Commentary

Telemedicine: Embracing virtual care during COVID-19 pandemic

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ABSTRACT

Telemedicine and related e-health facilities facilitate care from a distance through electronic information systems. COVID-19 pandemic is establishing telemedicine in the health care delivery system of countries. Telehealth is contributing significantly in health care delivery during the COVID-19 crisis. For mild-to-moderate symptoms of COVID-19 or any illness, telehealth services might represent a better, efficient way to receive initial care and perform triaging. Telemedicine also has a significant role in screening for COVID-19 symptoms and delivering routine needs and follow-up care. The large-scale adoption of telemedicine in public health care delivery is still not visible in low- and middle-income countries like India. Adoption by patients and healthcare professionals is limited and their concerns need to be addressed to ensure its utilization in future of the care continuum. In the current paper, we aim to review recent measures of Telemedicine adopted during the course of pandemic and its impact on public health in lower-middle income countries like India.

Keywords: COVID-19, pandemic, telemedicine

Introduction

The key issues faced by health care across countries include access, equity, quality, and cost-effectiveness. The problems are more aggravated and intense at the time of outbreaks, pandemics, and disasters when the already frail health system is over-burdened and nosocomial transmission of infections is a challenge. Technology of telemedicine has great potential to help address these concerns. Telemedicine is the delivery of health care services, by all healthcare professionals using ICTs for the exchange of information for diagnosis, research, evaluation, and for continuing education of health care providers. Telemedicine is a part of telehealth; telemedicine pertains to service delivery by physicians and telehealth signifies services provided by health professionals in general, including nurses, pharmacists, and others.[1] This E-health concept has been extended to Telecare, Teleconsultation, Telehealth, and Telemedicine Cabin services.[2]

Telemedicine promotes the interests of advancing the health of individuals and their communities.[1] Though the term was coined in late 1970s and literally meant "healing from distance," the acceptance of Telemedicine in various parts of world happened in early 2000s. Telemedicine and e-health services a decade later have brought a paradigm shift with the focus of healthcare systems to ensure that community remains healthy and hospitals are available only for the sick and needy.[2] In

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the wake of COVID-19 pandemic, telemedicine has been adopted aggressively in the process of health care delivery across nations. Lower middle-income countries like India are yet to take up the technology and benefits from telemedicine; however, the COVID-19 pandemic will lay down systems for the practice of telemedicine on an urgent basis. In India, Telecom Regulatory Authority of India 2019 annual report states the wireless subscriber base in 2019 as 1161.81 million. The Internet subscriber base in the country was 636.73 million. With smartphones being identified as a missing link for establishing telemedicine much gains are expected in times to come.[3]

Telemedicine and virtual care have become an important tool in caring for patients at COVID -19 pandemic time while keeping health care workers and patients safe. The explosive rise in number of cases in the community with many cases in home isolation, telemedicine is the only viable option available to monitor them and ensure timely referral. Platforms of teleconsultation are being utilized in surveillance and primary care delivery during home isolation of asymptomatic/mild COVID-19 cases. Triaging of patients by primary care practitioners will ensure that health facility and logistics are reserved for patients who need them most.[4,5] With the fear of disease transmission, many primary care physicians are adopting technology for delivery of other routine health care services to patients reducing in-person clinic visits. Can be ensured wherein health care providers in high-risk category, with co-morbidities and on isolation post infection can also be utilized for telemedicine services.[6] The screening for suspected patients among vulnerable groups like frail old people in nursing homes, shelter homes, etc., can be done through telemedicine and if found to be in general good health, they can be kept under daily follow-up teleconsultation, thus preventing other healthcare workers from further exposure.[7]

Telehealth can serve as an important tool for epidemiological surveillance, to identify hotspots, estimate the burden of the disease, and provide disease control measures. This platform can be used for health education of individual, family, or group of people on various risk factors and for disease prevention of communicable and noncommunicable diseases.

