

ORIGINAL RESEARCH REPORT

# Evaluation of the use and effectiveness of telemedicine among the health professionals during the COVID 19 lockdown period: A cross sectional study

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## ABSTRACT

**Background:** Telemedicine has been documented as a viable option in attending to patient's need where distance is a critical factor. The Federal Government of Nigeria on March 27, 2020, imposed a total lockdown in Lagos state in order to curb the spread of the coronavirus disease 2019 (COVID-19) pandemic. The restriction in movement prevented many patients from attending their regular clinics and physical consultations. The aim of this study was to evaluate the use and effectiveness of telemedicine among the hospital health professionals during the lockdown period. **Methods:** This was an online cross-sectional study among doctors at a tertiary health facility in Lagos. Ethical approval was obtained from the institutional ethical committee. A list of the telephone and WhatsApp contacts of doctors were obtained from the hospital directory; the SurveyMonkey tool was used as an online web-based structured questionnaire for data collection. The information obtained was analyzed to find means and averages. **Results:** A total of 104 doctors completed the survey. The proportion of participants who used telemedicine was 93.3%, with the most commonly used telemedicine option being phone call (27.1%) and WhatsApp video call (27.1%). The main management provided during this period was counseling (56.6%). Seventy-nine percent of the participants were satisfied with the result of the management provided through telemedicine options, but the major concern was that of ethical issues (36.2%). Majority (44.2%) of the respondents agree that telemedicine was effective during the COVID-19 lockdown period. There was no association found between gender, age, designation, and perceived effectiveness of telemedicine by respondents in this study ( $P = 0.88, 0.4, \text{ and } 0.07$ , respectively). **Conclusion:** Telemedicine was found to be a useful tool for effective patient's management during the lockdown period although there exist ethical concerns. The formulation of policies guiding its use will ensure the security of information and patient's confidentiality.

**Key words:** Coronavirus, COVID-19, lockdown period, pandemics, telemedicine

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## INTRODUCTION

The emergence of coronavirus disease in Wuhan, China, in December 2019 has brought another dynamic to health-care delivery all over the world. The coronavirus

disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is a respiratory disease caused by a novel virus from the group

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of coronavirus.<sup>[1-3]</sup> It spreads faster than other known SARSs and has continued to spread across countries.<sup>[2,4]</sup> The disease has caused a substantial global public health crisis prompting the World Health Organization (WHO) to declare it as a pandemic on March 11, 2020.<sup>[3]</sup>

The first index case was reported in Nigeria on February 27, 2020,<sup>[5]</sup> and at present, the disease has spread almost all over the states in the country.<sup>[5]</sup> The disease presently has no cure and it affects both genders sparing no age group.<sup>[4,5]</sup>

Although the fatality rate of COVID-19 has been reported to be about 2%–5% in the general population, a higher fatality rate >10% has been established among the geriatric population aged 60 years and above.<sup>[6-8]</sup> Other recognized vulnerable groups include those with chronic debilitating disease<sup>[7]</sup> and the health workers.<sup>[8]</sup> The health workers are exposed to various hazards such as pathogen, fatigue, emotional distress, stigma, long working hours, occupational burnout, and physical and psychological violence that put them at risk of being infected with COVID-19.<sup>[8]</sup>

