Risk Perception and Community Vulnerability to COVID-19 Infection Among Residents In Osun State, Nigeria

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Abstract

Background

Understanding the risk perception, attitude and vulnerability to Corona Virus infection among community dwellers is important in designing appropriate behavioral change communication programs necessary to stop the spread of this deadly contagious disease. The objective is to assess the risk perception, attitude and community vulnerability to COVID 19 infection among residents of Osogbo, Osun-State

Methods

It was a cross sectional descriptive study done using pre-tested semi-structured questionnaire where 1000 individuals were selected using multistage sampling technique. Data were analyzed using SPSS version 23. Descriptive and inferential statistical analysis was carried out using appropriate test statistics and level of significance set at P less than 0.05.

Results

The mean age was 38.4 ± 13.9 years with majority been females (60%), married (67.3%), tertiary educational status (59.8%) Christians (68.1%) and civil servants (33%). Almost all the respondents (99.3%) were aware of COVID 19 infection and commonest source of information is television, Also, more than half of respondents of respondents i.e 62.2%, 79.7% and 74.6% had good knowledge on symptoms, transmission and preventive measures respectively while 69.1% had good attitude. Overall, risky perception was poor (44.6%) while more than half (64.8%) were vulnerable to having infection. In binary logistic regression analysis, poor knowledge on preventive measures was significantly associated with vulnerability towards having COVID 19 infection. (OR- 0.64, CI 0.47- 0.87)

Conclusions

The overall knowledge and attitude of COVID-19 infection is commendable, the risky perception is poor while assessed vulnerability towards COVID 19 infection is high particularly among those with lower knowledge. Therefore, there is need for health promotional programs for encouraging and maintenance of safety measures among the respondents.

Background

The ongoing outbreak of the novel Coronavirus disease (COVID 19) is an emerging infectious disease that poses complex challenges to the global public health. The disease (COVID 19) is caused by a virus known as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) that is highly infectious, and causes an epidemic of acute respiratory syndrome.(1) Coronaviruses (CoVs) are positive-sense, single-stranded RNA viruses of the family *Coronaviridae* that infect a wide range of hosts including human beings to produce diseases ranging from common cold to severe/fatal respiratory illnesses.(2) The contagion could lead to severe respiratory problems or death, particularly among the elderly and persons

with underlying chronic illnesses. Some infected persons however, are carriers for the virus with no symptoms while others may experience only a mild illness and recover easily. There is currently no cure or vaccine for the COVID-19; medical treatments are limited to supportive measures aimed at relieving symptoms, use of research drugs and therapeutics.(3)

The disease, which emerged in China has rapidly spread to other countries of the world, Nigeria inclusive. Coronavirus disease (COVID 19) is associated with high morbidity and mortality and many nations are diverting their best efforts for the implementation of appropriate preventive and control strategies.

As at 13th May, 2020, more than 4 million people worldwide have become infected with COVID-19, resulting in more than 291 000 deaths. In Africa, we have over 69,000 cases and 2,403 deaths.(4) In Nigeria, till date 4,787 cases have been confirmed and 158 deaths have been recorded in 34 states (including Osun State) and the Federal Capital Territory.(5)

In an attempt to control the ongoing outbreak, different measures have been put in place by the government of each country which ranges from social distancing, regular hand wash with soap and water, use of alcohol based hand sanitizer, cough etiquette, use of face mask and complete lockdown of the general population. These measures aimed to prevent further spread of the disease and to protect the national health services from becoming overwhelmed by a sudden onslaught of cases.(1)

Individual risk perception is a major determinant of the people's willingness to cooperate and adopt health protective behaviors during pandemics, which in turn influences the spread of the disease. Knowledge gained from the control of previous disease outbreaks showed that the success of policies, programs or measures adopted by the government to control outbreak of diseases rely partly on the public having accurate perceptions of their personal and societal risk factors.

Majority of people around the world have heard of the coronavirus disease and the need to abide strictly to the preventive measures, but while some individuals strictly adhere to the restrictions, others ignore or delay the governments' rules and mingle in crowds in public places or in their homes. This means that risk perception is potentially a strong modifier of the epidemic evolution, since it can influence the number of new positive cases.(6)

As the number of deaths from the disease is rising globally, it becomes increasingly important to understand the Public risk perception and community vulnerability to COVID 19. This research result will be useful in decision making by the government which will further enhance the control of the pandemic. This study therefore sets out to measure the knowledge about COVID 19, risk perception and vulnerability to COVID 19 among residents in Osun State.

