

**TO EXPLORE THE POSSIBLE REASONS AND NEED
BEHIND THE BEGINNING OF THIS NEW ERA OF ONLINE
HEALTHCARE CONSULTATION**

Dissertation Report submitted to



***For the partial fulfillment for the award of the degree of Master of Business
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by

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(Batch-2020-2022)

Under the Supervision and Guidance of

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DECLARATION BY STUDENT

I hereby declare that this dissertation title **“To explore the possible reasons and need behind the beginning of this new era of online healthcare consultation”: A Systematic Literature Review** is the bonafide record of my original research work. I declare that it has not been submitted to any other university or institution for the award of any degree or diploma. Information derived for the published or unpublished work of others has been duly acknowledged in the text.

Dr. Ayushi Saini

Date: 2/07/2022

CERTIFICATE

This is to certify that the dissertation title **“To explore the possible reasons and need behind the beginning of this new era of online healthcare consultation”: A Systematic Review** of Literature is a record of the research work undertaken by Dr. Ayushi Saini in partial fulfillment of the requirements for the award of the degree of MBA (Hospital and Health Management from the IIHMR University, Jaipur under my guidance and supervision and his/her approach to the research study has been sincere, scientific, and analytical.

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A research project acts as a link between real-world experience and theoretical knowledge. With all that in mind, I researched a topic that would provide a wide overview of a new concept that emerged in India only a few years ago. The development and execution of the project required a great deal of direction and support from several people, and I count myself lucky to have received it during this work. My explicable gratitude goes to Dr. Mahender Kumar (Dean of Academics) for constantly being approachable for student-related concerns.

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1. Abbreviation:-

e-prescription	Electronic prescription
e-Consult	Electronic Consult
E-Healthcare	Electronic Healthcare
MeSH	Medical subject headings
RPM	Remote patient monitoring
mHealth	Mobile health
ICT	Information and communications technology
e-MSO	Electronic medical second opinion
RoW	Rest of the World
APAC	Asia-pacific
HIPAA	Health Insurance Portability and Accountability Act
EMR	Electronic medical records
AI	Artificial intelligence

2. Study Abstract: -

Background: Telemedicine is the use of telecommunications technology to provide health care and share medical information. Information technology and telecommunications changes, as well as their usage to improve health care service delivery, have recently received more attention. Telemedicine, in its broadest sense, is the application of modern telecommunications technology to diagnose, conduct research, transfer patient data, and/or improve disease management and treatment in remote places. The usage of telecommunications technology in remote locations is encouraged. Telemedicine can provide preventive, diagnostic, and therapeutic treatments, as well as patient education and aid with self-management of health. This article provides a brief overview of Telemedicine, its potential providers and the possible reasons and need behind the beginning of this new era of online healthcare consultation.

Methodology: Systemic literature review carried out between March 21st, 2022, to June 4th, 2022, was done with the help of two electronic database, i.e., PubMed and Google scholar. The selection criteria were full text published in English during the last 10 years articles.

Result: Telemedicine will further grow in the coming years with a positive and effective impact in fighting the communication barriers between patient-provider. Recent studies show that a majority of patients are interested in using telehealth services, especially once they see how telemedicine works and the potential benefits for them. The Statista depicts the age distribution of people's ability to use telehealth consultation services in India. There is a 4% increase for people who are 75 years old or older. Between 2019 and 2020, there is a 57 percent growth in the utilization of telemedicine.

Conclusion: There is huge scope of use of digital health technology in India, especially during COVID-19 times. Though government initiatives like providing telehealth insurance, providing internet connectivity in all areas of the country, and providing education to people about using the gadgets so that they have access to digital health, will go a long way in improving the situation.

Keywords: Telemedicine, Telehealth, digitization, Healthcare, COVID-19, e-Healthcare

3. Introduction: -

3.1 General: The Healthcare sector has become one of the largest sectors in terms of revenue and employment. Modern technology in the healthcare world leads to connecting millions of patients with numbers of healthcare providers around the world. Tele-Healthcare/ Tele-Medicine is revolutionizing the healthcare business and medical services. It is being used to enlarge medical business and practices in every facet of healthcare.

On-demand healthcare has always been in high demand, from home visits to emergency clinics. The dissemination of health-related services and information using electronic information and communications technology is known as Telehealth. It enables long-distance communication, care, counselling, reminders, education, intervention, monitoring, and remote admissions for patients and clinicians. Telemedicine (sometimes used as a synonym) is a term used to describe remote healthcare services such as diagnosis and monitoring.

Predominantly we visit the doctor's clinic for medical services, but with the advancement in technology, telemedicine / telehealth has become an important extension in the healthcare sector, and it certainly gained popularity during the pandemic because it bridges the gap. It provides a more accessible and cost-effective means of treatment. No need to go to the doctor's office, you can find the best doctor nearby and consult your doctor while sitting at home. At the same time increase the use of medical services and meet the needs of the people. it fosters professional/cohesive collaboration toward a patient-centred approach to providing care. It is used to provide healthcare education, out of love or on-demand.

Delivery Mode:

- Audio-Visual
- Only Audio
- Written

Telemedicine is the use of technology to help in distant clinical services, whereas telehealth covers both telemedicine and non-clinical services such as virtual physician-to-physician talks, virtual provider recommendations, training, CMEs, and so on.

3.2 About Tele-Medicine

Definition

There are several definitions of telemedicine. According to World Health Organisation, telemedicine is defined as, “The delivery of healthcare services, where distance is a critical factor, by all healthcare professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities”.

Tele stands for distance , mederi means to heal . Telemedicine was considered as surreal and experimental but now it is for real, and it will remain in near future as well. Telemedicine serves various purposes in the field of patient care, education, research , administration, and public health. The major people who struggle in terms of accessibility to high quality specialist treatment are rural population and people residing in distant places . This is just because specialist resides in metropolitan cities . Telemedicine creates a smooth path eradicating this barrier of healthcare making healthcare facilities accessible to rural populations.

3.3 Purpose of the Study:

Telemedicine is an important component of the healthcare system. Its goal is to give solutions to healthcare issues without requiring the patient to physically contact a practitioner.

It has become harder for patients to visit doctors for outpatient treatments due to the ongoing outbreak. On top of that, the lockdown has made it hard for patients to visit doctors for non-emergency treatment.

In certain ways, telemedicine has proven to be a viable option for patients seeking medical advice from the comfort of their own homes. They can also get an internet prescription, often known as an e-prescription, without any problems.

