



Provision and Utilization of COVID-19-related Services in Rivers State during the Pandemic

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Abstract

Background: The COVID-19 outbreak which started in China became a pandemic and Rivers State recorded its first case in March 2020. This research assessed the provision and utilization of COVID-19-related services in Rivers State during the pandemic.

Method: This study was done in two phases. The first with interviewer-administered questionnaires to assess the community participants' utilization and opinion about the adequacy of COVID-19-related services provided and the second was the collection of data on the provision and adequacy of those services from the healthcare workers who worked at the COVID-19 treatment centers. Analysis was done using IBM Statistical Product and Service Solutions (SPSS) version 25. Statistical significance was set at $p < 0.05$.

Result: The COVID-19-related services were provided by many stakeholders such as the Federal Government in collaboration with the state government and agencies like the Red Cross. Over 80 percent of community participants were aware of the services provided and 32.8% utilized them; though various reasons were given as challenges for non-utilization such as the fear of leaving the house (63%) and contracting the infection from the health centers (68.7%), lack of facemasks (42.7%), because family members forbade it (41%). The health workers' challenges were increased workload (85.7%), not getting the PPE in their right sizes (55.4%), discomfort with the use of PPE (62.5%), little/no incentives (75%), fear of being infected (78.6%) and fear of infecting loved ones (82.1%). At least 6 out of 10 healthcare workers and 7 out of 10 community participants reported that most of the government-provided services, were adequate.

Conclusion: 3 out of 10 persons utilized the COVID-19-related services provided in Rivers State and most of them were deemed adequate by both community members and COVID-19 center health workers.

Keywords: COVID-19-related services, demographics, presenting symptoms, provision, utilization, Rivers State.

Introduction

The 2019-nCoV or Covid-19 or SARS-CoV-2 spread over the whole continent causing devastating health, economic, and societal effects and was declared a global emergency on the 20th of January, 2020, by World Health Organization (WHO).¹⁻³ Its potential to cause a pandemic worldwide was recognized on February 24, 2020, and was declared a global pandemic on March 11, 2020.⁴ By April 15, 2020, the reported COVID-19 cases worldwide had passed two million, and this was just two weeks after one million infections were recorded.¹

Despite the rapid transmission of COVID-19 infection worldwide, African countries witnessed a low mortality rate.^{4,6} The first confirmed death from COVID-19 was reported in Egypt on February 14, 2020, and Nigeria reported her first COVID-19 case on February 27, 2020, when an Italian national tested positive for the virus in Lagos, Nigeria.⁷⁻⁹ River State recorded its first case on May 25, 2020.^{10, 11} There were 8,061,550 confirmed cases and 440,290 deaths from COVID-19 in over 200 republics and regions as of 18th of June 2020.³

Over the last months, statements on infection control, screening, and diagnosis in the general population have been mentioned.¹²⁻¹⁷ The use of facemasks, hand hygiene using soap and water or hand sanitizers, maintaining at least 2m physical distance, coughing into the elbow, and avoidance of touching the ear, nose, and mouth are some of the non-pharmaceutical measures for COVID-19.¹⁸⁻²¹ In addition to this, the use of medical gowns and coveralls was recommended for health workers during the pandemic.^{21,22}

Furthermore, the Rivers State Government instituted services such as COVID-19 testing, contact tracing, COVID-19 information and advice, hotlines/websites, testing/laboratory centers, contact tracing, isolation/quarantine centers, and recently vaccination centers to control the spread of the COVID-19 infection. The question is if these provided services were utilized or adequate. Also, the government provide necessary personal preventive equipment (PPE) and were they adequate or not.

As the pandemic spread to other countries, the infection increased in the younger individuals who are very active and thus this impacted the community transmission and infection of more vulnerable population groups.²³ A study done in the United Kingdom reported an increase in excess hospital admissions since Aug 1, 2020, among women aged 20–40 years old.²³ This is possible because many young people live with their parents and grandparents who are of an older generation and who may have comorbidities and as such, invariably increase

the possibility of passing on the infection to those likely to have severe disease.

This study assessed the community's utilization and the healthcare workers' provision of COVID-19-related services provided by the Rivers State Government as well as their opinion on their adequacy. This study is justified because assessing the services provided by the government by the providers (health workers) and residents of the state will help provide feedback to the government as regards areas that need improvement, and this will help them prepare adequately for future pandemics.

