

Appraisal of Health Sector Responses to Covid-19 at National and Sub-National Levels: Case Study of States with Highest Prevalence of Cases-Lagos, Kaduna and FCT Assessment of Health Sector Responses to Covid-19 at Selected States with Highest Prevalence of Cases

John Oladejo^{1*}, Abiodun Hassan²

¹Ph.D, Texila American University, Guyana

²TB DIAH, John Snow Inc, Boston, MA

Abstract

The Covid-19 pandemic is the largest and longest outbreak in modern times, with socio-economic, political, and educational disruptions. This study was to appraise the level of efforts and the impact of these interventions in the health sector. A mixed methodology approach involving quantitative research techniques. The study revealed that there was generally a high level of awareness and good compliance to government policies and guidelines on Covid-19 regulations being highest in Lagos state compared to FCT and Kaduna state. The public perception of the use of facemask and its enforcement and handwashing practices by health facilities was rated high across the three states. Client education and public perception of Covid-19 counselling was different across the three states, being highest in Lagos in comparison to FCT and Kaduna. Hence the study recommended refresher training of health workers on awareness creation and counselling of clients at all levels of care.

Keywords: Assessment, Covid-19, Health system strengthening.

Introduction

Since the emergence of Covid-19 on December 2019 in China and spread to all continents of the world except Antarctica, the pandemic has become the defining global health-care crisis of our time and the greatest challenge the world has faced since World War II. [1, 2]. Daily increase in cases is recorded in Africa, the Americas, and Europe [3, 4]. A total number of 223 countries, areas or territories have recorded Covid-19 cases [5]. Nigeria recorded her first case of coronavirus disease (Covid-19) on February 27, 2020, and as of September 11th, 2021, there were 198,239 confirmed cases of Covid-19 with a total of 2,588 deaths due to Covid-19 [5].

Given the rapid spread of the novel virus around the world, by the beginning of March 2020, the World Health Organization (WHO)

officially labeled the disease as a pandemic [4, 7].

Consequently, different countries imposed unprecedented measures to curtail the spread including lockdowns, restrictions on travels and public/religious gatherings, closure of businesses and schools, quarantine, and isolation of suspected cases, leading to devastating social, economic, and political crisis [6, 8]. It continues to pose difficult and unprecedented challenges to governments, health systems, communities, and individuals, not only in striving to control transmission rates to prevent morbidity and mortality from Covid-19, but also in mitigating the indirect impacts of these control measures. In the health sector measures include repurposing of health facilities for Covid-19 care, closure of primary health services, redeployment of health staff to Covid-19 care, fear of infection and loss of income have resulted in disruptions to

accessing and delivering quality essential services [9]. In Nigeria, the Federal Government has provided leadership and rapid investment in national health security. Diligent planning and hard work have been essential in providing necessary human, material, and financial resources to fight the spread of the virus. The Presidential Task Force (PTF) now Presidential Steering Committee (PSC) was constituted by the President Muhammadu Buhari has continued to strategically pilot the leadership and coordination of the outbreak response by ensuring continued communication with the public. Hospitals and other healthcare facilities play critical roles in national and local responses to emergencies, such as infectious diseases outbreaks and global pandemics [4, 8]. To contribute to efforts in controlling an epidemic, the hospitals must harness many of its functions and resources as well as use them in a coordinated fashion. If a hospital has not put in place adequate preparedness measures; such as Infection Prevention Control (IPC) protocol, observance of standard precautions among health-care workers, provision of Personal Protective Equipment (PPE), well-equipped isolation/treatment centers among others; it may amplify an epidemic by spreading the infection to patients, staff, and visitors as well as inability to manage patient loads and care requirement and may also overwhelm a hospital's capacity to deliver health-care services, as the epidemic may last for long duration involving several weeks or months [10].

Rationale of the Study

Concerns as to the adequacy, quality and coverage of resources needed to combat the pandemic as the country grappled with managing Covid-19 Pandemic within the context of a weak health system made the study imperative. As the country continues to manage Covid-19, it has become necessary to appraise the performance of different sectors of the health system and to generate data on the health sector response to Covid-19 by the three tiers of

Government that will inform policy actions at all levels to combat the spread or resurgence of the pandemic [11].

The study is there conducted to Provide insights into the adequacy of the three tiers of government response to the health sector needs in response to Covid-19 pandemic; and, to assess the health sector response to Covid-19 in terms of healthcare facility service delivery.

Material and Methods

Methodology

A mixed method approach involving quantitative and qualitative research techniques was adopted for the study. The techniques comprised of the following: a desk review of Government (Federal and State) policy documents, protocols and regulations around Covid-19 and pre-existing guidelines and protocols. Healthcare facility assessment consisted of Key Informant Interviews, in-depth interviews with relevant government officials and public perception survey on government (Federal, State and Local governments) policies and actions in response to Covid-19.

Study Location

Considering the spread of the Covid-19 pandemic among states in Nigeria. The selection criteria for the study were based on the states with the highest confirmed cases of Covid-19 in each of the 6 geo-political zones. After the ranking of states burden and the geopolitical zones, two states namely, Lagos, Kaduna and the FCT were selected for having the highest prevalence of Covid-19 reported cases.

