Telemedicine in India during COVID-19

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Abstract: *Travel has been limited due to corona virus disease (COVID-19), and social isolation has become the new standard. This pandemic outbreak has made telemedicine more critical than ever. This study aims to determine the factors that influence the rate of telemedicine adoption and the impact of the COVID-19 on these factors. The Medical Council of India issued practice guidelines in March 2020, anticipating an increase in the use of telemedicine by health-care providers. In this report, the literature on telemedicine and its implementations was reviewed and summarized in a historical and current sense, with a particular focus on recently published practice guidelines. Telemedicine would certainly broaden and become more commonly used.*

Keywords: COVID-19, Telemedicine, Pandemic

1. Introduction

Telemedicine is the use if telecommunications and information technology to provide specialized health care to patients who are far away or isolated. Clinicians will examine patients and make clinical decisions over long distances using this technology. [three] Real-time telemedicine is becoming possible thanks to technical advancements such as high-resolution vide cameras and secure broadband Internet. While India being a country with a population if over 1.39 billion, the amount if doctors is less.

Telemedicine can also be a mark where the gap between the rural and urban could be bridged. Equal distribution if healthcare facilities has always been challenging for the government. While it is unlikely to build a successful telemedicine network immediately, health facilities that have already done so will use it to combat COVID-19. [two] Health-care services will invest more money on telemedicine in the post-COVID era.The fig 1 represents simple telemedicine system. [1]

Telemedicine is one field that has succeeded in piquing the private sector's interest and encouraging them to participate actively in public health management. Narayana Hrudayalaya, Apollo Telemedicine Enterprises, Asia Heart Foundation, Escorts Heart Institute, and Amrita Institute are some if the current major Indian private sector players in telemedicine.
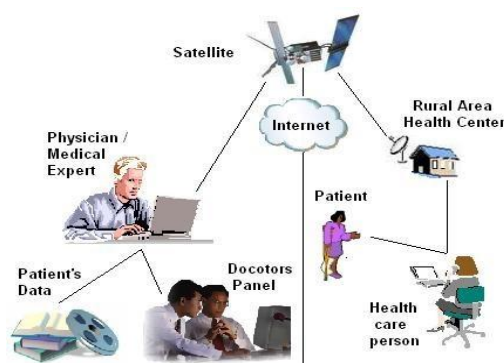

Figure 1: Simple telemedicine system

## 2. Telemedecine in India

a) Initial Stage

On March 30th 2000, India's telemedicine infrastructure was officially unveiled by Bill Clinton, then-President if the United States. In the village if Aragonda, the first telemedicine unit was created, some 200 kilometers from Chennai's tertiary treatment center. Clinton watched a live cardiac teleconsultation.

b) Arogya Setu App for Covid-19

When you go through your daily lives, Aarogya Setu uses touch tracing to keep track if all the people you come into contact with. If either if them tests positive for COVID-19 at a later date, you will be contacted promptly and proactive medical intervention will be planned for you. The software assists the Indian government in identifying hotspots and thereby preventing the transmission if the disease. The more users can use the software, the more efficient it would be at spreading the pandemic. It helped the government to predict 3,000 virus hotspots at a sub-post office level. With 25000 users of the app who tested positive, the government could contact trace over 400,000 people. Of these, 140,000 were found to be moderate and high risk. [2]
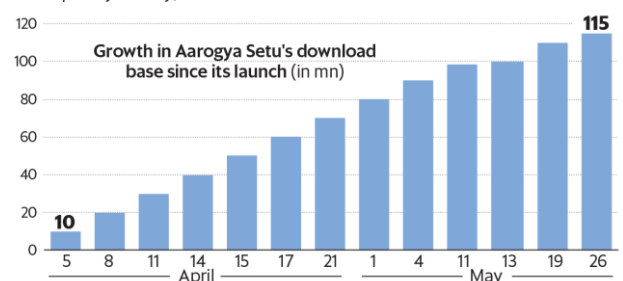
Figure 2: Aarogya setu app steady rise in download [2]