Method

The study was a descriptive cross-sectional study done in two phases among the residents of Ozuoba community in the Ozuoba-Ogbogoro ward of the Obio/Akpor Local Government Area in the Greater Port Harcourt, Rivers State and COVID-19 healthcare workers who provided care at the COVID-19 treatment centers in Rivers State. At each stage of the community quantitative study, participants were recruited using a multi-stage stratified sampling procedure. The recruitment process consisted of seven steps. To choose the LGA for the study, a random table was used for the initial random sampling, from which Obio-Akpor was chosen. After that the ward (Ozuoba-Ogbogoro) the community (Ozuoba) were chosen at random. Similarly, random sampling was used at the community level to select the streets, houses, families, and ultimately the study participants. This was done between August and September 2022. Interviewer-administered questionnaires were used to assess the utilization of the COVID-19-related services provided by the government and the opinion of the community participants as regards adequacy. Self-administered questionnaires were used through Google form to assess the provision of service and perception of COVID-19-related services of the healthcare workers between February and August 2023.

Inclusion criteria for the community were residents of Ozuoba a community in Ozuoba-Ogbogoro ward in Obio/Akpor LGA in Rivers State, who were at least eighteen years old, and healthcare workers who worked in the COVID-19 centers in the state who were willing to participate in the study.

Exclusion criteria included individuals who declined to participate in the study at both the community and COVID-19 treatment centers.

Medical personnel who worked at the Rivers State COVID-19 isolation centers including Eleme and Rivers State University Teaching Hospital, Port Harcourt (RSUTH), and other centers filled out the questionnaires

on the provision and utilization of COVID-19 related services through Google form between February and August 2023. Both questionnaires were pre-tested at the Choba community and UPTH COVID-19 treatment center.

Sample Size Determination

Cochran's formula for calculating a sample for proportions, $n = (Z\alpha)^2 pq/e^2$ $n = (1.96)^2$, was used to estimate the sample size.

The 95% confidence interval, denoted by $Z\alpha$, is 1.96 when $p = 34.0\%$ of preventative actions in an urban population, and $q = 1-p$ were substituted.²⁴

379.3 ~ 380 individuals made up the minimum sample size (n): $344.8 + 10\%$ non-response = $344.8 + 34.48$.

Sampling Technique

At each stage of the community quantitative study, participants were recruited using a multi-stage stratified sampling procedure. The recruitment process consisted of seven steps. To choose the LGA for the study, a random table was used for the initial random sampling, from which Obio-Akpor was chosen. After that, the community (Ozuoba) and the ward (Ozuoba-Ogbogoro) were chosen at random. Similarly, random sampling was used at the community level to select the homes, families, streets, and ultimately the study participants.

All the healthcare workers (56) who were willing to participate in the study were recruited.

To be able to assess the healthcare workers' views and those of the community on the adequacy of the services provided amid the COVID-19 outbreak, the excel spread sheet for the data collected for the community was used as a sample frame for a systematic sampling of fifty-six (56) participants that were used to compare proportionately with the healthcare workers data from the community.

The community sample size was 400, while the healthcare workers who participated from the COVID-19 treatment centers were fifty-six (56)

To get a sample size from the community that match that of the healthcare workers a proportionate to size has to be done using systematic sampling technique.

The sampling interval $k = 400/56 = 7.14$

This is approximately 7.

The first participant was picked using a table of random numbers, after which every 7th participant was added.

Service utilization was assessed with yes or no questions in which participants who chose 'yes' were deemed to have utilized those services and those who chose 'no' to not have utilized them.

Data was analyzed using the Statistical Product and Service Solutions (SPSS) version 25 (IBM, Armonk, New York, USA). Descriptive statistics were reported as frequencies, percentages, means, and standard deviations. The association between participants' perception of provision and utilization of COVID-19-related services was analyzed using the chi-square test to determine the differences among the groups and significance was set at $p < 0.05$.

Ethical approval was sought from the Ethics Committees of the University of Port Harcourt and Rivers State Ministry of Health Board, Port Harcourt. Respondents' consent was sought after explaining the study to them.

Results

Table 1: Community participants' demographics

Variables	Frequency	Percentage
Gender		
Male	186	46.5
Female	214	53.5
Age Group		
11-20	80	20.0
21-30	186	46.5
31-40	84	21.0
41-50	30	7.5
51-60	12	3.0
61-70	8	2.0
Tribe		
Ijaw	35	8.8
Ikwerre	87	21.7
Igbo	125	31.2
Yoruba	27	6.8
Hausa	6	1.5
Ibibio	48	12.0
Others	72	18.0
Religion		
Christianity	387	96.7
Islam	12	3.0
Traditionalist	1	0.3
Education		
No Formal	30	7.5
Primary	17	4.3
Secondary	125	31.3
Post-Secondary	62	15.5
Tertiary	166	41.5
Profession		
Housewife	18	4.5
Artisan	18	4.5
Self-employed	237	59.2
Civil servants	30	7.4
Retiree	3	0.8
Professionals	5	1.3
Others	89	22.3