Preventive measures such as social distancing, regular handwashing, hand sanitizing, and stringent personal hygiene measures remained a major strategy in halting the spread of COVID-19.<sup>[9-12]</sup> Population quarantine is another major strategy employed in the fight against the pandemic.<sup>[9]</sup> Globally, many countries have imposed a total lockdown mandating their citizens to stay indoor, thereby breaking the chain of person-to-person transmission.<sup>[10]</sup> This measure has proven effective in countries such as the United Kingdom, the USA, China, and many European countries.<sup>[10,11]</sup> The Nigerian government imposed a total lockdown on Lagos, Ogun, and the Federal Capital Territory on March 27, May 4, 2020. This population quarantine measure has disrupted routine medical care in these states and may have affected negatively the health of the populace. The need for innovative measures to provide quality health and workable plan to reach the public at home become more imperative while prioritizing the safety and well-being of patients and health workforce.<sup>[13]</sup> Telemedicine optimizes both needs while the health-care providers attempt to navigate the COVID-19 emergency.<sup>[14-16]</sup> Telemedicine is the delivery of health-care services where distance is a challenge.<sup>[8]</sup> It involves the delivery of health care by professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment, and prevention of disease and injuries; research and evaluation; and for the continuing education of health-care providers, all in the interests of advancing the health of individuals and their communities (WHO).<sup>[8]</sup> Telemedicine has been proven to be effective in reducing the risk of COVID-19 transmission, particularly in the United States of America,<sup>[17,18]</sup> the United Kingdom,<sup>[17,19]</sup> China,<sup>[20]</sup> and Australia.<sup>[21]</sup> It has also been successfully employed in a previous infectious outbreak

such as mSARS-CoV and MERS-CoV, or PHEICs related to Ebola and Zika viruses.<sup>[22,23]</sup> Although the effective use of telemedicine in health-care delivery has been reported by many countries, there is a paucity of information on its use in Nigeria despite the high use of information and communication technologies.<sup>[24-26]</sup>

Telemedicine is valuable as an information platform for giving instructions for quarantine processes at home, private safety applications, online medical consultation, and patient screening.<sup>[23,24]</sup> It can be used for training, panel discussion, consulting, broadcasting, and quality improvement among medical staff.<sup>[13]</sup> However, some challenges have been reported such as definition of national regulations,<sup>[11]</sup> guidelines,<sup>[11]</sup> framework developing clinical guidance, and assessment of its impact during outbreaks.<sup>[3]</sup> At the Lagos University Teaching Hospital, the routine medical care was scaled down during the population quarantine period taking only emergencies with skeletal clinical consultations. This prevented many patients from attending their regular clinics and physical consultations. There is the possibility that patients have contacted practitioners in the hospital during this period using information and communication technologies and some management provided. This study seeks to evaluate the use and effectiveness of telemedicine among the health professionals at the Lagos University Teaching Hospital during the lockdown period.

## METHODS

This was a cross-sectional study conducted among doctors at a tertiary health facility in Lagos, Nigeria, between May 2020 and August 2020. Ethical approval was obtained from the Hospital Ethical Review Committee (EREV/0520/26). A list of the telephone WhatsApp contacts of consultants and resident doctors in the hospital were obtained from the hospital directory, and an online survey was sent to their individual addresses. They were requested to fill the online questionnaire after consenting to the study. The SurveyMonkey tool that did not record identification information was used.

Survey questions were developed from the report on the standards and guidelines in telemedicine and telehealth.<sup>[27]</sup> Questions sought information such as demographics; consultation by patients through the use of different telecommunication media such as phone call, WhatsApp, video call, short message service (SMS), Twitter, and others; type of treatment provided; and concern of the health providers using these media. Likert scale of 0–4 was also used to rate the utilization of the different media and the incorporation of some preferential factors as tools for practitioners.

Descriptive statistics such as Chi-squared test was used to analyze the data. The confidence interval was set at 95%, and  $P < 0.05$  was considered as significant, with tests being

two-tailed. Statistical analysis was done using the Statistical Package for the Social Sciences (SPSS) 21 version (SPSS, Chicago, IL, USA).