Selection of Local Government Area

In each of the two states, one (1) Local Government Area in each Senatorial District was randomly chosen, while 3 Area Council were also covered in the FCT. Thus, making a total of 6 LGAs and 3 Area Councils involved in the survey as well as taking into consideration the presence of the Secondary and Tertiary Health Facilities during the selection.

Assessment Target Population

The study involved health facilities (secondary and tertiary), key stakeholders (health facility staff and government: State Primary Health Care Development Agency, State Ministry of Health, Federal Ministry of Health, and Local Department of Health), and the Public.

Study Location

Selection of the Area

Considering the spread of the Covid-19 pandemic among states in Nigeria. The selection criteria for the study were based on the states with the highest confirmed cases of Covid-19 in each of the 6 geo-political zones. After the ranking of states burden and the geopolitical zones, two states namely, Lagos, Kaduna and the FCT were selected for having the highest prevalence of Covid-19 reported cases with public perception survey on government policies and actions in response to Covid-19.

Sample Size Determination

Sample Size determination: the Power sample size determination method was:

used to avoid type 1 and type 11 error.

$$N = (Z \alpha + Z\beta)2 p*q/d^2$$

Where:

N= Sample Size.

Z α = Standard normal deviation at 95% Confidence Interval.

Z β = Statistical power at 80% Confidence Interval.

P = Proportion of household that Segregate their waste 60.9% [12].

q= 1-p.

d= level of precision (5%).

Selection of Local Government Area

In each of the two states, one (1) Local Government Area in each Senatorial District was randomly chosen, while 3 Area Council were also covered in the FCT. Thus, making a total of 6 LGAs and 3 Area Councils involved in the

survey as well as taking into consideration the presence of the Secondary and Tertiary Health Facilities during the selection.

Health Facility Assessment

The health facility assessment consisted of qualitative and quantitative research methods. These methods include Key Informant Interviews (KII), observational studies of health facilities for public and private as well as secondary and tertiary health facilities. Furthermore, health facility staff interviews were conducted using the interviewer-guided structured questionnaire.

Key Informants Interviews

Key Informant Interviews (KIIs) was conducted with key stakeholders in Government Agencies (Federal Ministry of Health, State Ministry of Health, and Local Government Health Departments), health facility levels and clients, opinion leaders in the society and private sector. The KIIs was conducted using an interview guide with open-ended questions to further explore information on policy documents, protocols, and regulations of federal and state governments in relation to the health sector before and during the Covid-19 pandemic in order to identify challenges, gaps and benefits to the health sector.

The stakeholders interviewed are but not limited to the following: Directors of Government Agencies namely, Federal Ministry of Health & relevant Agencies, Incident Managers, State Epidemiologists and State Ministry of Health. At the health facility level, Medical Directors, Covid-19 Case Managers, Incident Managers, and Head of Departments were interviewed as well as clients exiting the health facility were interviewed. For Government Agencies, interviews were carried out with relevant Directors in Kaduna and Lagos State Ministries of Health. While in FCT-Abuja, there was a Key Informant Interview with Federal Ministry of Health was conducted. Health facility staff for Key Informant

Interviews were randomly selected purposively from 6 health facilities in each state and FCT.

The table below shows the sample distribution of the key informant interviews.

Table 1. Sample Distribution for Key Informant Interviews

States	Client Interviews	Health Facility Level	State level	Federal Level
FCT	5	7		1
Lagos	3	7	2	
Kaduna	7	5	3	
Total	15	19	5	1

Health Facility Staff Interviews/Observation

This research method involves personal observation and witnessing Covid-19 procedures. A checklist was used for the assessment of suspected persons with Covid-19 in line with the approved protocol for case management. The research also involved face-

to-face interviews with the Head of Response Team, Head of Department/Units relevant to Covid-19. Health facilities for the assessment were selected from the LGAs/Area Councils, 4 secondary health facility and 2 tertiary health facility were selected from each State and the FCT. The table below shows the number of health facilities interviewed per state/FCT as well as staff interviewed.

Table 2. Number of Health Facilities Interviewed Per State and Health Facility Staff Interviewed

States	Tertiary	Secondary	Health facility Staff interviews
FCT	1	4	5
Lagos	1	3	4
Kaduna	2	4	6
Total	4	11	15

Survey Instrument

We utilized the interviewer's guided questionnaire designed for the survey while

ensuring that the survey complied with ethical standards. Table 3: Sample size for public survey

Table 3. Sample size for the survey in the Selected States and FCT

States	Population Size	Sample size	Proportionate Sample Size	Actual samples collected
FCT-Abuja	3,564,126	384	196	376
Lagos	9,113,605	384	502	367
Kaduna	8,252,366	384	454	366
Total	20,930,097	1,152	1,152	1,109

*Source: NBS 2006 Census Population Figures

Hence, based on the information in Table 1, the sample size in the selected States was 1,152. The achieved sample size 1,109 [12].

Sampling Technique

In the two states selected for the assessment, one (1) Local Government Area in each

Senatorial District was randomly chosen, while 3 Area Council were also covered in the FCT. Thus, making a total of 6 LGAs and 3 Area Councils involved in the survey as well as taking into consideration the presence of the Secondary and Tertiary Health Facilities during the

selection. We then administered questionnaires to the clients using the guided structured questionnaire. The sample size for the public survey was 1,152. The achieved sample size for the public survey is 1,109 [12].