Total	400	100.0
Table 2: Community participants' awareness of services provided by Rivers State Government for COVID-19 control		
Variables	Freq.	(%)
Are you aware that the government provided the following?		
COVID-19 information/travel advice		
Yes	355	88.7
No	45	11.3
COVID-19 hotlines/websites		
Yes	345	86.2
No	55	13.8
Contact tracing		
Yes	345	86.3
No	55	13.7
Treatment/Laboratory testing		
Yes	351	87.8
No	49	12.3
Vaccination centers		
Yes	371	92.7
No	29	7.3
Isolation/quarantine centers		
Yes	360	90.0
No	40	10.0
Were the services provided by the government adequate?		
Travel advises		
Yes	332	83.0
No	68	17.0
COVID-19 hotlines		
Yes	320	80.0
No	80	20.0
Contact tracing		
Yes	319	79.7
No	81	20.3
Laboratory testing		
Yes	303	75.7
No	97	24.3
Vaccination centers		
Yes	315	78.7
No	85	21.3
Isolation centers		
Yes	310	77.5
No	90	22.5
Total	400	100.0

Table 2 shows the community participants' awareness of services provided by the Rivers State Government for COVID-19 control. Over 80% of participants were

aware that the government provided travel advice and information, hotlines, contact tracing, Laboratory testing as well as isolation, quarantine, treatment, and vaccination centers. Most also believed that the services provided were adequate for the COVID-19 pandemic.

Table 3: Community participants' utilization and reason for non-utilization of services provided by Rivers State Government for COVID-19 control

Variables	Frequency	Variables
Did you make use of these services?		
Yes	131	32.8
No	269	67.2
Total	400	100.0
Services used by participants who utilized them		
COVID-19 hotlines/websites		
Yes	87	66.4
Contact tracing		
Yes	82	62.6
Laboratory testing		
Yes	84	64.1
Vaccination centers		
Yes	87	66.4
Isolation/quarantine centers		
Yes	82	62.6
Total	131	100.0
Challenges faced by participants in utilizing health services during the Covid-19 pandemic?		
Afraid to leave the house		
Yes	252	63.0
Afraid of getting infected at the health centers		
Yes	275	68.7
Covid-19 related health services were not available at the health centers		
Yes	198	49.5
No transport		
Yes	200	50.0
Lack of face masks and protective wear		
Yes	171	42.7
My family did not want me to access care		
Yes	164	41.0
Total	400	100.0

Only 32.8% of the participants utilized the services provided by the Government for COVID-19 control. Various reasons were given as challenges for utilization of services. Two-third did not access because of fear of leaving the house and contracting the infection from the health centers. Two-fifth lacked protective wears and two-fifth because their family members forbade them. Table 3.

Table 9: Perception of community participants and healthcare workers regarding Government-provided COVID-19-related services and their adequacy

Variable	Community participants		COVID-19 health workers		Total	p
	Freq	Percent	Freq	Percent		



Age group							<0.001
10-20	13	23.2	0	0.0	13	11.6	
21-30	28	50.0	3	5.4	31	27.7	
31-40	10	17.8	30	53.6	40	35.7	
41-50	3	5.4	15	26.7	18	16.1	
51-60	1	1.8	8	14.3	9	8.0	
61-70	1	1.8	0	0.0	1	0.9	
Sex							0.01
Male	32	57.1	19	33.9	51	45.5	
Female	24	42.9	37	66.1	61	54.5	
Services Provided by the government							
COVID-19 information/travel advice							1.00
Yes	48	85.7	48	85.7	96	85.7	
COVID-19 Hotlines/websites							0.80
Yes	47	83.9	46	82.1	93	83.0	
COVID-19 testing/laboratory centers							1.00
Yes	47	83.9	48	85.7	95	84.8	
COVID-19 contact tracing							0.56
Yes	51	91.1	48	85.7	99	88.4	
COVID-19 isolation centers							1.00
Yes	51	91.1	50	89.3	101	90.2	
COVID-19 quarantine centers							0.50
Yes	49	87.5	48	85.7	97	86.6	
COVID-19 Treatment centers							1.00
Yes	51	91.1	51	91.1	102	91.1	
Services Provided by the government adequacy							
COVID-19 information/travel advice							0.34
Yes	42	75.0	39	69.6	81	72.3	
COVID-19 Hotlines/websites							0.27
Yes	40	71.4	36	64.3	76	67.9	
COVID-19 testing/laboratory centers							0.50
Yes	41	73.2	42	75.0	83	74.1	
COVID-19 contact tracing							0.42
Yes	40	71.4	42	75.0	82	73.2	
COVID-19 isolation centers							0.59
Yes	42	75.0	42	75.0	84	75.0	
COVID-19 quarantine centers							0.05
Yes	43	76.8	34	60.7	77	68.8	
COVID-19 Treatment centers							1.00
Yes	40	71.4	40	71.4	80	71.4	
Total	56	100.0	56	100.0	112	100.0	

At least 6 out of 10 community participants and the COVID-19 health workers agreed on the services provided by the state government and their adequacy. Table 9.