The major goal of this study is to examine the viability of online healthcare and the necessity for additional research in this area to develop the subject further.

This study will also pave the way for healthcare providers to recognise the need of being tech-savvy in today's world. Incorporating technology into medical research is essential.

4. Literature Review: -

Specialization	Study Area	Author (Year)	Methodology (Sampling techniques)	SALIENT FEATURES
Telemedicine and virtual consultation: The Indian perspective	India	Navneet Ateriya (2018)	Literature review	This article mainly focused on medicolegal and ethical issues such as doctor–patient relationship, informed consent, rights of the patient, malpractice, and principles of confidentiality relevant to the practice of telemedicine and virtual consultation. Telemedicine is emerging as an important tool for convenient as well as specialized healthcare. However, there are multiple challenges to realizing its full potential. The absence of specific laws for registration and practice in India acts as a deterrent for medical practitioners. There is a need for specific legislation.
Real-World Implementation of Video Outpatient Consultations at Macro, Meso, and Micro Levels	United Kingdom	Trisha Greenhalgh (2018)	multilevel, mixed-method study Data source: macro level: - national-level stakeholders (N=36) meso-level: - staff at Barts Health (24) micro-level: - total patients (N=50)	The study aims to identify good practices and inform information on conducting video outpatient consultations and generate transferable knowledge on the challenges of scaling and modernizing the translation paradigm. this service. This study shows that when clinical, technical, and practical preconditions were met, video consultations appeared safe and were popular with some patients and staff. Compared with face-to-face consultations for similar conditions, video consultations were very slightly shorter, patients did slightly more talking, and both parties sometimes needed to make explicit things that typically remained implicit in a traditional encounter. This study also shows that with other technological innovations, it will be easy for some doctors to adopt, while others will need reminders and support. Integrating video consultation services into day-to-day operations in organizations that are reluctant to change, especially in times of austerity, poses complex challenges.
Telemedicine in India: Where do we stand?	India	Dr. Vinoth G. Chellaiyan A.Y. Nirupama	Literature review	The study suggests that Telemedicine can be a potential solution to many health problems and also helps family physicians by giving them easy access to specialist doctors and helping them in close monitoring of patients.

		Neha Taneja (2019)		Study also talk about the use of telemedicine in India scenario and major role in this was played by NASA and ISRO are the major role player for setting up of the National Telemedicine Taskforce, in India by the Health Ministry of India, in 2005. Telemedicine is used in the field of healthcare for tele-education, tele-home, tele-health as well as for training of healthcare staff, healthcare delivery in remote area and for healthcare management.
The need for a telemedicine strategy for Botswana? A scoping review and situational assessment	Botswana.	B. Ncube, M. Mars, R.E. Scott (2020)	Literature review	This study is conducted to provide a broad review of e-health activities in Botswana and used an adaptation of published guidelines. The aim of this study was to investigate the need, if any, for a specific telemedicine strategy for Botswana. This study also highlights Various ehealth technologies that have been applied within Botswana include Skype, SMS, and robotics along with this health informatics technologies have been also used for surveillance, monitoring, and access. This article identified infrastructure issues as the main barrier to implementation of telemedicine in developing countries, including Botswana. Is this study combined findings highlight the absence of scalable and sustainable telemedicine activity, which supports the need for development and implementation of a telemedicine-specific strategy for Botswana.
Comparing Patients' Experiences with Electronic and Traditional Consultation	USA	Sara L. Ackerman , Nathaniel Gleason, Scott A. Shipman (2020)	Multisite survey (N=8087)	Patients' awareness of and satisfaction with eConsult was assessed in this study, which compared the experiences of patients whose PCP (primary care providers) utilized eConsult to those of patients who were traditional referrals for an in-person consultation with a specialist. This study also shows that nearly one-third of patients who were recommended to visit a specialist in person, and nearly four out of five patients whose PCP used the eConsult service, said they would utilize eConsult again if they had a similar problem.

				Study also discovered statistical differences in age and education between the eConsult and referral groups, the differences were minor. Study shows that a high proportion of patients find it acceptable strategy for managing their medical condition. Lack of awareness among many patients warrants an increased effort to include them in decision-making and communication. There are concerns that patients might perceive services like eConsult to be a form of rationing or lower quality. This study provides evidence that appears to counter these concerns. A charge for co-payment may cause confusion for patients who do not recognize having received the service.
Use of a primary care online consultation system, by whom, when and why.	Southw est England (UK)	Hannah B Edwards, Elsa Marques, William Hollingwo rth, Jeremy Horwood, Michelle farr, Elly Bernard, Chris Salisbury, Kate Norths tone (2017)	pilot observational study (N=3968 28)	In this study there was 15-month pilot trial of online consultation system in primary care. Use of the system was very low; it was most likely to be used on weekdays. It was used more commonly by women than men, and most often by working-age adults. The average cost to a general practice to respond to an e-consultation was also highlighted (£36.28). By comparing with other studies, administrative requests were the most common reason for completing an e-consultation. A survey across 14 European countries found that men were more likely to use email to communicate with their healthcare providers. This discrepancy could be due to the difference in formats of email versus a structured online form. This study shows that what all the possible explanation for the low adoption of e-consultations. One issue is that few patients were aware of the system, even though all practitioners claimed to be advertising it. Another possibility is that there is now little demand for online consultations, at least in the form that they are available in the system being tested. After adapting this system, it's not so clear that use of the system would reduce, rather than increase staff workload (additional triage time and potentially longer resulting consultations). It is also possible that use of e-consultations may be associated with

				increased costs and workload in primary care. Patterns in use suggest ways that online consultation systems could be developed to improve efficiency. Future study will might open the way for a feasibility study to examine the effectiveness and cost-effectiveness of such services in a more systematic approach.
Revisiting Health Information Technology Ethical, Legal, and Social Issues and Evaluation: Telehealth/Tel emedicine and COVID-19	USA	Bonnie Kaplan (2020)	Literature review	This study aims to Identify and describe ethical, legal, and societal concerns of information technology in healthcare, as demonstrated by telehealth and telemedicine. To build on existing studies and fill gaps shown by the COVID-19 experience. To provide recommendations for future research directions. This Literature was divided into categories and sub-categories. Primary ethical, legal, and societal challenges were recognized, as well as those that require more study, particularly in light of the COVID-19 pandemic. Study also shows that by broadening the scope of ethical, legal, and social concerns, it is essential to combine telehealth and telemedicine into health care delivery in an ethical and evidence-based manner. Under this study the key ethical, legal, and social challenges surrounding telemedicine and telehealth were primarily focused on by professional guidelines and academics. These issues included quality of treatment, access, consent, privacy, and secrecy. The broad use of health information technology is likewise affected by these challenges. The COVID-19 pandemic offers a chance to examine moral concerns with the use of information technology in healthcare. Creating an informatics infrastructure and ethical standards is essential to address the growing demand for data and care. The secret to going ahead in an ethical, responsible, and efficient manner is learning from the experience.
Implementing Telemedicine in Primary Care	US	Christine A Sinsky (2020)	Literature review	The author discusses the numerous applications of telemedicine in primary care. Telemedicine offers the ability to address some of the issues that are currently affecting primary care.

