IMPLICATIONS OF COVID19 PANDEMIC ON HIGH DENSITY RESIDENTIAL AREAS OF LAGOS STATE

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Abstract

The implications of COVID 19 on the study area was examined with respect to the housing and environmental conditions. Problems of poor housing conditions and poor environmental sanitation were identified. An Area Cluster sampling was adopted and four areas were selected, namely; Idi-Araba; Idi-Oro; Olateju-Olosa; and Ojuwoye. Purposive sampling method was adopted, and 50 respondents were selected from each area, making a total of 200 respondents. Socioeconomic data of the respondents were collected through a structured questionnaire, and checklist for the assessment of the conditions of the sampled houses. 161 respondents, representing 81% of the total number of respondents were in the extended family structure with occupancy ratio of 4 persons per room, making physical distancing impossible, while working from home during the lockdown is impracticable due to the percentage of the traders and artisans which accounted for 85% of the occupational structure. Majority (66.5%) of respondents have Primary School Leaving Certificate as the highest educational level attainment and this accounted for poor compliance to COVID 19 preventions and precautions. Lack of potable water, substandard sizes of the rooms, and poor waste management are contributory factors to the high level of vulnerability of the study area to COVID 19. Adequate healthcare facilities as response to COVID 19 is recommended, while planning inputs in the form of spot clearance of urban renewal are imperative.

Keywords: Coronavirus, High Residential Density, Housing Condition, Environmental Sanitation

Introduction

The World Health Organization (2019) cited by Oyelola et al. (2020) noted that the novel coronavirus (COVID 19), which was caused by severe acute respiratory syndrome coronavirus (SARS-COV-2) emerged in the city of Wuhan, China in the late December 2019, and was declared a global pandemic by the World Health Organization (WHO) on 11th March 2020, and that in the time since, the disease has quickly spread to all continents and to date, over 1.6 million cases have been recorded with a fatality rate of 6.19%. It is important to note that Martinez-Alvarez *et al* (2020) cited by Oyelola et al. (2020) compared early transmission of COVID 19 (within 6 days after the first cases were detected) in selected countries, and observed a more rapid spread of the virus in some West African Countries than in Europe, while Gilbert et al. (2020) cited by Oyelola et al. (2020) predicted a worse situation in African countries, due to the inadequate preparation for disease outbreak, poor surveillance and response system, as well as inadequate and overstretched health facilities and services.

However, Nigeria Centre for Disease Control, (2020) cited by Oyelola et al. (2020) noted that the first case of COVID 19 in Nigeria was detected on 27th February 2020, but it did not lead to immediate outbreak. Osayomi (2020) emphasized the need to understand the spatial epidemiology of a disease as being helpful insights not only to its nature and ecological associations, but also on how to prevent and control it. **Hence**, identification of COVID 19 virus as the newest member of coronavirus family which is highly contagious in nature, is thereby described as the COVID 19 pandemic, as being the greatest global health emergency in contemporary times.

According to NCDC (2020), cited by Osayomi (2020), it is on record that as at April 14, 2020, there were a total of 373 cases in 20 states in the country, with Lagos State recording the largest cases of 214 in the country, followed by the Federal Capital Territory (FCT) with 58 cases. However, Vanguard (2020) reported that Lagos Mainland has the highest number of infection, while Alimosho, Oshodi, Mushin, Ikeja, Kosofe and Isolo L.G.As also have increased cases and still on the rise daily. The confirmed cases of COVID 19 in Lagos Local Government Areas as at May 10, 2020 is presented in table1. The full list of the Local Government Areas in Lagos State with COVID 19 infections as presented in table 1 shows the analysis of the spread of the disease in terms of the magnitude across the twenty (20) Local Government Areas of the state.

Table 1: *COVID 19: Lagos L.G.As and number of confirmed cases as at May10, 2020.*

S/N	Local Government Area	Number of COVID 19 Infections.
1	Surulere	31
2	Shomolu	40
3	Oshodi/Isolo	34
4	Ojo	4
5	Mushin	138
6	Lagos Mainland	500
7	Lagos Island	30
8	Ikorodu	18
9	Kosofe	59
10	Ikeja	73
11	Ifako Ijaiye	12
12	Ibeju Lekki	26
13	Eti- Osa	200
14	Epe	8
15	Badagry	5
16	Apapa	55
17	Amuwo Odofin	35
18	Alimosho	69
19	Ajeromi/Ifelodun	18
20	Agege	13