Table 4: COVID-19 Health workers' demographic

Variables	Rivers State University Teaching Hospital (RSUTH) COVID-19 Center		ELEME COVID-19 Center		OTHER COVID-19 Centers		Total		p
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	
Sex									0.07
Male	8	22.9	7	50.0	4	75.1	19	33.9	
Female	27	71.0	7	50.0	3	42.9	37	66.1	
Age group (years)									0.93
21-30	1	2.9	1	7.1	1	14.3	3	5.4	
31-40	19	54.2	8	57.2	3	42.8	30	53.5	
41-50	10	28.6	3	21.4	2	28.6	15	26.8	
51-60	5	14.3	2	14.3	1	14.3	8	14.3	
Education									0.25
Diploma	5	14.3	3	21.4	1	14.3	9	16.1	
University	5	14.3	4	28.7	3	42.8	12	21.4	
BDS/MBBS	17	48.5	1	7.1	0	0.0	18	32.1	
Mph/MSc	3	8.6	3	21.4	1	14.3	7	12.5	
PhD	1	2.9	1	7.1	0	0.0	2	3.6	
Fellowship	4	11.4	2	14.3	2	28.6	8	14.3	
Profession									<0.001*
Nurses	4	11.4	2	14.3	1	14.3	7	12.5	
Social worker /Psychologist	1	2.9	6	42.9	0	0.0	7	12.5	
Microbiologist	0	0.0	1	7.1	2	28.6	3	5.4	
Medical Laboratory Scientist	8	22.9	0	0.0	1	14.3	9	16.1	
Dentist/Medical doctor	17	48.5	2	14.3	1	14.3	20	35.6	
Specialist	5	14.3	3	21.4	2	28.6	10	17.9	
Total	35	100.0	14	100.0	7	100.0	56	100.0	

Mean age ± standard deviation =40.89±8.14 years, median =39 years, mode=34 years, variance = 66.21, Std of error mean = 1.09

Female health workers were twice more than male health workers with F: M of 1.95:1. Over half were in the 31-40 years age group. More than half (53.5%) were medical doctors among which 17.9% were specialists in various medical fields. Table 4.

Table 5: COVID-19 health workers' perception of COVID-19 preventive items provided by the Rivers State Government

Variables	Rivers State University Teaching Hospital (RSUTH) COVID-19 Center		ELEME COVID-19 Center		OTHER COVID-19 Centers		Total		p
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	



	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	
Did the State government provide the following?									
Hand gloves									0.54
Yes	33	94.3	14	100.0	7	100.0	54	96.4	
Facemasks									0.54
Yes	33	94.3	14	100.0	7	100.0	54	96.4	
Sanitizers									0.54
Yes	33	94.3	14	100.0	7	100.0	54	96.4	
Liquid soap									0.39
Yes	32	91.4	14	100.0	7	100.0	53	94.6	
Medical gowns									0.07
Yes	25	71.4	14	100.0	6	85.7	45	80.4	
Face shields									0.01*
Yes	21	60.0	14	100.0	6	85.7	41	73.2	
Others									0.34
Boots	0	0.0	1	7.1	0	0.0	1	1.8	
Logistics	0	0.0	1	7.1	0	0.0	1	1.8	
Thermometer	1	2.9	0	0.0	0	0.0	1	1.8	
Did the government provide the following adequately?									
Gloves									0.56
Yes	23	65.7	9	64.3	6	85.7	38	67.9	
Facemasks									0.11
Yes	22	62.9	11	78.6	7	100.0	40	71.4	
Sanitizers									0.66
Yes	24	68.6	10	71.4	6	85.7	40	71.4	
Liquid soap									0.36
Yes	20	57.1	9	64.3	6	85.7	35	62.5	
Medical gowns									0.08
Yes	18	51.4	11	78.6	6	85.7	35	62.5	
Face shields									0.07
Yes	11	31.4	8	57.1	5	71.4	24	42.9	
Total	35	100.0	14	100.0	7	100.0	56	100.0	

Though, 9 out of 10 health workers in all RSUTH and other treatment centers reported that the government provided hand gloves, facemasks, sanitizers, and liquid soap; about a third in all centers reported the supply was inadequate. The provision of face shields was very low and highly inadequate. Statistical analysis showed this to be significant. Table 5.