				The adoption of EHR is also compared by the author. The study also discusses the many approaches to using telemedicine in primary care.
Advancing beyond the system: Telemedicine nurses' clinical reasoning using a computerized decision support system for patients with COPD - An ethnographic study		Tina Lien Barken, Elin Thygesen & Ulrika (2017)	N=20 Participatory observation & focus group interview	The investigation was carried out in a telemedicine facility by the researchers. The nurses that work in the telemedicine facility are the subject of the research. The findings of this study point to the benefits of using the HER system by healthcare practitioners. With the usage of EHR, the nurses in the research were able to make more efficient decisions.
Designing Futuristic Telemedicine Using Artificial Intelligence and Robotics in the COVID-19 Era	India	Sonu Bhaskar, Sian Bradley, et al. (2020)	Literature review	The authors of the study look into the usage of telemedicine during COVID-19. Their authors note that telemedicine was employed for a variety of purposes during COVID-19, including telecardiology, tele acute neurology, telemedicine for COVID-19 patients with acute respiratory syndrome, and the widespread use of telemedicine in other chronic conditions for primary care. Telemedicine has also been highlighted as a method of care for the elderly. The report also points out some of the difficulties and limits that come with using and implementing telemedicine.

5. Study objectives & Methodology

5.1 Objective: The major study objective is to explore the possible reasons and needs behind the beginning of this new era of online healthcare consultation.

The special objectives are as follows:

- Assess the need of Telemedicine/Telehealth.
- Identify the areas or services covered by the online healthcare providers.
- Status of the nationally and internationally service providers.
- Opportunities & threat perceived by the online Healthcare service providers.
- Future of Telemedicine/Telehealth in India

5.2 Research Methodology: A comprehensive and in-depth literature evaluation was conducted, with a specific search technique used to find research on data analytics in healthcare published between 2015 and 2022. All essential material was gathered from well-known databases, journals, publications, and papers. A complete evaluation of the comprehensive essay titled "Impact of Digitization in Healthcare or Telemedicine." The paper evaluation was based on a thorough search of literature about telemedicine published between 2015 and 2022. It includes peer-reviewed publications from major sources such as PubMed and Google Scholar telemedicine reports. 110 paper have been included for title survey after expelling insignificant sections after perusing the title, 40 paper that don't utilize the word telemedicine in their title have been avoided. 35 papers were removed since they were not straightforwardly linked to tele healthcare/ telemedicine, and 24 papers were not full-text article and only 1 article was not in English which was not reviewed. At long last, the remaining 10 papers that met all the requiring criteria have been held.

A. Research question: To explore the new ideas of Telemedicine/Telehealth- "Alternative way of fact-to-fact consultation"

B. Study type: secondary study

C. Study design: Observational descriptive study - secondary (Narrative review of published studies and articles).

D. Inclusion Criteria

- Studies published between 2015 to 2022.
- Primary research paper including both qualitative studies and quantitative studies
- Studies included E-Healthcare.
- Studies reported in English.

E. Exclusion Criteria

- Studies published before 2015.
- Studies does not describe online Healthcare
- Studies using concept of online healthcare but not specific to business model on online Healthcare.

- Paper not written in English.

F. Study Tool

- Online PubMed and Google Scholar site.
- Structured search strategy using appropriate keywords and MeSH terms

6. Review Findings: -

Since for more than 30 years, clinicians, health services researchers, and others have been investigating the use of advanced telecommunications and computer technologies to improve health care. In the Netherlands, heart rhythm transmission over the phone thus marked the beginning of modern telemedicine. In the 1920s, broadcasts to radio consultation centres around Europe followed. In the 1940s, radiographic pictures were sent over the telephone between cities in Pennsylvania. Radiology, neurology, pathology, and other fields of specialisation are now using telemedicine.

The usefulness of telemedicine in urban and rural settings is being researched. It has the capacity to fundamentally alter healthcare in both good and bad ways. Additionally, it could change the one-on-one interaction that has long served as the foundation of medical treatment. In the past, many of the efforts made to advance clinical telemedicine were motivated by access issues.

Before concluding first, we have to Examine how telemedicine/telehealth fits into the practice's overall goals, including the strategic plan and future vision than only Telemedicine/Telehealth could be able to address some of your problems or fill in some of the gaps in the present practise. Some needs telehealth can address include: -

6.1 Overcome patient barriers to receiving care by reducing cost of staff and patient travel.

Patients who live in rural communities or medically underserved areas, telemedicine can provide reduced cost of traveling for both of staff and patient. When travel time is converted to clinical time through telehealth, clinician productivity can rise. There are unlikely to be any productivity advantages when switching from an in-person consultation to a video consultation in terms of consultation time. It is more likely that using asynchronous consultations in place of in-person consultations will boost productivity by cutting down on consultation time. However, there is a chance that these productivity improvements will lead to cost rises under activity-based payment schemes.

a) Productivity

An economic examination of The Northern Health Authority in Canada indicated that telehealth sessions substituting in-person sessions saved the health care Can \$65,520 (US \$49,584.14) in yearly travel expenditures and that nurses' workload capacity more than doubled as a result. In a trial in the United States using a videoconference telehealth strategy to substitute home visits, 43,560 driving minutes were also saved over a 14-month period.

Cross-sectional research by Liddy et al. on the cost-effectiveness of the service revealed that it cost \$47.35 per case on average across specialised groups, vs \$133.60 per case for conventional referrals. When indirect expenses like travel and time away from work are taken into account, recent research has also demonstrated cost reductions per case of \$1,100.93 for patients from distant locations because to eConsult access.

If the expenses of providing the service remain constant while patient volume grows, the marginal cost per patient will also drop. Under activity-based payment, capitation, or fee-for-service models, a more productive physician who can handle a higher number of patients will raise the cost to the health system.

