Challenges in delivering primary care via telemedicine during COVID-19 pandemic in India: A review synthesis using systems approach

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ABSTRACT

Background: Countries, including India, were quick to adopt telemedicine for delivering primary care in response to the widespread disruptions due to the coronavirus disease 2019 (COVID-19) pandemic. This expeditious adoption was critical and the challenges faced during this exigency could guide the design and delivery of future telemedicine applications toward strengthening primary healthcare services. **Methods:** To identify the challenges in delivering primary care via telemedicine technology in the Indian context, a scoping review was conducted. Drawing from the systems approach in healthcare delivery, the review findings are summarized at four levels, patient, provider, healthcare organizations, and policy. **Results:** The initial search yielded 247 articles and 13 met our inclusion criteria. This review highlighted that telemedicine facilitated the continuity of care during COVID-19 but not without challenges. Low levels of education and computer literacy along with the language barriers posed the predominant challenges at the patient level. Providers had concerns related to digital literacy, clinical process flows, legal liabilities, and unethical behavior of the patients. The policy-level challenges include data privacy and security, reimbursement models, unethical behavior by the patient, or provider, and regulating prescriptions of psychotropic drugs. A lack of an integrated telehealthcare model covering diagnostics, prescriptions, and medication supply mirrored the existing fragmentation of care delivery. **Conclusion:** Telemedicine has the potential to improve primary healthcare delivery even beyond COVID-19. Currently, telemedicine applications in India are only facilitating a remote consultation wherein an integrated person-centered care is lacking. There is a need to acknowledge and factor in the inter-connectedness of health system elements for ensuring an effective and efficient healthcare delivery via telemedicine.

Keywords: Challenges, COVID-19, India, primary care, systems approach, telemedicine

Introduction

The world health organization (WHO) declared a public health emergency on March 11, 2020, and in the absence of a definitive treatment for the severe acute respiratory syndrome coronavirus 2 (SARS COV-2) virus, countries adopted preventive measures including safe distancing and face-covering while enforcing restrictive measures including lockdowns and quarantine measures.[1] These restrictive measures resulted in severe disruption of health services delivery, and in particular, covid primary health services were significantly affected, especially in low-middle income countries (LMICs) and in this context, the WHO recommended virtual consultations using telemedicine.[2] As the pandemic surged, care of COVID-19 infected patients was of utmost priority. This unprecedented demand on the healthcare delivery systems resulted in widespread panic and avoidance of health services utilization. This was more pronounced

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among people with chronic conditions particularly patients with non-communicable diseases (NCDs), those dependent on interventions such as dialysis, chemotherapy, and regular blood transfusions suffered the most due to the movement restrictions and repurposing of routine health services delivery for COVID-19 management.[3] Many studies have highlighted the challenges in availing treatment for chronic conditions during the COVID-19 pandemic in India.[4–6] These range from transportation issues due to lockdown, non-availability of prescribed medications, non-availability of teleconsultation slots, deferral of surgeries, loss to follow-up, among others. Early in the pandemic, recognizing the potential impact of disruptions to routine health services delivery, a shift to a virtual care delivery model became necessary, and countries across the globe started issuing guidelines for teleconsultations. The board of governors of the Medical Council of India issued Telemedicine Practice Guidelines in late March 2020, which was then ratified as a gazette notification.[7] The exigent adoption of telehealth modalities for delivering healthcare was *ad hoc*. The adoption of telemedicine on a large scale is a significant shift in the healthcare delivery model.[8-10] A primary care physician needs to be cognizant of these shifts—architectonic and far-reaching as they are potentially because of the following. There is a lack of congruence between the dangers in the future due to multiple factors, which are the mining of personally identifiable patient-specific data, the immediacy of the need of primary and tertiary care physicians to provide immediate attention to critical patients even in India's LMIC setting, making nascent telemedicine technologies the only viable option, but finally, the use of which is compounded by the lack of overarching legal, technological, reimbursement, and medical frameworks. These multiple, overarching, and interdependent factors make for a paradigm shift that will affect patients, doctors as well as the healthcare system.[9,11,12] This is why this paper adopts a systems approach as under.

The effectiveness and efficiency of a healthcare delivery system using technology (like telemedicine) would depend upon the interactions among the interdependent elements within a broader system, which include patients, providers, the healthcare delivery system, and the environment (policy). The healthcare systems ought to be patient-centered wherein the needs and preferences of the individual patients must be factored in the design and delivery of healthcare[11-13] For this, the question that needs to be answered is how the system will ensure that preferences and values are factored while delivering care through telemedicine.