3. Emerging Indian Startups

India spends just 3.6 percent if its GDP on healthcare, which

is slightly less than other countries. This opens up a lot if doors for the private sector to invest in health tech startups and help the country's healthcare become more accessible. Unfortunately, the pandemic, which should have prompted investors to increase their investments in health tech companies, had the opposite impact.[3]

Some noteworthy Indian startups are as follows:

Dozee
The company offers remote patient care through its health tracking products both at hospitals and homes. The first Dozee unit was sold in 2019 after being tested and proved to be 98.4 percent as reliable as medical-grade equipment. The Rs 7,500 health monitor uses Ballistocardiography as the underlying technology, which involves placing a thin sensor layer under the user's mattress to collect data on micro-vibrations in the human body. To construct a user's health data, this data is further processed using sophisticated machine learning and artificial intelligence algorithms.

Practo
Practo is India's largest digital health firm, bringing together millions if patients and providers on a single platform. Practo provides its users with a healing touch by providing them with a trusted and familiar home. It was formerly known as Turbodoc. It was a low-cost cloud-based healthcare software as a service platform for delivering clinically valuable and usable healthcare information services. It sold its first product to a doctor in 2009. They renamed the firm Practo in late 2010. Fig 3 show estimated preview for practo. It is a patient-centered, objective, and independent medical website with over 100,000 doctor profiles from India and Singapore.

Patients can use this app to schedule confirmed appointments with specific doctors who are listed on Practo's website. [9]

Both doctors and patients benefit from this free service. It guarantees that its users will discover ways to live a healthier life.
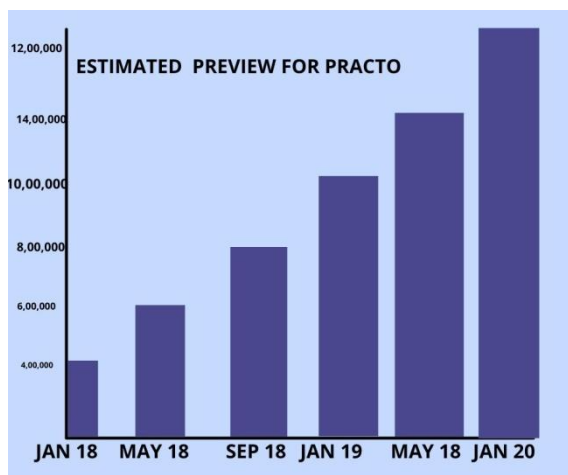

Figure 3: Estimated preview for practo

Arvi
Arvi is a senior healthcare management platform that includes a medical alert system that provides emergency and non-emergency medical assistance at the user's doorstep. The goal is to assist elderly people by tracking, monitoring, and improving their health. In the event of an emergency, seniors may simply press a button on their home screen to activate an alarm. This sends an automatic alert to five family members, and the Arvi support team will track the mobile's GPS location every sixty seconds and dispatch an ambulance and paramedic to the scene.[5]

Tricog
Tricog is one of the world's largest predictive healthcare analytics companies, having been founded in 2014. Dr. Charit Bhograj, an Interventional Cardiologist, founded Tricog after noticing that cardiac problems became more serious as a result of a delay in preliminary diagnosis (ECG). Tricog uses its extensive medical and technological expertise to provide remote clinics with Virtual Cardiology Services. inset", not an "insert". The word alternatively is preferred to the word "alternately" (unless you mean something that alternates). The startup which recently launched InstaEcho for remote echocardiography, using AI for the diagnosis of heart failure and screening for congenital heart disease, has a presence in more than 12 countries in Southeast Asia and Africa, with 3 million patients using its platform.[10]
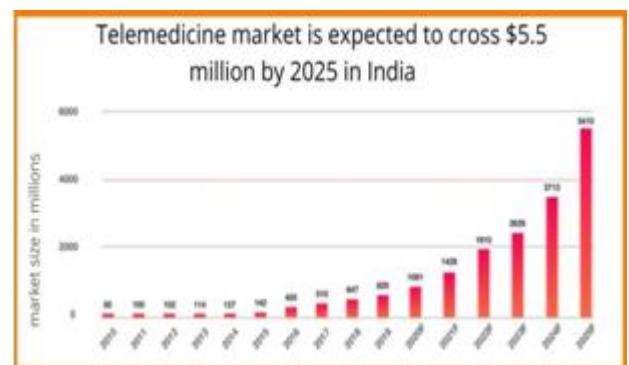