Methods

Study Area: The study was conducted in Osun state, which is one of the thirty six states in Nigeria. Osun state is located in the Western part of Nigeria, bounded in the North by Kwara state, East by Ekiti and

Ondo States, South by Ogun and West by Oyo state. The state has three senatorial districts with thirty Local Government Areas

Study Design: This study was a descriptive cross sectional study in design

Study Population: Adults within the age range of 18 years and 65 years who have lived in Osun state for more than two months were chosen while adults too ill to participate as well as those who could not give their consent were excluded from the study.

Sample Size Calculation:

Considering the fact that the total population of people residing in Osun State, Nigeria is greater than 10,000 and taking the risk perception to Covid 19 infection to be 50% since there was no official report on the rate in the country, the sample size was calculated at 95% Confidence level and degree of inaccuracy of 5% using the formula $N = Z^2 P (1-P) / d^2$ (7) The minimum sample size derived was 350 which was increased to 1000 respondents after adding non response rate of 20%.

Sampling Technique: Multistage sampling technique was used.

First stage

From the three senatorial districts in Osun state, two Local Government Areas(LGAs) were selected each by simple random sampling technique using balloting procedure making six (6) LGAs altogether.

Second stage

Two wards each were chosen from the six selected LGs using simple random sampling (balloting method) making a total of 12 wards.

Third stage

Two settlements were selected from the twelve (12) wards using simple random sampling to make a total of twenty four (24) settlements.

Forth stage

The middle of each settlements was identified, then a pen tossed. Sampling start from the house in the direction of the tip of the pen. For settlements with less than 20 houses, a house is skipped while two houses were skipped for settlements with more than 20 houses. Sampling was continue until the required sampling size expected for the settlement was reached.

Instrument for the study: The instrument was an interviewer administered semi structured questionnaire.

Instrument of Data Collection

The primary means of gathering data for analysis on this work was by the use of structured questionnaires, which was designed by the research team after an extensive review of literature. The structured questionnaire was administered to eligible respondents within the selected community. The questionnaire was divided into five sections:

Section A: containing 7 items will gather patient's demographic data on the age, sex, marital status, religion, educational status and occupational status.

Section B: containing 27 items pertaining to Knowledge risk factors of Corona Virus Disease. Knowledge on mode of Spread, Knowledge on mode of Prevention as well as knowledge on Treatment Measures

Section C: contains 11 items on risky perception about corona virus infection

Section D: contains 8 items on attitude towards Preventive measures of COVID 19 infections using the likert scale

Section E is on Community Vulnerability to COVID 19 Pandemic and it contains 11 items .This section combines open and closed-ended type of questions.

Instrument validation

The face validity and content validity was determined by the research team, by encouraging all the researchers to go through the questionnaire items and provide valuable input. Each section of the questionnaire was matched with the predetermined objectives. The face validity of the instrument was determined in terms of its relevance, layout and format. Revision of the instrument was made based on observations and suggestions of each researcher. Ten research assistants were trained for a minimum of two weeks in order for uniformity during questionnaire administration.

Scoring of outcome variables

Questions on knowledge, risky perception, attitude were scored accordingly with correct answer awarded 1 while in-correct answer awarded zero. Total and average score were computed and respondents having average score and above were categorized as having good knowledge, good attitude, good perception while those with score below the mean score were categorized as having poor knowledge, poor perception and poor attitude.

Presentation and test statistics: The questionnaires were manually sorted out, entered into a computer and the obtained data were analyzed using Statistical Package for Social Sciences (SPSS) version 24. Frequency distribution tables and charts were drawn, while Chi square test and binary logistic regression was employed in inferential statistics with significance regarded as $p < 0.05$.

Ethical Considerations: Ethical clearance for the study were sorted from ethical committee of Lautech Teaching Hospital, Ogbomoso. All respondents voluntarily sign an informed consent form and confidentiality highly guaranteed.