Further, the delivery of holistic and effective care is an integrated process and requires an understanding of the interdependencies among various healthcare system elements.[14] Thus, a systems approach is critical to understanding the challenges in delivering healthcare via information and communication technology (ICT). With this background, this study adopts a systems approach to synthesize the challenges faced in providing primary care during COVID-19 in the Indian context. A systems approach recognizes the multiplicity of elements and their interaction that affects the intended outcome.[14,15] The elements in a systems framework for healthcare delivery consist of patients, frontline healthcare providers, organization (infrastructure/resources), and environment (regulatory, market, and policy framework). These elements serve as our themes for narrative synthesis.

Methodology

A scoping review was conducted using the Arksey & O'Malley framework,[16] wherein the search strategy is guided by the study objectives. The literature review followed the preferred reporting items for systematic reviews and meta-analyses (PRISMA) guidelines [Figure 1]. The literature search was conducted using the popular medical literature electronic database MEDLINE (through PUBMED) and SCOPUS, the largest database of peer-reviewed literature. The initial search with the identified search criteria yielded 247 articles (PUBMED = 145; SCOPUS = 102). The search included articles published up to April 2021. Thirteen articles met the inclusion criteria and were read to extract the data within the systems framework in healthcare delivery.

Search terms

Telehealth OR telemonitoring OR teleconsultation OR telemedicine OR telehealth OR telecare OR telepathology OR telepsychiatry OR tele-dermatology OR tele-rehabilitation) AND ("covid-19" OR "2019 novel coronavirus infection" OR "2019-nov" OR "SARS-CoV-2" OR "COVID19" OR "COVID-19 pandemic" OR "COVID19 pandemic" OR "covid 19" OR "covid 2019" OR "severe acute respiratory syndrome coronavirus 2" OR "severe acute respiratory syndrome coronavirus 2" OR "2019 ncov" OR "sars cov 2" OR "2019 ncov") AND ("Challenges" OR "barriers" OR "concern" OR "implementation" OR "experience") AND ("India" OR "Andhra Pradesh" OR "Arunachal Pradesh" OR "Assam" OR "Bihar" OR "Chhattisgarh" OR "Goa" OR "Gujarat" OR "Haryana" OR "Himachal Pradesh" OR "Jharkhand" OR "Karnataka" OR "Kerala" OR "Madhya Pradesh" OR "Maharashtra" OR "Manipur" OR "Meghalaya" OR "Mizoram" OR "Nagaland" OR "Odisha" OR " Punjab" OR "Rajasthan" OR "Sikkim" OR "Tamil Nadu" OR "Telangana" OR "Tripura" OR "Uttar Pradesh" OR "Uttarakhand" OR "West Bengal" OR "Delhi")

Inclusion criteria

Primary studies published in peer-reviewed journals on using, implementing, or evaluating telemedicine in its various modes during COVID-19 in the Indian context were included. The title and abstracts of the retrieved searches were screened for relevance to answer the study questions and to remove duplicates using the Reference Management Software, Mendeley.

