

Virtual Care for Neurological Practice

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Abstract

The COVID-19 crisis has worsened the pre-existing barriers to accessing neurological specialist care in Low and middle income countries. Telemedicine has been available for well over 2 decades but has not been widely adopted in LMIC's due to issues around cost, feasibility, infrastructure and regulation. Virtual care is an offshoot of traditional telemedicine leveraging the widely available internet enabled devices to connect patients with their healthcare providers. In this manuscript, we provide an overview of the virtual care, relevance to neurology and some guidance on implementing virtual care in an Indian context.

Keywords: eVisit, teleneurology, telemedicine, virtual care

OVERVIEW OF VIRTUAL CARE

Telemedicine is defined as remote delivery of healthcare services and clinical information using telecommunication technology.^[1] Virtual care, an offshoot of telemedicine, is defined as any interaction between patients and members of their circle of care occurring remotely, with the aim of facilitating or maximizing the quality and effectiveness of patient care.^[2-5] Secure messaging, secure email, and secure video conferencing are some of the most common types of virtual care modalities. The difference between traditional telemedicine and virtual care is the technology used. Traditional telemedicine is usually performed between two remote hospitals with dedicated videoconferencing equipment, hard-wired network connection, and personnel to help with the telemedicine visit. Virtual care, however, is set up by the patients and/or family using their own personal internet-enabled devices like smartphones, tablets, and computers. Virtual care in the form of video visits is ideal for providing follow-up care, symptom management, conveying diagnostic results, and collaborating in therapeutic decision making for many neurological conditions.^[6]

Virtual care has been making steady gains globally, particularly in response to the COVID-19 pandemic.^[4,7] Virtual care is largely patient centered, reduces healthcare costs, efficient for the providers, increase acc to healthcare, and has the potential to improve health outcomes.^[6,8-10] A transition to virtual care has been advocated by patients, physicians, and policymakers for the last few years.^[2,6,9,11-17]

Since 2016, Queen's University/Kingston Health Sciences Center (KHSC) has been an early adopter of virtual care for ambulatory specialist care and the local virtual care program is considered as a model for delivery of care by Ontario Telemedicine Network.^[6,18] The lead author (RA) also has an active multidisciplinary virtual care research group. Leveraging our long experience with virtual care, virtual care

has been rapidly rolled out to all 450 specialist physicians, 575 medical residents, and 160 allied health professionals at the start of April 2020 at Queen's University.^[19]

In the following sections, we will discuss the regulatory aspects of virtual care, our recommendations for setting up a virtual care practice, and the current applications of virtual care for neurological conditions.

REGULATORY FRAMEWORK AROUND VIRTUAL CARE IN INDIA

There are several laws and regulations protecting Personal Identifiable Information and healthcare data in the US, Canada, and Europe.^[20-22] However, similar laws do not exist in India. The Digital Information Security in Healthcare Act (DISHA) was introduced as a draft document by the Ministry of Health and Family Welfare (MoHFW) in order to bring a healthcare security law in India.^[23] The DISHA act has not been formally passed as a law. Until recently, telemedicine and virtual care have been frowned upon by legal and regulatory bodies in India. However, given the COVID-19 crisis, the Medical Council of India has released a telemedicine practice guideline in partnership with NITI Aayog.^[24] These guidelines provide

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an in-depth overview of various virtual care modalities and should be referred to by any physician planning to provide virtual care services to their patients.

Patient selection

Selecting which patient or a specific medical condition is appropriate for virtual care may be challenging. Physicians must use their professional judgement to decide when it is appropriate to offer virtual care. This is the general recommendation from other regulatory bodies where telemedicine is routinely practiced.^[25] Though virtual care is often demanded by the patients and/or their families due to the convenience it offers, physicians should be careful to only provide this service when they feel it is appropriate and safe. Physicians should be cognizant of the patient's level of education and their familiarity and ability to use the technology. Based on this information, physicians can select the most appropriate virtual care modality (i.e., text messaging vs. video conference) for individual patients, or instead, offer an in-person visit.