Survey Training and Pilot

Central training of survey personnel was conducted virtually for FCT-Abuja, Lagos and Kaduna team members for 2 days. The central training consisted of technical lead, project manager, data manager, research associates, moderators, state supervisors, and enumerator/recruiters. This approach is to reduce security risk in order to adhere to Covid-19 precautionary measures. Day 1 of the training involved overview of the survey objectives, methodology and review of the survey instruments. While Day 2 involved role play and pilot interviews. The training focused on ensuring good understanding of the purpose of the study, its research objectives, research design, sampling procedures, health facility observation, questionnaire administration, moderator discussion guide administration, drills on procedure for screener questionnaire, mock interviews, and rehearsals by all the research team members. Enumerators/supervisors also participated in several role-playing exercises.

Ethical Consideration

Ethical approval for the survey was granted by the Federal Ministry of Health before the commencement of the study. Participation in this study was voluntary. Informed consent was obtained from all participants after the study was properly explained to them. Confidentiality was assured while verbal and written consent was obtained from all respondents.

Data Collection

Quantitative data was collected using mobile forms through Android tablets where the mobile forms utilized the Open Data Kit (ODK) technology for data collection. The process involved the administration of questionnaire

through tablets; hence this approach facilitated good quality of data collection in a number of ways: real time data entry and delivery; skip patterns, and filtering, offline use and GPS location tracking. The study also ensured logical checks in advance and any logical errors in data were addressed, and quota controls. The extracted data was then uploaded to Statistical Package for Social Sciences (SPSS) for analysis.

Data Analysis

Statistical Package for the Social Sciences (SPSS. 20) was used to analyze quantitative data. Descriptive statistics was used to present relevant variables using tables and charts.

Quality Control Measures

Data quality control mechanisms were instituted at every stage of this study. There was equipment testing using digital voice recorders before the conduct of each qualitative session, to ensure their functionality; and back-ups were provided to ensure no disruption in the recording process. Android tablets were tested during training to ensure they are working and can perform quantitative data collection tasks. There was also supervision of field work to ensure compliance with the protocol and to provide necessary assistance that may be needed to resolve any field work issue during the data collection exercise. While face-to-face interviews were monitored from the server and quality control checks were carried out during data collection.

Limitation of the Study

Ethical Clearance

The appropriate ethical clearance was obtained from the National Health Ethics Research Committee. However, Lagos State Ministry of Health required the research team to obtain ethical clearance from the state and have this delayed data collection for more than a month in Lagos State. In addition, some tertiary health facilities in the selected states requested the research team to apply and obtain the facility

ethical clearance. The state research team had to continually engage facility management before access were granted to the facilities, His process took extended data collection time considerably.

Government Official Bureaucracy

The research team experienced frustration due to unending delays and postponement of appointments by government officials, especially at the Federal and State levels. Some interviews were never held while access to crucial information required for the study could not be accessed as this opportunity was not granted by the relevant government officials. Data on Covid-19 case management could not be accessed and assessed for the study.

Security Crisis

The current state of insecurity in Kaduna state prevented the research team from completing the interviews in some selected areas.

Results and Discussion

Awareness of Key Content of Covid-19 Regulations

Majority of clients interviewed on awareness of key content in the FCT-Abuja (88.3%), the states of Kaduna (90.5%) and Lagos (83.1%) are aware of the Covid-19 regulation the President of Nigeria signed into law (Figure 1). This was attested by a paper authored by Golden [13] which stated that regarding Covid-19 infection among community-based residents in River's state was high a few months after the index case of the disease was recorded.

