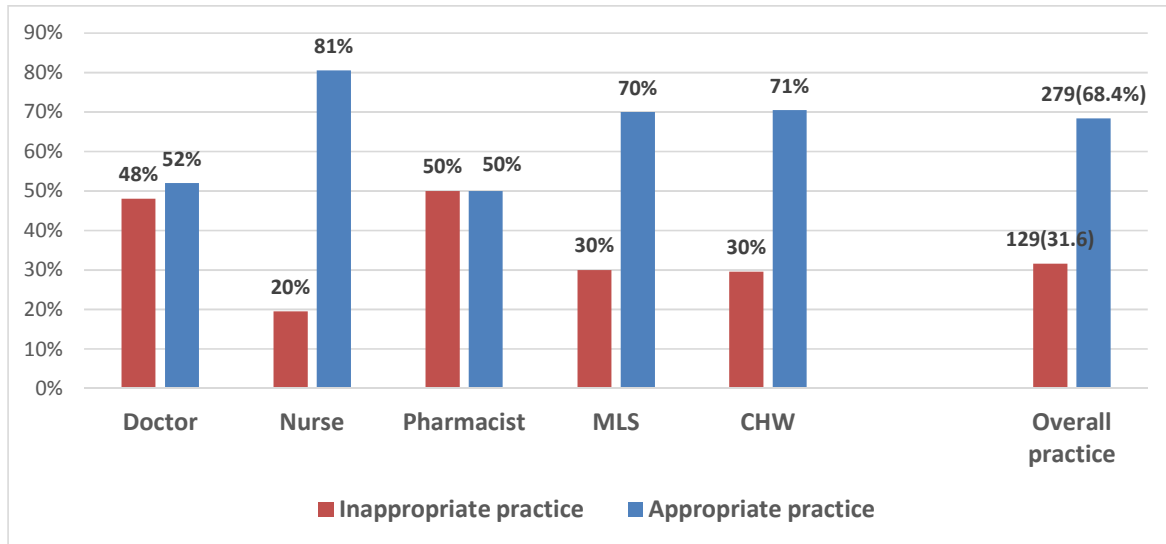| Variable	Practice	
	Yes n(%)	No n(%)
Wearing of facemask at all times while attending to a patient	257(70)	110(30)
Maintaining hand hygiene at all times	293(79)	78(21)
Using hand gloves at all times while attending to the patient	285(82.4)	61(14.9)
Washing hands with soap and water after removing gloves	282(78.6)	77(21.4)
Always avoiding touching of eyes with unwashed hands	171(64.3)	95(35.7)
Always avoiding touching of nose/mouth with unwashed hands	326(86.7)	50(13.3)

Fig. 6. Preventive Practices of Covid-19 by respondents in Sokoto metropolis

Table 5. Factors that determine the preventive practice of the respondents

Variable	Preventive practice Appropriate(%)	Inappropriate(%)	Statistics (P value)
Age Group (n = 345)			
15 to29	75(67.6)	36(32.4)	
30 to 44	116(67.1)	57(32.9)	P = 0.967
45 to 65	42(68.9)	19(31.1)	
Sex			
Male	131(62.7)	78(37.3)	P = 0.011
Female	138(74.8)	47(25.4)	
Knowledge Category (n= 408)	3(25)	9(75)	P = 0.004
Poor Knowledge	55(71.4)	22(28.6)	
Fair Knowledge	221(69.3)	98(30.7)	
Good Knowledge			
Years of Work Experience			
1 to 15	170(69.9)	84(33.1)	
16 to 30	39(70.9)	16(29.1)	P = 0.720
31 and above	70(70.7)	29(29.3)	
Attitude			
Positive	264(71.2)	107(28.8)	
Negative	15(40.5)	22(59.5)	P< 0.001
Categories of Health Workers	57(57)	43(43)	
Doctors	133(76.4)	41(23.6)	
Nurses	11(55)	9(45)	P = 0.012
Pharmacists	19(65.5)	10(34.5)	
Laboratory Scientist	29(65.9)	15(34.1)	
Community Health Workers			
Place of Work			
Primary Healthcare Center	15(51.7)	14(48.3)	
Secondary Health Facility	51(79.7)	13(20.3)	P = 0.054
Tertiary Health Facility	147(63.1)	86(36.9)	

