

Influence of COVID-19 Pandemic on Breast Cancer Diagnosis and Treatment in Low Resource Setting: A Case Study of a Nigerian Tertiary Healthcare Facility

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Background: The COVID-19 pandemic had a wide range of effects on healthcare services, from disrupting normal patient flow to healthcare facilities to stressing and overwhelming healthcare resources. This study aims to evaluate the influence of COVID-19 on breast cancer diagnosis in a tertiary healthcare facility in Nigeria.

Methodology: The study was a descriptive cross-sectional survey using data extraction. The study population comprised medical professionals at Lagos State University Teaching Hospital (LASUTH), including doctors, laboratory technicians, and scientists in the pathology, oncology, and general medicine departments. Data were analysed using IBM-SPSS for Windows version 28.0.

Results: The study comprised 36 participants. They were predominantly males (63.9%), aged 20-30 (47.2%), attained tertiary education (100%), Christians (88.9%), married (66.7%), medical laboratory scientists (33.3%), and had 1-5 years of experience (58.3%). Although 88.9% of the participants said they were at risk of contracting COVID-19 due to exposure to patients at work, 11% of them said they did not. Even though 27.8% of the participants said they are not experiencing a lack of proper supply diagnostics materials/supplies due to the pandemic, 72.2% said they are experiencing it. Some respondents gave 60% positive feedback on the satisfactory level of patients during the pandemic, while others rated the feedback they got as poor. Most participants agreed that the pandemic has resulted in several practical challenges for the facility, including a lack of funding, poor patient turnout, longer waiting times for results, and inadequate personal protective equipment (PPE).

Conclusion: This study showed that healthcare providers and patients were hampered by a lack of PPE, apprehension about contracting an infection, high costs, and incompetence during the pandemic.

Keywords: COVID-19, LASUTH, Personal-Protective-Equipment (PPE), Diagnosis

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Introduction

Coronavirus disease 2019 (COVID-19) has been widespread at an alarming rate worldwide, and the tremendous load COVID-19 has placed on health systems has significant implications for cancer care.¹ Although data are sparse, patients with cancer appear to be more susceptible to infection-related complications, such as an increased requirement for ventilator support and increased fatality rates.²⁻⁴ Also, diagnosis may be delayed since screening programs and diagnostic services have been reduced in several nations. People fearful of infection have been less willing to seek healthcare services.⁵ Several clinical trials have been halted, limiting current treatment choices for patients who may have enrolled and jeopardising longer-term therapeutic development.⁶ However, responding rapidly, healthcare professionals and management in several nations have reorganised cancer services and updated instructions for medical personnel and patients to limit the impact of COVID-19 on cancer care provision.⁷

Patients with cancer must attend healthcare facilities more frequently than patients with other diseases due to the nature of the disease and its treatment.⁸ Treatment of cancer patients involves the active participation of multidisciplinary teams throughout the disease's course, from diagnosis through survivorship or end-of-life care.⁸ Throughout the disease's course, patients require repeated hospital visits to be assessed by various doctors and to undergo numerous laboratory or imaging tests for diagnosis, staging, or monitoring therapy effects, in addition to various surgeries and therapies.⁸ Besides medical professionals, cancer patients require the assistance of various other professionals, including social workers, psychologists, educators, and other support services.⁸ Patients diagnosed with cancer require ongoing monitoring and assistance throughout and after treatment.¹ These services must operate in unison and on time, with a high level of dedication and compliance from patients to maximise patient benefit because any slight divergence from well-established

standards may result in fragmented and low-quality treatment, as well as a worse patient outcome.^{5,9}

The COVID-19 pandemic had a wide range of effects on healthcare services, from disrupting normal patient flow to healthcare facilities to stressing and overwhelming healthcare resources, and ultimately leading to the implementation of additional protective measures and social isolation through increased use of telehealth and virtual medicine.¹⁰ Patients with cancer, including breast cancer, are a vulnerable demographic.¹¹ During pandemics, they face various risks, including increased susceptibility to life-threatening infections and interruptions in their treatment or regular medical care.¹⁰ As a result, oncologists have faced significant difficulty balancing the administration of high-quality continuous unbroken cancer care to decrease patients' risk of exposure.^{9,12} The pandemic's detrimental impact is most significant in low- and middle-income nations, where resources are scarce, infrastructure is inadequate, healthcare personnel and organized care teams are insufficient, medical supplies and PPE are low, and technology is scarce—resulting in a deficiency in the provision and delivery of critical care.^{12,13} If left unchecked, the pandemic's access barriers to oncology care would exacerbate existing cancer-preventative, diagnostic, and treatment gaps, ultimately worsening the region's total cancer disease burden, morbidity, and death. This study aims to evaluate the influence of COVID-19 on breast cancer diagnosis in a tertiary healthcare facility in Nigeria.