Source: https//www.vanguardngr.com.10th May2020

Analysis of the COVID 19 infections as presented in table 1 shows that Lagos Island has the highest number of infection cases, followed by Eti- Osa, while Mushin local Government Area has the third highest number of infection cases as at 10th May 2020. However, Mushin Local Government Area is one of the local Government Areas of Lagos state with high population density. High Residential Density Areas are areas of high population which posed great challenges to the achievement of Urban Planning goals. It is characterized with slum development, with greater health implications. Hence, this research therefore examines the implications of COVID 19 on the High Residential Density of Mushin, Mushin Local Government Area, Lagos, in order to make necessary recommendations.

Ramalho et al. (2012) cited by Owolabi (2018) noted that to balance environment with urban growth – or at a minimum, to arrive at trade-offs, there is need to examine the concepts which are necessary to balance between urbanization and environment in the context of sustainable urban housing, and these concepts include; Sustainable Communities; Sustainable Cities; Liveable Cities; Green Cities, Prosperous Cities; Eco Cities; Healthy Cities; Resilient Cities; and Affordable Cities. It is on this background that an association is drawn among urbanization, housing, and human health. Ren et al. (2020) cited by Adeniran et al. (2020) noted that housing generally is a major area where pandemic is experienced, and that COVID 19 will impact on housing in several ways, asides the fact that it will impact individual's experience of home, particularly on the area of health and generally the environmental qualities.

Afolayan (2020) noted that COVID 19 has significantly emerged as an indispensable housing issue which requires urgent attention. Adediran et al. (2020) observed that coronavirus has been globally reported as a strain virus that infects human, and current pandemic which has globally prompted myriad of studies, discussions and reports over the past few months, with lots of concern for housing sector's operation. It has been identified that the mean transmitting method of this virus is identified as virus from person to person, which is aided through respiratory droplets been sneezed out by people, and exhale or cough that can survive for many hours on surfaces like door handles, cloths, hair, tables, and so on.

The potential problems posed by this virus on the study area being a high density area is a major concern, owing to the following problems identified in the study area:

1. Lack of adequate air space within the houses.
2. Overcrowdings of inhabitants, which is manifested in high occupancy ratio
3. Lack of adequate housing facilities.
4. Poor Sanitation.
5. Poor arrangement of structures, which devoid of planning inputs.

With the environmental problems of the study area, which has a very great negative health implications, it is therefore necessary to examine the effects of COVID 19 on the study area, owing to the fact that slum developments are development prone to disease outbreak, in which the study area is not an exception

Literature Review

Currently, COVID-19 is one of the most devastating of all infectious diseases all over the world. At present, there is no approved vaccine by WHO and the disease is nearly fatal for older adults and people with underlying diseases. Some patients are asymptomatic and can pass the disease to many others without knowing that he/she is a carrying COVID-19. At the end of July, 2020, an estimated 17million people around the world were tested positive to COVID-19, with more than 700,000 in Africa. This represents about 5 % of the world figures (WHO African Region External Situation Report 22, 2020).

According to NCDC in its report for 31st of July 2020, about 43,151 people were infected with COVID-19 in Nigeria. With this figure, the country is ranked second after South Africa as it harboured almost 16 percent of the total Africa cases of COVID-19. This figure has jumped from 1,932 in May giving about 41,219 increase in just three months. Over 15,000 of the people infected with COVID-19 lives in Lagos (NCDC, 2020). As pointed out by WHO, the virus spreads through direct, indirect or close contact with Covid-19 patients through mouth and nose secretions. People within 1 metre radius of infected people are at higher risk of contracting the virus when the patient speaks, sneezes or cough. Saadet et al. (2020) identified population density, household size and physical distancing as some of the factors that can increase the risk of been infected with the virus. In similar vein Uduku (2020), noted that since the virus spreads by mouth and nose secretions of someone with the virus means it would spread with higher proximity of people, larger contact network and lower levels of hygiene.

In an attempt to curtail the spread of the virus, WHO and NCDC recommends physical distancing, washing of hands, wearing of face mask and home quarantine. All of these guidelines have been describe as not practical in high density area due to the challenges of the area such as overcrowding, poverty, poor sanitation, and limited sanitation facilities (Islam and Kibira, 2020; Uduku, 2020). According to Uduku, (2020), the preferred lockdown is not feasible due to the need for food, inadequate or lack of bailout from the government, while Saadet et al. (2020) observed that physical distancing would be more than challenge for those who lives in smaller and crowded houses with limited ventilation and open spaces. Further, guidelines such as teleworking or working from home cannot be easily achievable by people in low income group.