Results

Table 1 shows the socio-demographic characteristics of the respondents (n = 1000). One-quarter of the respondents were in age group 35–44 and the mean age was 38.4 ± 13.9 years. Two-fifth of the respondents were female while 40% were males. Majority of the respondents (67.3%) were married while 29.5% were single, 0.8 were divorced, 0.5% were separated and about two percent were widowed. Concerning the educational status of the respondents, greater than half had tertiary education, 32.6% attained secondary education, and 5.8% attained primary education while 1.8% of the respondents had no education. With regards to religion, 68.1%, 30.9% and 0.7% were Christians, Muslim and traditional worshipper while 0.3% of the respondents had no particular religion. About 33% of the respondents were civil/public servants, 29.4% were traders, and 6.4% were farmers while 20.4% were students and unemployed.

Table 1
Socio-demographic characteristics of respondents

VARIABLES	FREQUENCY	PERCENTAGE
Age (mean = 38.4 ± 13.9 years)		
15–24	194	19.4
25–34	236	23.6
35–44	250	25.0
45–54	201	20.1
55–64	76	7.6
> 65	43	4.3
Sex		
Male	401	40.1
Female	599	59.9
Marital status		
Single	295	29.5
Married	673	67.3
Divorced	8	0.8
Separated	5	0.5
Widow	19	1.9
Educational status		
No education	18	1.8
Primary education	58	5.8
Secondary education	326	32.6
Tertiary education	598	59.8
Occupation		
Trading	294	29.4
Civil/Public servants	327	32.7
Farming	64	6.4
Student	183	18.3
Others	132	13.2

VARIABLES	FREQUENCY	PERCENTAGE
Religion		
Christian	681	68.1
Muslim	309	30.9
Traditional	7	0.7
No religion	3	0.3

Table 2 shows the level of awareness and knowledge of COVID-19 among the respondents (n = 1000). Nine out of ten have heard/ were aware of covid-19 in which the most common sources of information reported by the respondents with highest percentage were television and radio (70.85 and 64.3%) respectively while internet as the source of information accounted for 44.7%, health center was 14.3, 11.6% heard from friends, 16.9% heard from religious places while 1.4% heard about covid-19 from campus news and market place.

Table 2
Awareness and Knowledge of COVID-19 among respondents

Variables	F	%
Aware of COVID-19 (	993	99.3
Yes	7	0.7
No		
Source of information (Yes options)		
Television	708	70.8
Radio	643	64.3
Internet	447	44.7
Health Centre	143	14.3
Friends	116	11.6
Church	120	12.0
Mosque	49	4.9
Others (campus news, market)	14	1.4
Knowledge of transmission (Yes options)		
Contact with wild animals can result in corona virus diseases	296	29.6
Corona virus spread via respiratory droplet of infected individuals during coughing or sneezing	948	94.8
Person with corona virus disease can transmit to another person when fever or other symptoms is not present	800	800
Handling of money can contribute to spread of corona virus infection	796	79.6
Knowledge of symptoms (Yes options)		

Variables	F	%
Fever	932	93.2
Muscle pain	397	39.7
Fatigue	546	54.6
Sneezing	954	95.4
Cough	967	96.7
Chest pain	657	65.7
Chest tightness	578	57.8
Convulsion	229	22.9
Diarrheal	207	20.7
Knowledge of Prevention (Yes options)		
Wearing face mask	962	96.2
Avoiding overcrowded places	978	97.8
Avoiding use of public transportation	886	88.6
Staying at home during outbreak	905	90.5
Washing of hands regularly with soap and water	979	97.9
Covering of mouth while sneezing or coughing	979	97.9
Are you aware of confirmed cases of the covid 19 infected individuals detected in your state	923	92.3
Isolation and treatment of people who are infected with corona virus are effective in reducing spread of virus	940	94.0
People who have contact with someone with corona virus are effective in reducing spread of virus	959	95.9
People who have contact with someone with corona virus are effective in reducing spread of virus	923	92.3
In general, observation period during isolation of people with corona virus is 14 days		

Concerning knowledge of transmission, greater proportion (94.8%, 80% and 79.6%) of the respondents were of the opinion that corona virus spread via respiratory droplet of infected individuals during coughing or sneezing, person with corona virus disease can transmit to another person when fever or other symptoms were not present and handling of money can contribute to spread of corona virus infection respectively while 29.6% said contact with wild animals can result in corona virus diseases.