Figure 4: The growth of telemedicine in India [3]

4. Benefits during COVID-19

Telemedicine practices provide clinical information and allow consultation and debate between health-care professionals and patients regardless if where the patient is located, reducing travel expenses, saving time, lowering medical costs, and making specialist doctors more accessible to the general public without interfering with their daily duties. It can help in the following ways and be proved a boon:

a) Telemedicine may be used to provide psychological support to patients and their families while preventing them from becoming infected.
b) Telemedicine can be a safe and effective substitute for

in-person treatment. A Cochrane systematic review published in 2015 compared the effect if telehealth, which involves remote monitoring or vide conferencing, to in-person or telephone visits for chronic conditions like diabetes and congestive heart failure, and concluded that both had similar health outcomes.

c) During the COVID-19 pandemic, telemedicine will help relieve the burden on tertiary hospitals by providing diagnosis and treatment to patients in their own homes, lowering the risk if patient exposure from hospital visits, and reducing the burden on tertiary hospitals.

d) Telemedicine can be used to manage chronic diseases like bronchial asthma, hypertension, and diabetes mellitus on an ongoing basis, particularly at a time when social isolation is promoted. Individuals with these conditions are more vulnerable to COVID-19, and medication adherence and disease management are important ways to reduce the disease's severity.

e) Telemedicine can also be used to train caregivers for sick and disabled children and the elderly.

The Medical Council if India (MCI) Board if Governors has adopted the "Telemedicine Practice Guidelines," which include both overarching principles and a practical framework for telemedicine. While the overarching principles would apply to all future guidelines, the latter attempts to address a particular need in the wake if COVID-19 related legislation.

As a result, the Indian Medical Council (Professional Conduct, Etiquette, and Ethics) Regulations, 2002, have been amended, and the Ministry if Health and Family Welfare, Government if India formally approved the amendment on March 25, 2020.[8]

5. Types of Telemedicine

Store-and-forward, remote monitoring, and real-time interactive services are the three main types of telemedicine. Each of these plays an important role in overall health care and, when properly implemented, can provide tangible benefits to both healthcare workers and patients. [6]
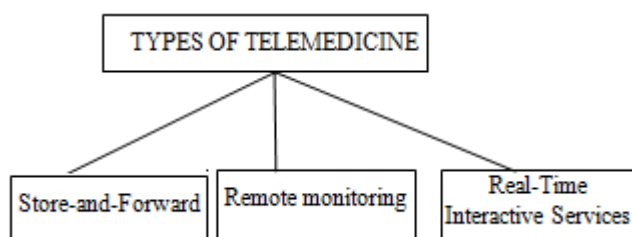
a) Store and Forward

The use if store-and-forward telemedicine eliminates the need for a medical practitioner to meet with a patient in person. Instead, once data such as medical images or biosignals has been obtained from the patient, it can be sent to the specialist as needed. Dermatology, radiology, and pathology are among the medical disciplines where this practice is prevalent. This method, with proper structure and care, can save time and allow medical practitioners to provide more comprehensive services to the public. However, instead if a physical examination, it depends on a history report and recorded information or photos, which can lead to complications such as misdiagnosis.