World Health Organization has mentioned telemedicine among its recommendations for essential services in strengthening the health systems response to COVID-19 policy.[8] It could be used in forward triage, where patients can be screened before reaching the health care facility.[9] Centre for Disease Control and Prevention (CDC), USA updated their interim guidance on infection prevention and emphasized on the implementation of telemedicine facilities to minimize the chance of transmission.[10] This will help in early identification and transfer of suspected cases without coming in physical contact, thus reducing the risk of infection among health care workers and public. On March, 2020, Medicare—administered by the Centres for Medicare and Medicaid Services (CMS)—had paid clinicians to provide telehealth services for beneficiaries in the US by waiving off restrictions and permitting additional services to be furnished via

telehealth using platforms such as Doxy.me, eVisit, Vsee, Mend, etc.[11] American Medical Association has expressed a number of recommendations for the ethical practice of telemedicine. Medical-care providers are permitted to utilize devices such as smart-phones and electronic devices to treat patients. Virtual medical-care companies such as Am-Well and Tela-doc have supported communication between patients and physicians through secure video chats. Coronavirus Preparedness and Response Supplemental Appropriations Act aids deployment and use of telemedicine solutions in the country.[12]

In China, the implementation of telemedicine services decreased the death rates and lowered the incidence of COVID-19 in Shangdong province. Telemedicine provided prevention and treatment guidance, training, communication, and remote consulting for the community residents and medical staff and, thus, played a considerable role in controlling the COVID-19 epidemic in this province.[13] Patients were advised to seek physician's help online rather than in-person which increased the number of consultations significantly. National Telemedicine Center of China (NTCC) established the emergency telemedicine consultation system, a telemedicine-based outbreak alert and response system for surveillance purpose.[12]

A mobile telemedicine device was used to effectively collect, transform, and assess patient health data such as oxygen level, respiratory rate, and blood pressure, which reports the data to the attending physician. This helps to prevent direct physical contact, thus decreasing the risk of exposure and prevents potential transmission of infection to nurses and physicians.[13] The Australian government provided funding for Medicare telemedicine services (Medicare support at home) against COVID-19, to encourage physicians to help provide health services.

European Union and countries in Asia also expanded laws and regulations to permit greater adoption of telemedicine systems, providing increased guidance on digital health technologies, cyber-security expectations, and expanded reimbursement options. Italy, in the course of pandemic, implemented telemedicine guidelines promulgated by the Italian Health Council in 2012 to facilitate greater use of telemedicine technologies throughout the country.[4] In France, the Ministry of Health allowed the reimbursement of video teleconsultations and tele-expertise by the National Health Insurance (NHI), for patients with confirmed COVID-19 infection without the need for prior registration. The nurses and midwives involved in the follow-up of patients were incentivized as the pandemic worsened. Paris saw a surge in teleconsultations following the pandemic, with 44% of general practitioners conducting at least one teleconsultation.[14] In Spain, a follow-up system at the primary care uses phone calls to monitor patients' symptoms and take action. This implementation offers longitudinal and continuous care for patients. Concurrently, medical prescriptions are allocated from the Patient Electronic Medical Record (PEMR) to pharmacies' electronic systems and medication is given to patients.[15] Public-private collaborations

are established in Spain, with private providers facilitating the use of their telemedicine platforms for the public health providers.[15] Inpatient care for noncommunicable diseases during the pandemic also witnessed the successful trials of virtual care compared to traditional care regimens.[16,17]

India is a developing country with over 1.3 billion population and majority residing in rural areas.[18] There are concerns of un-equitable health care delivery due to poor access and availability along with a weak public health care system. Telemedicine was initiated in India as a pilot project of Indian Space Research Organization (ISRO) by Chennai's Apollo Hospital in the early 2000s.[19] Thereafter, some successful telemedicine projects in India include mammography services at Sri Ganga Ram Hospital, Delhi, Oncology at Regional Cancer Centre, Trivandrum, provision of medical care at the time of Maha Kumbha melas and disasters like Tsunami which had struck Indian coast in 2004.[20-22] Recent initiatives like National Medical College Network, National Telemedicine Network, and Use of Space Technology for Telemedicine have been done. However, these projects are limited in geographic location and utility. The large-scale adoption of telemedicine in public health care delivery is still not visible.

India has seen a surge in cases of COVID-19 despite its measures to contain the transmission of the virus by social distancing and stringent lockdown measures. Lack of access to health care is a major challenge in the period of lockdown.[23] Such incidents have paved the way for recognition of telemedicine where health care delivery could be made ubiquitously available.

The Indian government has adopted telemedicine to reduce direct doctor-patient contact during the course of pandemic. In view of the increasing importance of telemedicine at the time of COVID-19 pandemic, the guidelines on practice of telemedicine published in 2005 got revised in 2020 to focus on medical ethics, data privacy, confidentiality, documentation, digital records of consultation, and process setting of fees for telemedicine. It emphasizes on principles of medical ethics, including professional norms for protecting patient privacy and confidentiality as per the Indian Medical Council Act.[24] Several measures thereafter were introduced by the central and state governments to boost telemedicine services in country.

