



## Commentary

## Deployment of telemedicine as another mitigation tool during the COVID-19 pandemic in India

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## ABSTRACT

Healthcare systems in resource scarce countries continue to face unprecedented challenges due to the COVID-19 pandemic, including saturation of healthcare system capacities. Data suggest that medical staff deployed for COVID-19 containment are at higher risk of exposure and thus greater susceptibility to infection, further decreasing the available workforce. Telemedicine, as an additional healthcare delivery approach, can circumvent hospital visits of non-critical COVID-19 patients and thus reduce exposure of both providers and non-COVID-19 patients. Widespread implementation of telemedicine at this watershed moment for healthcare system in India will establish a new public health delivery alternative that can cater to the COVID-19 pandemic and beyond.

## 1. Introduction

COVID-19 pandemic continues to cause unprecedented morbidity and mortality across nations. As evident through various clinico-epidemiological surveys and from the second wave of infections, a large proportion of the Indian population, including in the rural areas, remains vulnerable to acquiring SARS-CoV-2 infection [1]. The caseload of the second wave in India in 2021 has pushed the capacities of its healthcare system beyond limits in many foci. The medical infrastructure in India is under intense pressure due to the vast numbers of critical COVID-19 patients. In addition to risks from exposure to COVID-19 patients, there are risks of infection for medical staff from hospital environments, from infectious co-workers, and from extended times in ICUs [2]. When the pandemic struck in 2020, there was a rise in tele-consultations and the second wave has increased the demand for telemedicine even further. Thus, it is timely to consider expansion of teleconsultation approaches to reduce the burden on hospitals and allow safer working environment for healthcare providers.

## 2. Digital technology as a tool against COVID-19

In essence, telemedicine entails medical consultation, remote patient monitoring and distantly supervised treatment [3]. Telemedicine using digital communication technology allows healthcare professionals to evaluate, diagnose and treat patients remotely thus obviating the need

for patient visits. A host of clinical services like medical consultations, scheduling of follow-up visits, guidance for self-management, rehabilitation and medication management can be dispensed via secure video and audio connections [4]. The ultimate utility of telemedicine can be appreciated during global health emergencies such as COVID-19 [5], where the workforce of health system itself is under grave threat from infection by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). Therefore, protection of frontline medical personnel becomes top priority during the management of this pandemic.

Telemedicine has other notable advantages. Besides reducing exposure of providers to SARS-CoV-2, widespread implementation of telemedicine can also contribute [3] to COVID-19 mitigation via: (1) "Forward triage" i.e., sorting patients before arrival in emergency departments, (2) fast tracking of mild cases to minimize hospital visits, (3) scheduling visits of non-respiratory illness patients to reduce peak load in COVID-19 times, (4) leveraging access to wider range of medical specialists, (5) round the clock remote clinical care, especially when physical access may be unfeasible due to lockdowns, (6) online pre-screening based on medical records and diagnostic tests, (7) enabling long distance consultations, (8) tailor-made ICU monitoring programs for patients of variable disease severity, (9) providing medical care even when healthcare providers are either ill or quarantined, (10) lowering levels of physical and mental fatigue, (11) reducing usage of personal protective equipment, (12) stemming the costs associated with hospital visits including transport, security and sustenance of patient

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families [6], (13) enforcing digital vigilance on the quality of healthcare, and (14) establishing a standardized, integrated platform that will cover all future medical needs in COVID-19 era and beyond.

### 3. Adoption of telemedicine by India

Many virtues are associated with a telemedicine-inclusive national health system that may specially benefit developing and underdeveloped nations. Telemedicine as an adjunct facet of healthcare facilities can: (a) establish new egalitarian health systems, (b) may be more cost-effective to the country and to the patients, (c) will allow access to best medical expertise despite geographical barriers, (d) can be of added value for medical conditions that need multi-disciplinary expertise where scheduling of multiple consultant appointments becomes a bottleneck in diagnosis and patient care, (e) will discourage quackery, (f) could reduce dependence on unqualified practitioners, especially so in countries with poor health infrastructures, and (g) can capture the significant patient population that gravitates towards alternative (bogus) medicine due to their inability to access standard evidence-based modern medicine systems.

Further, the health inequities all over the world arising out of decades of socio-economic and racial disparities are far more stark in this time of COVID-19 [7,8]. We foresee that digital healthcare approaches can offer a level playing field to the most disadvantaged sections of society as medical access and its performance can be monitored without bias.