Consent

There are broadly two types of consent—expressed and implied consent. For practical purposes, the use of implied consent is reasonable to provide virtual care. However, it is preferable to obtain and document expressed consent. The MCI Telemedicine practice guidelines provide further direction on consent for virtual care.^[24]

Documentation, prescriptions, and medical negligence

Virtual care visits should not be taken as casual encounters and any interaction should be considered as a professional medical interaction. All standards for professionalism and consent should be maintained during a virtual visit. Standards for documentation should be adhered to as much as possible. Any virtual care interaction (video/audio/messaging/email) could be used as a piece of evidence in a medico legal litigation.^[26-28]

ADVANTAGES AND LIMITATIONS OF VIRTUAL CARE

Virtual care offers transformational change to the healthcare landscape in the way physicians and patients interact. This is a very exciting time and, like any significant change in the industry, it is easy to be carried away by the advantages that virtual care has to offer. It is equally important to be aware of the limitations of the virtual care to optimally utilize this platform. The advantages and limitations of virtual care differ based on the modality used (video conference vs. secure messaging vs. audio only). An excellent overview of these is provided in the Telemedicine practice guidelines released by Medical Council of India.^[24] Some of these are provided below in Table 1. For physicians, it is ideal if the virtual visits can be integrated with the EHR and HIS (Hospital information system) for easy availability of the past clinical data and access to previous laboratory reports and prescriptions of the patient. Scheduling virtual care visits along with routine in-person visits.

We must keep in mind, however, that access to this technology is not universal. Patients with neurological conditions often

have cognitive impairment or poor dexterity, both of which will impair their ability to use this technology. Caregivers may need to assist them. Furthermore, patients of poor socioeconomical status may not be able to afford these devices or have a reliable internet connection. Nonetheless, creative solutions can be found, for example, using one device and internet connection for several residents of a single village or residential area.

HOW TO SET UP A VIRTUAL CARE PRACTICE

Virtual care platforms

Broadly speaking, there are two kinds of platforms for providing any form of virtual care. These can be divided into regulated and unregulated platforms. Regulated platforms refer to software platforms that are designed for healthcare use and adhere to all privacy and security regulations mandated for safeguarding personal health information.^[20-22] Unregulated platforms do not fulfill the privacy and security regulations. These unregulated applications commonly used for personal video-conferencing: Facetime, WhatsApp, Zoom, Skype, or Google Duo. Given the lack of a regulatory framework for healthcare data in India, it is difficult to compile a list of regulated and unregulated platforms available to physicians in India. Given the sociocultural context in India and the knowledge/attitudes and practices of patients and healthcare providers in India, it is thus reasonable to use a platform that is available, accessible, and reliable to both the physician and patients. This may include the unregulated platforms listed above. Virtual care is a reliable alternative for providing medical care during the COVID-19 lockdown, and likely beyond it. The abundance of digital payment available options available in India should be leveraged to deal with payment and reimbursements.^[29]

Equipment, etiquette, and working environment

Virtual care can be provided through any of the widely available internet-enabled devices including smartphones, tablets, or computers. For physicians, it is preferable to use a desktop or laptop with external video/audio conferencing equipment. As this setup offers a reliable internet connection with high quality audio-video conferencing. Below is a list of steps one should take to set up the virtual care workplace [Table 2].