Data extraction

The included studies were reviewed in full-text (*N* = 13) and the data were obtained regarding the healthcare organization
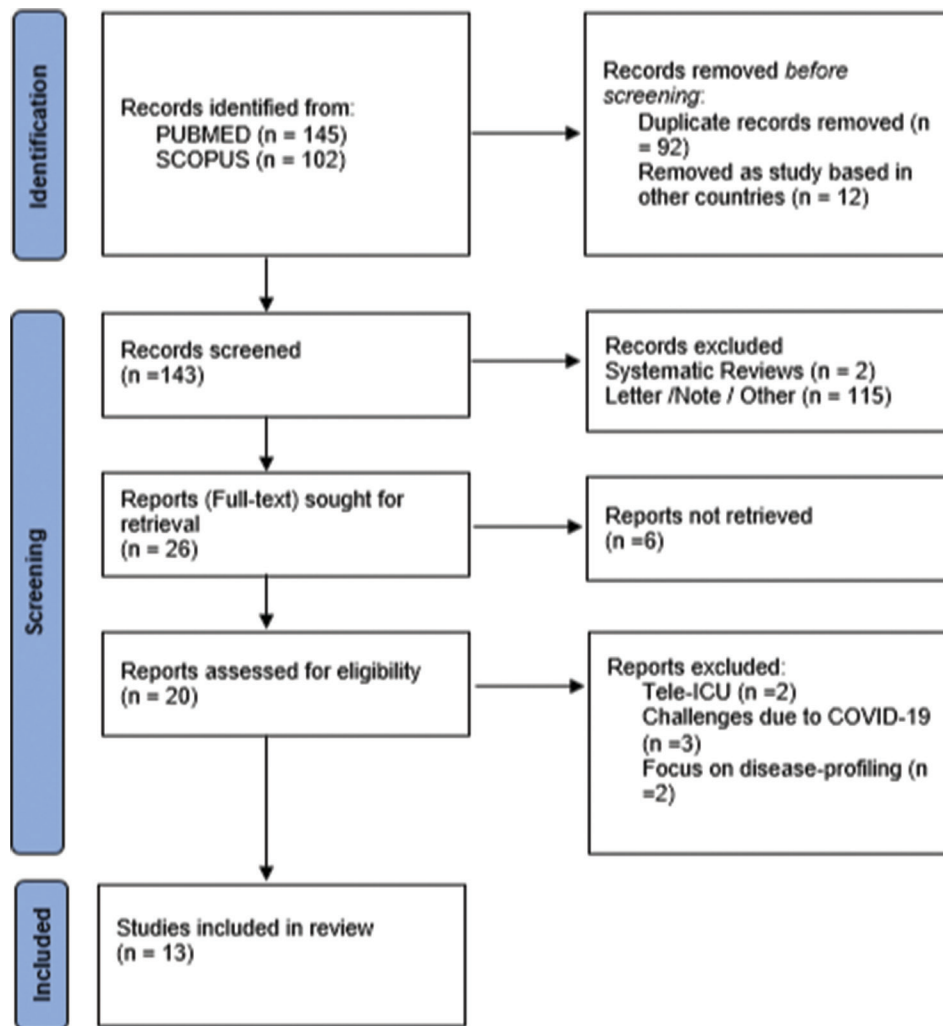
Figure 1: PRISMA Flow diagram depicting the selection of studies in our review

type (tertiary hospital/clinic), hospital ownership type (public/private/non-governmental organization (NGO)), location of the hospital, and purpose for initiating the telemedicine (TM) service (primary consultation/follow-up care). As part of the analysis, we focused on the challenges faced by the patients/healthcare providers while receiving/delivering care through TM modalities. The data extraction guided by the systems approach in healthcare delivery followed four themes: issues faced by patients; providers, challenges at the level of organization; and challenges at the policy level. The findings are summarized using the narrative synthesis approach with the identified themes.

Results

The initial search yielded 247 articles through the PUBMED and SCOPUS databases. After applying our screening criteria, we identified 13 articles for the full-text review. All 13 articles were read carefully to extract the relevant information. [Table 1] provides a summary of telemedicine interventions in India during COVID-19. More than 50% of the studied interventions are from

the northern region. Close to 50% of the interventions were from public hospitals. All the included studies were performed in tertiary care centers except one which was done in a private clinic in Kerala. It is worth noting that all the interventions used the WhatsApp platform either for video consultation or for sharing prescriptions.

Table 2 provides a summary of the identified challenges or concerns. It is evident from this review that telemedicine is more acceptable for follow-up case management. Specialties like Ophthalmology find it difficult to diagnose without in-person visits.[17,18] Providers involved in long term care expressed the need for an integrated care as loss to follow-up becomes common when effective referral mechanisms are missing.[19,20] Some studies mention that patients, specifically elderly age groups, prefer face-to-face consultations.[21] A common agreement across the studies is that telemedicine can be used effectively for forward triaging, is useful in reducing the risk of infections for multi-morbidity patients, reduces crowding at the health centers, and reduces the travel cost for the patient.

Challenges or concerns summarized using the systems approach

A recent review of the systems approach in healthcare design and delivery defined the systems approach as "a way of addressing health delivery challenges that recognize the multiplicity of elements interacting to impact an outcome of interest and implements processes or tools in a holistic way."[15] Adopting the four-level model of the systems approach by Reid *et al.*,[14] the challenges in delivering primary healthcare via telemedicine are outlined in [Figure 2].

At the level of the patient, preferences for face-to-face consultation, language barriers, and limited digital literacy, especially among the elderly population, are predominant challenges. For achieving an equitable healthcare system (using teleconsultation) issues related to computer literacy and language barriers must be addressed.

Providers had concerns related to the efficiency of clinical workflows when delivering remote care.