Table 6: COVID-19 health workers' perception of services provided by the government and their adequacy



Variables	Rivers State University Teaching Hospital (RSUTH) COVID-19 Center		ELEME COVID-19 Center		OTHER COVID-19 Centers		Total		p
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	
Did the State government provide the following services?									
COVID-19 information/ Travel advice									0.03*
Yes	32	91.4	9	64.3	7	100.0	48	85.7	
Facemasks COVID-19 hotlines/websites									0.59
Yes	32	91.4	9	64.3	5	71.4	46	82.1	
COVID-19 Testing/Laboratory centers									0.20
Yes	32	91.4	10	71.4	6	85.7	48	85.7	
Contact tracing									1.00
Yes	30	85.7	12	85.7	6	85.7	48	85.7	
Isolation centers									0.04*
Yes	33	94.3	10	71.4	7	100.0	50	89.3	
Quarantine centers									0.20
Yes	32	91.4	10	71.4	6	85.7	48	85.7	
Treatment centers									0.15
Yes	33	94.3	11	78.6	7	100.0	51	91.1	
Psychological support									0.08
Yes	20	57.1	9	64.3	1	14.3	30	53.8	
Did the government provide these services adequately?									
COVID-19 information/ Travel advises									0.04*
Yes	27	77.1	6	42.9	6	85.7	39	69.6	
Facemasks COVID-19 hotlines/websites									0.34
Yes	25	71.4	7	50.0	4	57.1	36	64.3	
COVID-19 Testing/Laboratory centers									0.36
Yes	26	74.3	12	85.7	4	57.1	42	75.0	
Contact tracing									0.77
Yes	26	74.3	10	71.4	6	85.7	42	75.0	
Isolation centers									0.68
Yes	25	71.4	11	78.6	6	85.7	42	75.0	
Quarantine centers									0.94
Yes	21	60.0	9	64.3	4	57.1	34	60.7	
Treatment centers									0.78
Yes	24	68.6	11	78.6	5	71.4	40	71.4	
Psychological support									0.11
Yes	13	37.1	3	21.4	0	0.0	16	28.6	



Total	35	100.0	14	100.0	7	100.0	56	100.0
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Table 7: COVID-19 health workers' perception of COVID-19 training provided by the River State Government and their adequacy

Variables	Rivers State University Teaching Hospital (RSUTH) COVID-19 Center		ELEME COVID-19 Center		OTHER COVID-19 Centers		Total		p
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	
Did the State government provide the following training?									
COVID-19 symptoms									0.02*
Yes	35	100.0	11	78.6	6	85.7	52	92.9	
COVID-19 clinical/laboratory diagnosis									0.01*
Yes	35	100.0	11	78.6	7	100.0	53	94.6	
COVID-19 Management									0.01*
Yes	35	100.0	13	92.9	5	71.4	53	94.6	
How to donn and doff Personal Protective Equipment (PPE)									0.86
Yes	32	91.4	13	92.9	6	85.7	51	91.1	
Psychological support for those infected									0.65
Yes	15	42.9	7	50.0	2	28.6	24	42.9	
Psychological support for relatives of those infected									0.52
Yes	12	34.3	7	50.0	2	28.6	21	37.5	
Was the training provided adequate?									
COVID-19 symptoms									0.80
Yes	32	91.4	12	85.7	6	85.7	50	89.3	
COVID-19 clinical/laboratory diagnosis									0.13
Yes	29	82.9	9	64.3	7	100.0	45	80.4	
COVID-19 Management									0.93
Yes	27	77.1	11	78.6	5	71.4	43	76.8	
How to donn and doff Personal Protective Equipment (PPE)									0.56
Yes	24	68.6	11	78.6	6	85.7	41	73.2	
Psychological support for those infected									0.71
Yes	11	31.4	5	35.7	2	28.6	19	33.9	
Psychological support for relatives of those infected									0.42
Yes	7	20.0	5	35.7	1	14.3	13	23.2	
Total	35	100.0	14	100.0	7	100.0	56	100.0	

