

## EVOLVING TELEMEDICINE PRACTICE: EXPERIENCES OF HEALTH CARE WORKERS DURING COVID-19 PANDEMIC

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### ABSTRACT

**Background:** Telemedicine is employed in patient care when direct physical contact is not possible or discouraged, as was seen during the COVID-19 pandemic. The use of smartphone technology could make telemedicine affordable and available in low and medium-income countries (LMICs). However, the evolution of telemedicine care depends on multiple factors.

**Aim:** To explore the practice of telemedicine by Nigerian health care workers (HCWs) during the COVID-19 pandemic

**Methods:** A cross-sectional study of the Nigerian HCWs on telemedicine practice in patient care during the COVID-19 pandemic period. Recruitment of respondents was done through dedicated WhatsApp and Telegram social media platforms for HCWs over a period of 40 days (May 1st and June 10th, 2020).

**Results:** A total of 481 HCWs participated in the study consisting of 153(31.8%) doctors, 150(31.2%) nurses and 178(37%) other HCWs. Though 89.2% of the HCWs agreed that telemedicine is important, it was only 266 (55.3%) that practiced telemedicine, phone consultation was the form of telemedicine used in all the health institutions. Telemedicine was practiced more by doctors 91(18.9%), nurses 79(16.4%) and pharmacists 35(7.3%) than other groups of health care workers. Inadequate COVID-19 screening test and lack of personal protective equipment were strong motivators for the attending HCWs to practice telemedicine.

**Conclusion:** There was widespread use of phone consultation by all cadres of health care workers during the pandemic. Hence there should be a health policy that will encourage greater use and acceptance of telemedicine in clinical practice and in the patients care beyond the pandemic period

**Keywords:** COVID-19 pandemic, Health care workers, Telemedicine, Low and Medium-income countries

### INTRODUCTION

Telemedicine provides an audio-visual means of remote practise of medicine. Patients can communicate remotely with health care workers (HCWs) via telephone or via internet facilities at the comfort of their homes or within designated places in the community or hospital premises. Clinical images of lesions can be taken at home by the patients or relations which can be shared with physicians to aid accurate diagnosis. It has been shown that images acquired by HCWs and non-HCWs are equally effective for adequate clinical diagnosis comparable with conventional face-to-face clinical evaluation<sup>1</sup>, although, some specific examination and evaluation are not currently supported by telemedicine.<sup>2</sup> Nonetheless, telemedicine has been employed in the care of patients

without direct physical contact with HCWs or in remote areas where HCWs are not available.<sup>3,4</sup>

Telemedicine can be an essential innovation to cater for the shortage of HCWs in low and medium-income countries (LMICs). However, early report shows that adoption of telemedicine usage by HCWs in LMICs is limited.<sup>5</sup> Several factors may be responsible for the low adoption of telemedicine in LMICs. These may include inertia by clinicians to adopt telemedicine, it may also include lack of adequate infrastructure to aid telemedicine deployment, lack of clarity on who will bear the associated costs and medico-legal issues surrounding physicians' obligations. All these factors may have led to the slow pace of adoption of

telemedicine in LMICs, despite the fact that telemedicine has aided medical practice globally.<sup>5</sup> The advent of COVID-19 pandemic may however alter the usage of telemedicine in clinical practice within LMICs.

One of the dilemmas faced by HCWs during COVID-19 pandemic was sustaining capacity in continued offering of clinical service, while protecting themselves and other patients within the health facilities. COVID-19 is a highly contagious infection transmitted through droplets or aerosols from the respiratory system.<sup>6,7</sup> HCWs are exposed to high risk of this infection in the course of duty; some cadres of HCWs endure even greater risk of infection during examination of patient's oral cavity, pharynx, nasal cavities, head and neck.<sup>8</sup> The risk of infection with COVID-19 can be eliminated by avoiding contact with infected individuals, this can be achieved through the use of telemedicine in the hospital setting. Telemedicine will permit clinical consultation and limited examination to be done while preventing contact with infected patients.<sup>1,2</sup> Moreover, the use of telemedicine during COVID-19 pandemic can prevent crowding in the hospital premises – a significant measure in breaking transmission of COVID-19 infection – it is therefore important to examine usage of telemedicine by HCWs in Nigeria. The results would provide evidence on the practise and acceptability of telemedicine in Nigeria. This study determined telemedicine practise by HCWs at various healthcare facilities in Nigeria during the COVID -19 pandemic.