Table 2 also shows the knowledge of covid-19 symptoms among the respondents, nine of ten knew fever, sneezing and coughing were symptoms of covid-19 while 65.7% answered chest pain, 54.6% fatigue, 57.8% chest tightness, 39.7% muscle pain, 22.9% convulsion and 20.7% of the respondents answered

diarrhea as the symptom of covid-19. With regards to knowledge of covid-19 prevention as detailed in Table 2, majority of the respondents (about nine out of ten) responded that wearing face mask, avoiding overcrowded places, avoiding use of public transportation, staying at home during outbreak, washing of hands regularly with soap and water, covering of mouth while sneezing or coughing, being aware of confirmed cases of the covid-19 infected individuals detected in your state, and isolation and treatment of people who are infected with corona virus, are effective ways in preventing and reducing spread of covid-19.

Figure 1 shows overall knowledge scores of covid-19 among respondents. About 62.2% had good knowledge of symptoms, 79.7% had good knowledge of transmission while 74.6% had knowledge on prevention of covid-19

Table 3 shows the risk perception to covid-19 among the respondents. Larger proportion of the respondents answered that covid-19 exist in Nigeria. More than half (54.6%) of the respondents were at risk of contacting corona virus disease. About 93.9% and 82.2% agreed that covid-19 will be successfully control and the government will win the battle against covid-19 in the country. Also about 91% belief that the measure put in place by government can control the spread of the covid-19 infection. About two-third of the respondents responded that covid-19 is generating stigma against specific people in which 66.2% were recent travelers from outside the country, 18.9% were family members of infected individuals, 21.9% were survivor of corona virus disease, 35.2% were Chinese or anyone from Asia and 10.2% health workers or front line workers. Generally, about 52.8% of the respondents had good perception while 47.2% had poor perception.

Table 3
RISK PERCEPTION TO COVID-19

Variables	F	%
Do you think covid-19 exists in Nigeria	963	96.3
Yes	37	3.7
No		
Do you think you are at risk of contracting corona virus disease	546	54.6
Yes	454	45.4
No		
Do you agree that covid-19 will finally be successfully control	939	93.9
Yes	61	6.1
No		
Do you have confidence that government can win battle against covid-19 in the country	822	82.2
Yes	135	13.5
No	43	4.3
Not sure		
Do you think covid-19 is generating stigma against specific people?	846	84.6
Yes	147	14.7
No	7	0.7
I don't know		
which of the following group of people being discriminated/stigmatized	662	66.2
Recent travelers from outside the country	385	18.9
Family members of infected individuals	219	21.9
Survivor of corona virus disease	352	35.2
Chinese or anyone from Asia	102	10.2
Health workers or front line workers		
Do you belief in the measures put in place by government can control the spread of covid-19 infection	906	90.6
Yes	94	9.4
No		

Table 4 above shows the respondents attitude and perception on covid-19. Majority of the respondents (82.3%) agreed that wearing of face mask can help reduce the spread corona virus infection, about 2% disagreed while 6.2% were undecided. About 96.3% agreed that avoiding handshake, hugging and kissing can help reduce the spread of corona virus. 91% agreed that total lock down of the cities, states and restriction of interstate travels is necessary in curbing the spread of corona virus infection. About 87.7% and 89.5% agreed that closure of educational centres and closing the country border respectively is necessary in the containment of the spread of covid-19. Concerning the variable “do you agree that lockdown of religious sites/ places is necessary in the containment of the virus infection” 75.5% agreed, 18% disagreed while 6.4 were undecided/ not sure.

Table 4
Attitude to COVID

Do you agree that;	SA	A	NS	Ds	SD
wearing face mask can help reduce the spread corona virus infection	545(54.5)	378(37.8)	62(6.2)	7(0.7)	8(0.8)
avoiding hand shake, hugging and kissing can help reduce the spread corona virus infection	596(59.6)	367(36.7)	29(2.9)	1(0.1)	7(0.7)
total lock down of the cities, states and restriction of interstate travels is necessary in curbing the spread of corona virus infection	494(49.4)	416(41.6)	46(4.6)	30(3.0)	14(1.4)
closure of educational centers (schools, universities) is necessary in the containment of the spread of covid-19 virus infection	472(47.2)	405(40.5)	58(5.8)	36(3.6)	29(2.9)
building isolation centers will help reduce transmission of corona virus infection	561(56.1)	318(31.8)	84(8.4)	14(1.4)	23(2.3)
lockdown of churches, mosque, shrines, and other religious sites is necessary in the containment of covid-19 infection	426(42.6)	330(33.0)	64(6.4)	116(11.6)	64(6.4)
Closing the country border (land, sea and air) is a good strategy to contain the spread of covid-19 infection?	623(62.3)	272(27.2)	52(5.2)	28(2.8)	25(2.5)
allowing infected person who has been medically declared free from covid 19 virus to teach children in schools will lead to covid 19 infection among the school children	215(21.5)	194(19.4)	185(18.5)	240(24.)	166(16.6)