## RESULTS

A total of 104 doctors completed the online survey. There were 48 (44.9%) males and 56 (55.1%) females; age range was 27–63 years with a mean age of  $41 \pm 9.9$  years. Most participants belong to the age range 31–35 [21.2%, Table 1]. The highest number of respondents was from restorative dentistry (19%–18.3%) department, and most respondents were honorary consultants/lecturers [48%–46.2%, Figure 1]. The most common communication technology used by the respondents was phone call (278) followed by WhatsApp chat [258, Table 2]. Counseling was the most common management provided using telemedicine [56.6%, Figure 2]. Sixty-nine percent of the patients were satisfied with the result of the management received using telemedicine [Figure 3]. Most (36.2%) of the respondents were, however, concerned about ethical issues involving the use of telemedicine [Figure 4]. Majority (44.2%) of the respondents agree that telemedicine was useful during the COVID-19 lockdown period [Table 3] [Figure 5]. The highest number of patients was managed with WhatsApp [33.2%, Table 2]. There was no association

found between gender, age, designation, and the participant's perceived effectiveness of telemedicine during the study period [Table 3].

## DISCUSSION

Living with COVID-19 is fast becoming the new normal global lifestyle as the medical community is still battling with getting a cure for the disease. The use of telemedicine

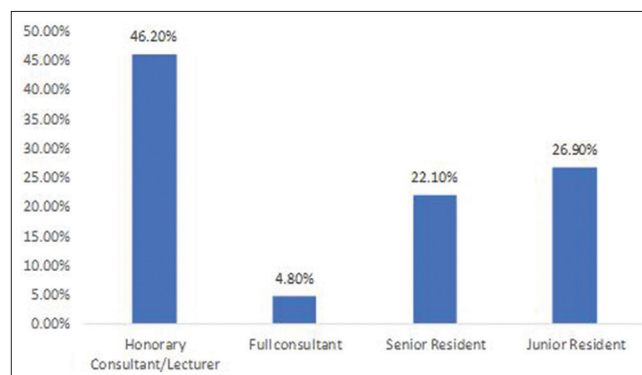


Figure 1: Designation of the respondents

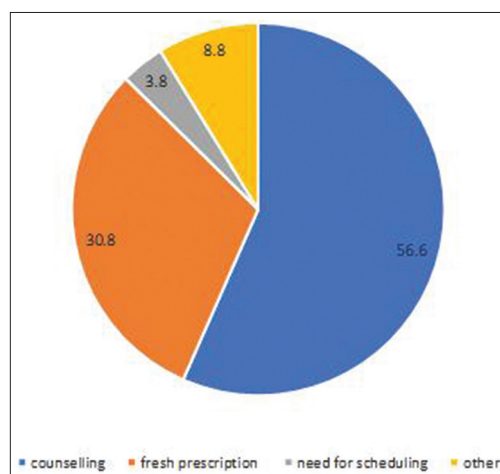


Figure 2: Management provided

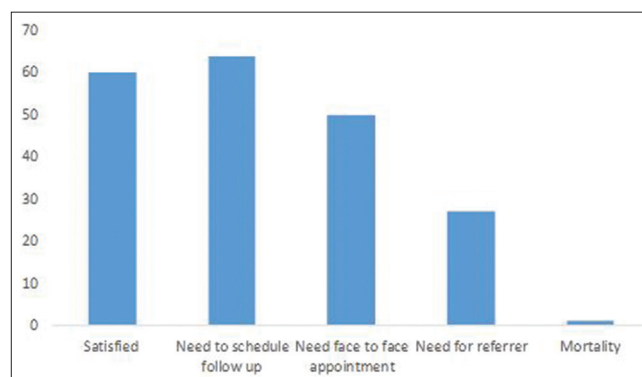


Figure 3: Results of management

Table 1 Sociodemographics

Variables	Frequency (%)
25-30	8 (7.7)
31-35	22 (21.2)
36-40	20 (19.2)
41-45	18 (17.3)
46-50	13 (12.5)
51-55	14 (13.5)
56-60	3 (2.9)
61-65	6 (5.7)
Mean age=41.67±9.91	
<b>Departments</b>	
Public Health	5 (4.8)
Radiology, radiodiagnosis, radiation oncology	3 (2.9)
Medicine	5 (4.8)
Child Dental Health	14 (13.5)
Surgery	5 (4.8)
Oral and Maxillofacial Surgery	16 (15.4)
Restorative Dentistry	19 (18.3)
Paediatrics	4 (3.9)
Oral Pathology	6 (5.8)
Pathology (Morbidity Anatomy)	4 (3.9)
Preventive Dentistry	6 (5.8)
Ophthalmology	4 (3.9)
Obstetrics and Gynaecology	9 (8.7)
Psychiatry	2 (2.0)
Anaesthesia	1 (1.0)
Ear, Nose and throat	1 (1.0)
TOTAL	104