Expanding the footprint of telemedicine in nations like India will be beneficial. India's ~1.3 billion population has variable distribution of medical care. India's three tier healthcare system starts with districts (total of 736 with average population of ~2 million) that are further divided into blocks and villages. District level hospitals are tertiary care facilities and blocks have community health centres (secondary level care that caters to ~0.3 million). Villages have access to primary healthcare centres (and cater to ~50 thousand). An essential provision of deploying telemedicine countrywide in India will be its availability to all levels of healthcare as India's graded system necessitates establishments of virtual networks for primary, secondary and tertiary care. Thus the COVID-19 crisis presents an opportunity to consider investment in telemedicine that can provide equitable medical access to all levels of social organization in India and other countries.

### 4. Requirements for implementation

Telemedicine-specific developments and subsequent deployment of information technology is the backbone of telemedicine [9]. Nationwide rollout of telemedicine will have to cross many hurdles including [10] (a) policy barriers wherein accreditations and regulatory bodies will need to be integrated, (b) technological barriers that include lack of hardware and software required for digital integration, (c) legal barriers where clarity on digital prescription, malpractice liability and insurance claims will need to be addressed, (d) financial barriers for the initial establishment of telemedicine networks, and (e) social barriers wherein patients may be resistant towards adopting virtual consultations given the comfort feeling associated with direct contact with medical professionals. However, since COVID-19 has necessitated both sudden infusion of financial resources and uniformity in national public health policies in many countries, the time is ideal for overcoming any obstacles in the road towards telemedicine universality.

### 5. Conclusions

The current COVID-19 crisis worldwide provides an opportunity to circumvent the usual inertia and lassitude in adoption of new healthcare

provisions. It is apparent that telemedicine is a disruptive technology whose expansion and widespread implementation can play a decisive role in public health. The investments in public health management due to COVID-19 emergency must provide sustainable and strategic solutions so that once this healthcare emergency recedes or diminishes, the national healthcare infrastructures it leaves behind can be redirected easily towards the provision of quality healthcare. Thus, expansion of telemedicine will contribute not only towards better COVID-19 patient management in India but will also bear fruit in coming times for strengthening the healthcare system of the country.

### Ethics approval and consent to participate

Not applicable.

### Consent for publication

Not applicable.

### Availability of data and materials

Not applicable.

### Competing interests

The authors declare that they have no conflict of interest.

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### Declaration of interests

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### References

- [1] S. Malhotra, M. Rahi, P. Das, R. Chaturvedi, J. Chhibber-Goel, A. Anvikar, H. Shankar, C.P. Yadav, J. Meena, S. Tewari, S.V. Gopinath, R. Chhabra, A. Sharma, A prospective observational study of clinico-epidemiological profiles and associated risk factors of SARS-CoV-2 positive patients from India, *Open Biology* 11 (6) (2021) 200288, <https://doi.org/10.1098/rsob.200288>.
- [2] J.E. Hollander, B.G. Carr, Virtually perfect? Telemedicine for covid-19, *N. Engl. J. Med.* 382 (2020) 1679–1681.
- [3] B. Klaassen, B.J. van Beijnum, H.J. Hermens, Usability in telemedicine systems-A literature survey, *Int. J. Med. Inf.* 93 (2016) 57–69.
- [4] J. Freed, C. Lowe, G. Flodgren, R. Binks, K. Doughty, J. Kolsi, Telemedicine: is it really worth it? A perspective from evidence and experience, *J. Innovat. Health Inf.* 25 (1) (2018), 014–018.
- [5] A.C. Smith, E. Thomas, C.L. Snoswell, H. Haydon, A. Mehrotra, J. Clemensen, et al., Telehealth for global emergencies: implications for coronavirus disease 2019 (COVID-19), *J. Telemed. Telecare* 26 (5) (2020) 309–313.
- [6] M.R. Sim, The COVID-19 pandemic: major risks to healthcare and other workers on the front line, *Occup Environ Med* 77 (5) (2020) 281–282.
- [7] W.N. Laster Pirtle, Racial Capitalism: a fundamental cause of Novel Coronavirus (COVID-19) pandemic inequities in the United States, *Health Educ. Behav.* 1–5 (2020).
- [8] K. Bibbins-Domingo, This time must be different: disparities during the COVID-19 pandemic, *Ann. Intern. Med.* (2020), <https://doi.org/10.7326/M20-2247>.
- [9] A. Kapoor, S. Guha, M.K. Das, K.C. Goswami, R. Yadav, Digital Healthcare: the only solution for better healthcare during COVID-19 Pandemic? *Indian Heart JEPub* (2020) <https://doi.org/10.1016/j.ihj.2020.04.001>.
- [10] C.M. Kruse, P. Kareem, K. Shifflett, L. Vegi, K. Ravi, M. Brroks, Evaluating barriers to adopting telemedicine worldwide: a systematic review, *J. Telemed. Telecare* 24 (1) (2018) 4–12.