## METHODS

This was a cross-sectional electronic survey of HCWs using a convenient sample size, among the HCWs that are actively involved in patients care during the pandemic in Nigeria. This study was approved by the Research Ethics Committee of University of Ibadan/ University College Hospital Ibadan (UI/UCHECR20/0334). HCWs were recruited from WhatsApp and Telegram social media pages dedicated for health workers (approximately 20 chat groups of between 25 and 200 participants) between May 1st and June 10th, 2020. WhatsApp and Telegram are the most widely used social media platform in Nigeria.<sup>9</sup>

A structured Google Forms questionnaire (a 35-item survey) was used to collect data on demography, type of health institution, the average number of patients attending the health facility availability of personal protective equipment (PPE), availability and the type of telemedicine, and the use of telemedicine by HCWs during the COVID-19 pandemic. The data was automatically saved to a dedicated Google drive account on completion of the questionnaire by the respondents. The continuous variables and proportions were analysed with descriptive statistics while inferential statistics was used for categorical variables using Statistical Product and Service Solutions (IBM-SPSS) software version 20.

## RESULTS

A total of 481 respondents participated in the study, consisting of 288 (59.9%) females and 193 (40.1%)

**Table 1:** Demography of the respondents

FACTORS		TOTAL(481) N (%)
Age	21-30	296(61.5)
	31-40	155(32.2)
	41-50	23( 4.8)
	51-60	6( 1.3)
	61-70	1( 0.2)
Gender	Female	288(59.9)
	Male	193(40.1)
Type of Health Institution	Private	277(57.6)
	Federal government	82(17.0)
	State government	55(11.4)
	NGO	27(5.6)
	Missionary	18(3.8)
	Others	22(4.6)
Cadre of HCWs	Nurse	150(31.2)
	Medical Officer (Doctor)	108(22.4)
	Resident (Doctor)	32( 6.7)
	Consultant (Doctor)	13( 2.7)
	Pharmacists	49(10.1)
	Lab Scientist	72(14.9)
	Physiotherapist	9( 1.9)
	Radiographer	10( 2.1)
	Others	38( 8.0)

**Table 2:** Usage of phone consultation

FACTORS		Do you make use of phone/telemedicine consultation during this pandemic period		TOTAL(481)
		YES (226)	NO (215)	
<b>Type of Health Institution</b>	Private	157(32.6)	120(25.0)	277(57.6)
	Federal government	47(9.8)	35(7.2)	82(17.0)
	State government	23(4.8)	32(6.6)	55(11.4)
	NGO	17(3.5)	10(2.1)	27(5.6)
	Missionary	9(1.9)	9(1.9)	18(3.8)
	Others	13(2.7)	9(1.9)	22(4.6)
<b>Cadre of Health Care Workers</b>	Nurse	79(16.4)	71(14.7)	150(31.2)
	Medical Officer (Doctor)	62(12.9)	46(9.5)	108(22.4)
	Resident (Doctor)	21(4.4)	11(2.3)	32(6.7)
	Consultant (Doctor)	8(1.7)	5(1.0)	13(2.7)
	Pharmacists	35(7.2)	14(2.9)	49(10.1)
	Lab Scientist	32(6.6)	40(8.3)	72(14.9)
	Physiotherapist	7(1.5)	2(0.4)	9(1.9)
	Radiographer	3(0.6)	7(1.5)	10(2.1)
	Others	19(4.0)	19(4.0)	38(8.0)
<b>Were you provided PPE to use for clinical work?</b>	Yes	79(16.4)	56(11.7)	135(28.1)
	No	78(16.2)	75(15.6)	153(31.8)
	Yes but not all the time	94(19.5)	81(16.8)	175(36.4)
	Not applicable	15(3.1)	3(0.6)	18(3.7)
<b>Average patients seen per week during the COVID pandemic in your health facility</b>	1-50	204(42.4)	163(33.9)	367(76.3)
	51-100	37(7.7)	32(6.7)	69(14.3)
	101-150	14(2.9)	8(1.7)	22(4.6)
	151-200	1(0.2)	4(0.8)	5(1.0)
	201-250	4(0.8)	1(0.2)	5(1.0)
	251-300	1(0.2)	3(0.6)	4(0.8)
	351-400	1(0.2)	1(0.2)	2(0.4)
	401-450	1(0.2)	0(0.0)	1(0.2)
	451-500	0(0.0)	1(0.2)	1(0.2)
	551-600	2(0.4)	1(0.2)	3(0.6)
	600-1000	1(0.2)	1(0.2)	2(0.4)
<b>Do all your patients undergo routine COVID-19 testing before receiving care?</b>	Yes	22(6.2)	32(5.0)	54(11.2)
	No	198(41.1)	163(33.9)	361(75.0)
	Yes, but not all the time	15(3.1)	12(2.4)	27(5.6)
	Not applicable	31(6.4)	8(1.7)	39(8.1)

males. The participants age ranged from 21-61 years (mean  $30.7 \pm 5.6$  years). Among them, 227(47.2%) worked in private health institutions and 137 (28.5%) worked in government health institutions (Table 1). HCWs, 429 (89.2%) agreed that telemedicine is important and should be encouraged for patient care especially during the pandemic. The only type of telemedicine practised during the pandemic period was phone consultation. The HCWs 301 (62.6%) were of the opinion that phone consultation was effective for patients care however, only by 266 (55.3%) HCWs used phone consultation during the pandemic. Phone

consultation was very high in health facilities with smaller patient population (Table 1). Although, the respondents reported that there was a general reduction in hospital attendance during the initial phase of the pandemic compared to the pre-pandemic period.