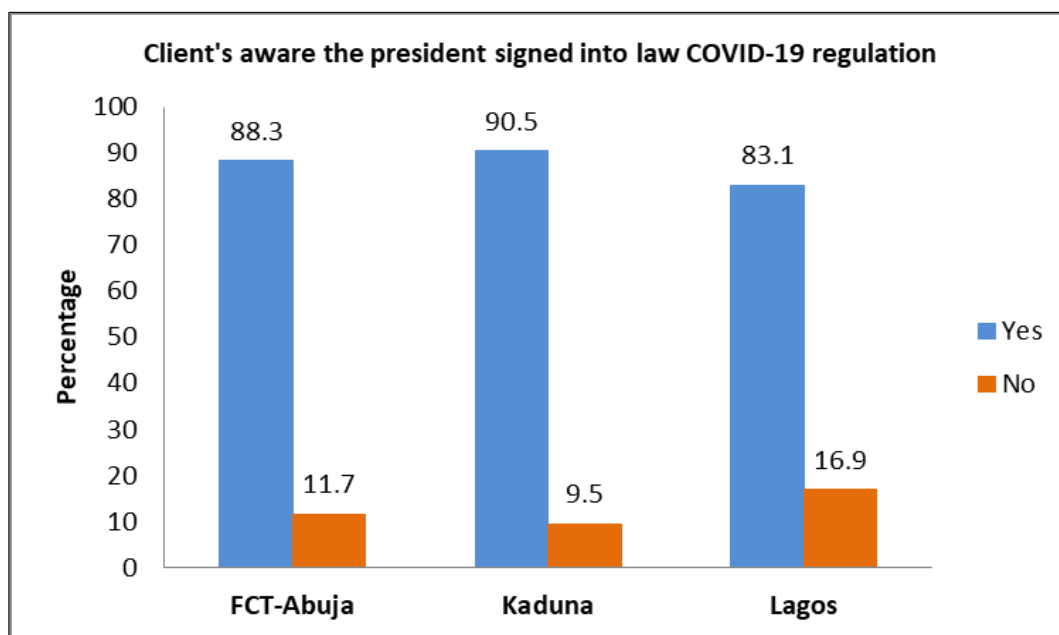


Figure 1. Client's Aware the President Signed into law Covid-19 Regulation

Table 4. Client's Aware the President Signed into Law Covid-19 Regulation

		FCT-Abuja		Kaduna		Lagos	
		Count	Percentage	Count	Percentage	Count	Percentage
I am aware the president signed into law Covid-19 regulation	Yes	332	88.3	332	90.5	304	83.1
	No	44	11.7	35	9.5	62	16.9

Key Informant Interviews Quotes

“The five protocols as assign by the government are use of PPE and that includes the use of face mask, washing of hands regularly and use of hand sanitizers, then we have household, restriction in public places, and this includes avoiding mass gathering that will take more than 50 people” KII SMoH, Kaduna.

“We should always try to maintain social distance, before you can access the facility you must be on your face mask, we also have the hand sanitizer at every point and unit, washing of hands under a running tap and as a hospital we minimize gatherings.” KII HCF 3, Abuja.

“People should always use the face mask to cover their nose and mouth, whenever they want to sneeze or cough, they should observe cough etiquette and give distance while interacting with individuals and to observe 2 meters’ distance from the person they are talking to. And also, if they should be in a place where there is a large crowd, they should maintain a social distance. In public places to the sitting arrangement must be such that social distance has to be maintained and even at the entrance of these places, should have hand washing facilities with sanitizers and the space must be well ventilated not an enclosed space” KII SMoH 1, Lagos

Compliance to Covid-19 Regulation

Government officials interviewed believed compliance of health care workers was good but for the public it is not that good. The Health Care Workers interviewed expressed that compliance with health regulation is not a challenge, however, the challenge is with the clients visiting the health facility as they must ensure clients comply with wearing face mask. These assertions were across FCT-Abuja, Kaduna, and Lagos States. Elias Naumann et al, [14] asserted that policies or regulations can alter frames and the way people think about an issue and we expect that policies themselves shape the framing and perception of the pandemic and should influence reform preferences but also on risk perceptions.

Health Care Workers were observed in the health facilities for complying to Covid-19 regulations and wearing face mask that covers nose and mouth properly at the point of contact shows in FCT-Abuja is at 95.7%, Kaduna at 88.4%, and Lagos at 100.0% compliance. Health Care Workers were also observed for having access to running water and soap in their health facility office, for FCT-Abuja (76.1%), Kaduna (90.7%), and Lagos (81.2%) health workers have access to running water and soap in their respective offices (Table5).

Table 5. Observed Health Care Worker Compliance to Covid-19 Regulations

		FCT-Abuja		Kaduna		Lagos	
		Count	Percentage	Count	Percentage	Count	Percentage
Observation of Health Worker wearing Face Mask that covers nose and mouth properly at the point of contact	Yes	88	95.7	38	88.4	48	100.0
	No	4	4.3	5	11.6	0	0.0
Observation of health workers having access to running water and soap in his/her office?	Yes	70	76.1	39	90.7	39	81.2
	No	22	23.9	4	9.3	9	18.8
Observation if there is job Aid on Covid-19 in the health worker’s office	Yes	59	64.1	38	88.4	46	95.8
	No	33	35.9	5	11.6	2	4.2

Table 6. Client’s Experience of Covid-19 Prevention Compliance in Health Facilities Visited

Clients	FCT-Abuja					Kaduna				Lagos			
	I was allowed to the facility because I was wearing my Mask	Yes	157	91.3	192	94.1	92	95.8	235	86.7	124	92.5	222
	No	15	8.7	12	5.9	4	4.2	36	13.3	10	7.5	10	4.3
All patients without nose mask were denied access to the facility	Yes	139	80.8	165	80.9	91	94.8	202	74.5	109	81.3	168	72.4
	No	33	19.2	39	19.1	5	5.2	69	25.5	25	18.7	64	27.6
There was adherence to 2 meters social distancing in the sitting arrangement in the facility	Yes	136	79.1	145	71.1	86	89.6	214	79.0	108	80.6	167	72.0
	No	36	20.9	59	28.9	10	10.4	57	21.0	26	19.4	65	28.0
Clients	FCT-Abuja					Kaduna				Lagos			
There is provision for hand washing with soap in strategic places in the facility with regular running water and soap	Yes	142	82.6	143	70.1	94	97.9	251	92.6	110	82.1	202	87.1
	No	30	17.4	61	29.9	2	2.1	20	7.4	24	17.9	30	12.9
There is provision for hand sanitizer with at least 60 alcohol in the various sections I visited	Yes	135	78.5	171	83.8	90	93.8	182	67.2	91	67.9	161	69.4
	No	37	21.5	33	16.2	6	6.2	89	32.8	43	32.1	71	30.6
My temperature was checked before I entered the facility	Yes	37	21.5	123	60.3	60	62.5	111	41.0	107	79.9	154	66.4
	No	135	78.5	81	39.7	36	37.5	160	59.0	27	20.1	78	33.6