Table 5 shows that 90.6% of the respondents had good attitude towards preventive measure of covid-19 infections. With regards to measures instituted by government to prevent spread of covid-19 infection, closure of schools accounted for 44.2%, closure of markets 43%, enforcement of stay at home 49.4%, closure of Nigerian borders 45.5%, enforcement of use of face mask 32.7%, lockdown of churches and mosques 27.1%, prevention of interstate movement 30.3%, provision of palliates items for the masses 6.4% while 4.3% subjected that only God should have his way about covid-19. About 73.9% of the respondents agreed that calling a national line for help is appropriate for someone suspected having the infection in the community, 11.8% chose stay at home, 2.2% considered seeking traditional or religious healer as appropriate measure, 1.5% go to private hospital and 1% agreed that seeking health experts' aid was appropriate.

Table 5
Beliefs in measures instituted by government, lockdown and effects

VARIABLES	F	%
Attitude towards preventive measures of covid-19 infections	906	90.6
Yes	94	9.4
No		
If yes, which of the following measures instituted by government do you think can prevent spread of covid-19 infection (Yes options)	442	44.2
Closure of schools	430	43.0
Closure of markets	494	49.4
Enforcement of stay at home except those on essential duties	455	45.5
Closure of Nigerian borders	327	32.7
Enforcement of use of face mask	271	27.1
Lock down of churches and mosques	303	30.3
Prevention of interstate movement	64	6.4
Provision of palliates items for the masses	43	4.3
Only god should have his way		
What are your suggestions to improve the measures put in place by the government to prevent the transmissions of coronavirus disease in your area	387	38.7
Every one to always obey/yield to all the rules and regulation	519	51.9
To provide palliative items for the masses	95	9.5
Government should avoid playing politics with all their dealings		
Closure of Nigeria borders		

VARIABLES	F	%
Which of the following measures do you considered appropriate for someone suspected having the infection in the community (Yes options)	118	11.8
Stay at home	22	2.2
Seek traditional or religious healer	7	0.7
Buy medicine at the chemist	9	0.9
Use traditional herbs	739	73.9
Call a national line for help	15	1.5
Go to private hospital	8	0.8
Go for 14 days at isolation center	10	1.0
Seek health expert aids	72	7.2
I don't know		
Are you experiencing lockdown, curfew or movement restriction in your area	979	97.9
Yes	21	2.1
No		
If yes, how is the lockdown or curfew affecting you	114	11.4
i like it, no effect on me)	475	47.5
It affect my job	256	25.6
It affects me from socializing with friends	402	40.2
It affects me from practicing my religion	327	32.7
It affect me from making money daily	213	21.3
It affects me from providing for my family and my education	81	8.1
It affects me from being in school	13	1.3
It affect my husband	6	0.6
It make me grow fact and lazy	12	1.2
It affect me from going to joint / party or eat point	19	1.9
It affect me from travelling to another state for a very important matter	1	0.1
It affect my lecturer		

Concerning the lockdown and effects, majority of the respondents (97.9%) were experiencing lockdown, curfew and/or restrictions of movement. Effect of the lockdown reported by the respondents were; 11.4%

love the lockdown because it has no effect on them, 47.5% said it affected their job, 25.6% responded to the effect on socializing with friends, 40.2% said it affects their practicing religion, 32.7% said it affect their daily income, and 8.1% said the lockdown affect them from being in school.

Table 6 showed the community vulnerability to covid. it shows that 530(53.0%) said that to prevent contacting and spreading of covid-19 infection, they always observe social and physical distancing measures and 538(53.8%) said they always own and use a face mask all the time especially in public places while 636(63.6%) said they never use herbal products and traditional medicine. half 593(59.3%) of the respondents claimed that they always avoid hand shaking, hugging and kissing while 561(56.1%) claimed that they always cough or sneeze into their elbow or use a tissue that will be disposed properly.