Globally, 780 million people do not have access to water WHO (2020), majority are who resides informal settlement. For instance, Islam and Kibira (2020) observed that only 28% of the population in Bangladesh has access to hand washing station with soap and water. Nwaka (2005) observed that in most Nigeria towns and cities water supply and sanitation facilities are grossly inadequate for domestic and personal hygiene. According to him significant percentage depends on crowded and sometimes distant community tap, well, stream or from iterant water vendors. Hence, this makes hand washing with soap and running water a difficult task. Equally, Olajide (2015) observed that 80 percent of the population in Sari-Iganmu lives in a single room with an average of seven people. He also observed that an average of seven households uses the same toilet and bathroom.

The relationship between development density and health has been a subject of debate in the literature. In the opinion of Glasser (2011), high urban density enhance close contact and could result to greater exposure to diseases, this spawn them the possible epicenter of the pandemic crisis. Another empirical study by Garret (2010) reported a positive relationship between development density and spread of pandemic. He observed that there is a positive relationship between density and death rate in 1918 pandemic in United States. However, Chowell et al. (2008) reported that there is no significant relationship between development density and death rate in the same 1918 pandemic in United Kingdom

In a recent study, Hamidi et al. (2020), in their study of the relationship between development density and the COVID19 morbidity and death rates in 1165 metropolitan counties in United States reported that population of the area is found to be the most significant of infection rate while county density is not significantly related to the infection rate. The study attributed these unconvincing findings to the fact that counties with higher densities in the study area have access to superior health care system among other reasons.

It must however, be stated that significant number of these studies were carried out in developed countries. Hence, findings cannot be generalized and totally adopted in developing countries due their peculiarity. This study, therefore, intend to address this major gap in literature.

Research Methodology

The study area is Mushin LGA, located in the very heart of Lagos State. The area lies within Latitudes $6^0$31'30" and $6^0$35'15" North of the Equator and Longitudes 3^0 18'45" and 3^0 21'45" East of Greenwich Meridian. It is 10km north of the city core and has a land area of 17.0 km^2. It is bounded in the north by Kosofe Local Government, in the east by Shomolu Local Government, to the south by Surulere Local Government and to the west by Oshodi/Isolo Local Government. The present Mushin LGA was part of Ikeja Native Authority in the then Western Region before it was carved out as a District in 1954, with its boundary extending to the present Shomolu Local Government Council Area. The study area is densely populated mixed commercial and residential area with inadequate sanitation, low-quality housing, and an estimated population of 1,312,517 according to the Lagos State 2006 census (Robert et al., 2020). The study area is as shown below in its national, regional and local settings in Figure 1.