Methodology

Study Design

This study design included the use of breast cytology and histopathology data, which were extracted from Lagos State University Teaching Hospital (LASUTH). These data were extracted to determine the trend and challenges of cancer diagnosis during COVID-19 compared to before the COVID-19 outbreak.

Study Location

The study was conducted at Lagos State University Teaching Hospital (LASUTH) in

Lagos, Nigeria. Lagos is the most populous state in Nigeria. The metropolitan area originated on islands, including Lagos Island, protected from the Atlantic Ocean by sand spits. However, the city has expanded onto the mainland west of the lagoon, with Ikeja, the capital of Lagos, and Agege over 25 miles northwest of Lagos Island. Lagos's population is estimated at 21 million, making it the largest African city.¹⁴

Study Population

The study population comprised medical professionals at LASUTH, including doctors, laboratory technicians, and scientists in the pathology, oncology, and general medicine departments.

Data Source

Existing data on breast cytology and histopathology from the facility were extracted to get information about the impact of the COVID-19 pandemic on breast cancer diagnosis.

Sample Size

The sample size for this study is comprised of 36 respondents randomly selected from three departments in the facility.

Data Analysis

After the extraction of data procedure, the data was processed using the IBM-Statistical Package for Social Sciences (IBM-SPSS) version 28.0 for Windows IBM Corp., Armonk, N.Y., USA. The descriptive data included the respondents' sociodemographic characteristics and the impacts the COVID-19 pandemic has had on cancer diagnosis. Data were described as percentages/proportions, mean/average, and standard deviation and presented as charts or tables.

Inclusion and Exclusion Criteria

Pathologists, technicians, doctors, and scientists that work at LASUTH are included in this study, while non-medical professionals and non-medical staff at LASUTH were excluded.

Ethical approval

Before the study commencement, authorizations were sought from the Lagos State University Teaching Hospital, the covered area's administrative and health authorities. The study received authorization with the approval number LREC/06/10/1913. Before participating in the study, the research team confirmed that all respondents willingly and with informed permission. Informed permission was established using signed consent forms securely stored with completed questionnaire forms. Skilled data collectors did each study with extensive experience collecting data in LASUTH. Additionally, all study supervisors and note-takers received training on research ethics and consent processes.

Results

Sociodemographic profile of the study respondents

As shown in Table 1, more than three-fifths of the respondents, 23 (63.9%), were male, and 13 (36.1%) were female. Half, 17 (47.2%) of the respondents were between 20 and 30 years, 36.1% were between 31 and 40 years, and 16.7% were between 41 and 50. All the respondents (100%) had tertiary education, 66.7% were married, and 33.3% were single.

Most of the respondents, 32 (88.9%), were Christian, and 11.1% Muslim; 6 (16.7%) were general medicine practitioners, 8.3% health administrators, 33.3% medical laboratory scientists, 11.1% nurses, 5.6% were an oncologist, 11.1% a pathologist, and 13.9% a physiotherapist. More than half, 21 (58.3%) of respondents had 1-5 years of experience, 33.3% had 6-10 years of experience, and 8.3% had more than ten years of experience.

Impact of COVID-19 on diagnostic processes

As shown in Figure 1, 32 (88.9%) respondents said they were at risk of contracting COVID-19 due to their exposure to patients at work, while 4 (11.1%) did not.