Some of the studies have highlighted that providers are not comfortable using technology for delivering care owing to risks of misdiagnosis, and the use of technology being more time-consuming relative to face-to-face consultations.[20] There is a need to address the training needs of the healthcare providers by incorporating healthcare informatics education early in their careers. The National Institute of Mental Health and Neurosciences (NIMHANS) under the Ministry of Health and Family Welfare is actively involved in promoting telepsychiatry services by training the healthcare providers in delivering remote care and issuance of telepsychiatry guidelines during the COVID-19 pandemic.[29,30] There is a need for such initiatives by other organizations as well.

Currently, TM applications are only facilitating a remote consultation with e-prescription wherein the continuity of care ranging from prevention strategies, diagnostics, delivery of prescribed medicines, and referral to other departments (if required) are missing[29,31]. There is a need to organize the health system elements such that integrated care can be ensured. The efficiency in the current practices of TM could be enhanced by ensuring that the providers are familiarized in using these technology systems, enhancing the user interface, and embedding electronic health records (EHR) that would permit tracking and measuring of outcomes including assessing for the variability of care and deviations from the standard treatment

Table 1: Summary of the articles (telemedicine interventions) included	
Variable	**Frequency/Percentage**
India Region	
South	4
North	6
Northeast	1
West	1
East	1
Hospital Type	
Public	5
Private	3
NGO	2
PPP	1
Purpose	
Primary Consultation and Follow-up Care	40%
Follow-up Cases	60%
Month/Year of Publication	
June - August 2020	4
September - November 2020	4
December - February 2021	5
WhatsApp used for consultation/ sharing prescriptions	100%
Followed India's Telemedicine Guidelines	100%
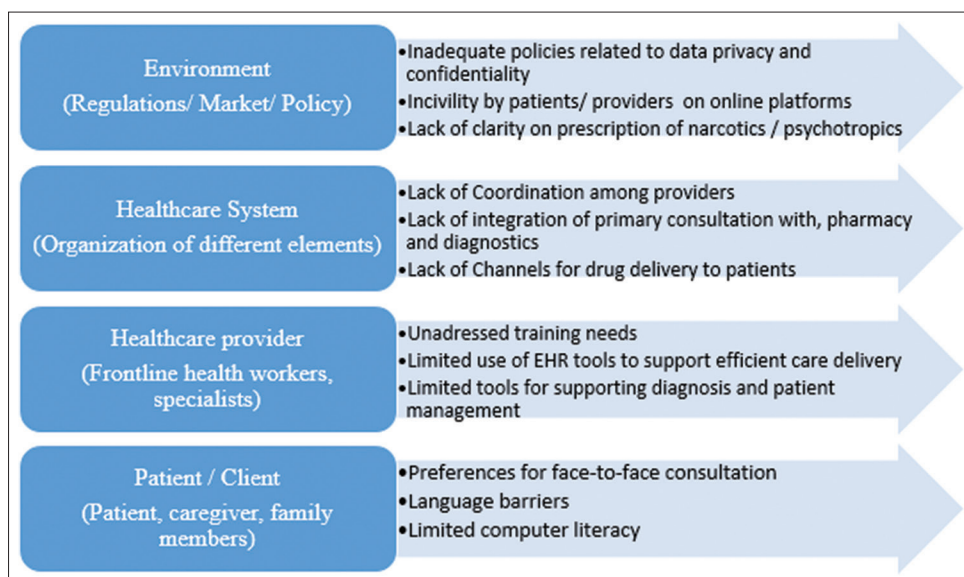
Figure 2: Challenges in delivering primary care - synthesis using systems approach