Clients interviewed in FCT-Abuja were majorly allowed in the health care facility (tertiary 91.3%, secondary 94.1%) because they were wearing a face mask. The clients were asked if all patients without face mask were denied access to the facility and most clients in (tertiary 80.8%, secondary 80.9%) facilities confirmed (said YES) that clients were not allowed in health facilities without a face mask. Clients that had their temperatures checked have the lowest percentages (tertiary 21.5%, secondary 60.3%) among other questions asked. (Table 6).

In Kaduna State, clients were mostly allowed in the health care facility (tertiary 95.8%, secondary 86.7%) to wear a face mask. Also, clients confirmed (tertiary 94.8%, secondary 74.5%) that most clients without face masks were denied access to the health facilities (Table 6). Similarly, to FCT-Abuja, the percentage of clients (tertiary 62.5%, secondary 41.0%) who had their temperature checked before entering the health facility were lower than those wearing facemasks.

Lagos State clients in the health care facilities (tertiary 92.5%, secondary 95.7%) were majorly

permitted to enter the facilities because they wore face masks. When asked about clients being denied access to the health facilities based on not wearing a face mask a large percentage of clients (tertiary 81.3%, secondary 72.4%) affirmed the statement. Clients in (tertiary 79.9%, secondary 66.4%) health facilities who experienced temperature in Lagos were more than FCT-Abuja and Kaduna.

Key Informant Interviews Quotes

“In terms of health workers, the compliance is basically above average in the use of PPEs and social distancing. With the challenge of space that we have, for example in my office where you will have ten Doctors using just a small space you will agree that the compliance is not as expected because social distancing is not achieved and is the same with the Nurses too. So, in that case I will say that the compliance to physical distance is poor but in the use of face mask within the health working setting is quite encouraging” KII FMOHI

“For staff we have little or no problem because we all know that we have to wear our mask but for the patients we have to go round to ensure that they comply especially when coming into the facility and ones they come in they take it off. So, the level of compliance is low but for the staff I think at all units you rarely find staff without a face mask because we provide all these things for them. “KII Secondary HCF 2, Abuja

“The level of compliance within the office holders is high but that of the public I will say is average to low rating because when you go to some communities, they don’t really believe Covid-19 exist, they just go about their socio-economic activities as usual. “KII SMOH 1, Lagos

“The adherence is poor most especially we Nigerians. When it comes to gathering of people, here we have a considerable distance management by spacing the seats of the patient although this is a hospital so there are certain clinics that may be difficult to control the crowd especially the ANC clinic, GOPD but we are trying to see how we can segregate the clinics so as to reduce the number of patients “KII HCF 4, Abuja

System in Place to Educate the General Public on Covid-19 Prevention Protocol and Regulations

At the health care facility level clients were asked if they were counselled on Covid-19 prevention in FCT-Abuja (tertiary 30.2%, secondary 26.0%), Kaduna (tertiary 43.8%, secondary 62.4%), and Lagos (tertiary 56.7%, secondary 60.3%) clients confirmed they were counselled on Covid-19 prevention when they visited the health facility. Lagos has a high percentage of clients being counselled in the target health facilities and FCT-Abuja has the lowest percentage of clients (Table 4). (Table 7)

The government through the Federal Ministry of Health and Federal Ministry of Information has educated the public on Covid-19 prevention protocol and regulations through various platforms which include print media-newspaper publications, posters; electronic media- radio & television, social media, community campaigns, and community engagement of traditional leaders.

Kaduna State has a risk communication pillar which communicates to the public through sensitization campaigns in churches, mosques, and marketplaces. Public sensitization also includes the use of billboards, radios, and television stations (Table 5).

Table 7. Clients Educated on Covid-19 Prevention during Health Facility Visit

Clients	FCT-Abuja				Kaduna				Lagos				
	Yes	52	30.2	53	26.0	42	43.8	169	62.4	76	56.7	140	60.3
I was counselled on Covid-19 Prevention in the waiting station?	No	120	69.8	151	74.0	54	56.2	102	37.6	58	43.3	92	39.7

Key Informant Interviews Quotes

“We have a communication team in the Organization who also work with the Ministry of Information to address some of these things in terms of publication, media handles, jingles, both television and radio. Then there were also community engagements of traditional leaders to reach out to their subjects on the risk of Covid. We also had some campaign within the community settings where we have community mobilizers to send messages to those communities about Covid-19. Then we also organized training for patent medicine store vendors and there were also posters and billboards on Covid-19 that were distributed across states and the country. For some of the states, we have Covid-19 Ambassadors and the use of SMS and social media like twitter and face book. “KII FMOHI

“Yes, we have risk communication pillar, and their responsibility is to go out to the public, marketplaces to churches, the mosque to sensitized people on covid-19 and they have been doing that perfectly. “KII SMOH 1, Kaduna

“We have the health education unit and the psychosocial unit that make sure a committable structure is put in place to work in collaboration with the primary Health care Board where the control is almost total in terms of health education activity and sensitization to the communities and the local government. So you see them going with their public address system and talking in communities and they also make use of posters, billboards, radio and television jingles and social media. “KII SMOH 1, Lagos

Lagos State has a collaboration structure with the Primary Health Care Board, Ministry of Health, Education Unit and Psychosocial Unit to sensitize the public through community campaigns, posters, billboards, social media, radio, and television.