Table 6. Willingness of respondents to work in COVID 19 isolation centers

Variable	Response	
	Yes(%)	No(%)
Do you have an isolation center in your facility?	280(70.9)	115(29.1)
Willingness to work in isolation centers?	149(46.3)	173(53.7)
Reasons for not willing to work in Isolation centers	**Frequency (%)**	
Lack of personal protective equipment (PPE)	98(56.7)	
Lack of health insurance	29(16.7)	
Inadequate knowledge of the disease	7(3.7)	
Lack of incentives	4(2.3)	
Fear of stigmatization	10(6.0)	
Inadequate training	15(8.4)	
Other reasons	10(6.0)	
Conditions for willingness to work in Isolation centers　**Frequency (%)**		
Availability of Personal Protective Equipment	230144(83)	
Provision of incentives	7(4)	
Provision of Health insurance	10(5.8)	
Provision of adequate training	12(7.2)	
Perceived concerns about Isolation center　**Frequency(%)**		
May be ill-equipped	169(58.9)	
Work environment may be poor	118(41.1)	
What improvement do you think are necessary at the Isolation center	**Frequency(%)**	
Provision of adequate equipment	220(68.1)	
Provision of conducive working environment	79(24.5)	
Others	24(7.4)	

Table 7. Factors that determine willingness of respondents to work at an Isolation Center in Sokoto metropolis

Variable	Willingness to Work at Isolation Center		Statistical Sig.(P value)
	Yes(%)	No(%)	
Age Group			
15 to 29	35(42.7)	47(57.3)	
30 to 44	56(39.2)	87(60.8)	P = 0.117
45 to 65	27(56.3)	21(43.8)	
Sex			**P < 0.001**
Male	92(55.8)	73(44.2)	
Female	52(35.1)	96(64.9)	
Knowledge			
Poor Knowledge	5(45.5)	6(54.5)	
Fair Knowledge	27(44.3)	34(55.7)	P = 0.937
Good Knowledge	117(46.8)	133(53.2)	
Years of Work Experience			
1 to 15	87(42.4)	118(57.6)	
16 to 30	22(48.9)	23(51.1)	P = 0.147
31 and above	40(55.6)	32(44.4)	
Attitude			
Positive	138(46.9)	156(53.1)	
Negative	10(37.0)	17(63.0)	P = 0.323
Category of Health Workers			
Doctors	28(36.4)	49(63.6)	
Nurses	75(47.5)	86(52.5)	
Pharmacists	7(70.0)	3(30.0)	
Laboratory Scientists	13(54.2)	11(45.8)	P = 0.159
Community Health Workers	9(37.5)	15 (62.5)	
Place of Work			
Primary Healthcare Centers	3(27.3)	8(72.7)	
Secondary Health Facilities	17(34.7)	32(65.3)	P 0.305
Tertiary Health Facilities	94(47.5)	104(52.5)	
Practice			
Appropriate	103(45.2)	125(54.8)	P = 0.601
Inappropriate	45(48.4)	48(51.8)	

4. DISCUSSION

Nigeria, the most populous country in Africa and with a population of over 200 million people [26], stands a great risk of spread of the disease with high mortality especially amongst the elderly and those with comorbidities like hypertension and diabetes mellitus

In this study, the age group 20-39 years constituted the majority among the respondents and this is in keeping with findings from other studies [27-29]. These findings may not be unrelated to the fact that majority of the health care workers who come in contact with patients are within this age bracket. Findings from our study showed that slightly above half (53.2%)of the respondents were males. This is in contrast to findings from other studies where the majority of their respondents were females [30-35]. The presence of high proportion of males in our study could be due to the fact high that large number of male workers are encroaching into areas that were hitherto exclusive domain of females especially the nursing profession, although among the different cadres of health care workers in our study, the nurses were almost half (47.3%). In this study, majority, 42.2% of the respondents had only worked for less than five years. Findings from similar studies in Vietnam and Yemen also found that majority of their study subjects had worked less than five years [27-28].