Telehealth can boost clinician output, which in turn increases the number of patients a health care can manage. Through the use of telehealth, a doctor may be able to turn travel time into

clinical time, increasing productivity. The likelihood of increased productivity is higher in store-and-forward and virtual consultations. The financing arrangement will determine if productivity increases result in savings.

According to different studies that compared videoconference consultation time with in-person consultation time disparate results shows that Videoconferencing was less time efficient, equally time efficient, and more time efficient.

b)Secondary Care Resource Use

Numerous situations, such as remote monitoring, hospital avoidance, and triage, can be used to actualize the usage of telehealth to minimise secondary care. The majority of research looked at how telehealth affected the use of secondary care, but it was necessary to extrapolate from the findings to understand cost reductions.

According to a research by Celler et al., clinicians in Australia were able to anticipate and prevent 53% of hospitalizations by carrying out a quick, low-cost intervention. It has been demonstrated that remote monitoring can shorten a patient's stay after admission as well as their overall hospital presentation time. This may be because remote monitoring offers physicians the assurance that a patient is still being watched after being discharged.

A videoconference system was established by Houston, Texas, Emergency Medical Services. Ambulance transports to the Emergency Department (ED) were dramatically decreased by more than 50%. 44 minutes faster and in less than half the time as it takes for an ambulance to arrive, the crew was ready for the next call. Another research found that the use of a comparable service in residential elderly care decreased ED visits by 28%.

According to a recent assessment, tele triage might significantly lower the amount of unneeded specialist outpatient sessions. According to a research, the reported percentage of missed in-person visits in dermatology varied from 38 to 88 percent, and in ophthalmology, it was between 16 and 48 percent. There were 89 percent fewer in-person visits for ear, nose, and throat conditions and 18 percent fewer for vascular surgery/wound treatment, according to separate research. No study, however, has calculated the possible cost reductions. Telehealth triage can help cut down on needless specialist outpatient consultations. Although it makes sense that this might save expenses for a healthcare provider, no study has specifically calculated cost reductions.

c) Enhanced access to care

Fundamental aim of telemedicine is to improve access to healthcare and related optimal health outcomes. Telemedicine has rapidly expanded into a means of providing comprehensive care across multiple medical domains. Ranging from acute to chronic, as well as primary to specialty care, telemedicine has successfully been implemented in a wide variety of medical conditions

Telemedicine is beneficial for patients because of its convenient health care, increased specialty access, and extended provider access. It allows patients to access their provider without the cost of travel and time. It also offers a greater variety of specialties for specific diseases without needing to travel far distances. Patients can consult their providers and gain a treatment plan in minutes when in critical need.

According to the US Centers for Disease Control and Prevention (CDC), about 10% of individuals aged 18–64 delayed or did not obtain essential medical treatments, and this number more than triples for those living below the poverty line. Individuals encounter

numerous significant hurdles to healthcare access, and when it is accessible, it is either unsafe or inefficient.

d) Components of health care access amenable to telemedicine intervention

i) Entry into the health care system (Transportation barriers):

Entry into the health-care system is the initial step toward receiving health-care services. However, several hurdles restrict insured patients from using it. One of the most significant barriers is transportation. Lack of availability, geographic distance and cost are common barriers cited by patients. Patients in rural communities are especially vulnerable to lack of access to health care services.

ii) An adequate supply of services available (Provider availability):

Another important obstacle to access is the availability of services after patients reach the health care system. Utilization of health services and access to treatment are significantly influenced by provider availability. Another significant impediment to health care access is the lack of physicians, particularly in rural areas. Access to health care is being hampered by the current gap between supply and demand, which calls for intervention.

iii) Timely provision of care (Long wait times):

Receiving care in a suitable amount of time is also important for getting adequate health care. And for many individuals, timely access to healthcare continues to be a significant obstacle. Long wait times are linked to higher mortality and morbidity rates as well as worse patient satisfaction. According to research, specialist care wait times can range from months to more than a year in some circumstances. Long wait times for both acute and chronic treatment in outpatient settings is a significant disincentive, deterring people from seeking medical help in the first place.

Telemedicine has the potential to improve health care by increasing access and reducing the load on patients and clinicians, but it will need success in numerous areas to extend its availability and use. Broadband connectivity is required for telemedicine to be used in rural regions where it is most needed, and more work might be put toward telemedicine inclusion.

Project ECHO (Extension for Community Healthcare Outcomes) Created by Sanjeev Arora, MD, a social entrepreneur and liver disease specialist at the University of New Mexico Health Sciences Center in Albuquerque. Project ECHO uses ongoing telementoring to equip primary care practitioners in rural areas with the knowledge they need to provide high-quality specialty care and connects specialists with on-the-ground practitioners to bridge health gaps in rural communities.

Project ECHO employs a hub-and-spoke telementoring model rather than transferring people. By taking part in weekly virtual clinics with teams of specialist mentors, primary care practitioners in rural and underserved areas acquire the knowledge necessary to treat patients with complex health issues like Hepatitis C, HIV, chronic pain, opioid addiction, mental illness, diabetes, and cancer.

The March 23, 2020 introduction of COVID-19 ECHO provides assistance to healthcare workers, particularly those working in remote and rural locations. An instructional strategy based on guided practise was employed using de-identified case presentation examples. The ECHO virtual collaboration network offers the perfect setting for easing rural health care practitioners' feelings of isolation.

One of the most common images of telehealth is that of a patient speaking by video conference with a healthcare provider who is located remotely, telehealth can take other forms, including:

- Remote patient monitoring (RPM)
- Store and forward transmission of medical information
- Mobile health communication (mHealth)

Telemedicine also helps family physicians by giving them easy access to speciality doctors and helping them in close monitoring of patients.

If there is a gap between the availability of on-site or local mental health services and patient needs, telehealth may be used to reach specialists and address this issue. Health professional to health professional - giving easier access to specialty care, referral and consultation services

Health professional to patient- providing healthcare to the unreached population by giving them direct access to a medical professional

Telehealth can be utilized for follow-up care for persistent circumstances, wound care and different circumstances requiring various visits.

Remote or stationary patient populaces might profit from telehealth. Likewise, distant patient checking might improve benefits currently set up.

Telemedicine is considered to be the remote diagnosis and treatment of patients by means of telecommunications technology, thereby providing substantial healthcare to low-income regions.

Telemedicine can be especially useful in situations where the patient does not need to visit the RMP (or another medical professional) in person, such as for routine check-ups or continuous monitoring. Telemedicine has the potential to relieve the strain on secondary hospitals.