All India Institute of Medical Sciences, a premier institute has started providing consultation to patients on non-COVID-19 ailments through telemedicine. "Calldoc" and "DR YSR Telemedicine" are initiatives by state governments during COVID-19 to deliver OPD services. In Delhi, the government has joined hands with "CallDoc" app to launch 24 × 7 free online medical consultation services to help the patients connect with doctors remotely through mobile application for nonemergency medical needs. The user is able to connect to doctor through video or audio or chat and get the consultation over phone by using this mobile app and the patients can upload their test reports for doctors to review. The doctors can upload prescriptions on the app after consultation. "DR YSR Telemedicine" helps the health department to locate people with symptoms of COVID-19 in Andhra Pradesh. On receiving a missed call, an executive collects the detail of the patient and a doctor will respond through audio or video conference and will prescribe the medicines and tests required through SMS. COVID-19 symptomatic patients will be sent to PHCs, district, and state-level hospitals for further treatment.

Barriers and challenges to telemedicine adoption

Characteristics of end users need consideration while designing user-centered telemedicine intervention. Age, gender, education, socioeconomic determinants, digital literacy, and social environment are key parameters to consider.[25-27] Computer literacy, linguistic barriers between the provider and patient, and unawareness of the existence of services can lead to failure in adopting telemedicine in community.[28-30]

The high cost of implementation and poor policies of reimbursements for care delivered through telemedicine can result in resistance to change for the adoption of digital innovations among physicians. Licensing issue is a significant barrier because countries and states within countries require individual licensing requirements. A shortage of studies documenting economic benefits and cost-effectiveness of telemedicine applications is a challenge which has resulted in an inability to convince the policymakers to invest in telemedicine. Legal considerations such as the absence of an international legal framework to allow health professionals to deliver services in different jurisdictions and countries, lack of policies that govern patient privacy and confidentiality, and health professional authentication are major obstacles to telemedicine uptake. A Telemedicine network was established between countries of BIMSTEC (Bay of Bengal Initiative for Multi Sectoral Technical and Economic Cooperation) including India as these countries in common face disparity in health care delivery in urban and rural regions and shortage of trained specialists in peripheral health institutions. To bridge the service gap of mental health professionals in providing mental health care, a Telepsychiatry application was also launched in India in 2017. To improve the medical check-ups and enhance security of inmates of prisons, teleconsultation services were launched in prisons of Pune. Telemedicine centres such as Mukhyamathri Arogya Kendra (MAK) – e Urban Primary Health centres were launched in Andra Pradesh as an initiative to provide telemedicine services.

Telemedicine: All about Indian Telemedicine. [Internet] [Cited on 24 August 2020] Available from: http://telemedindia.org/home.html

Confidentiality and privacy issues could also pose a challenge. Issues include breach of personal health information that can occur on unsecured networks, as well as unlocked and unencrypted hardware that can be accessed by third parties. The lack of available high-speed bandwidth and complex application

design can also hamper the smooth functioning of the novel system. Also, technological challenges like software or hardware failure which can result in malfunctioning also pose a challenge to the implementation of telemedicine. The top barriers are technology-specific and could be overcome through training, change-management techniques, and alternating delivery by telemedicine and personal patient-to-provider interaction.[31]

Way forward

We hope that this pandemic of COVID-19 would mark a shift in the health care delivery system with more people accepting teleconsultation and a change in the face of the health system of the country. With the aim of achieving universal health coverage in India, there is a leap in adoption of digital health platforms in health sector following the release of National Health Policy 2017. The Blueprint on National Digital Health focuses on the standards for maintaining confidentiality and privacy of patient which health systems should incorporate to enable adoption of electronic health records.[32] Telemedicine can further effectively gain from such systems established. eSanjeevani is a web based online telemedicine initiative launched under Ayushman Bharat scheme of Government of India in 2019 to provide healthcare services to patients at home. About 21 states and union territories have initiated this service delivery free of cost through the Health and Wellness centres. The use of e Sanjeevani portal for non-covid patient care surged during the COVID-19 pandemic which reduced direct interface with the Healthcare professionals.