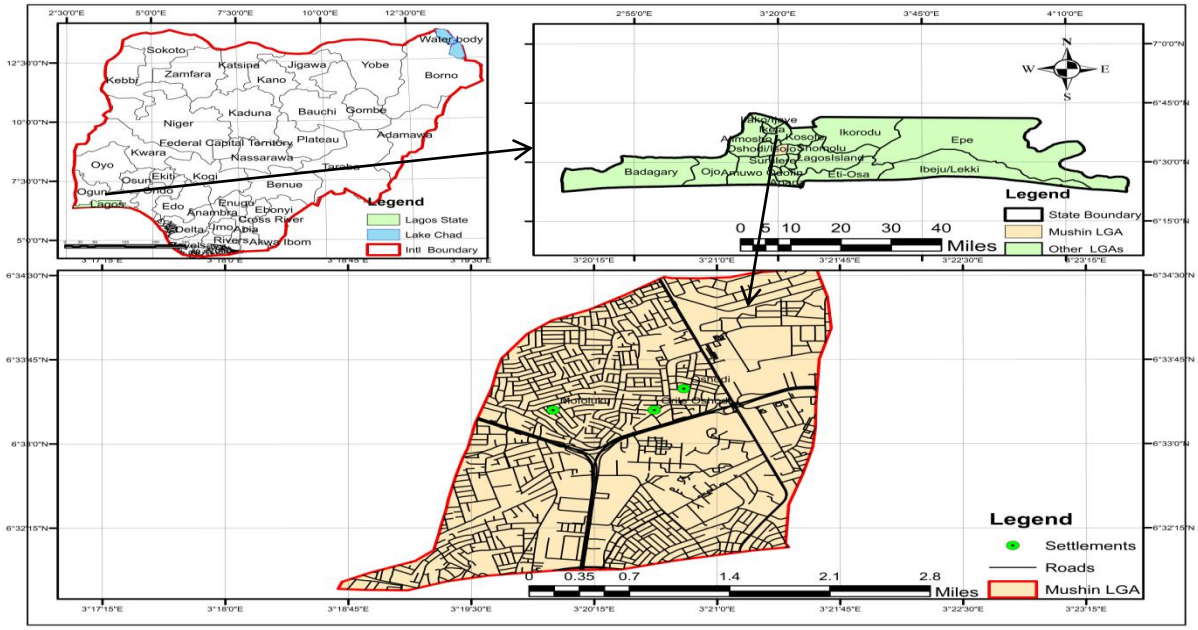

Figure 1: Mushin Local Government Area in National Context

Source: Department of Urban and Regional Planning, Federal Polytechnic, Ilaro, Ogun state, Nigeria

An Area Cluster was adopted in delineating the geographical area of Mushin, in Mushin Local Area of Lagos State. According to the Mushin Street Zip Code (2019), a total of 153 streets were identified to be in existence in Mushin. A purposive sampling method was adopted in the selection of the 4 areas within Mushin for the purpose of this research. The four (4) areas selected are; Olateju Olosa, Idi Araba, Ojuwoye and Idi Oro. It is important to note that these four (4) areas selected are true representative of the housing characteristics of Mushin, as a high residential density area of the study area. A total of fifty (50) houses were chosen as samples in each area, thereby making a total of two hundred (200) houses selected as samples for the study. Random sampling method was adopted in the selection of houses for the purpose of data collection, while a household from each house represents the total characteristics of all the households in that building. A structured questionnaire was used for the collection of relevant data from the respondents, while a checklist was used to collect data on the housing characteristics of the selected houses.

Relevant secondary data on the incidence of COVID 19 in the study area were extracted from the Nigeria Centre for Disease Control publications (NCDC), while the relevant planning standards for high residential density area was used for the purpose of analysing the implications from the planning perspectives.

Descriptive statistical analysis was adopted in the analysis of the data collected, for the purpose of making logical conclusion.

Data Presentation and Findings

Data on the socio-economic characteristics of the respondents are germane to the study, as it gives a good foundation to the rationale behind the environmental characteristics and housing conditions, which often expressed the nature of the density area. Socio-economic factors of the respondents considered in this research

are; family structure, levels of education, occupation, income levels, period of stay in the area and reasons for residing. The socio-economic characteristics in terms of the family structure of the respondents in the selected area are presented table 2.

Table 2: *Family Structure of the Respondents in the Selected Areas.*

Selected Area	Family Structure			
	Nuclear Family		Extended Family	
	Freq.	%	Freq.	%
Idi- Araba	9	23	41	26
Idi- Oro	11	28	39	24
Ojuwoye	8	21	42	26
Olateju Olosa	11	28	39	24
Total	39	100	161	100

Source: Researchers' Field Survey July 2020.

Data collected on the family structure of the respondents in the selected area, as indicated in table 2 shows that the extended family structure type has the highest frequency of the types of family structure in the study area. Investigations revealed that inter- generational housing exists in the study area, and this attributed to the existing family structure. A critical examination of extended family structure revealed high occupancy ratio which are expressed in terms of high density, and the existence of aged people.

The educational characteristics of the respondents in the selected area are presented in table 3.

Table 3: *Educational Characteristics of the Respondents in the Selected Areas.*

Selected Area	Educational Levels									
	Primary School Leaving Cert.		SSCE or its equivalent		National Diploma, NCE or its equivalent		HND, Bsc or its equivalent		Post Graduate Degree	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Idi- Araba	15	31	32	24	3	16	-	-	-	-
Idi- Oro	13	27	35	26	2	10	-	-	-	-
Ojuwoye	9	19	34	26	7	37	-	-	-	-
Olateju Olosa	11	23	32	24	7	37	-	-	-	-
Total	48	100	133	100	19	100	-	-	-	-

Source: Researchers' Field Survey July 2020.