Zone	Public/Private Hospital	Department	Main Purpose	Challenges/Concerns
			Table 2: Telemedicine initiatives and challenges or concerns	
South	Non-Profit Charitable Hospital	Cardiology	Active surveillance of already registered patients (patients on anticoagulants) [22]	Transition to virtual mode is desirable after at least two in-person visits Lab test reports need to be uploaded. Thus, patients residing in remote areas may have to travel long distances to get tests done
Northeast	PPP	Psychiatry	Tele-counseling for new as well as follow-up cases[23]	Difficulty getting a formal signed consent Refiling the doses without actual examination is tricky Difficult to build trust for new cases
South	Private Clinic	Rheumatology	Teleconsultation for primary and follow-up cases[21]	26% of the patients preferred face-to-face visits even though as per clinicians they were eligible for teleconsultations
North	Public Tertiary Care Center	Ophthalmology	Teleconsultation for primary and follow-up cases[17]	40% of the new cases required in-person visits Virtual mode is more time-consuming
North	Private Tertiary Care Center	Cardiology	Active surveillance of patients on anticoagulants[24]	Patients were required to visit labs for repeated testing
North	Public Tertiary Level	Gastroenterology	Follow-up for inflammatory bowel disease[25]	Not all patients were familiar with video consultations
North	Public Tertiary Level	Oncology	End-of-life care to cancer patients in terminal stage[26]	Continuous monitoring not possible
South	NGO (Not-for-profit)	Ophthalmology	Teleconsultation for primary and follow-up visits[18]	About 20% of the patients required in-person visits TM can act as an effective forward triage
North	Public	Rheumatology	Continuity of care for chronic patients[20]	The recording and reporting of outcome measures was a challenge for patients with lower education status Misinterpretation of the symptoms by the patients Voice and video quality Language barrier Incivility by patients sharing of inappropriate content Accessibility to lab services Involving other disciplines for ensuring holistic care
North	Public	Oncology	Palliative care for cancer patients[19]	Safety of patient data is an issue while using platforms like WhatsApp for consultations Opioids' prescription Loss to follow-up Lack of multi-disciplinary approach
South	Private	All Departments	Teleconsultations for primary and follow-up visits[27]	Elderly patients prefer face-to-face consultations Computer literacy is a concern Internet connectivity
West	Public/Private	Psychiatry/ General Physicians	Perceptions/challenges faced by physicians while delivering care for dementia through telemedicine[28]	Virtual assessment is a challenge Interrupted connections make it difficult for patients to comprehend questions Establishing therapeutic rapport with the patient is a challenge in virtual mode Physicians are concerned as there is a lack of clarity of legal implications Ensuring coordinated care (referral to other departments) was a challenge
East	Private Tertiary Care Hospital	Cancer	Challenges faced by patients[4]	Non-availability of slots for teleconsultation Network connectivity Lack of guidance on accessing modes of care

workflows. Studies from developed economies have highlighted the significance of an integrated telemedicine approach in reducing costs and improving efficiency.[32–34] An integrated system ensures timely access to patients' records, saves time in data entry, and reduces chances of medical errors.[34]

With the adoption of new technology arises new legal and accountability issues such as data privacy, patient consent, standardization of varied applications, maintaining ethical standards both by patients and providers. All the studied interventions have used WhatsApp either for video consultation or sending prescriptions. This has implications for privacy and data security around sensitive demographic and individual patient data in the context of recent debates and increasing recognition of privacy infringements by these social media platforms.

Discussion

This scoping review focuses on telemedicine initiatives in the Indian healthcare system implemented during COVID-19.

The review found that hospitals, both public and private, were quick to adopt telemedicine technology in response to the COVID-19 pandemic and delivered care via audio and video mode using the easily available platforms facilitating video calls, such as WhatsApp, Facebook, and Skype. Though providers were using social media platforms due to the emergent situation, they had concerns about patient privacy and data security while using these platforms. Thus, there is an evident need of adopting safe and secure platforms for delivering care to mitigate patients' as well as providers' perceived risks, thus, ensuring better acceptability and sustainability of the telemedicine platforms. Several public and private initiatives emerged in the telehealth space as the digital health ecosystem became favorable with the release of Telemedicine Practice Guidelines during the COVID-19 pandemic. Telemedicine for care delivery is not a new development but has gained momentum during the pandemic owing to lockdowns, travel restrictions, and fear of disease transmission. The longstanding concern regarding the widespread adoption of health information technologies in healthcare is linked to poor-user acceptance and stems from a lack of process reengineering to garner the efficiencies that these technologies offer. Often despite automation, several manual steps continue to co-exist, thereby, placing an additional burden on the users, which perhaps explains the slow and sluggish adoption of telemedicine for delivering care. While the COVID-19 pandemic has accelerated its uptake, the sustainability of the initiatives remains questionable. Thus, it is critical to understand the challenges faced by different stakeholders at various health system levels and adapt the systems accordingly. In recent months, governments across developing countries are expanding telemedicine service use in routine care. This review is timely and summarizes the learnings from the experience of using telemedicine for delivering primary care in a resource-constraint setting.

The Indian Government, in its efforts toward achieving universal health coverage (UHC), plans to ensure comprehensive primary healthcare through health and wellness centers (HWCs) under its flagship program, *Ayushman Bharat*. For addressing healthcare delivery challenges and workforce shortages, specifically in rural and remote areas, HWCs are expected to harness the potential of technology.[35] The eSanjeevani provider-to-provider program is expected to connect 150,000 HWCs via telemedicine services to specialist services. With effective implementation of telemedicine services at HWCs, the Indian Government envisages decongesting secondary-care facilities, reducing the cost of care, improving referral advice, and ensuring specialist services.[35] Before COVID-19, the focus was on provider-to-provider telemedicine application, however, the unprecedented situation created by the pandemic mandated a shift toward patient-to-provider teleconsultation, *eSanjeevani* out-patient department (OPD).