Government of India. Ministry of Health and Family Welfare. National TeleConsultation Service. [Internet][Cited on 24 August 2020] Available from: https://esanjeevaniopd.in/

Telemedicine holds a promising future in India with unprecedented growth and development in information and communication technology (ICT) system. Satellite transmission, high-speed broadband connectivity, mobile and wireless telephones are making inroads into suburban and rural India.[33] Other key growth drivers include the widespread use of wireless and web-based services, and improving technology which includes the adoption of 3G and upcoming availability of 4G spectrum and optic networks. The integration of telemedicine into national frameworks including public health preparedness is needed. Strategies to quickly define telemedicine frameworks, operational plans, communication toolkits, and data-sharing mechanisms must be available. This process should be supported by evaluation and research to describe and assess the impact of telemedicine during outbreaks.[14]

Rapid establishment of telemedicine can spearhead change in the overall health care delivery, simultaneously addressing contemporary global health issues.

Conclusion

In all countries, issues pertaining to confidentiality, dignity, and privacy are of ethical concern with respect to the use of ICTs in telemedicine. It is imperative that telemedicine be implemented equitably and to the highest ethical standards, to maintain the dignity of all individuals and ensure that differences in education, language, geographic location, physical and mental ability, age, and sex will not lead to the marginalization of care.[34] This pandemic has paved light on the importance of telemedicine in service delivery and how it is going to be accepted in future. Policymakers and health care providers should be mindful to accept the advantages of delivering care through virtual mode in this digitalized world and should encourage the development of policies and guidelines on the subject on an urgent mode to support the uptake of telemedicine in an efficient manner.

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Conflicts of interest

There are no conflicts of interest.

References

1. WHO. A Health Telematics Policy in Support of WHO's Health-For-All Strategy for Global Health Development: Report of the WHO Group Consultation on Health Telematics, 11–16 December, Geneva, 1997. Geneva: World Health Organization; 1998.

2. Baudier P, Kondrateva G, Ammi C. The future of telemedicine cabin? The case of the French students' acceptability. Futures 2020;122:102595.

3. Allaert FA, Legrand L, Carime NA, Quantin C. Will applications on smartphones allow a generalization of telemedicine? BMC Med Inform Decis 2020;20:30.

4. Rockwell KL, Gilroy AS. Incorporating telemedicine as part of COVID-19 outbreak response systems. Am J Manag Care 2020;26:147-8.

5. Cervino G, Oteri G. COVID-19 pandemic and telephone triage before attending medical office: Problem or opportunity? Medicina (Kaunas) 2020;56:250.

6. Mann DM, Chen J, Chunara R, Testa PA, Nov O. COVID-19 transforms health care through telemedicine: Evidence from the field. J Am Med Inform Assoc 2020;27:1132-5.

7. Cormi C, Chrusciel J, Laplanche D, Dramé M, Sanchez S. Telemedicine in nursing homes during the COVID-19 outbreak: A star is born (again). Geriatr Gerontol Int 2020;20:646-7.

8. WHO. Strengthening the Health System Response to COVID-19 Recommendations for the WHO European Region Policy brief. Geneva: World Health Organization; 2020. Available from: http://www.euro.who.int/__data/assets/pdf_file/0003/436350/strengthening-health-system-response-COVID-19.pdf. [Last accessed on 28 Apr 2020].

9. Khairat S, Meng C, Xu Y, Edson B, Gianforcaro R. Interpreting COVID-19 and virtual care trends: Cohort study. JMIR Public Health Surveill 2020;6:e18811.

10. Atlanta. Centre for Disease Control and Prevention. Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 (COVID-19) in Healthcare Settings. April 13, 2020. Available from:

https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html. [Last accessed on 24 Apr 2020].

11. Using Telehealth to Care for Patients During the COVID-19 Pandemic [Internet] 2020 May 8 [cited on May 10]. Available from: https://www.aafp.org/patient-care/emergency/2019-coronavirus/telehealth.html. [Last accessed on 10 May 2020].

12. Bokolo AJ. Use of telemedicine and virtual care for remote treatment in response to COVID-19 pandemic. J Med Syst 2020;44:132.

13. Song X, Liu X, Wang C. The role of telemedicine during the COVID-19 epidemic in China-experience from Shandong province. Crit Care 2020;24:178.

14. Ohannessian R, Duong TA, Odone A. Global telemedicine implementation and integration within health systems to fight the COVID-19 pandemic: A call to action. JMIR Public Health Surveill 2020;6:e18810.

15. Vidal-Alaball J, Acosta-Roja R, Pastor N, Sanchez U, Morrison D, Narejos S, *et al.* Telemedicine in the face of the COVID-19 pandemic. Aten Primaria 2020;52:418-22.