b) Remote Monitoring

Remote monitoring, also known as self-monitoring or self-testing, employs a variety if technical devices to remotely monitor a patient's health and clinical signs. This is widely used in the treatment if chronic illnesses like cardiovascular disease, diabetes, and asthma. Cost efficiency, more frequent monitoring, and higher patient satisfaction are all advantages if remote monitoring. Although there is a chance that tests performed by patients themselves will be inaccurate, the results are usually considered to be comparable to professional- patient tests.

c) Real-Time Interactive Services

Patients who need medical attention will benefit from interactive services that provide immediate advice. For this purpose, a variety if methods are used, including phone, online, and home visits. A medical history and consultation about current symptoms can be done, followed by an appraisal similar to those done in face-to- face appointments.[6]

6. Framework Telemedicine Development

The four basic stages if the telemedicine technology development process are as follows: fig5

Stage 1: Basic Technological Capabilities Development
Sensors, imaging, computer-controlled devices, communications, voice-driven systems, complex and intelligent database and network technologies will all be required for telemedicine. We see the growth if new types if technology in different stages if the health-care delivery process during Stage 1. Information capture, transmission, and interpretation are all possible applications if these technologies. As these technologies advance, creative practitioners come up with new ways to integrate them into their practice.

Stage 2: Relevant Application Development
The initial development if applications to meet the capabilities if new technologies is referred to as Stage 2. Practitioners can imagine ways in which these technologies can be implemented on a larger scale as they begin to be used in various health-care applications. Telemedicine applications will develop, as will greater support within specific medical disciplines and federal agencies. The technology's acceptability for specific applications can be verified at this stage, and clinical effectiveness can be demonstrated.

Stage 3 – The Integration if Technical Applications within a Complex Environment
As issues about licensure, credentialing, and standards continue to be discussed at the national level, telemedicine applications reach the third stage if the technology development process. According to studies, the most common specialties that use telemedicine to provide care are mental health, emergency/triage, cardiology, dermatology, and surgery. In either case, incorporating new technology into the practice if medicine is asignificant undertaking that

deserves more attention than it currently receives from the medical and engineering communities.

Stage 4 – The Transformation if the Operating Environment
Stage 4 defines the environment's transformation to accommodate the new telemedicine applications. The complexity if environmental problems, combined with the demands if applications, creates a new emphasis on current needs and available solutions. New technologies emerge as technologies are integrated into specific applications, improving the efficiencies and quality if the existing system. At this point, the cycle starts all over again. Telemedicine technologies may emerge within an existing health-care delivery environment in some cases. In other cases, telemedicine advancements may broaden the scope if the environment to include sites.

Figure 5: Framework Telemedicine Development

7. Application of Synchronous and Asyncrnous Telemedicine

Telemedicine can be used in asynchronous or synchronous modes [4]

a) Synchronous
Patients and doctors may use synchronous telemedicine systems to create a real-time video session while exchanging vital data. Patients may consult physicians via eHealth platforms for online health consultation services using synchronous telemedicine. Following this initial triage, the doctor performs a remote consultation to determine the COVID-19 risk further. In addition, synchronous teleconferencing can be recorded for clinical evaluation and decision-making on patient treatment and follow-up.

