



# Out-Patient Neurosurgery Telemedicine Clinics: A Model to Provide Healthcare And Prevent Cross-Infection

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- Received Date: 17 Oct 2022
- Accepted Date: 30 Oct 2022
- Publication Date: 16 Dec 2022

## Keywords

telemedicine, neurosurgery, prevention of infection, COVID-19, healthcare

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## Abstract

**Objectives:** To determine patient's and health worker's views of telemedicine on prevention of cross infection and delivery of health care in our centre.

**Methods:** A prospective cross-sectional study conducted at our neurosurgery centre. Sample size was calculated, questionnaire designed and administered to consecutive patients or healthcare workers. Data was analysed using SPSS, IBM version 20.0.

**Results:** We found 161 patients. 79.5% were males with a male to female ratio of 3.8:1. The mean age of the patients was 32±12 years. Majority of patients, 68.9% (111/161) lack awareness of virtual consultation. Most patients, 76.4% (123/161) showed interest in having virtual consultation to prevent COVID-19 infection. Most patients opined that, virtual consultation can be done in any day and at any time. There is statistically significant association between age (11-30year), male gender and short distance to the hospital (1-200KM), to interest in virtual consultation ( $p < 0.05$ ). Patients living close to hospital have five times likelihood of accepting virtual consultation than those coming from far distance (odds ratio-5.7, CI-1.5-21.23,  $p=0.002$ ). 84.6% of the health workers have prior knowledge of virtual consultation as a means of preventing COVID-19 infection. All age group, gender and non-emergency cases should be offered virtual consultation as suggested by the 100% of health workers.

**Conclusion:** This single centre study shows paucity of knowledge of virtual consultation in our patients, though interested. In contrast, most health workers know about virtual consultation as a way of preventing COVID-19 infection, as such, virtual consultation should be introduced in our practice.

## Introduction

World Health organisation defines telemedicine as “the delivery of health care services, where distance is a critical factor, by all health care 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” [1,2]. While, American Telemedicine Association, defined telemedicine as “the remote delivery of healthcare services and clinical information using telecommunications technology” [3].

Since the discovery of telephone by AG Bell in 1876, communication to a distant place was made possible, and many years later medical science becomes part of telecommunication [4]. Early use of telemedicine to provide health care services to migrants was reported in 1962 and thereafter, large study on telemedicine was credited to Dunn et al in 1977 [5,6].

During this pandemic, outpatient physical clinic poses a great health risk for both the physician and the patient, as this would lead to spread of the virus rapidly. Therefore, there is need to curb the spread of COVID-19 pandemic and at same time provide the needed neurosurgical care to our patients. Virtual consultation provides the opportunity for patients and physicians to meet without spreading the virus [7]. Virtual neurosurgery clinic saves time, maintain social distancing and reduces the cost and risk of visiting a health facility.

Outpatient physical clinic poses a great health risk for both the physician and the patient, as this would lead to spread of the virus rapidly. Therefore, there is need to curb the spread of COVID-19 pandemic and at same time provide the needed neurosurgical care to our patients. Virtual clinic provides the opportunity for patients and physicians to meet without spreading the virus [8,9]. Telemedicine can be used to identify neurosurgical patients with symptoms of COVID-19 infection and appropriate referral to infectious disease hospital thereby preventing healthcare providers from getting infected.

**Citation:** Koko AM, Lasseini A, Ismail NJ, Shehu BB. Out-Patient Neurosurgery Telemedicine Clinics: A Model to Provide Healthcare And Prevent Cross-Infection. *Sur Res J.* 2023;3(1):1-3.

COVID-19 has caused numerous challenges to the healthcare services globally. The pandemic necessitated adjustments in clinical work and cancellations of neurosurgery clinic visits worldwide [10,11]. In our institution, all outpatients' clinics were closed during the first peak of the pandemic and lockdown (April to July, 2020). Neurosurgical morbidity and possibly mortality that may have resulted from cancellation of neurosurgery consultations were unquantifiable. Our neurosurgical centre gives services to three neighbouring States and two neighbouring Countries (Niger and Benin republics). Only emergency consultations and surgeries were allowed during the pandemic. There is paucity of studies on virtual neurosurgery clinic in west African setting, hence the need for the present study. Also, in order to eliminate or significantly reduce the suffering caused by closure of outpatients clinic, telephone consultations, a form of telemedicine was conceptualised and this study was designed to determine patient's and health worker's views on prevention of cross infection and delivery of health care in our centre.

**Methods**

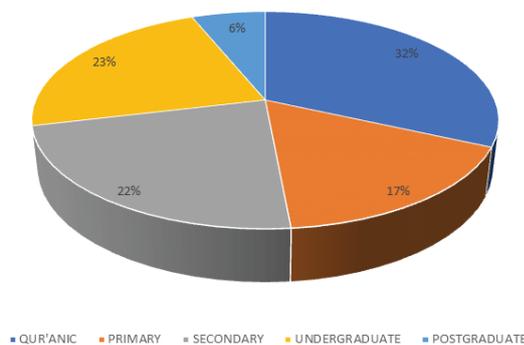
This is a prospective hospital-based cross-sectional study conducted at neurosurgery department of Usmanu Danfodiyo University Teaching Hospital Sokoto, Nigeria. Sample size was calculated using an appropriate formula. A questionnaire was designed and administered to consecutive patients or care givers, who have given consent to the study. Data was entered and analysed using SPSS, IBM version 20.0.