Almost all the respondents in our study, 99% were aware of covid-19. Although Nigeria had previously experienced the outbreak of Ebola fever, the lockdown imposed on the country with the closure of both land and air borders with

resultant shutdown of all economic activities could have created the high awareness of covid-19 disease recorded in this study. Similar high levels of awareness were observed in studies elsewhere [28,32,35]. Given the serious threats posed by the covid-19 pandemic especially to frontline health workers, it is not surprising that the commonest source of information regarding the disease was the electronic media -radio and television (78.6%). Anecdotal evidence has shown that virtually all homes in Nigeria possesses either a television or a transistor radio set which are the commonest channels for communication of government policies and other social activities, with such information sometimes conveyed in local languages. This finding is in contrast with the findings from other studies that observed the social media as the commonest source of information about covid-19 [27-28,32,36]. Real-time information through social media could be attributed to the spread of myths and misinformation often driven by fear and sometimes stigma associated with highly contagious diseases like covid-19. This has made the use of social media handles for information, education and communication purposes unpopular in times of serious health threats as covid-19 disease. It is difficult to determine the authenticity of the sources of such messages and information which invariably can mislead and misguide people. However, in other studies, information about covid-19 was obtained through hospital guidelines, Ministries of Health websites and journals [29,37-38].

In this study, respondents opined that Covid-19 disease is caused by a virus, can spread from person to person, is transmitted by droplets and through shaking of hands. Similar findings were observed from other studies among HCWs [31,39,40]. Findings from our study showed that overall knowledge for covid-19 amongst our respondents was 78%. This high knowledge recorded in our study is comparable to other studies that observed high knowledge amongst their study subjects [28,31,34,35]. In contrast to the findings from our study, overall knowledge was low in some other studies elsewhere [33,41]. The low level of knowledge observed in these other studies may not be unrelated to the fact that their studies were amongst the general population and students who may not have sufficient exposure to all the channels of information, education and communication about covid-19 compared to the frontline health workers who need to be well knowledgeable about the causation, mode of transmission and

prevention of the disease in order prevent contracting it. McEachan and colleagues rightly observed that "Knowledge of a disease may influence HCWs' attitudes and practices, and incorrect attitudes and practices directly increase the risk of infection" [42].

Knowledge is a necessity for the establishment of prevention beliefs, developing positive attitudes, and hence promoting positive behaviours; the individuals' cognitive and attitudinal disposition towards disease affects the effectiveness of their coping strategies and behaviours to a larger extent.

A great majority of our respondents believed it was ideal to obey government directives to stay at home and observe the lockdown, restrict all travels in and out of the country, completely isolate infected persons and also observe the frequent hand washing with soap and running water. This is in consonance with the findings by Singh and colleagues in India [33].

Furthermore, over 90% of the respondents in this study had a positive attitude towards covid-19 disease with medical doctors having a more positive attitude than the other cadres of HCWs. The high attitude recorded in this study is in consonance with similar studies that recorded high attitude towards covid-19 [22,32,35,41]. The high level of awareness and knowledge showed by our respondents could have been responsible for the high and positive attitude towards covid-19. This high level of positive attitude exhibited by our study subjects has been corroborated by Roy et al. who postulated that "adequate awareness often leads to optimistic attitudes, which could positively affect the preparedness of HCWs to address pandemic issues" [43].