Etiquette

Physicians may initially find the interaction through the virtual platform challenging. The etiquette for virtual visits is largely similar to in-person visits; however, there are a few key differences. Physicians should resist the temptation to stare at the screen or to look away, but rather, should look directly into the camera to provide the 'virtual' eye contact when talking to the patient. As audio quality may sometimes be suboptimal, healthcare providers should speak in a loud and clear voice. Physicians should dress professionally, preferably with a white coat. Identification badges should be clearly visible or, at the very least, shown at the beginning of the interview when the physician introduces themselves. In order to avoid delays, it is important to verify that all audio and video equipment is working properly prior to the visit. It is also preferable to

Table 1: Advantages and limitations of virtual care

Advantages	Limitations
<p>Patient specific</p> <ul style="list-style-type: none"> Provides a more convenient service and may be done from anywhere (i.e., work, home) Saves time Reduces costs associated with medical visits Reduces caregiver burden Allows relatives to join visit remotely Provides timely care Reduces chances of contracting infections Eliminates challenges with transport <p>Physician specific</p> <ul style="list-style-type: none"> Increases access to patients Allows to provide more frequent follow-up Improves healthcare outcomes Allows for more convenient scheduling Reduced overhead fees 	<p>Patient specific</p> <ul style="list-style-type: none"> May be challenging to set up, particularly for patients with cognitive impairment or loss of dexterity Requires cellphone or other telecommunication device and a reliable internet connection May feel impersonal May pose difficulty in providing prescriptions <p>Physician specific</p> <ul style="list-style-type: none"> Makes physical examination more challenging May limit access to results of new investigations, especially imaging May be difficult to convey an empathic response

Table 2: Equipment, etiquette, and working environment

<p>Equipment</p> <ul style="list-style-type: none"> Verify that the equipment (computer/camera/microphone/speaker) is working properly prior to the visit Place the camera above the screen if possible Mute the microphone until starting the visit It is preferable to have a second screen for reviewing patients' electronic medical records If paper records are used, ensure they are available prior to starting the visit If access needed, open electronic medical record before starting the visit <p>Etiquette</p> <ul style="list-style-type: none"> Dress professionally Ensure identification badge is visible Look into the camera when talking to the patient, as opposed to the screen Speak in a loud and clear voice Avoid eating/drinking during a video visit <p>Working Environment</p> <ul style="list-style-type: none"> Select a private, quiet room for video visits to avoid distractions Ensure optimal lighting Ensure that you are clearly visible, with your face and torso in the shot
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have a second screen with electronic medical records and investigations readily available.

VIRTUAL CARE IN NEUROLOGY

Certain characteristics of the practice of neurology and its patient population make virtual care an ideal method for delivering care. In the following sections, we will discuss why virtual care should be adopted in neurology practice, with a focus on the context of Low and Middle Income Countries (LMIC).

Increased access to neurological expertise and consultation

Neurological conditions are very common in India and other LMIC.^[30,31] The limitations of the neurological workforce in

these settings are also widely known.^[30,32,33] Access to neurology consultation, a highly specialized field is limited in India and other LMIC's. Generally, specialists and subspecialists tend to work in academic centers in metropolitan areas.^[33] Unfortunately, this leaves many populations, particularly those living in rural communities, underserved. This challenge has only been exacerbated by the recent massive migration to villages in response to the COVID-19 lockdown in India.^[34] Virtual care has the potential to allow patients all over the country to have increased access to neurological as well as to reduce the economic burden associated with attending medical appointments.^[6,35] In fact, in a study based out of Cleveland, Ohio, it was estimated that patients saved a median of 137 miles of travelling to access specialty neurology clinics*. Similarly, stroke centers tend to be clustered in urban centers. Telestroke has revolutionized access to stroke care and improved health outcomes globally for hyperacute stroke treatments.^[36,37] The value of Telestroke in improving access and outcomes in resource-poor settings is well recognized.^[38-40] Telestroke allows physicians to call upon the expertise of a cerebrovascular specialist who can examine patients through video, interpret relevant imaging findings, and make critical decisions. A virtual care platform using low cost rapidly deployable system could be used as a modified telestroke system.