**Results**

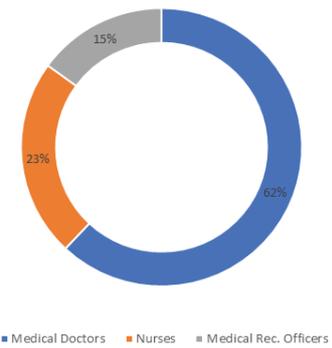
A total of 161 patients were studied. Males constituted the majority, 79.5% were males with a male to female ratio of 3.8:1. The mean age of the participants was 32±12 years. Majority of patients, 68.9% (111/161) lack awareness of virtual consultation. Most patients, 76.4% (123/161) showed interest in having virtual consultation to prevent COVID-19 infection, but 81.4% (132/161) prefer physical over virtual consultation.

Most patients opined that, virtual consultation can be done in any day and at any time. The mean distance travelled by the patients was 166KM ±15sd

There is statistically significant association between age (11-30year), male gender and short distance to the hospital (1-200KM), to interest in virtual consultation (p< 0.05). Patients living close to hospital have five times likelihood of accepting virtual consultation than those coming from far distance (odds ratio-5.7, CI-1.5-21.23, p-0.002).



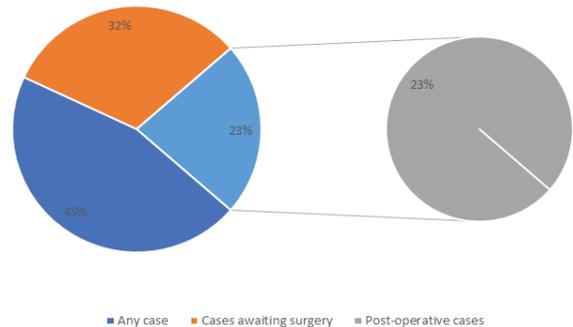
**Figure 1.** Educational level of the Patients



**Figure 2.** Distribution of Health care workers

84.6% of the health workers have prior knowledge of virtual consultation as a means of preventing COVID-19 infection. Also, 84.6% of health workers chose morning hours to be preferred time for virtual consultation and most (61.5%) selected the present clinic day (Thursday) and majority (46.2%) suggested six to ten patients to be consulted per day. All age group and gender should be offered virtual consultation as suggested by the 100% of health workers.

And, all non-emergency cases can be given virtual



**Figure 3.** Views of Health workers on distribution of cases appropriate for virtual clinic

consultation (100% of health workers).

**Discussion**

Despite huge burden of neurosurgical conditions in Nigeria and Africa in general, there is very poor access to neurosurgical care to most people in Nigeria, due to fewer number of neurosurgeons, weak health care system and out-of-pocket payments of hospital bills. This poor access to neurosurgical care was further aggravated by recurrent pandemics, the recent of which was COVID-19. Practical modality to bridge the aforementioned impediments to quality neurosurgical care and at same time prevent spread of infections to both patients and health care workers is much desirous and welcomed. Neurosurgery telemedicine clinics is believed to be the timely model required to achieve the stated objectives.

Young, males were observed to be the dominant attendees of neurosurgical out-patient clinic. This was in line with the previous reports in Nigeria, but contrary to the findings

of a study in united states of America (USA) that had older age at presentation to neurosurgery clinics [2,12,13]. The index study found that, most of our patients lack awareness of existence of telemedicine. This could be attributed to low level of education seen in the study participants. However, despite poor knowledge of telemedicine, majority of the study participants expressed interest in virtual clinic and at same time prevent cross infection. This finding agrees with the data of other published study [14,15]. The index study shows that, physical face-to-face clinic is being preferred by most patients, compared with telemedicine clinic, which was in tandem with previous studies [16,17]. In contrast, telemedicine clinic was liked more over physical clinic as reported by some publications [2,18].

The overwhelming majority of health workers reported to be in the know of telemedicine clinic as a means of providing telehealth care and preventing spread of infections. They believed that all neurosurgery cases could benefit from telemedicine clinic. In addition, our health workers suggested that, the tele-clinic should be conducted in the morning hours of the present physical clinic day and about six-to-ten patients should be consulted per doctor per week. Contrary to the views of the health workers, patients opined that, tele-clinic can be conducted at any day and any time. The present study shows that, young males and people living close to the hospital (1to 200KM) were more likely to accept telemedicine clinic. Surprisingly, patients coming from place with a short distance (200KM and below) were more interested in having tele-clinic compared to those from far distance (> 200KM).

The index study reveals disagreement between patients and health care workers in terms of timing and the day for conducting virtual clinic. It's not unexpected as both parties suggested what will be convenient for them. While health workers prefer the virtual clinic to be run in the morning hours of the present clinic day, patients submit that virtual clinic should be conducted on any day and any time of the chosen day. The dilemma here is who should we ignore, both parties are sacrosanct in health care facility. More researches are welcomed to resolve this contradicting opinion. Also, it will be interesting to know reasons behind patients living close to the hospital to accept virtual clinic more than those at distant places.

## Conclusion

This study shows that, both patients and health care workers believe that telemedicine clinic provides health care services and at same time prevents cross infection. While health workers were in the know of virtual clinic, patients lack awareness of its practice. As such, telemedicine clinics should be introduced in our practice.

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