Table 6
COMMUNITY VULNERABILITY TO COVID

Variable	Never	Once	Few time	Often	Always
Vulnerability to COVID					
To prevent contacting and spreading of covid-19 infection, i observe social and physical distancing measures)	32(3.2)	18(1.8)	212(21.2)	208(20.8)	530(53.0)
To prevent covid 19 virus transmission, i own and use a face mask all the the time especially in public places	43(4.3)	26(2.6)	179(17.9)	214(21.4)	538(53.8)
To prevent contracting covid 19 infection, i use herbal products and traditional medicine	636(63.6)	122(12.2)	78(7.8)	87(8.7)	77(7.7)
To prevent contracting and spreading covid 19 infection, i frequently sanitize my hands with alcohol based sanitizer or wash my hands with soap and water for at least 20 seconds	27(2.7)	20(2.0)	144(14.4)	279(27.9)	530(53.0)
To prevent contracting and spreading covid-19 infection, i avoid hand shaking, hugging and kissing	23(2.3)	10(1.0)	143(14.3)	231(23.1)	593(59.3)
To prevent spreading covid-19 infection, i cough or sneeze into my elbow or use a tissue that will be disposed properly	64(6.4)	24(2.4)	126(12.6)	225(22.5)	561(56.1)
Variable	F		%		
In the last 14 days, have you gone to any crowned place?	459		45.9		
Yes	541		54.1		
No					
In the last 14 days, do everyone visiting your house wash their hands before entering	561		56.1		
Yes	439		43.9		
No					

Variable	Never	Once	Few time	Often	Always
In the last 14 days, did you have a personal sanitizer or have have access to any sanitizers to use		912		91.2	
Yes		88		8.8	
No					

The Fig. 2 above shows that 69.1% had good attitude while 30.9% had a poor attitude to COVID-19. The figure also shows that 55.4% had a positive or good risk perception while 44.6% had poor risky behavior. In addition, 64.8% were vulnerable to acquiring COVID while 35.2% were not.

The Table 7 above shows that there was a statistically significant association between knowledge of prevention and community vulnerability to COVID (P=0.005). Other variables used were not statistically significantly associated on bivariate analysis ($p > 0.05$). On binary logistic regression, Females were 1.2 (1/0.85) times less likely to be vulnerable to COVID compared to men (OR 0.85), though this observation was found not to be statistically significant ($p = 0.1165$). Also respondents who were aware of COVID were 1.4 (1/0.73) times less likely to be vulnerable to COVID compared to those who were not aware (OR 0.73), though this observation was also found not to be statistically significant ($p = 0.3785$). Respondents who had good knowledge of prevention were 1.6 times (1/0.64) times less likely to be vulnerable to COVID compared to those who had poor knowledge (OR 0.64), though this observation was found to be statistically significant ($p = 0.0023$). Other variables were not predictive based on a close to +1 OR values. Thus predictors of being vulnerable to COVID include being a male, not being aware of COVID 19 and having poor knowledge of transmission of COVID.

Table 7
Socio-demographic predictors of vulnerability to COVID 19 infection

Variable	Bivariate analysis			Multivariate analysis			
	Vulnerability to COVID-19		χ^2 P	OR	95%CI		P value
	Yes	No			Lower	Upper	
Age	122(62.9)	72(37.1)	0.386	0.90	0.6515	1.2488	0.2668
18–24	526(65.3)	280(34.7)	0.534				
> 24*							
Sex	251(62.6)	150(37.4)	1.429	0.85	0.6540	1.1085	0.1165
Male	397(66.3)	202(33.7)	0.232				
Female*							
Marital status	188(63.7)	107(36.3)	3.695	0.94	0.7048	1.2425	0.3228
Single	460(65.2)	245(34.8)	0.610				
Ever married*							
Education status	46(52.6)	30(47.4)	2.075	0.92	0.5078	1.3247	0.2093
Primary/none	602(65.2)	322(34.8)	0.557				
Secondary +*							
Aware3 of COVID	643(64.8)	350(35.2)	0.136	0.73	0.1418	3.8074	0.3785
Yes	5(71.4)	2(28.5)	0.713				
No*							
Knowledge of transmission	519(65.1)	278(34.9)	0.175	1.07	0.770	1.4760	0.3368
Good*	129(63.5)	74(36.5)	0.675				
Poor							