Table 8: Challenges faced by health workers while providing COVID-19 services



Variables	Rivers State University Teaching	ELEME COVID-19 Center	OTHER COVID-19 Centers		Total		p		
	Hospital (RSUTH) COVID-19 Center		Frequency	Percentage	Frequency	Percentage			
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage			
Increased workload							0.20		
Yes	32	91.4	10	71.4	6	85.7	48	85.7	
Getting the right size of PPE									0.03*
Yes	24	68.6	4	28.6	3	42.9	31	55.4	
PPE discomfort									0.01*
Yes	27	77.1	4	28.6	4	57.1	35	62.5	
Little or no incentive									<0.001*
Yes	29	82.9	6	42.9	7	100.0	42	75.0	
Fear of getting infected									0.23
Yes	30	85.7	9	64.3	5	71.4	44	78.6	
Fear of infecting family members									0.48
Yes	30	85.7	10	71.4	6	85.7	46	82.1	
Others									
Psychological abuse									0.22
Yes	0	0.0	1	7.1	0	0.0	1	1.8	
Total	35	100.0	14	100.0	7	100.0	56	100.0	

It was significant that the government provided COVID-19 information/ Travel advice and isolation centers and most health workers agreed the information and travel advice was adequate. Table 6.

Almost all participants in all centers agreed that the government provided training on COVID-19 symptoms, clinical/laboratory diagnosis, and management. Statistical analysis showed these to be significant. Though two-fifths agreed that psychological support was provided for those infected and their relatives, one-third and one-fifth reported that psychological support for those infected and for relatives of those infected was inadequate. Table 7.

As regards challenges faced by health workers at the COVID-19 treatment centers, 9 out of 10 workers agreed that their workload increased, half (55.3%) complained about not getting the PPE in their right sizes, three-fifths reported discomfort with the use of PPE, 75% mentioned little/no incentives, 7 out of 10 feared being infected and 8 out of 10 feared they would infect their loved ones. Table 8.

Discussion

Though the preparedness for handling COVID-19 in health centers all over Nigeria was not adequate, that was not the case in the COVID-19 centers that were set up. There was good representation and adequate healthcare workers in the centers as well as adequate provision of personal protective equipment though face shields were not adequately provided. However, this should not be the case. The leaders at the three tiers of the government need to earmark resources for medical emergencies in all the health centers and Teaching Hospitals in Nigeria and not wait to use fire brigade approach when such occurred. Luckily, this time, the mortality was low, what happens when the next pandemic occurs, and the infection affects many people and is more contagious.

Furthermore, if the already existing health centers and hospitals had been well equipped to handle pandemics, there would not have been the need to put up new COVID-19 holding and treatment centers as those already prepared beforehand would have been used and the resources conserved and used in other area of national development.

The Federal government in collaboration with the state government, the Red Cross and stakeholders from the private sectors who provided finances. All in all, 3 COVID-19 hotlines, 2 COVID-19 holding centers (RSUTH and Mini), 3 COVID-19 treatment centers (Bonny, UPTH and Eleme), 7 PCR laboratories (UPTH, RSUTH, Everught, Shell, Indorama, Nigeria Liquified Natural Gas (NKNG), numerous PPEs and vaccination centers were

provided in the state for the control of COVID-19 pandemic.

Over two-thirds of healthcare workers agreed that the COVID-19-related services (COVID-19 information and advice, hotlines/websites, testing/laboratory centers, contact tracing, isolation/quarantine centers, and vaccination centers) provided by the River State Government were adequate as against at least 8 out of 10 community participants who felt so.

In this study, one-third of the participants used the services provided by the government.

The pandemic brought a lot of challenges to people all over the world. Two-thirds of the community participants in this study reported that they were afraid of leaving home and going to the health centers to access care in case they got infected. Half reported that they couldn't access health care because the pandemic interrupted health services. Other studies done in Nigeria and Africa also reported disruption of healthcare services during the pandemic.²⁵⁻³⁰ Thus, routine medical care was interrupted, and individuals lost their lives because of this. The implication of this is that if the health sector is not properly prepared to have centers designated to handle contagious diseases which could result in pandemics in the teaching hospitals as well as designated health centers in the country, there would continue to be disruptions in health care during those periods. The maternal and childcare, dental care, medical care as well as surgical care were all interrupted during the COVID-19 pandemic.²⁵⁻³⁰

Healthcare workers also faced challenges during the pandemic. At least half of the healthcare workers in this study reported challenges in getting the right size of PPE, PPE discomfort, increased workload, little incentives, and fear of infecting self and family members. A study done in Bangladesh reported that their participants mentioned, a shortage of quality PPE, and a lack of incentives as part of the challenges they faced during the pandemic.³¹ A qualitative systematic study reported healthcare workers reporting insufficient equipment and information, and work burnout as their challenges during the pandemic.³²

Strengths and Limitations of the study

This study listed the COVID-19-related services provided by the government in curbing the pandemic and reported their utilization as well as highlighted the opinion of the participants as regards its adequacy.

The study did not access how the provision and utilization of services were operationalized.