Phone consultation was used by HCWs in most of the health facilities, though doctors, nurses and pharmacist made use of phone consultation more than other groups of HCWs ( $p = 0.806$ ). HCWs in private health institutions used phone consultation more than their counterparts in government health institutions.

Majority of HCWs, 361(75.1%) reported that patients were not screened for COVID-19 prior to being seen in clinics or emergency room; thus, in this group, 198(54.8%) HCWs made use of phone consultation in patient care ( $p = 0.003$ ). While only among HCWs who worked in hospitals that screens patients routinely for COVID-19, only 22 (4.6%) HCWs made use of phone consultation. Phone consultation usage was also very high among HCWs who had poor supply of personal protective equipments (PPEs), although, in spite of availability of PPEs, 109 (22.7%) HCWs still used phone consultation.

## DISCUSSION

The use of telemedicine by HCWs in this study was very high, this contrasts earlier reports on the adoption of telemedicine in clinical practice.<sup>5,10</sup> The use of telemedicine cut across all the cadres of the HCWs although doctors, pharmacist and nurses appeared to use telemedicine more than others. This shows that telemedicine could be an important tool for implementing the social distancing guidelines in clinical settings during a pandemic by ensuring continuous rendering of medical services via telemedicine with minimal compromise in the quality of care and clinical outcome of patients.<sup>11,12</sup> This telemedicine utility may not dissipate in clinical or community settings when the COVID-19 pandemic crisis ends in Nigeria. Thus, there may be need for policies guiding telemedicine practise to assist in building the health care system of the future.

Phone consultation was the sole type of telemedicine used in this study; this alludes to the fact that the smartphone technology enables digitized images to be reviewed, stored, archived, and transmitted for medical specialist opinion or diagnosis. The quality of information from the phone technology may have contributed to the high usage of telemedicine among the HCWs in this study. There are technological advances in artificial intelligence and virtual reality, these advances are drivers for delivery of precision medicine, and quality health care. These advances can be utilized in telemedicine in LMICs to ease the lack of HCWs in the rural areas.

Although in Nigeria, telephone consultations were recommended for non emergency cases in order to prevent patients from coming to the hospital during the pandemic;<sup>13</sup> widespread adoption of phone consultation in telemedicine in Nigeria will face multiple challenges because less than 20% of the Nigerian populace currently have access to smartphones.<sup>14</sup> Moreover, the lack of public information on the usage of telephone for telemedicine consultation services as well the burden

of phone charges are other factors that may tend to limit adoption of phone consultation component of telemedicine.<sup>15</sup> Thus, there is a need to educate the populace on the use of telemedicine in patient's health care services through mass media and public enlightenment campaign.

The reduction in the number of patients seen in the health facilities during the study period compared to the pre-pandemic period, may be due to the lockdown orders by the government in accordance to the WHO recommendation<sup>16</sup>, or the fear of been infected with the virus in the hospital setting. It could also be that a large number of non-emergency outpatients' cases were clinically managed effectively via telemedicine, without compromising the quality of care and clinical health outcomes.

The non-screening of patients in some health facilities as reported by the HCWs may be due to the limited COVID-19 testing in the country at the time of the study<sup>17,18</sup>, possibly due to inadequacy of test kits. This situation considerably influenced the adoption of the telemedicine in the institutions that lacked routine COVID-19 screening, possibly to ensure protection of the HCWs.

The non-availability of appropriate PPEs also influenced the use of telemedicine in this study. Majority of HCWs with inadequate or inappropriate PPEs supplies used telemedicine more compared to counterparts with adequate PPE supplies. Telemedicine would have ensured physical distancing and limit the spread of the infection.

Though some HCWs still used telemedicine during the clinical evaluation despite the availability of appropriate PPEs, this may be related to the fact that some evaluation with accurate diagnosis can be obtained via telemedicine. Although, it has been reported that there is a limitation to the use of telemedicine in certain clinical conditions and clinical examination of patients.<sup>2</sup>

## CONCLUSION

Telemedicine was used as a tool for enforcing social distancing by HCWs during COVID-19 pandemic without compromising patient care. There is a need to develop appropriate framework and logistics to ensure a wide usage of telemedicine in Nigeria; this may include additional training of HCWs and employment of IT personnel to ease the flow of medical information and treatment.

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