*Reference category **Significant

Variable	Bivariate analysis		Multivariate analysis				
	Vulnerability to COVID-19		χ^2 P	OR	95%CI		P value
	Yes	No			Lower	Upper	
Knowledge of symptoms	396(63.7)	226(36.3)	0.928	0.88	0.6694	1.1467	0.1682
Good*	252(65.7)	126(33.3)	0.335				
Poor							
Knowledge of prevention	465(62.3)	281(37.7)	7.840	0.64	0.4702	0.8767	0.0023**
Good*	183(72.0)	71(28.0)	0.005**				
Poor							
Risk perception to COVID	358(64.5)	197(35.5)	0.048	0.97	0.7480	1.2613	0.4139
Good*	290(65.2))	155(34.8)	0.827				
Poor							
Attitude towards COVID	453(65.6)	238(34.4)	0.562	1.11	0.8374	1.4635	0.2377
Good*	196(63.1)	114(36.9)	0.453				
Poor							
*Reference category **Significant							

Discussion

The Coronavirus disease 2019 (COVID-19) is recognized as a global pandemic.(8) Nigeria's first coronavirus case was confirmed on the 28th of February 2020 and since then there has been a gradual but exponential increase in the number of cases all over the country.

A greater proportion of study participants were females, and a quarter were in the 4th and 5th decades of life, well-educated with greater than half having tertiary education. In this study, nine out of ten respondents had heard or were aware of COVID-19, with the highest sources of information being the television and radio, this is in contrast to a Ghanaian study which reported overall knowledge about COVID-19 as 61%,(9) and also a study to evaluate the knowledge and perceptions of COVID-19 among healthcare workers in United Arab Emirates found insufficient knowledge among the study population. (10) However, in tandem with our study is a report from a Chinese study where residents had 90% on the

COVID-19 knowledge questionnaire.(11) The high level of awareness and knowledge of covid-19 in this study could be likely be attributed to the high educational level of respondents, and the fact that more than one third were civil/public servants and tertiary institution students with a high propensity to be attracted to information about the on-going pandemic.

Consequently, more than 80% of these groups had good knowledge and awareness of the modes of transmission, symptoms and preventive measures of covid-19. Studies conducted in china by Chen et al. and Li et al. showed high awareness of the main symptoms and transmission routes of covid-19, using masks and hand washing as prevention of covid-19 but demonstrated a moderate level of knowledge about COVID-19 among the Chinese people.(12),(13) Also in another study among the Thai people in the provinces close to China poor knowledge about this disease transmission was reported.(14) In the early stages of the epidemic in china, Zhong et al. in a study assessed the level of Chinese residents' overall knowledge as low.(15) However, an Iranian study reported about two-thirds of people had correct knowledge regarding transmission routes of COVID-19, while the remaining one-third had inadequate knowledge about preventive routes and the common symptoms of COVID-19.(16)

Interestingly in an era of social media surfing for information, respondents reported the commonest source of COVID-19 information as television and radio which is divergent from another study where more than 70% received information through the social media (internet),(10) these albeit traditional sources of information on COVID-19 may be responsible for the good level of awareness and knowledge described in this study.

The attitude of people plays a major role in the effective control of an infectious disease epidemic. In this study, majority of the respondents had a positive attitude towards covid-19 preventive guidelines, with about eight in ten people agreeing to the use of face masks, avoiding physical contacts, total lockdown of cities and restriction of movements as necessary measures to control the pandemic. This is in contrast to findings from a Peruvian study where more than 75% of the people did not participate in effective measures to prevent spread of the disease like the use of face mask and practicing social distancing(17), likewise findings among low income households in the Philippines reported that majority (82.2%) of respondents recognized hand hygiene only as an important preventive measure against infection, while there was a gross lack of identification of other key measures such as social distancing and avoiding large crowds.(18)

Risk perceptions are interpretations of the world. It refers to an evaluation of experiences, beliefs, attitudes, judgments, (mis)conceptions, and feelings, as well as wider social, cultural, and institutional processes.(6) A very Large proportion of the respondents believed that COVID-19 exist in Nigeria with more than half admitting being at risk of contracting the corona virus disease. This is like findings from a Ghana study which reported most participants had a high-risk perception towards the COVID-19, with about 85% of the study population perceiving COVID-19 as dangerous disease, were worried about it and indicated they were at a high risk of contracting the COVID-19 infection.(19)