Table 1. Sociodemographic profile of the study respondents

Variable	Parameters	Frequency	Percent
Gender	Female	13	36.1
	Male	23	63.9
Age	20 - 30 years	17	47.2
	31 - 40 years	13	36.1
	41 - 50 years	6	16.7
Education	Tertiary	36	100
Marital status	Married	24	66.7
	Single	12	33.3
Religion	Christianity	32	88.9
	Islam	4	11.1
Field of practice	General medicine	6	16.7
	Health Administration	3	8.3
	Medical Laboratory Science	12	33.3
	Nursing	4	11.1
	Oncology	2	5.6
	Pathology	4	11.1
	Physiotherapy	5	13.9
Years of experience	1 - 5 years	21	58.3
	6 - 10 years	12	33.3
	> 10 years	3	8.3
	> 10 years	3	8.3
Total		36	100.0

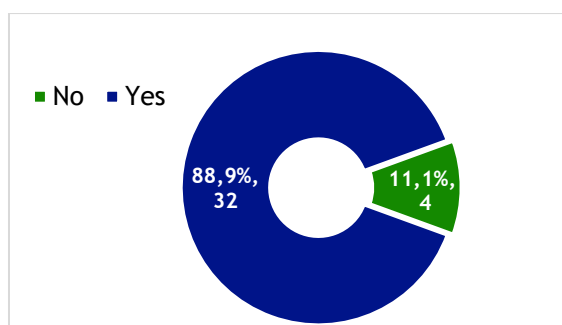


Figure 1. Respondents who see themselves at risk of contracting COVID-19 infection due to exposure to patients and others at work

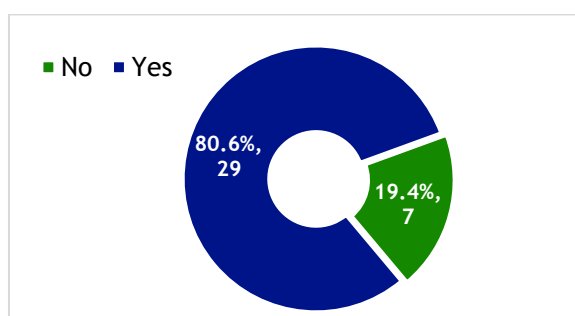


Figure 2. Facility breast samples diagnosis during the COVID-19 pandemic

Facility breast samples diagnosis during the COVID-19 pandemic

As shown in Figure 2, most respondents said the facility could continue with breast sample diagnosis even during the COVID-19 pandemic.

Effect of COVID-19 on the supplies of diagnostics materials

As shown in Figure 3, when asked if they are experiencing a lack of proper supply diagnostics materials/supplies due to the pandemic, 26 (72.2%) said yes, and 10 (27.8%) said no.

Analysis of breast data. Variation in breast sample diagnosis before and during the COVID-19 pandemic

As shown in Figure 4, the total breast samples tested increased by 39 (8.2%) from 2018 (474) to 513 in 2019. However, the number decreased by 172 (33.5%) in 2020 when the COVID-19 pandemic started, with a six-month lockdown. In 2021, the total number of breast

samples tested increased from 341 to 380, accounting for an 11.4% increase.