Neurological burden and vulnerable population

The burden of neurological conditions in India and other LMIC's is very high.^[41,42] The neurological conditions affecting the patients make them vulnerable.^[43] Patients with neurological conditions often suffer from physical, mental disability and often require mobility assistance. Virtual care allows physicians to provide medical care to these patients who cannot leave their homes and saves the patient and caregivers a huge amount of physical, financial, and psychological trouble. Similarly, patients with physical and cognitive disability related to stroke or other neurological illness, as well as those with epilepsy, may be unable to travel/drive alone due to restrictions related/

restrictions. This makes it more challenging for them to visit their physician at the clinic. Many patients with neurological conditions are also elderly, frail, or immunocompromised—more specifically, those with autoimmune conditions such as multiple sclerosis, autoimmune encephalitis, or CIDP who are being treated with immunosuppressants. By visiting hospitals, these patients are putting themselves at risk for infectious diseases, particularly in a time of pandemic. Lastly, neurologists treat many chronic conditions which require frequent follow-up for medication titrations. This includes Parkinson's disease, epilepsy, multiple sclerosis, myasthenia gravis, and other neuromuscular conditions.

Neurological conditions ideal for virtual care

Virtual care could be employed in a wide variety of settings and patients. Virtual care could be used in all three practice settings—emergency care, in-patient care, and out-patient care settings.^[44] Traditional telemedicine systems of care are costly and difficult to setup. Use of virtual care for delivery of Telestroke services is feasible and should be explored.^[45] Similar virtual care solutions could also be used for providing in-patient consultation, thus improving access to specialist care. The value of virtual care is very high in the out-patient setting.^[6,18] Virtual care for out-patient care could be used for a wide variety of conditions and purposes. Virtual care is currently used for a wide variety of neurological conditions, for both new consultations and follow-up care. These include triaging new neurological referrals and consultations, assessing new neurological consultations for simple and straightforward conditions, follow-up on symptom severity, symptom management, titration of medication doses, follow up on test results, education, reassurance, counselling, general advice as well as suggest consultations with other physicians/referrals to other locations. Post stroke care: virtual visits can enhance the availability of neuro-rehabilitative support which is very scarce in rural India. Ease of frequent monitoring and provision of supporting audiovisual literature for physiotherapy and occupational therapy can greatly enhance the functional recovery of the patients reducing the burden on the family and society. This will certainly reduce the caregiver burden associated with frequent medical visits. Virtual visits to a specialist can help patients with neurodegenerative disorders for routine follow-up visits, more frequent screening questionnaires, better follow-up after the change of prescriptions for adverse effects, and also reduce the burden on the caregivers which usually is the case.

In our experience, cerebrovascular conditions, headache, epilepsy, sleep disorders, headaches, and non-specific conditions are among the most suited conditions for virtual care for new consultations.^[6,18] Virtual care is ideal for follow-up in a wide variety of conditions. This is generally the case for conditions where the physical examination noncontributory or can be easily replaced by ancillary testing. Excluding those conditions, neurology is a specialty that tends to heavily rely on the physical examination for diagnosis and assessment of patients. Clearly, certain physical examination maneuvers

cannot be realistically performed over a screen, including auscultation, palpation, tone, or strength testing. Thus, certain clinical presentations such as focal weakness, or parkinsonism are more challenging to diagnose over teleconference. Still, new research suggests some tests can be adequately performed through videoconferencing. In fact, a group from Germany has validated several neurological examination maneuvers over teleconferencing, such as general observation, gait examination, cranial nerve testing, and coordination testing.* While certain aspects of the physical examination may be reliably performed through teleconferencing, physicians must carefully select which patients may be best served through in-person visits.

CONCLUSION

Virtual care offers a more accessible, convenient and less costly service to patients. For many years, telemedicine has allowed to bridge the access gap in medical care, allowing patients living in remote rural areas and those with disabilities to access care previously unavailable to them. Many physicians are now turning to virtual care during the pandemic in order to limit the spread of the virus. While this novel technology appears to be an ideal solution on many fronts, we must keep in mind its limitations in order to carefully select which patients are best suited for virtual care.

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Conflicts of interest

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