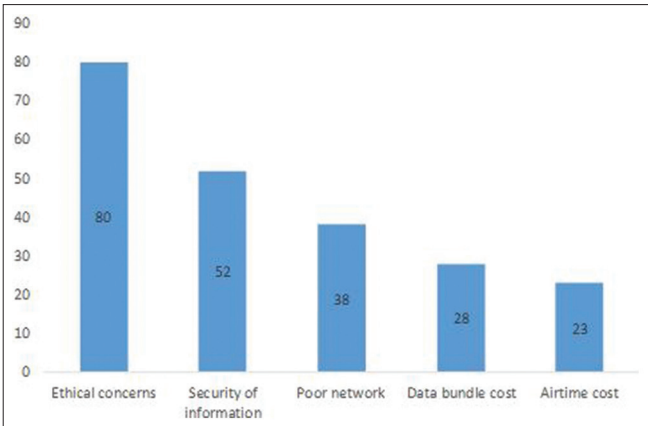


Figure 4: Concerns about the use of telemedicine

in patient management and health care is beneficial, especially when distance is a critical factor (WHO). Information and communication technology is valuable for exchange of valid information for diagnosis, treatment, and prevention of diseases.<sup>[28-30]</sup> In this study, the use and effectiveness of telemedicine among doctors of a tertiary institution was evaluated and the mean age of the participants seen was  $41 \pm 9.9$  years. An earlier similar study done in the same institution showed a mean age of  $25.8 \pm 5.4$  years.<sup>[25]</sup> The reason for this disparity is due to the wider group of participants seen in an earlier study which included the medical practitioners and paramedics.<sup>[25]</sup> The proportion of males (55.1%) seen was higher than that of females, and this was similar to a previous study that reported 57.5% of males.<sup>[25]</sup> Most of the respondents were honorary consultants who were also university lectures; this may be due to higher proportion of this cadre of doctors in the hospital and their better understanding of importance of research to clinical practice.

The interaction between health professionals and their patients have involved the use of various means of information communication technology.<sup>[4,31]</sup> Information may be transmitted through a variety of media such as SMS, video call, WhatsApp, and phone calls.<sup>[32-34]</sup> Various information and communication technologies were employed for remote patient's management during the study period. These included phone call, SMS, WhatsApp, video call, Instagram, Twitter, and Facebook. Mostly used was phone call, this possibly due to easy accessibility coupled with the opportunity to have dialog.<sup>[35]</sup>

The remote delivery of health care to a patient through information technology has been used in improving quality and accessibility of medical care by allowing distant counseling, diagnosing, treating, and providing follow-up.<sup>[28,36-38]</sup> In this present study, counseling stands out as the most treatment provided using telemedicine followed by review of medication. This is similar to the experience of Song *et al.*<sup>[11]</sup> where patients were counseled