About a sixth of the participants reported that COVID-19 is generating serious stigma issues towards recent international travelers, infected persons and their family members, COVID-19 survivors and their family and frontline health workers. These could be the reason for the overall good risk perception observed in this study which in turn correlates with findings of a uniformly high-risk perception observed in a study carried out across ten countries of the world.(1) Another interesting finding is the level of trust put in the capacity of the government to handle this pandemic. Every eight out of ten respondents agreed that COVID-19 will be successfully controlled and the government will win the battle against COVID-19 in the country, in addition is almost every respondents belief that the measures put in place by government can control the spread of the COVID-19 infection. Conversely, a study in South Korea and Spain showed that trust in government played a very significant role but was associated with lower levels of risk perception.(1) The high level of risk perception in this study subsequently translated to majority of the respondents agreeing and complying with the governments instituted preventive measures such as the use of face mask, observing social and physical distance, minimal or no bodily contacts and avoid public/large gatherings.

Nigeria and virtually most countries of the world are in the phase of community transmission of the corona virus disease. The vulnerability of a community to COVID-19 is associated with a host of factors one of which is the ability of the community to practice laid down precautionary measures amidst her knowledge and perception of the risk associated with contracting the disease. In this study, there was significant association between good knowledge of the virus and vulnerability, with increased awareness showing less likelihood of vulnerability to COVID-19. Invariably, knowledge of COVID-19 and its prevention serves as a protective factor against the disease, implying that high level of education and a credible source of information enables the good practice of precautionary measures and subsequently reduces community vulnerability. This is consistent with findings in a Saudi Arabian study which reported significant association between high knowledge and good and safe practices of the preventive guidelines and thus reduced vulnerability to covid-19,(20) similarly an association was found between the level of education and good knowledge of covid-19 which culminates in observance of precautionary measures and reduced community vulnerability in a Ghanaian study.(19)

It is important to note that the research on COVID-19 is still too recent to give weighted impact on these different factors, however public health experts are working acidulously to identify specific factors which need to be addressed locally for each community to reduce its vulnerability.(21) More than half of the population in this study believed that practicing the main precautionary measures would reduce vulnerability to the virus. There was significant association between good knowledge on preventive measures and vulnerability, with increased awareness showing less likelihood of vulnerability to COVID-19. Invariably, knowledge of COVID-19 and its prevention serves as a protective factor against the disease, implying that high level of education and a credible source of information enables the good practice of precautionary measures and subsequently reduces community vulnerability.

It is important to note that findings from this study provide baseline information on knowledge, attitude, risky perception as well as vulnerability status to COVID 19 infection among residents in Osogbo, Osun-

State. A further qualitative study to explore in-depth information on knowledge, attitude and risky perception will still be needed.

Conclusion

The overall knowledge and attitude towards COVID-19 infection among the residents of Osogbo, Osun state was good. Community vulnerability is significantly influenced by knowledge on COVID 19 preventive measures. Therefore, there is need for continuous and sustained health promotional programs on preventive measures to reduce vulnerability among the respondents.

Abbreviation

COVID: Coronavirus Diseases of 2019

Declarations

Ethics approval and consent to participate: Ethical clearance for the study was requested from ethical committee of LAUTECH Teaching Hospital, Ogbomoso. All respondents voluntarily sign an informed consent form and confidentiality highly guaranteed.

Consent for publication: Authors have given the journal the consent for publication.

Availability of data and materials: Data will be made available at any point in time for use.

Competing interests: The authors have declared that there was no existing competing interest

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Authors' contributions: The authors are involved in the following aspects

Conceptualization-OA, OSO,

Literature search- IOR, AC, AWO, OJO, IO

Study design- OSO, IOR, OA

Data collection – IO, OJO, AC

Data analysis –AC, AWO, IOR

Corrections and final write up.-OJO, IO, OSO, OA, AWO

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Figures

Figure 1

Overall knowledge of Covid-19 among respondents

Figure 1

Overall knowledge of Covid-19 among respondents

Figure 2

Mean score of risky perception, attitude and community vulnerability to COVID-19

Figure 2

Mean score of risky perception, attitude and community vulnerability to COVID-19

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