Nevertheless, the results from our study showed that the high knowledge and attitude exhibited by our respondents translated into good and safe practices as majority of the participants were involved in the wearing of face masks all the time, maintaining hand hygiene at all times, avoiding the touching of the eyes and mouth with unwashed hands and washing of hands with soap and water after removing hand gloves. This is a reflection of the increasing concern of our study participants towards personal hygienic measures geared towards avoiding COVID-19 infection. Concerning the preventive practices, it was observed that more than half, (68%) of the respondents had appropriate preventive behaviors which is attributable to the high levels of awareness and knowledge of the respondents

towards covid-19. It has been observed in a previous study that those who had acquired adequate knowledge exhibited optimistic attitudes and adequate proactive practices toward COVID-19 [35]. The findings from our study succinctly corroborates that of Roy and colleagues who observed that" the level of good or sound knowledge in a given population about COVID-19 is significantly reflected in their behaviour and attitude" [43]. The findings from this study are similar to studies conducted in China and Yemen where their respondents showed high performance level of preventive behaviours towards covid-19 [27,44]. However, the findings from this study were higher than that of a study conducted in Cameroon where 60.8% of their respondents exhibited good practices of prevention towards covid-19 [31].

Despite the high level of awareness and knowledge shown by doctors in the study, appropriate preventive practices against covid-19 was exhibited by 52% of doctors compared to 81% of nurses. This may not be unrelated to the non-availability or inadequate personal protective equipment (PPE) in most health facilities as covid-19 pandemic came up when the country was ill-prepared. The non-availability or ineffectiveness of PPE can contribute to the transmission of covid-19 disease to HCWs and from the HCWs to the general public [45]. It is of serious concern that 48% of doctors who ordinarily are usually the first contact for all patients coming into the hospital showed inappropriate preventive practices against covid-19. This has prompted more than half, 53.7% of the respondents to declare their unwillingness to work in isolation centres where covid-19 patients are kept. In a country as Nigeria, where HCWs earn less than 500USD as monthly hazard allowances and no general medical or life insurance for HCWs, it becomes difficult to attract the right caliber of HCWs to work effectively in isolation centres. Prominent amongst the reasons for not wanting to work in such centers are non-availability of PPEs, lack of health insurance and lack of incentives. Findings from our study showed that being a male HCW was the only factor associated with willingness to work in an isolation center.

However, in a separate study to determine the factors associated with the willingness of Health Care Personnel to work during an Influenza Public Health Emergency, it was observed that: being female, being in a support staff position, working part-time, the peak phase of the influenza emergency, concern for family and loved ones, and personal obligations were associated with less willingness [46]. In separate studies, Connoir and Tipette observed that healthcare professionals are 25 to 82% and 56.3% respectively willing to work during outbreak conditions [47-48]. Given that disease outbreaks are associated with a high level of uncertainty in the early stages, employers need to communicate with frontline workers and keep them abreast of the evolving dynamics of disease outbreaks generally [49].

The need to provide adequate PPEs and incentives to HCWs cannot be overstressed as these can guarantee quick response to any deployment to isolation centers

5. CONCLUSION

Findings from this study demonstrated a significant awareness, attitude, practice, and knowledge of COVID-19 among the respondents studied. The high knowledge and attitude exhibited by our respondents were translated into good and safe practices as the majority of the participants were involved in the wearing of face masks all the time, maintaining hand hygiene at all times, avoiding the touching of the eyes and mouth with unwashed hands and washing of hands with soap and water after removing hand gloves. This underscores the increasing concern of our study participants towards personal hygienic measures geared towards avoiding COVID-19 infection. The need to provide adequate PPEs, updated guidelines, and incentives to HCWs cannot be overstressed as these can guarantee a quick response to any deployment to isolation centers. Real-time information and guidelines are equally needed among the HW before, during, and after pandemics.

6. STRENGTH AND LIMITATIONS

Majority of the HCWs were willing to participate in the study hoping that the outcome of the study will bring about informed policy changes. However, due to the prevailing transmission of covid-19 infections the study was limited only to the metropolitan health facilities

CONSENT

All authors declare that 'written informed consent was obtained from all study participants. A copy

of the consent form is available for review by the Editorial office/Chief Editor/Editorial Board members of this journal.

Written informed consent was obtained from each participant before the commencement of data collection after assurance that all information sought shall be handled with utmost confidentiality.

ETHICAL APPROVAL

Ethical approval was sought from research ethics committee of the sokoto state ministry of health Ethical consideration

Ethical approval was sought from Research Ethics Committee of the Sokoto State Ministry of Health (SKHREC/031/2020).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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