Telemedicine can support the therapy of various ailments. It is viable when an individual gets clinical consideration from a skilled supplier. As per a few reports, patients who use telemedicine invest less energy in the medical clinic, setting aside cash and travel time. It makes benefits more available to patients with handicaps. Different populaces, like the old, the geologically confined, and the imprisoned, will benefit also.

6.2 Improved patient and provider convenience

Telemedicine is the utilization of data innovation for conclusion, treatment and observing of patients' circumstances. Businesspeople are utilizing the Internet, program and rapid media communications networks in creative ways to make clinical consideration more available and advantageous. It means to raise quality and decrease costs.

Patients will never again need to squander hours heading out to or holding up in an emergency clinic. Telehealth may likewise assist the people who with requiring crisis clinical consideration. Specialists who can see on-request require the utilization of an inside data set of inherent inquiries for simple access.

You won't have to wait in a crowded waiting area with other patients if you use telemedicine. It protects you from infection and helps you conserve your vitality. It allows you to schedule appointments with your doctor online or via your mobile phone, and consultations may be done via video technology. Patients with complicated medical issues often receive excellent care from a specialist at another hospital.

Getting a meeting with a specialist may be convoluted by different elements. Transportation might be exorbitant and badly arranged. Certain individuals have liability regarding really focusing on kids or more seasoned grown-ups, subsequently telemedicine addresses this test by permitting you to see your PCP while maintaining your family obligations. Patients might get care from any place they are on the grounds that to telemedicine. Patients and suppliers might team up on a complete treatment plan all the more effectively with video visits. Patients who are attempting to get more fit or stopped smoking might profit from way of life instructing. Without adversely influencing office the executives, suppliers might adopt a more all-encompassing strategy to treatment.

It helps in access Specialists, when it comes to serious health issues, you want to take guidance from the best, not the closest. Telemedicine allows you to access the expertise of specialists who are not in your immediate area. Some patients who want specialty care must travel considerable distances and devote a significant amount of time. Today's market offers a variety of online-only, on-demand options. They can't treat every ailment, but they can deal with a wide range of issues. This sort of care is covered by some insurance carriers.

6.3 Telemedicine's potential in the COVID-19 pandemic

a) COVID-19 symptoms are triaged and tested:

Patients can be assessed for COVID-19 and the seriousness of their side effects utilizing telehealth to decide whether they should be seen for evaluation, owned up to the emergency clinic, or can be taken care of at home. Telehealth permits medical services professionals to embrace a far-off evaluation of a patient's clinical status. Telehealth can likewise be utilized to evaluate patients for non-COVID-19 consideration before they go to a medical services foundation. On the off chance that patients report COVID-19 side effects during the telehealth interview, they might be urged to defer non-developing consideration and on second thought look for COVID-19 testing.

b) Contact tracing:

Individuals contaminated with COVID-19, a kind of norovirus, may have had contact following completed to check what their identity was in touch with during the time they were possibly irresistible.

c) Monitoring COVID-19 symptoms :

To limit overpopulation in medical services establishments, individuals with gentle or serious COVID-19 side effects can disconnect locally disengagement focus or be observed at home. Medical services professionals can check in with patients frequently utilizing telemedicine innovation (e.g., telephones or applications) to screen their status and proposition exhortation.

d) Providing specialized care for hospitalized patients with COVID-19:

Tele-intensive care frameworks can likewise be utilized to monitor fundamentally sick patients and proposition proficient exhortation. One colleague can visit the patient's room and use telehealth innovation (tablets, telephones) to deliberate with the remainder of the group about the patient's condition. Telehealth may likewise be used to instruct clinical experts and medical services laborers with online COVID-19 preparation.

e) Providing access to essential healthcare for non-COVID-19 patients:

Telehealth can be utilized as a methodology to keep care as predictable as plausible, staying away from unfortunate results from protection, persistent, or customary consideration that

could somehow be postponed attributable to COVID-19 worries. To diminish the quantity of in-person visits and congestion in short term settings, follow-up visits can be made via telephone or over the web. Mental and conduct wellbeing medicines can be provided to the populace by means of helplines or virtual supplier patient visits to diminish pressure during COVID-19.

f) COVID-19 patients who are recovering:

After COVID-19 patients have been discharged from the hospital, healthcare practitioners can utilise telehealth technology to follow up with individuals who may need to remain in isolation at home or be monitored for any abrupt deterioration or long-term health problems caused by COVID-19.

The sudden COVID-19 epidemic has demonstrated the advantages of this unique Internet medical model, which diminished the spread of the infection, yet additionally decreased the clinical tension on significant emergency clinics and saved numerous clinical assets.

6.4 High degree of provider satisfaction

Like patients, providers are also satisfied by telemedicine services, but their approval tends to be more measured. Even when it works, providers also note room for improvement or offer suggestions. It also makes the life of healthcare providers easy by decreasing the load of missed appointments and cancellations, increasing revenue and patient load, and improving follow up and health outcomes.

Healthcare providers concern about being able to treat patients in a critical emergency due to which the quality of healthcare may increase.

Telemedicine can speed up diagnosis and provide expert opinions on a more flexible timetable. Gilmour et al. also reported that more than 85% of surgeons expressed satisfaction with weekly teleconferences. 75% of participants found sessions to be of educational benefit, as well as potential to diagnose and manage dermatology.

Telemedicine earned high marks for initial assessments, but issues with equipment and the environment surrounding consultations led medical staff to prefer face-to-face sessions. The amount of time initially required to set up and adapt to technology also served as a barrier to attaining the support of healthcare providers.

Teleconsultations are highly valued for their educational potential, as well as their capacity to eliminate needless specialist referrals. Specialists can make early judgements on the necessity for complete office visits if they can acquire first views from patients. Providers' opinions might be influenced by factors other than technology. Management views on telemedicine can influence provider attitudes. Supervisors who are unfamiliar with the application and capabilities of telemedicine may make it difficult for healthcare staff to use it.

6.5 Increased levels of sustainable services

Telemedicine takes into account the exchange of biological information and data (texts, sounds, photographs, etc) for patient anticipation, determination, treatment, and follow-up. Telemedicine might be respected a specialized info equipped for further developing the medical care conveyance process by changing the customary "eye to eye" contact among patient and doctor from an administration stance. Obviously, this impacts medical care association and supportability, both as far as monetary assets and the results accomplished.