Implications of this study

Seeing how the existing health facilities could not handle the pandemic and the government had to set up emergency facilities to curtail the spread of it, the government should supply the health centers and teaching hospitals with necessary equipment and materials as well as equip and designate emergency centers that will handle future pandemics.

There were challenges in providing services during the pandemic, the Rivers State government is urged to put in place an incident action plan that will be rolled out immediately if there is any medical emergency and also set apart funds for medical emergencies to make the initial rollout easy. Lastly, the Federal government should put policies in place to make the health sector viable and ready to handle future pandemics. They should also increase the budgetary allocations for health.

Conclusion

There was good representation and adequate healthcare workers in the COVID-19 centers as well as adequate provision of personal protective equipment, though face shields were not adequately provided. Over two-thirds of healthcare workers agreed that the COVID-19-related services were provided by the River State Government as against at least 8 out of 10 community participants who felt so.

Declarations

Ethical Consideration: Informed consent was obtained from all individual participants included in the study.

Authors' Contribution: Soroye MO (Conception of study, study design, data collection, data analysis, interpretation of data, drafting of article, and critical revision). Imarhiagbe C (Data collection), Nnokam B (Data collection), Owhonda G (Data collection), Soter Ameh (study design), Ordinioha B (conception of the study)

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References

1. Covid WHO. Dashboard. Geneva: World Health Organization 2020 @ <https://covid19.who.int>. Assessed December 22, 2023.
2. Zhu H, Wei L, Niu P. The novel coronavirus outbreak in Wuhan, China. *Global health research and policy*. 2020; 5:1-3.
3. Ogundokun RO, Lukman AF, Kibria GB, Awotunde JB, Aladeitan BB. Predictive modelling of COVID-19 confirmed cases in Nigeria. *Infectious Disease Modelling*. 2020; 5:543-8.
4. Martellucci CA, Flacco ME, Cappadona R, Bravi F, Mantovani L, Manzoli L. SARS-CoV-2 pandemic: An overview. *Advances in biological regulation*. 2020; 77:100736.
5. Jacobsen KH. Will COVID-19 generate global preparedness? *The Lancet*. 2020; 395(10229):1013-4.
6. Rosenthal PJ, Breman JG, Djimde AA, John CC, Kanya MR, Leke RG, et al. COVID-19: shining the light on Africa. *The American journal of tropical medicine and hygiene*. 2020; 102(6):1145.
7. Mbow M, Lell B, Jochems SP, Cisse B, Mboup S, Dewals BG, et al. COVID-19 in Africa: Dampening the storm? *Science*. 2020; 369(6504):624-6.
8. Ohia C, Bakarey AS, Ahmad T. COVID-19 and Nigeria: putting the realities in context. *International Journal of Infectious Diseases*. 2020; 95:279-81.
9. Adepoju P. Nigeria responds to COVID-19; first case detected in sub-Saharan Africa. *Nat Med*. 2020; 26(4):444-8.
10. Eze-Emiri C, Patrick F, Igwe E, Owhonda G. Retrospective study of COVID-19 outcomes among healthcare workers in Rivers State, Nigeria. *BMJ open*. 2022 Nov 1;12(11): e061826.
11. Owhonda G, Onyekwere N, Kancee RB, Maduka O, Nwadiuto I, Okafor C, et al. Community Awareness, Perceptions, Enablers and Potential Barriers to Non-Pharmaceutical Interventions (NPIs) in the COVID-19 Pandemic in Rivers State, Nigeria. *Biomedical Journal of Scientific & Technical Research*. 2021;36(5):28984-95.
12. Güner HR, Hasanoglu İ, Aktaş F. COVID-19: Prevention and control measures in community. *Turkish Journal of Medical Sciences*. 2020;50(9):571-7.
13. Pradhan D, Biswasroy P, Naik PK, Ghosh G, Rath G. A review of current interventions for COVID-19 prevention. *Archives of medical research*. 2020; 51(5):363-74.
14. Dadras O, Alinaghi SA, Karimi A, MohsseniPour M, Barzegary A, Vahedi F, et al. Effects of COVID-19 prevention procedures on other common