16. Jones MS, Goley AL, Alexander BE, Keller SB, Caldwell MM, Buse JB. Inpatient transition to virtual care during COVID-19 Pandemic. Diabetes Technol Ther 2020;22:444-8.

17. Garg SK, Rodbard D, Hirsch IB, Forlenza GP. Managing new-onset type 1 diabetes during the COVID-19 pandemic: Challenges and opportunities. Diabetes Technol Ther 2020;22:431-9.

18. New Delhi. India. Census of India. Urban- Rural Population of India. Ministry of Home Affairs, GOI; 2011 Jul. [Internet] Available from: http://censusindia.gov.in/2011-prov-results/paper2/data_files/india/Rural_Urban_2011.pdf. [Last accessed on 24 Apr 2020].

19. Banglore. India. Indian Space Research Organization. Telemedicine: Healing touch through space; 2005 Feb. [Internet]. Available from: http://www.televital.com/downloads/ISRO-Telemedicine-Initiative.pdf. [Last accessed on 24 Apr 2020].

20. Sudhamony S, Nandakumar K, Binu P, Niwas SI. Telemedicine and tele-health services for cancer-care delivery in India. IET Commun 2008;2:231-6.

21. Mishra SK, Ayyagari A, Bhandari M, Bedi BS, Shah R. Telemedicine application in mahakumbhmela (Indian festival) with large congregation. Telemed J E Health 2004;10:S107-8.

22. Telemedicine. National Health Portal. India. [Internet]. 2016 Jul 16 [Updated 2019 Sep 13; cited 2020 May 10]. Available from: https://www.nhp.gov.in/telemedicine_pg. [Last accessed on 10 May 2020].

23. Kasaragod borders can't be opened, says K'taka: Court seeks a humane solution. The NEWS Minute [Internet] 2020 Mar 31 [cited 2020 April 28]. Available from:https://www.thenewsminute.com/article/kasaragod- borders-can-t-be-opened-says-k-takacourt-seeks-humane-solution-121549. [Last accessed on 28 Apr 2020].

24. Telemedicine: Practice Guidelines Enabling Registered Medical Practitioners to Provide Healthcare Using Telemedicine. India; 2020 Mar. p. 1-48. Available from: https://www.mohfw.gov.in/pdf/Telemedicine.pdf. [Last accessed on 28 Apr 2020].

25. Harst L, Lantzsch H, Scheibe M. Theories predicting end-user acceptance of telemedicine use: Systematic review. J Med Internet Res 2019;21:e13117.

26. Castells M. The Internet Galaxy: Reflections on the Internet, Business, and Society. Oxford University Press on Demand; 2002. doi: 10.1093/acprof:oso/9780199255771.003.0006.

27. Buente W, Robbin A. Trends in Internet information behavior, 2000–2004. J Am Soc Inf Sci Tec 2008;59:1743-60.

28. van Deursen AJ, van Dijk JA. Internet skills performance tests: Are people ready for eHealth? J Med Internet Res 2011;13:e35.

29. Robben SH, Perry M, Huisjes M, van Nieuwenhuijzen L, Schers HJ, van Weel C, *et al.* Implementation of an innovative web-based conference table for community-dwelling frail older people, their informal caregivers and professionals: A process evaluation. BMC Health Serv Res 2012;12:251.

30. Scholl J, Syed-Abdul S, Ahmed LA. A case study of an EMR system at a large hospital in India: Challenges and strategies for successful adoption. J Biomed Inform 2011;44:958-67.

31. Qaddoumi I, Bouffet E. Supplementation of a successful pediatric neuro-oncology telemedicine-based twinning program by e-mails. Telemed J E Health 2009;15:975-82.

32. India. Ministry of Health and family welfare. National Digital Health Blueprint. 2019 Apr Available from: https://www.nhp.gov.in/NHPfiles/National_Digital_Health_Blueprint_Report_comments_invited.pdf. [Last accessed on 24 Apr 2020].

33. Ganapathy K. Telemedicine in India. APBN 2006;10:1086-91.

34. Resolution and Decisions. World Health organization. WHA58.28. eHealth. In: Fifty-eighth World Health Assembly, Geneva; 2005 May 16–25. Available from: https://apps.who.int/gb/ebwha/pdf_files/WHA58REC1/english/A58_2005_REC1-en.pdf. [Last accessed on 24 Apr 2020].