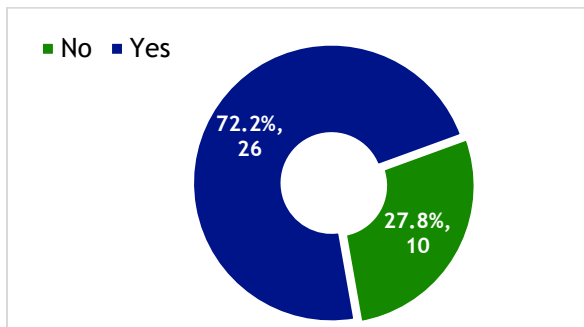


Figure 3. Effect of COVID-19 on the supplies of diagnostics materials

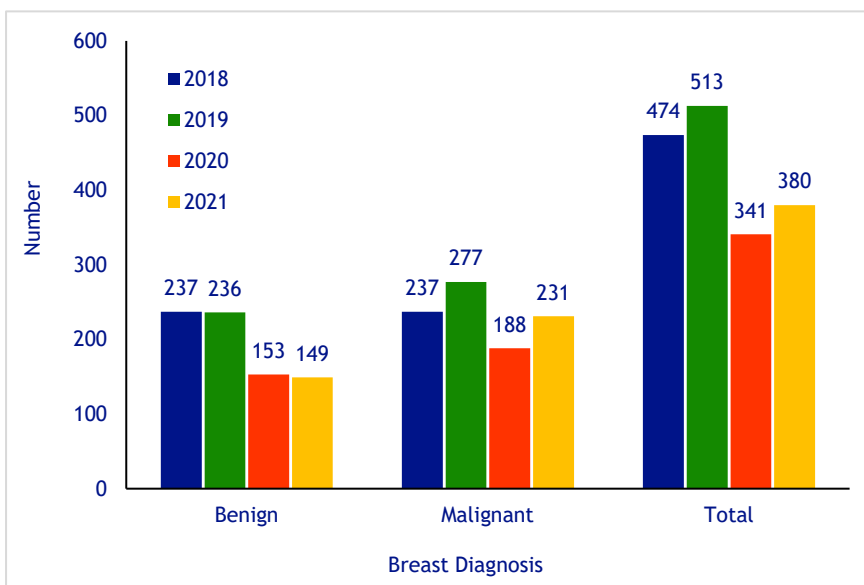


Figure 4. Variation in breast disease diagnosis with years (2018 - 2021)

The diagnosis results showed a steady decrease in breast benign from 237 in 2018 to 149 in 2021, representing a 37.1% decrease during the COVID-19 pandemic. Similarly, malignant cases increased from 237 in 2018 to 277 in 2019 but reduced to 188 in 2020 and 231 in 2021.

Table 2. Variation of breast disease diagnosis before and during the COVID-19 pandemic

Period	Diagnosis			Odds ratio	P-value
	Benign (n=775)	Malignant (n=993)	Total (n=1708)		
Before COVID-19	473 (61.0)	514 (55.1)	987 (57.8)	1.00	0.013*
During COVID-19	302 (39.0)	419 (44.9)	721 (42.2)	1.28 (1.05-1.55)	

As shown in Table 2, a total of 1708 valid breast samples were tested in four years (2018-2019 - before and 2020-2021 - during the COVID-19 pandemic). Of this, more than half, 987 (57.8%) samples were tested before and 721 (42.2%) during the pandemic. Similarly, breast 514 (55.1%) malignant and 473 (61.0%) benign were diagnosed before COVID-19 compared to 44.9% malignant and 38.0% benign during the pandemic. The odds of cancer diagnosis were 1.28 (95% CI = 1.05 - 1.55, P = 0.013), higher than before the pandemic.

Discussion

The study's primary purpose was to investigate how COVID-19 affected cancer detection. The pandemic's interruptions to cancer services have been especially severe in low-resource contexts, such as many African nations and other low-middle income countries.^{6,9,15,16} It is extremely challenging for medical oncologists to continue meeting the needs of

their patients and staff during this unprecedented epidemic. Preliminary data reveals that cancer patients may be at a considerably higher risk of COVID-19-related disorders.¹⁷ Most of the participants in this study are males between the ages of 20 and 30; they have all finished post-secondary education, are married with children, in general, practice medicine, and have between one and five years of experience. The selection process may contribute to the difference in socioeconomic status indices.

Impact of COVID-19 on diagnostic processes

When asked how they were exposed to the risk of contracting COVID-19, most respondents (88.9%)

highlighted their close interactions with patients during the cancer diagnostic process. Dhada et al.¹⁸ reported a similar issue in their Systematic Review of cancer patients and carers, which is consistent with the current study's findings.¹⁸ According to their findings, incomplete therapy, COVID-19-related issues, and the resulting consequences on participants' mental and emotional health were all sources of worry in the studies included in their meta-analysis.¹⁸ As a result, cancer screenings were discontinued, regular oncology appointments were cancelled, and treatment was postponed, all of which contributed to increased stress and worry, demonstrating a terrible lack of disaster preparedness.¹⁹

Facility breast samples diagnosis during the COVID-19 pandemic

The outbreak is expected to influence the diagnosis of breast samples. On the other hand, the findings of this study suggested that the great majority of laboratories stayed open during the pandemic and continued testing on breast tissue samples. According to Elghobashy et al.²⁰ and Nnaji & Moodley²¹, COVID-19 substantially influenced diagnosis, which contradicts their findings. Early detection programmes have been halted worldwide because of worries about the spread of COVID-19 in healthcare settings.^{22,23} This effect is expected to be more evident in low-resource settings due to weak infection control strategies and resource constraints in providing PPE, cancer screening, and diagnostic services.²¹ Due to the pandemic, routine breast sample procedures have been postponed in Ghana and Nigeria.^{9,24} To minimise the spread of the COVID-19 virus and decrease demand for medical services, cancer patients are frequently encouraged to delay or postpone treatment, and hospitalization is discouraged.^{5,9,25} However, this can be hazardous to patients' health since delays in cancer diagnosis or treatment have the potential to negatively impact patient outcomes, such as the chance of a late diagnosis, the spread of the illness, and the progression of a tumour from treatable to incurable.²⁶⁻²⁸

Effect of COVID-19 on the supplies of diagnostics materials and availability of PPE.