Telemedicine reduces the expense of medical services and work on its quality. Video correspondence offers worth to medical care. Patients' wellbeing results were equivalent (and now and again better) than customary consideration.

The telemedicine is the best illustration of the ICT assisting the poor in working on the norms of their daily routines and making them experience with bettering lives, albeit the basic variables of the cycle are causing individuals to figure out the interaction and its utilization.

6.7 Areas or services covered by the online healthcare providers

According to American Telemedicine Association (ATA), "Telemedicine is the natural evolution of healthcare in the digital world".

a) Modes or Baskets of telemedicine

- Synchronous
- Asynchronous
- Remote Monitoring type of telemedicine

b) Two main ways of telemedicine

- Provider to Providers
- Patients to Providers

After mixing all the 3- modes/Baskets with the two ways ,that's how we get the flavours of telemedicine's or the different offering

c) Real time or synchronous telemedicine or live two-way audio/video

(Where the sender and receiver both are online at the same point of time and 'live' transfer of information occurs).

Synchronous refers to the delivery of health information in real-time. This works with for a continuous frame discussion with the patient or doctor to offer clinical guidance. A Facilitated Virtual Encounter is one more kind of live (or coordinated) telemedicine visit (FVV). At the point when the patient is at an open area (e.g., a facility) with symptomatic gear and the clinical professional is at a distant area, this is an illustration of a helped virtual visit. A tele facilitator (e.g., a clinical collaborator, a medical caretaker, and so forth) gathers objective estimations utilizing hardware (e.g., a computerized stethoscope, a thermometer, a heartbeat oximeter, and so on) and sends the data to the supplier.

Real-time telemedicine solutions have grown in popularity in recent years, due to firms like Teladoc and DoctoronDemand, which have made it inexpensive and simple for patients to connect with a doctor from anywhere and receive instant care.

Specialists are likewise starting to utilize constant telemedicine innovations to furnish their patients with the comfort of virtual clinical arrangements, upgrade their treatment results, further develop balance between enjoy and serious activities, and partake in various different advantages. A patient may now get clinical consideration with simply a reasonable gadget, a web association, a receiver, and a camera.

Definition:

The Office of the National Coordinator for Health Information Technology (ONC) defines synchronous telemedicine as "live video-conferencing," which is a "two-way audio-visual link between a patient and a care provider."

The U.S. Department of Veterans Affairs (VA) states, "Synchronous telemedicine requires the presence of both parties at the same time and a communication link between them that allows a real-time interaction to take place."

The American Telemedicine Association (ATA) defines synchronous telemedicine as follows: "Interactive video connections that transmit information in both directions during the same time period."

As patient and provider can discuss the problems and solution with each other, synchronous telemedicine service gives more advantages than asynchronous services because here the patient can communicate with healthcare provider and can share all the problems. On the spot healthcare provider will help you with a problem or suggest the solution. It is same as the traditional method because patient have to be in front of the doctor, but it's like a virtual clinic.

Different offerings are:

- Video visit, home video visit:

Patient and clinician have a face-to-face, synchronous (real-time) clinical virtual encounter. The provider or patient might be in any location, including their own house. The originating site refers to the location of the patients, whereas the remote site refers to the location of the provider. Peripherals can be employed as integrated or non-integrated components.

- Assisted video visit:

The visit is facilitated by a home care nurse, social worker, care manager or clinical health worker (CHW) who is physically present with the patient. Can include use of peripherals, integrated or non-integrated. This is in the health department. Where the patient is on site at the health department, there's a nurse there with that patient but the provider is anywhere

- Clinic to clinic video visit:

Where both the provider and the patient are in separate clinical locations but within the same health system. Integrated, peripheral is typically used. A patient comes into a primary care clinic to have a video visit because that provider is in a cardiology specific clinic providing that care.

- Location based video visit:

Patient and clinician have a face-to-face, synchronous (real-time) clinical virtual visit between the patient in a facility and the provider. The visit is facilitated by a care provider who is physically present with the patient. Examples :- include outside hospital, clinics, school, skilled nursing department anywhere that end point would be.

- Tele Consult:

There haven't a national definition, people are using interchangeably all over the place. But this is a face-to-face synchronous virtual visit between multiple providers and the patient could be there or not. So, this is provider to provider is a TeleConsult. Typically, we see TeleConsult in the inpatient realm, emergency as well in ambulatory setting.

- Tele screening:

face-to-face, synchronous (real-time) triage virtual visit between a patient in an emergency room or triage area and a remote provider. Patient may be assisted onsite by a care provider or could be independent. Visit typically included peripherals.

- Kiosk video visit:

Face-to-face, synchronous on demand clinical virtual visit between patient at a kiosk video to care provider. If a patient needs to "visit" a doctor, they simply go to a kiosk at their local shopping center or perhaps just down the hall from their cubicle at work. Inside of the private structure, they can chat with a doctor on a large flat screen. The doctor and patient may be separated by hundreds of miles, but that doesn't stop the doctor from collecting a history and doing a physical exam.

- Urgent care video visit:

Video visits bring you face-to-face with a team of urgent care doctors and clinicians so you can get expert treatment and care quickly – and all from the comfort of home. Usually for low acuity, things like pink eyes or sore throat or flu or covid.

- Educational video visit:

It happened online between the provider and a patient, that is pre-surgical learning about the surgery patient is having. It is all education happening online, which could be a group education where bunch of people who are set up for Whipple surgery in the next month. This will clear the general question of patient and about the surgery also.

- Group video visit:

It is purely educational could use for pre and post surgically focused, support group, therapy group or group clinical care such as cardiac rehab sessions. Educational group, therapy group, supportive group all three groups have different ways but the same modality technic.

- MultiProvider video visit:

It is between a group of providers , either multidisciplinary or within the same specialty focused on a care plan. Making life very easy for the patient, cutting out all that back and forth and doing it together all around the patient.

- Virtual rounding video visit:

Virtual rounds typically involve a patient's care team using video technology installed in the patient's room to talk with the patient from another location. This is saving on PPE, time and letting families join into that Virtual rounding experience.

6.8 Advantage & Disadvantages

The fundamental benefit of synchronous communication is that it allows the sender and receiver to react quickly. It may be both an advantage and a drawback, but in this section, we'll look at how it benefits your performance:

1. It is easier and intuitive to use, as it is inherently human-friendly and useful in crisis like when immediate reaction and response immediate, it's natural discussion and interaction
2. Offers real-time assessment of fluctuating indicators and image.
3. Facilitates education and collaboration between colleagues.