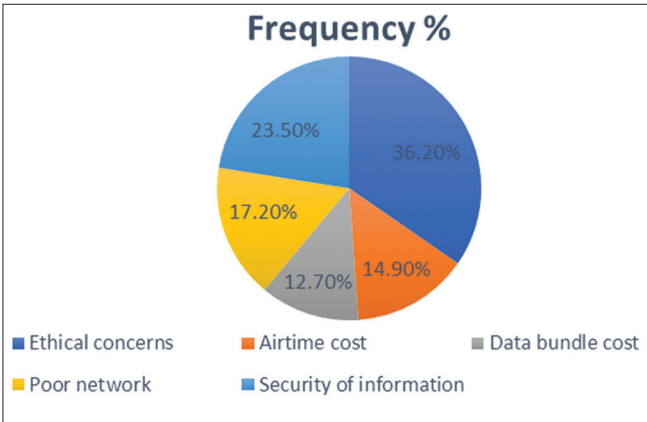


Figure 5: Effectiveness of telemedicine

Table 2: Number of patients seen and telemedicine option

Telemedicine option	Number of patients
SMS	238 (22.1)
E mail	154 (14.3)
Phone call	278 (25.8)
Video call	50 (4.6)
WhatsApp	358 (33.2)
TOTAL	1078

using online consulting clinic on their medical conditions. These options are easier for the patients as most people in our environment owned a handset. However, few patients still require scheduling of face-to-face appointment with the doctor which confirms the fact that telemedicine cannot replace medical examination.<sup>[23]</sup> It has been documented that the use of telemedicine reduces the number of on-site facilities referrers and patient transfer.<sup>[30,31]</sup> It also reduces the need for travel for specialist care and reduces expenses, time, and stress.<sup>[27,32,33]</sup> This might explain why the need for referral recorded in this study was low. Majority (44.2%) of the respondents found that telemedicine was useful and effective and made possible the continuum of care and patient-doctor communication during the physical separation occasioned by the COVID-19 pandemic. This is in agreement with the experience of Song *et al.*<sup>[11]</sup> and many other researchers.<sup>[29-34,36-39]</sup> This may be a revelation to the potentials of telemedicine that can be employed in patient management beyond the COVID-19 pandemic.

The major concerns of the respondents in this present study were ethical issues and security of information. There is a fear of patient's confidentiality being endangered and exposure of health practitioners to litigation. These concerns have also been highlighted by several authors, and the need for formulation of standard guidelines has been stressed.<sup>[3,40-43]</sup> In the opinion of Krupinski and Bernard, the development of guidelines and standards for telemedicine is an important and valuable process to help ensure the effective and safe delivery of quality health

**Table 3: Gender, designation and decision on telemedicine effectiveness**

Variables	Strongly disagree	Disagree	Neutral	Strongly Agree	Agree	Total	Chi Square/P
Gender							
Male	5	9	12	8	22	56	1.21/0.88
Female	3	7	14	5	19	48	
Age							
<20-30			1	7		8	8.32/0.4
<30-40	2	9	14	22	3	42	
41-50	2	6	9	9	5	31	
>50	2	3	2	12	4	23	
Designation							
Honorary/Full Consultant	4	8	12	26	11	45	8.76/0.07
Junior/Senior Resident	1	6	15	21	1	21	
TOTAL						104	

care.<sup>[29]</sup> There is also a need for training of health-care providers, commitment to regular funding, and long-term sustenance plans to be made by the stakeholders.<sup>[43-45]</sup> The importance of legal and ethical considerations to ensure patient's privacy and confidentiality ensured and preserved has also been stressed.<sup>[27,28]</sup> Cross-border legalities are also concern in developing countries when communicating with health professionals in more than one country.<sup>[44]</sup>

## CONCLUSION

This study established telemedicine as a useful tool in managing patients during the lockdown period. The positive effect experienced should serve as opportunities to incorporate telemedicine in daily clinical practice and should continue when coronavirus pandemic is mitigated. Stand-alone medial such as Zoom for Healthcare, Skype, Doxy.me, Updox, VSee, and Google G Suite Hangouts that will allow for multiple guest participants may be employed for a telemedicine, virtual clinics, and consultations. Establishment of virtual clinics, especially for follow-up patients, may be a useful option to reduce patient's physical contact that may reduce transmission rate and reduce the workload of the health providers. There is, however, the need for formulation of policies guiding the use of telemedicine in management of patient. Development of a framework that will ensure the security of information and patient's confidentiality is also crucial.

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## Conflicts of interest

There are no conflicts of interest.

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James, *et al.*: Usefulness and effectiveness of telemedicine

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