- infections: a systematic review. *European journal of medical research*. 2021; 26(1):1-3.
15. Baye K. COVID-19 prevention measures in Ethiopia: current realities and prospects. *Intl Food Policy Res Inst*; 2020.
 16. Lee HH, Lin SH. Effects of COVID-19 prevention measures on other common infections, Taiwan. *Emerging Infectious Diseases*. 2020; 26(10):2509.
 17. Briko N, Kagramanyan I, Nikiforov V, Suranova T, Chernyavskaya O, Polezhaeva N. Pandemic COVID-19. Prevention measures in the Russian federation.
 18. Madhusudanan A, Iddon C, Cevik M, Naismith JH, Fitzgerald S. Non-pharmaceutical interventions for COVID-19: a systematic review on environmental control measures. *Philosophical Transactions of the Royal Society A*. 2023; 381(2257):20230130.
 19. Chan EY, Shahzada TS, Sham TS, Dubois C, Huang Z, Liu S, et al. Narrative review of non-pharmaceutical behavioural measures for the prevention of COVID-19 (SARS-CoV-2) based on the health-EDRM framework. *British medical bulletin*. 2020; 136(1):46.
 20. Baker RE, Park SW, Yang W, Vecchi GA, Metcalf CJ, Grenfell BT. The impact of COVID-19 nonpharmaceutical interventions on the future dynamics of endemic infections. *Proceedings of the National Academy of Sciences*. 2020; 117(48):30547-53.
 21. Lionello L, Stranges D, Karki T, Wiltshire E, Proietti C, Annunziato A, et al. Response Measures Database working group. Non-pharmaceutical interventions in response to the COVID-19 pandemic in 30 European countries: the ECDC–JRC Response Measures Database. *Eurosurveillance*. 2022; 27(41):2101190.
 22. Snoeijer BT, Burger M, Sun S, Dobson RJ, Folarin AA. Measuring the effect of Non-Pharmaceutical Interventions (NPIs) on mobility during the COVID-19 pandemic using global mobility data. *NPJ digital medicine*. 2021; 4(1):81.
 23. Campisi T, Basbas S, Skoufas A, Kaltsidis A, Tesoriere G. The impact of COVID-19 is not gender neutral: regional scale changes in modal choices in Sicily. *Transportation Research Procedia*. 2023; 69:584-91.
 24. Reyes-Vega MF, Soto-Cabezas MG, Cárdenas F, Martel KS, Valle A, Valverde J, Vidal-Anzardo M, Falcón ME, Munayco CV. SARS-CoV-2 prevalence associated to low socioeconomic status and overcrowding in an LMIC megacity: A population-based seroepidemiological survey in Lima, Peru. *E Clinical Medicine*, 2021; 1:34.
 25. Balogun M, Banke-Thomas A, Sekoni A, Boateng GO, Yesufu V, Wright O, et al. Challenges in access and satisfaction with reproductive, maternal, newborn and child health services in Nigeria during the COVID-19 pandemic: A cross-sectional survey. *PloS one*. 2021; 16(5): e0251382.
 26. Ahmed SA, Ajisola M, Azeem K, Bakibinga P, Chen YF, Choudhury NN, et al. Impact of the societal response to COVID-19 on access to healthcare for non-COVID-19 health issues in slum communities of Bangladesh, Kenya, Nigeria and Pakistan: results of pre-COVID and COVID-19 lockdown stakeholder engagements. *BMJ global health*. 2020; 5(8): e003042.
 27. Assefa N, Sié A, Wang D, Korte ML, Hemler EC, Abdullahi YY, et al. Reported barriers to healthcare access and service disruptions caused by COVID-19 in Burkina Faso, Ethiopia, and Nigeria: a telephone survey. *The American journal of tropical medicine and hygiene*. 2021; 105(2):323.
 28. Shapira G, Ahmed T, Drouard SH, Amor Fernandez P, Kandpal E, Nzelu C, et al. Disruptions in maternal and child health service utilization during COVID-19: analysis from eight sub-Saharan African countries. *Health policy and planning*. 2021; 36(7):1140-51.
 29. Adelekan B, Goldson E, Abubakar Z, Mueller U, Alayande A, Ojogun T, et al. Effect of COVID-19 pandemic on provision of sexual and reproductive health services in primary health facilities in Nigeria: a cross-sectional study. *Reproductive health*. 2021; 18(1):1-2.
 30. Awucha NE, Janefrances OC, Meshach AC, Henrietta JC, Daniel AI, Chidiebere NE. Impact of the COVID-19 pandemic on consumers' access to essential medicines in Nigeria. *The American journal of tropical medicine and hygiene*. 2020; 103(4):1630.
 31. Razu SR, Yasmin T, Arif TB, Islam MS, Islam SM, Gesesew HA, et al. Challenges faced by healthcare professionals during the COVID-19 pandemic: a qualitative inquiry from Bangladesh. *Frontiers in public health*. 2021:1024.
 32. Koontalay A, Suksatan W, Prabsangob K, Sadang JM. Healthcare workers' burdens during the COVID-19 pandemic: A qualitative systematic review. *Journal of Multidisciplinary Healthcare*. 2021; 3015-25.