PPE Supply Protocol

Personal Protective Equipment is procured in a multifaceted method at both the National and

Sub-national levels. At the Federal level, a large chunk of the PPEs are procured by Government for distribution to the designated health facilities and some to the sub-national governments. Other sources of supplies are through donations by Individuals and Private Organizations, Friendly Nations, Non-Governmental Organizations and Development Partners. The PPEs are distributed through the Federal Ministry of Health, the Nigeria Center for Disease Control (NCDC) to the State Government and the Designated Treatment Centers. Distribution is scheduled monthly, based on needs assessment. Supplies at the Sub-national levels is dependent on procurement by the State Governments and supplies from the Federal Government. other sources are donations by Individuals, Private Organizations and Non-Government Organizations. These are distributed to the Health Facilities through their Ministries of Health. Edward Faiva et al, in their paper clarified why [15] significant shortages of other essential medicines and medical products across the country was imminent especially during the Covid-19 pandemic period is because of several accumulated factors, majorly because of global lockdown, decreased manufacturing, unaddressed regulatory affairs, poor access to resources by the population, lack of buffer stocks, security instability, and poor funding of the healthcare system.

In the FCT-Abuja, Kaduna, and Lagos all the target health care facilities were able to estimate their PPE consumption rate and all the health care facilities take monthly inventory of PPE. Kaduna has 3 out of 6 health care facilities interviewed who do not know how to request additional supplies from the authorities. They only receive what is supplied from the ministry of health (table 8). A pooled source was adopted in Nigeria for the response of Covid 19 pandemic and was largely used for procurement of medical personal protective equipment and commodities; purchase of test kits and cost of health care for individuals who test positive to Covid 19 [16], [17]

Table 8. Health Care Facility PPE Supply Inventory

Clients		FCT-Abuja		Kaduna		Lagos	
		Count	Percentage	Count	Percentage	Count	Percentage
Facility is able to estimate its consumption rate	Yes	5	100.0	6	100.0	4	100.0
	No	0	0.0	0	0.0	0	0.0
	DK/Refused	0	0.0	0	0.0	0	0.0
Facility performs an inventory of PPE supply at least once a month	Yes	5	100.0	6	100.0	4	100.0
	No	0	0.0	0	0.0	0	0.0
	DK/Refused	0	0.0	0	0.0	0	0.0
A person responsible for managing the supply chain for critical IPC supplies has been identified	Yes	5	100.0	6	100.0	4	100.0
	No	0	0.0	0	0.0	0	0.0
	DK/Refused	0	0.0	0	0.0	0	0.0
Facility leadership knows how to request additional supplies from national or sub-national authorities	Yes	5	100.0	3	50.0	4	100.0
	No	0	0.0	3	50.0	0	0.0
	DK/Refused	0	0.0	0	0.0	0	0.0

Discussion

The awareness level of Covid-19 regulations and policies was not high among the public and health workers [18]. Most health facilities' clients did not have adequate space for observing social distances of two meters as this was a challenge in health facilities to maintain this regulation.

Most clients revealed that, there were not enough PPE in health facilities that are not designated as treatment centres. These health facilities occasionally get PPE for all Covid-19 procedures. Some health facilities include purchase of PPE in their budget to serve as a complement to government supplies. Some clients observed that not all health workers wear PPE as at when required this was buttressed by Davie Madziapra [19] in a study conducted in Malawi. This was also supported by an online

survey conducted by David Oladele in Nigeria [20], [21].

Healthcare workers at the designated treatment centres are more trained than other workers at other health facilities, hence, making the response capacity of the health workers at designated treatment centres higher than other non-designated centres.

The condition between IPC officers and committees at health facilities enable a good response to the pandemic. The momentum to sustain routine disinfection at the facilities is waning as the perceived level of risk is declining. However, in order to ensure sustained epidemic control, the use of PPEs by healthcare workers handling suspected cases presenting with infectious diseases, mass communication and awareness on use of facemasks, social distancing and handwashing are key in containing the spread.

Conclusion and References

As the country grapple with the numerous challenges in the health sector and beyond, it is pertinent that as part of measures to build a resilient health system, health institutions must be equipped with strong and capable personnel and resources, and this will entail an inter-agency, inter-sectoral collaboration and coordinated efforts to combat the epidemic now and in the future.

While the apparent success in the control of Covid-19 may be associated with the strong political will, dedication of the frontline health workers, the support from the private sector and the international community, the epidemiological context also played a vital role. There is need to take cognizance of the actions that aided the accomplished feat and take bold decisions and actions to sustain and move forward to prevent future epidemic.

Recommendations

Thus, the following recommendations among many if implemented will help the country to attain the dream of a resilient and sustainable health system.