The analysis of the data in table 3 revealed that 133 respondents out of the 200 respondents sampled, representing 66.5% of the total number of sampled respondents have SSCE or its equivalent as the highest educational level attainment, followed by 48 respondents with Primary School Leaving Certificate, representing 24% of the total number of respondents sampled. The analysis in table 3 is a major tool in assessing the literacy level of the respondents in the study area, particularly on the issue of the enlightenment of COVID 19 preventions and precautions.

The occupation of the respondents in the selected area are presented table 4.

Table 4: *Occupation of the Respondents in the Selected Areas.*

Selected Area	Occupation of the Respondents									
	Traders		Artisans		Government Workers		Private/ Company workers		Unemployment	
	Freq.	%	Freq	%	Freq.	%	Freq.	%	Freq.	%
Idi- Araba	29	25	14	26	2	20	5	25	-	-
Idi- Oro	26	22	16	30	2	20	6	30	-	-
Ojuwoye	31	27	13	24	4	40	2	10	-	-
Olateju Olosa	30	26	11	20	2	20	7	35	-	-
Total	116	100	54	100	10	100	20	100	-	-

Source: Researchers' Field Survey July 2020.

Occupation is one of the major socioeconomic aspects which is often cross examined with the income level of individual in order to assess the affordability of housing facilities, and their maintenance. Analysis of data in

table 4 revealed that 116 respondents, representing 58% of the total number of respondents sampled are traders, while 54 respondents, representing 27% of the total number of respondents sampled are artisans. This analysis therefore shows that 85% of the respondents engaged in informal activities.
The income levels of the respondents in the selected area are presented table 5.

Table 5: *Levels of Income of the Respondents in the Selected Areas*

Selected Area	Monthly Income									
	Below ^30,000		^30,000-^60,000		^61,000-^90,000		^91,000-^120,000		^121,000 and above	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Idi- Araba	3	17	24	35	21	24	2	8	-	-
Idi- Oro	7	39	18	26	20	22	5	20	-	-
Ojuwoye	5	27	16	24	18	20	11	44		-
Olateju Olosa	3	17	10	15	30	34	7	28	-	-
Total	18	100	68	100	89	100	25	100	-	-

Source: Researchers' Field Survey July 2020.

Analysis of data in table 5 revealed that 89 respondents, representing 45% of the total number of respondents sampled earned a monthly income of between ^61,000 and ^90,000, while 68 respondents, representing 34% of the total number of respondents earned between ^30,000 and ^60,000. This simply implies that an average of ^60,000 is earned by 79% of the sampled respondents.

The period of stay of the respondents in the selected area are presented table 6.

Table 6
Period of Stay in the Areas

Selected Area	Period of Stay of Respondents									
	Less than 1yr		Btw 1yr – 5yrs		Btw 5yrs – 10yrs		Btw 10yrs – 15yrs		15yrs and above	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Idi- Araba	-	-	-	-	-	-	13	26	37	25
Idi- Oro	-	-	-	-	-	-	11	22	39	27
Ojuwoye	-	-	-	-	-	-	9	18	41	28
Olateju Olosa	-	-	-	-	4	100	17	34	29	20
Total	-	-	-	-	4	100	50	100	146	100

Source: Researchers' Field Survey July 2020.

Period of residence is an important factor when it is of interest to ascertain that the data collected does not have a temporal dimension. Data in table 6 revealed that 146 respondents, representing 73% of the total number of sampled respondents have been residing in the selected area for 15 years and above.

The reasons for the respondents residing in the selected area are presented table 7.

Table 7: *Reasons for the respondents residing in the Selected Areas.*

Selected Area	Reasons for the Respondents Residing in the Area									
	Cheap Rent		Good Security		Close to Relation		Close to Commercial Area		Close to Work	
	Freq	%	Freq.	%	Freq.	%	Freq.	%	Freq	%
Idi- Araba	4	17	-	-	7	33	9	28	30	25
Idi- Oro	6	25	-	-	8	38	12	38	24	20
Ojuwoye	4	17	1	33	4	19	7	21	34	28
Olateju Olosa	10	41	2	67	2	10	4	13	32	27
Total	24	100	3	100	21	100	32	100	120	100

Source: Researchers' Field Survey July 2020.

Analysis in table 7 revealed that 120 respondents, representing 60% of the total number of sampled respondents reside in the study area because of its closeness to place of work.