The issues faced by the patients in India, particularly those suffering from chronic conditions due to the COVID-19 pandemic, are well outlined in the existing literature.[6] The continuity of care was disrupted, many patients had to skip their medicines due to the non-availability of drugs, travel restrictions, and financial hardships. Teleconsultations provided a means to reach healthcare providers and ensure continuity of care. Thus, the launch of the eSanjeevani OPD during the COVID-19 pandemic by the Indian Government was critical and timely. Owing to the increased shift toward virtual consultations there is a need to continuously adapt and learn from our existing experiences. The study findings could guide the expansion of the eSanjeevani program and other telemedicine initiatives in India.

Utilizing the systems approach, this review has identified challenges at four levels in the healthcare system including the patients, healthcare providers, healthcare organization, and policy. At the policy level, data privacy and confidentiality remain pertinent issues. At present, the existing platforms are focussed on providing timely patient care. As a result of this, there is silence about the issues concerning patient data and privacy/confidentiality. One of the studies in our review highlighted the issue of incivility by patients.[20] There is a need for clear accountability frameworks for patients as well as providers for maintaining ethical standards during online consultations. At the health system level, the provision of integrated care remains a challenge. The current platforms only provide consultation with e-prescriptions sent to the patients. There was no follow-up mechanism to ensure if the patient received the drug or not. Some studies also report the abuse of e-prescriptions for drug overuse, especially psychotropic drugs.[36] At the provider level, the most frequently reported issues in delivering care via TM include difficulty in diagnosing, difficulty in utilizing the system, more time-consuming, and difficulty in building a rapport with the patient.

There is a definitive need for telemedicine services for ensuring continuity of care, however, factors affecting the acceptability, and thus, sustainability of telemedicine initiatives, require attention. The patients' preferences for face-to-face/virtual consultation are among the major factors that could affect the quality of the physician-patient interaction, and thus, the treatment outcome. The quality of treatment or treatment outcome would also depend upon the providers' confidence in delivering care through the TM modality. As identified in this review, many providers doubt the effectiveness of virtual diagnosis, perhaps, such concerns could be managed by ensuring sophisticated remote diagnostic tools. Moreover, training medical professionals in health informatics early on in their career path would ensure the providers' confidence in virtual consultations. The concerns related to data security, incivility by patients, prescription of psychotropic drugs, chances of drug abuse by patients via e-prescriptions among others could be addressed by strong regulatory frameworks. Many providers also raised concerns related to lost-to-follow-up in the current TM systems as the doctors' task ended with e-prescription. There was no follow-up mechanism to ensure if the patient received the medications or adhered to the treatment. Some studies highlighted that teleconsultations ensured consultation with the provider

but the patients faced issues in getting the prescribed medicines. Perhaps an integrated system wherein the delivery of medicines is ensured with the end of consultation are required. Similarly, for remote surveillance of chronic conditions, there is a need for repeat lab tests. Teleconsultation ensured that patients were guided to undergo tests but the process afterward was not defined and patients faced challenges. Many patients were not familiar with using the online system for consultations and there is a need to identify ways to address the issues of this sub-population. Thus, a systems lens is required for ensuring effective delivery of primary care wherein the interconnected elements in the healthcare delivery system, that is, the patients, providers, healthcare system, market, and regulatory environment support each other to work toward the common goal of improved health status.

Conclusion

In the wake of the COVID-19 pandemic, healthcare providers started providing telemedicine-supported consultations for primary care and/or follow-up care in India. The current telemedicine applications are facilitating consultations with/without e-prescriptions but fall short in ensuring integrated care, a majority of the telemedicine consultations do not generate a longitudinal electronic health record. The interdependencies of different health system elements must be factored in the design of telemedicine applications for ensuring effective and efficient healthcare delivery. As India does not have a primary care led gate-keeping function to ensure the health systems' efficiencies through risk-based triage, care cascading, and referral services, a national scale implementation of telemedicine supported primary care through the evolving Ayushman Bharat Digital Mission ecosystem provides an opportunity for policy interventions to ensure equitable and accessible health to all citizens.

Conflicts of interest

There are no conflicts of interest.

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