Disadvantages are:

1. It is more time-consuming because there is a one-to-one interaction between the patient and the provider, and it end up taking a lot of time.

2. Poor lighting, noise, and other distractions may impact the quality of communication. Video transmission may be affected by internet quality.
3. It is hard to find a date that works for everyone in a group of busy people. Since synchronous communication requires the presence of participants, if you want to have a long discussion, you need to schedule it so that all parties feel comfortable and can express their opinions.
4. Depending on the application used, interaction may not be automatically stored to support documentation for medical records.

6.9 Store-and-forward or asynchronous telemedicine

(Where the sender stores the information databases and sends it to the receiver at a convenient point of time, and the receiver can review the data according to his convenience).

Asynchronous telemedicine refers to the "store-and-forward" technique, in which a patient or physician gathers medical history, pictures, and pathology reports and transmits them to a specialist physician for diagnosis and treatment. It is a secured electronic communication system, it collects the patient information and clinical history and saving it in the cloud.

A synchronous phone call needs all participants to communicate in real time, but an email exchange does not. The word "asynchronous" refers to the fact that the consulting expert, the patient, and the main doctor do not have to communicate at the same time. These services provide a sophisticated, secure email platform — a method to securely communicate confidential patient data online.

When a provider has to outsource diagnostics to an expert, store-and-forward telemedicine works best. Teleradiology, for example, is heavily reliant on store-and-forward technology to allow technicians and healthcare workers at smaller hospitals to transmit patient x-rays for diagnosis by an expert at a different location. Tele dermatology and teleophthalmology are two examples of asynchronous telemedicine.

Store-and-forward Telemedicine is a great way to increase healthcare efficiency since a provider, patient, and specialist don't need to be in the same place, at the same time. It also facilitates faster diagnosis, especially for patients located in underserved settings that may not have the necessary specialist on staff.

Asynchronous modality allows the storage and transfer of data and fixed images (store and forward) in "deferred" mode. In this mode, there is no direct interaction between the specialist and the patient, and the asynchronous mode is used in those cases in which the diagnosis or consultation of the information sent does not imply an emergency situation. This modality is the one that has greater volume of activity at the present time.

6.10 Different offering

- e-Consult:

Probably the most used asynchronous, non-face-to-face, structured consultation between two providers using messaging in the patient's electronic medical record. Consulting provider responds to requesting provider with confirmation of the treatment plan , an adjustment to the treatment plan or an expedited referral for an in-person office visit. It reduces the specialty referral and appointment process to just a few days, which increases the speed delivery for patient care services.

- e-Visit:

It is a structured clinical virtual visit between patient and provider. Patient uses a provider supplied condition specific questionnaires to report symptoms and attach images if appropriate. Provider responds with treatment plan or referral for an in-person office visit. All communication is housed in then EMR and accessed via patient portal. This is also used for low acuity and specific disease state. Having high provider and patient satisfaction , totally eliminates the need for synchronizing schedules.

- e-MSO (Electronic Medical Second Opinion):

Electronically patient can take medical second opinion from another health system or specialist to a whole by send the reports to the providers, so that patient can get confirm or adjust diagnosis and treatment plan. Researcher says that 60% of the time it changes the care plan.

Advantages:

1. Improving efficiency and convenience, where patient and doctor do not have to be available at the same time.
2. Do not have to travel anywhere, participants can be located anywhere and easier to implement
3. Waiting time was reduce and offers flexibility in terms of scheduling users.
4. Second opinions can be quickly obtained.
5. Mandates less complicated technological and systematic requirements.
6. Outpatient appointments are freed up for patients that need them most.
7. Unnecessary prescriptions and surgical procedures are minimised.

Disadvantages:

1. the specialist does not examine the patient directly. It may be necessary to arrange an in-person or video consultation later.
2. Demand better interface designs
3. Inability to address requests in real time
4. Vulnerable to confidentiality issues

6.11 Remote Monitoring type of telemedicine, also known as self-monitoring or self-testing

Remote monitoring uses various technological interventions like direct video monitoring , analysing test and obtaining photos remotely to constant assess patient's condition and to keep an eye on patient's vital signs and other health data. It aids in observing warning signs and providing intervention for post-surgical risks in patients if required . Telemonitoring and home telehealth are the terms describing this. Patients have more advanced tools for tracking their health. RPM solution maintains close contact between patient and doctor. It records and transmit patient's data automatically to physicians. Growth of wearables and mobile medical devices helps patients in keeping home instruments which aids in remote patient monitoring telemedicine

RPM is growing as physicians see various advantages . For eg - glucometers helps diabetic patients in checking their blood glucose. So, patients can regularly send their glucose values to doctor and if doctor find something wrong, they may call patient for consultation.

I'd like to describe remote patient monitoring using this graph because it's a broad spectrum that covers acuity levels. So, moving from green to red, we see ambulatory than chronic disease, then episodic care and then inpatient, looking at the top to location, low acuity can be done at home and as moving to right side into high acuity need to be in facility to do this.

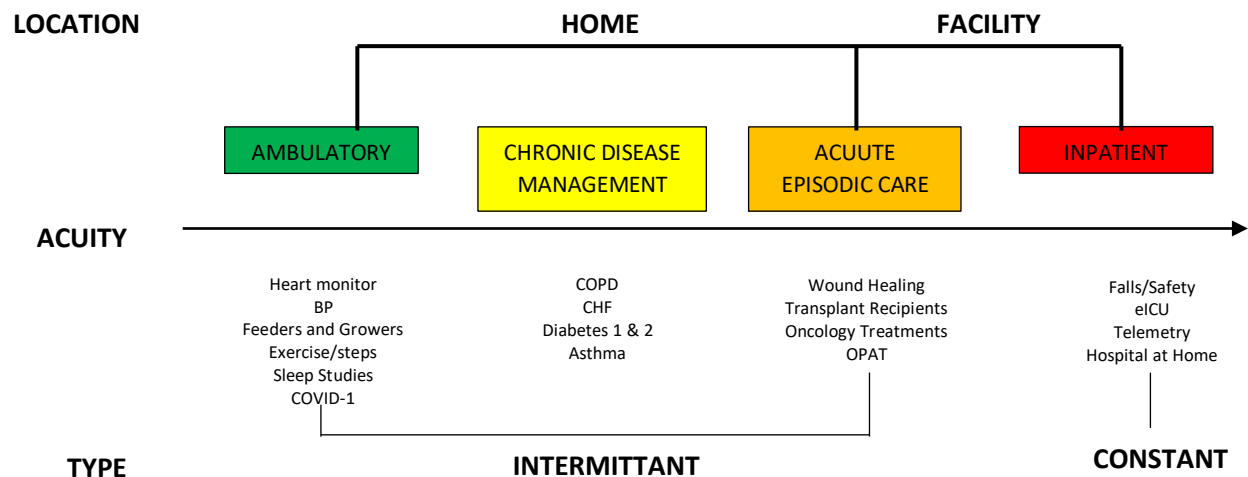


Fig.1 (REMOTE PATIENT MONITORING)

As we go down there is 2 types- intermittent (at low acuity) where patient is monitored at particular intervals like heart monitor, COPD, COVID-19, Oncology recipients. and constant (at high acuity/inpatient) where patient is constantly monitored like eICU, telemetry.