Federal Level

1. To sustain the gains of the epidemic control, government at all levels should ensure the regular supply of PPEs to all facilities through a robust commodity replenish plan that will guarantee all categories of health facilities are well equipped to provide the emergency response whenever the need arises.
2. The government should develop a schedule for conducting refresher training for frontline healthcare workers. This approach would increase preparedness and response to a pandemic both in the short term and long term.
3. Government at the federal and state levels in collaboration with health facilities should establish a database and archive for Covid-

19 that would be readily accessible for researchers and other users.

4. Government at all levels should take advantage of the opportunities provided through Covid-19 to revamp the state of infrastructure in the federal and state-owned public health facilities as well as leveraging on the private sector participation, government might be able achieve the state-of-the-art facilities with modern technologies and to curb medical tourism and brain drain.
5. Federal government should encourage pharmaceutical companies and Medical Research Institute in Nigeria to produce the different categories of PPEs.
6. The government through NCDC and other institutions should endeavor to ramp up the recently established molecular laboratories and sustain them post-epidemic. The sustainability of these laboratories is critical to the country's preparation for future epidemics.
7. A nationwide survey to adequately evaluate the pre and post Covid intervention and strategies will provide a holistic perspective of the successes, gaps and shortcomings while documenting lessons learnt for the future. Research should involve an appraisal of the occupational hazard and factors aiding health workers' infection, evaluation of treatment outcomes from the different treatment modalities, usage, reuse and disposal mechanism for facemasks and other PPE, effectiveness and impact of lockdown measures and impact of mass media in Covid-19 control.
8. To avert the brain, drain syndrome and build a critical mass of infectious disease clinicians and frontline health workers, a statutory fund should be established for capacity building and provision of risk/hazard allowance during pandemic response. This fund should be built over the years as a long-term solution. In the short term the current remuneration should be

upgraded in accordance with the current economic realities.

State Level

1. The government should ensure sustained community awareness and risk communication to mitigate the spread of Covid-19 as there are concerns about other strains of the virus circulating in the public.
2. Government should ensure that facilities designated as isolation and treatment centers remain functional and well equipped with ventilators and oxygen tanks to avert casualties that may result in the event of any emerging infectious disease outbreak.
3. Government at the federal and state levels in collaboration with health facilities should establish a database and archive for Covid-19 that would be readily accessible for researchers and other users.
4. Government at all levels should take advantage of the opportunities provided through Covid-19 to revamp the state of infrastructure in the federal and state-owned public health facilities as well as leveraging on the private sector participation, government might be able achieve the state of the art facilities with modern technologies and to curb medical tourism and brain drain.
5. The government should develop a schedule for conducting refresher training for frontline healthcare workers. This approach would increase preparedness and response to a pandemic both in the short term and long term.

Health Facility Level

1. Health facilities (Tertiary and Secondary) building structures should be remodelled to

meet the requirements of a pandemic in the long term. In the interim, designated locations should be made available in health facilities for cases of Covid-19 or another pandemic occurrence.

2. Health facilities should ensure adequate supply and appropriate use of PPE by frontline health workers especially those who are involved in intensive/critical care and high-risk exposures to aerosol-generating procedures.
3. Health worker allowances for hazardous response should be upgraded. The remuneration should outweigh the risk.
4. Management of health facilities should ensure strict compliance of Covid regulations, especially the application of non-pharmaceutical interventions for healthcare workers, patients, and visitors.

Acknowledgement

The Authors expressed gratitude to the Office of the Secretary to the Federation for the financial support of this study. Our appreciation goes to Alhaji Abdulkarim Ganiyu, the Director of Planning research and Statistics and his team for their efforts towards the success of the study. We also thank Mr. Olufemi Taiwo and Dr. Oluyemi Atibioke for their hard work in the coordination of training of interviewers. All efforts of the interviewers recruited for the study are appreciated.

Conflict of Interest Statement

The authors hereby declare no conflict of interest in this study.

References

[1] Adepaju P. (2020) Nigeria responds to Covid-19; first case detected in sub-Saharan Africa. *Nat Med.* 2020 Apr;26(4):444-448. doi: 10.1038/d41591-020-00004-2. PMID: 32161414.

[2] UNDP Covid-19 Pandemic Humanity Needs Leadership and Solidarity to Defeat the Virus. UNDP; 2020. [Accessed at <https://www.undp.org/coronavirus> on 25th September 2021] <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>.