Participants in this research overwhelmingly blamed a lack of diagnostic equipment and personnel at the clinic during the outbreak. Furthermore, there were wide discrepancies in how much PPE was available at any one time during the pandemic. When asked about the availability and quantity of PPE, some respondents felt it was inadequate, while others felt it was fair or suitable. A rise in demand resulted in a shortage of PPE, which increased costs and reduced supply. Perhaps this is the result of travel bans that have hurt the economies of many nations. Similar results were found by Khot²⁹ when they investigated healthcare supply bottlenecks. Amid the widespread spread of COVID-19. Khot²⁹ claims that the COVID-19 epidemic has wreaked havoc on the global healthcare supply chain, leading to a scarcity of raw materials and significant price hikes. That's because, as Khot²⁹ explains, the worldwide grounding of aeroplanes and the prohibition of cross-border travel and cargo have seriously disrupted the global transportation infrastructure.²⁹ According to Reynolds³⁰'s findings, the global supply chain has been significantly disrupted by the 68 nations that have banned shipments of personal protective equipment supplies owing to the pandemic.³⁰

Variation in breast sample diagnosis before and during the COVID-19 pandemic

The findings of this study demonstrated substantial changes in the diagnostic accuracy of breast cancer samples collected before and after the COVID-19 outbreak. There was steady growth before the outbreak, despite more samples being analysed before the pandemic's commencement in 2020. Similarly, there was a 37.1 percent decrease in benign breast diagnoses throughout the outbreak. Malignant cases also declined throughout the pandemic, matching the trend seen before and after the epidemic. The lockdown may have deterred breast cancer women from obtaining medical treatment, explaining the disparity. People's

unjustified fear of contracting the virus may add to the disparity. Lowry et al.³¹ reported that declines in cancer diagnoses during the pandemic were primarily due to declines in screen-detected cancers, which was consistent with previous work.³²⁻³⁴ The pandemic had a greater impact on screening than diagnostic breast imaging. Although monthly screening levels recovered to normal by the summer of 2020, rescheduling missed mammography exams earlier in the pandemic would demand higher-than-average imaging volumes to compensate for the shortage in cancer diagnoses.³⁵ According to Angelini et al.³⁶, cancer screening and diagnosis were among the several medical services that had to be halted owing to the limitations imposed to battle the pandemic.^{33,37} As a result, fewer cancer tests and detection would be performed during the outbreak. Cancer diagnoses and diagnostic tests exhibited a U-shaped declining trend during the pandemic, with a negative peak in April 2020, when most governments around the world instituted quarantine measures to limit the disease. Angelini et al.³⁶ discovered that the number of cancer diagnoses decreased by 37.3% between 2010 and 2012, while the number of diagnostic tests decreased by 27.0%.³⁶

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Limitations

It is possible that the findings of this study are not reflective of the breast cancer population in Nigeria. This study focused primarily on the influence of COVID-19 on breast cancer diagnosis and was carried out in an environment with limited resources. Consequently, further research should evaluate larger regions and the impacts of COVID-19 on breast cancer patients, such as those genetically susceptible to mental illness and clinical depression.

Conclusions

This study analysed the effects of the COVID-19 pandemic on breast cancer screening in a low-resource nation. The findings show that a shortage of medical staff frequently caused increased patient volume due to a lack of willingness to show up to work or a lack of proper medical equipment. Lack of PPE, fear of catching an illness, high prices, and inexperience inhibited healthcare providers and patients. As a result, it's crucial to furnish the healthcare industry with adequate funds, personnel, and supplies to suit the needs of patients and staff. In addition, information exchange and coordination among healthcare practitioners are vital for delivering high-quality patient treatment and decreasing workloads.

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