The examination of the housing and its environmental characteristics of the study area are imperative to this research. The housing characteristics considered are; the occupancy ratio; the sizes of room; air spaces within buildings; the conditions of the physical components of the buildings; the number, location and conditions of housing facilities, and the environmental sanitation of the area under study. Hence, the conditions of the sampled houses in the selected areas are derived from the total assessment of the variables identified in the housing characteristics, in order to examine the implication of COVID 19 on the study area.

Data collected revealed that the occupancy ratio is 4 persons/room, which is against the World Health Organization (WHO) stipulation of 2 persons per room. An average size of a room in the study area is 3m by 2.5m which is against the standard of 3.4m by 3.4m. Air spaces are not provided within the buildings and the arrangement of the buildings does not permit free flow of air. Structural instability of buildings, which are expressed in the form of dilapidated walls and crack foundations were identified in125 buildings in the study area, which represent 63% of the total number of buildings sampled. Inadequate housing facilities have been major housing problem of the study area, taking into cognizance its high density characteristics. Lack of potable water, poor waste management and poor sanitation have made the study area to be best described as slum. The conditions of the sampled houses in the selected area are presented table 8.

Table 8: *Conditions of the Sampled Houses in the Selected Areas.*

Selected Area	Conditions of Houses					
	Good		Fair		Poor	
	Freq.	%	Freq.	%	Freq.	%
Idi- Araba	-	-	4	13	46	28
Idi- Oro	-	-	7	23	43	25
Ojuwoye	-	-	11	35	39	23
Olateju Olosa	-	-	9	29	41	24
Total	-	-	31	100	169	100

Source: Researchers' Field Survey July 2020.

The analysis in table 8 revealed that 169 houses, representing 85% of the total number of houses sampled are in poor condition, while 31 houses (which accounts for the remaining number of sampled), representing 15% of the total number of houses sampled are in fair condition.

With the housing and environmental conditions of the study area, the dwellers of the study area are highly vulnerable to COVID 19. The vulnerability of the dwellers to COVID 19 is better expressed in terms of;

- Difficulty in observing physical distancing due to the extended family structure existing in the study area, with 81% occurrence, reflecting in the occupancy ratio of 4 persons/room, and coupled with unacceptable room size, and lack of adequate air space.
- Working from home during lock – down/ self-isolation is not feasible owing to the occupation of the working class population in which 85% are traders and artisans. Supportive facilities for working at home are not available at their disposal, when cost is considered.
- Poor compliance level to the preventions and precautions of COVID 19 is attributed to the level of education of the dwellers, as 66.5% of the respondents have SSCE or its equivalent, while 24% of the respondents have Primary School Leaving Certificate.
- Continuous washing of hands and maintaining hygiene is a major preventive measure of COVID 19. Lack of potable water has made this measure impossible, thereby making the dwellers highly vulnerable to the disease.
- Poor environmental sanitation which manifest in the form of poor drainage, poor waste management, and pollution from market makes the area highly contagious to the disease.
- The existence of inter-generational housing in the study area, which is one of the basis of the extended family structure is an important aspect considered in this research. High number of aged people, with the prevailing environmental conditions of the area pose a great danger to other categories of people, as the aged are highly vulnerable to COVID 19 when compared to other age classes of people.

Conclusion and Recommendations

This study has examined the implications of COVID 19 on the high residential density in Mushin, Mushin local government area of Lagos state. Results of this study suggested that majority of the residents in this area are low income earner with 79% earning below #60,000 ($155) monthly. According to this study, it is established that 85% of the population involved in informal activities. More than 80% of the houses in the area are in poor condition with appalling environmental sanitation. The study has also revealed that the area is overcrowded with an average of 4 persons per room The study therefore, concluded that the socio economic characteristic, environmental sanitation of the area, high occupancy ratio and poor housing conditions in the area might not be unconnected to high number of Covid-19 cases recorded by NCDC in the local government area. However, the findings of this study are limited by the inability to access locational data of COVID-19 patients. Therefore, further study is recommended to analyse the relationship between residential density and COVID-19 spread and lethality in Nigeria.

From the findings of this study, the following recommendations were made

- It is imperative that health care facilities should be provided and equipped to respond to possible public health crises that may arise as a result of high development density in the area.
- Concerted effort should also be made to improve the quality of housing and environment in the area.
- Finally, this study calls for the need for relevant agencies to be proactively mindful about the vulnerability of high development density area during pandemic.

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