b) Asynchronous
When implementing in non-urgent cases or regular outpatient follow-up, asynchronous consultation could be the best option. As a result, a patient can submit an original medical request as well as follow-up images and videos along with a description of how they are feeling or recovering. Following that attending physician will review the records, and patients will be contacted via email or phone. Following that, the attending physician will review the records, and patients will be contacted, or a phone call will be made, or an in-person appointment will be rescheduled if appropriate.
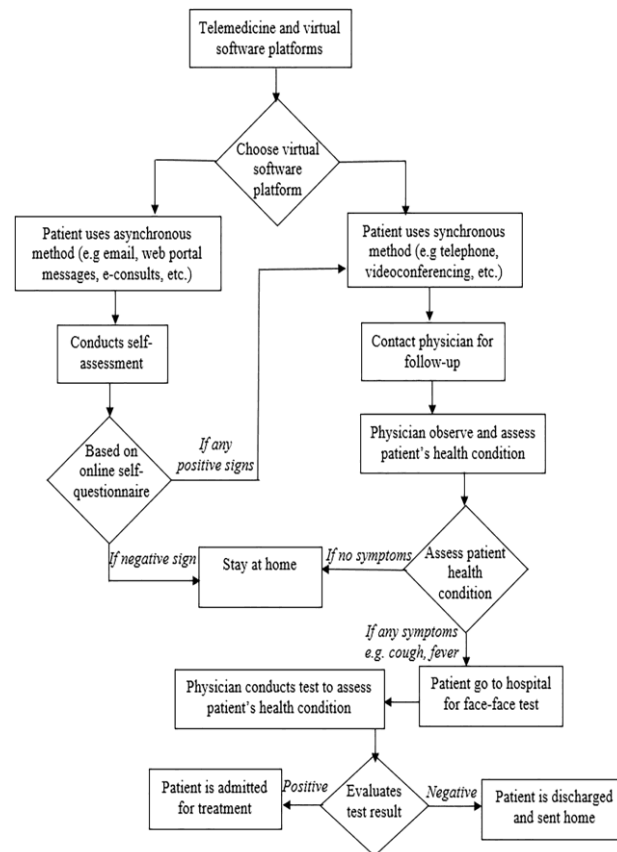
Application of telemedicine and eHealth platforms [4]

During the COVID-19, synchronous and asynchronous telemedicine and eHealth systems were used to provide clinical services, as shown in Figure 1. Furthermore, in the first step of the synchronous teleconsultation, mobile and online surveys are used as effective methods to protect outpatients from infection exposure in order to minimise exposure and "flatten the curve" of pandemics.

The physician performs a preliminary automated screening of the patient and provides recommendations about whether to stay at home or go to the hospital. When the patient is admitted to the hospital, each treating medical professional performs a physical examination to determine if the patient is suspected of having COVID-19.[4]

8. Features of the Medical Council of India's proposed "telemedicine Practice Guidelines" (2020)

1) The Indian Medical Council Act 1956 requires a Registered Medical Practitioner (RMP) to be enrolled in either the State Medical Register or the Indian Medical Register. The RMP's norms and standards for telemedicine consultations are covered in the guidelines.[7]
2) The guidelines include important exclusions, such as the fact that digital technology should not be used for surgical or invasive procedures. There are no provisions for consultations outside if India's jurisdiction.
3) Telemedicine practice training: To allow RMPs to become acquainted with these guidelines, as well as the process and constraints if telemedicine practice:

- In place if MCI, the board if Governors will create and make available an online program.
- To provide telemedicine consultations, all currently registered medical practitioners must complete a mandatory online course within three years if receiving notification if these guidelines
- Following that, completing and passing a prescribed course will be required before a medical practitioner can register.

4) Specific limitations: Medicines that can be prescribed through teleconsultation will be determined by the Central Government's notification, which will be updated from time to time.
5) Apart from that, the practitioner will have to keep a digital record if the consultation.
6) A fee for telemedicine consultation may be charged, and the patient may be given a receipt/invoice.
7) When seeking advice for an emergency, the goal should be to provide in-person care as soon as possible. [7]

9. Conclusion

Telemedicine will continue to evolve and be embraced in a variety if ways by more health-care practitioners and patients, and these practice guidelines will be a key enabler in that development. The goal if these guidelines is to provide doctors with practical advice so that all services and models if care used by doctors and health workers should regard telemedicine as a standard practice.

To ensure patient and provider safety, these guidelines will help the medical practitioner in pursuing a sound course if action to provide effective and safe medical care based on current information, available resources, and patient needs..
Telemedicine, on the other hand, cannot solve all problems and cannot replace in-person consultations or emergency medicine. It can, nonetheless, make a significant contribution to combating the current Covid-19 pandemic. Furthermore, if it is widely accepted and implemented, it will help us better prepare for future pandemics.

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