- [3] World Health Organization. Archived: WHO Timeline - Covid-19. (2020) Available from: <https://www.who.int/news-room/detail/27-042020-who-timeline—covid-19>.
- [4] World Health Organisation. Covid-19 Dashboard. Geneva: WHO (2021). Available online at: <https://covid19.who.int> (accessed May 20, 2021).
- [5] Nigeria Centre for Disease Control (2021) Dashboard for Covid cases available on <https://covid19.ncdc.gov.ng/> [Accessed on 11th September 2021]
- [6] Atzrodt, C. L., Maknojia, I., McCarthy, R., Oldfield, T. M., Po, J., Ta, K., Stepp, H. E., & Clements, T. P. (2020). A Guide to Covid-19: a global pandemic caused by the novel coronavirus SARS-CoV-2. *The FEBS journal*, 287(17), 3633–3650. <https://doi.org/10.1111/febs.15375>.
- [7] Palinkas LA, Springgate BF, Sugarman OK, Hancock J, Wennerstrom A, Haywood C, Meyers D, Johnson A, Polk M, Pesson CL, Seay JE, Stallard CN, Wells KB. A Rapid Assessment of Disaster Preparedness Needs and Resources during the Covid-19 Pandemic. *Int J Environ Res Public Health*. 2021 Jan 7;18(2):425. doi: 10.3390/ijerph18020425. PMID: 33430355; PMCID: PMC7825778.
- [8] Umar, S. S., Muhammad, B. O., & Zaharadeen, S. B. (2020). Preparedness of Nigerian health institutions toward managing lassa fever epidemic and Covid-19 pandemic. *Niger J Med [serial online]* 2020 [cited 2021 Sep 11]; 29:303-7. Available from: <http://www.njmonline.org/text.asp?2020/29/2/303/287943>.
- [9] OECD (2020), Containment and mitigation policy actions are key to fight the Covid-19 pandemic, OECD, Paris.
- [10] Presidential Task Force on Covid19 report (2021) available <https://statehouse.gov.ng/covid19/objectives/>.
- [11] Adesanya, O. A. (2020). Government preparedness and response towards Covid-19 outbreak in Nigeria: A retrospective analysis of the last 6 months. *Journal of Global Health*; 10(2). Accessed at <http://www.jogh.org/documents/issue202002/jogh-10-020382.htm>.
- [12] Israel, G.D., (1992). Determining Sample Size. Fact Sheet PEOD-6. University of Florida.
- [13] Golden Owhonda, Omosivie Maduka, Ifeoma Nwadiuto, Charles Tobin-West, Esther Azi, Chibianotu Ojimah, Datonye Alasia, Ayo-Maria Olofinuka, Vetty Agala, John Nwolim Paul, Doris Nria, Chinenye Okafor, Ifeoma Ndekwu, Chikezie Opara, Chris Newsom, Awareness, perception and the practice of Covid-19 prevention among residents of a state in the South-South region of Nigeria: implications for public health control efforts, *International Health*, Volume 14, Issue 3, May 2022, Pages 309–318, <https://doi.org/10.1093/inthealth/ihab046>.
- [14] Naumann E, Möhring K, Reifenscheid M, Wenz A, Rettig T, Lehrer R, Krieger U, Juhl S, Friedel S, Fikel M, Cornesse C, Blom AG. COVID-19 policies in Germany and their social, political, and psychological consequences. *Eur Policy Anal*. 2020 Dec;6(2):191-202. doi: 10.1002/epa2.1091. Epub 2020 Sep 28. PMID: 34616900; PMCID: PMC7537296.
- [15] Faiva E, Hashim HT, Ramadhan MA, Musa SK, Bchara J, Tuama YD, Adebisi YA, Kadhim MH, Essar MY, Ahmad S, Lucero-Prisno DE 3rd. Drug supply shortage in Nigeria during COVID-19: efforts and challenges. *J Pharm Policy Pract*. 2021 Jan 22;14(1):17. doi: 10.1186/s40545-021-00302-1. PMID: 33482871; PMCID: PMC7820524.
- [16] Aregbesola S and Folayan M (2021) Nigeria’s financing of health care during the Covid-19 pandemic: Challenges and recommendations <https://doi.org/10.1002/wmh3.484>.
- [17] Dixit, S, ogundeji KY and Onwujekwe O (2020) How well has Nigeria responded to Covid 19 (Accessed from 2nd July 2020.).
- [18] OECD (2020) Regulatory Quality and Covid-19: Managing the Risks and Supporting the Recovery, contributing to global efforts. OECD.org.com.
- [19] Davie Madziatera, Kondwani Stanslas Msofi, Thokozani V Phiri, Samuel Devaughn Mkandawire, Amy Comber (2020) Availability, Accessibility and Proper Use of Personal Protective Equipment in Wards at Queen Elizabeth Central Hospital (QECH) Blantyre, Malawi: An Observational Study.

[20] Oladele DA, Idigbe IE, Musa AZ, Gbaja-Biamila T, Bamidele T, Ohihoin AG, Salako A, Odubela T, Aina O, Ohihoin E, David A, Ezechi O, Odunukwe N, Salako BL. Self-reported use of and access to personal protective equipment among healthcare workers during the Covid-19 outbreak in Nigeria. *Heliyon*. 2021 May;7(5): e07100. doi: 10.1016/j.heliyon. 2021.e07100. Epub 2021 May 19. PMID: 34031646; PMCID: PMC8133390. M. A. Alao, A. O. Durodola, O. R. Ibrahim, O. A. Asinobi, “Assessment of Health Workers’ Knowledge,

Beliefs, Attitudes, and Use of Personal Protective Equipment for Prevention of Covid-19 Infection in Low-Resource Settings”, *Advances in Public Health*, vol. 2020, Article ID 4619214, 10 pages, 2020. <https://doi.org/10.1155/2020/4619214>.

[21] World Health Organisation (2020) Combatting health worker infections in Nigeria: Combatting health worker infections in Nigeria | WHO | Regional Office for Africa.