Different offerings - four main offering under those four main buckets:-

- Primary care(Asynchronous intermittent monitoring enable by patient entered data):

Is using that ambulatory acuity level, which is used to manage or monitor patients' behaviour health, glucose monitoring in stable phase. BP and weight management. Patient enter the data manually into questionnaires, app or home-base platform , and then clinical coordinator contacts patients as needed for intervention. It is just on time but low acuity only to monitor and manage the patients

- Chronic care:

Asynchronous centralized intermittent monitoring of patients at home with chronic condition such as CHF, COPD, Diabetes 1 and 2 and asthma by a clinical coordinator. Patient upload vitals via an at home platform. Clinical coordinator contacts patients as needed for intervention.

- Acute episodic care:

Asynchronous centralized intermittent monitoring of patients at home following an acute episode care at ED visit, inpatient discharge or post-surgery visit. Patient upload vitals via an at home platform. Clinical coordinator contacts patients as needed for intervention. Example- home COVID-19 monitoring.

- Hospital at home (or acute remote patient monitoring in the facility):

In this patient is monitored 24/7 hr. Hospital. Defined as a service that provides active treatment by health care professionals, in the patient's home, of a condition that otherwise would require

acute hospital in-patient care, always for a limited period. Hospital-at-home has become a popular response to the increasing demand for acute hospital beds.

- eICU: (Electronic Intensive Care Unit)

Synchronous centralized intermittent monitoring of remote ICU patients by team of providers. Where offsite nurse is managing a set of patients and then a physician has a set of offsite nurses that they are assisting. Medical team utilizes the EMR and 2-way real time video and audio to assist on-site staff with patient care.

- eSitter: (eye on site) portable camera units mounted on rolling IV-like poles that provide live video and auditory feeds from the patients' rooms and remote sitter is in another space watching the patients.

Advantages:

1. Improvement in patient outcome
2. Reduction of healthcare costs
3. Increased patient and family satisfaction and safety
4. Improvement in clinical systems productivity.

Disadvantages:

1. Lack of acceptance among patients and caregivers
2. Risk of breaching patient privacy
3. Lack of insurance reimbursement
4. Elderly patient inability to use technology.

6.12 Status of the nationally and internationally service providers

Geographically, market is divided into four regions: North America, Europe, Asia-Pacific, and the Rest of the World (RoW) (Middle East and Africa). In 2017, North America held the highest proportion of the global telehealth market. The United States is the largest market in North America, owing to rising healthcare expenditures and regulatory rules, an ageing population and rising incidence of chronic diseases, a scarcity of healthcare professionals, government efforts, increased investment for telehealth, and the presence of numerous significant competitors. While North America continues to dominate the global telehealth industry, Asia-Pacific is estimated to be the fastest growing region. This is owing to a large patient pool, an ageing population, and an increase in the burden of chronic illnesses such as diabetes and cardiovascular disease. Competitors in the telehealth business in APAC have a lot of room to develop in China. A large population base, a rising patient pool with chronic conditions, and improvements in the country's telecommunications and IT infrastructure all point to a large market opportunity.

i) North America:

North America Is Projected to Be Largest Market. In 2019, North America occupied the top share of the telemedicine market, and this growth is projected to continue during the forecast period. This is mainly due to the rising frequency of chronic and lifestyle-related illnesses, the region's ageing population, and increased government financing and grants for telemedicine. According to a Centers for Medicare & Medicaid Services (CMS) report, the healthcare cost in the U.S. is projected to grow from an average of 17.7% in 2018 to an average of 19.7% by 2028.

The recent incidence of COVID-19 has resulted into travel restrictions due to lockdowns and government regulations. This has offered considerable demand for telemedicine services during pandemic. Escalating prevalence of chronic diseases in the region will create the demand for remote monitoring and home healthcare services. According to the Center for Disease Control and Prevention, chronic diseases are among the leading causes of disability and death in the U.S. furthermore, adoption of internet-based services with rising internet consumption among the population will positively impact the North America telemedicine market.

According to the graphical analytics private limited report of North America telemedicine market, 5 trends impacting North America telemedicine market:

- ✚ Robust governmental intervention and strategies
- ✚ Increased use of smartphone applications during COVID-19 pandemic
- ✚ Expanding remote analysis via tele-monitoring
- ✚ Declining mental health
- ✚ Enhanced strategic measures by Canadian government

Market in North America The market is divided into four categories based on service: teleconsulting, telemonitoring, tele-education/training, and others. The tele-consulting category increased its market share in 2019 and is predicted to grow significantly by 2026, according to the forecast. Tele-consultations enable for effective patient examinations in remote locations, resulting in improved treatment access and cost savings. Technology advancements, such as video consultation with HIPAA-compliant tools, have boosted monitoring capabilities even further. Teleconsulting's widespread use in gynaecology, cardiology, and dermatology will drive segment expansion in the approaching years.

North America Market based on type, market is divided into two types: telehospital and telehome. In 2019, the telehospital segment led the market, accounting for the majority of market share, and is expected to increase at an annual rate throughout the forecast period 2026. Its rapid expansion can be ascribed to its greater accessibility to the region's general population. Telehospitalists are assisting in the improvement of efficacy in healthcare institutions with limited resources.

The dermatology segment was valued at more than USD 6.5 billion in 2019. Increasing focus on facial appearances and number of cosmetic surgeries will drive the demand for online consultation.

According to the research report published by Polaris Market Research, the Global U.S. Telemedicine Market Size Is Expected to Reach USD 25.88 Billion By 2027, at a CAGR of 15.8% during the forecast period (2026).” By 2026, the telemedicine industry in the United States is expected to approach USD 80 billion. The adoption of high-end technology services and products in the area is largely responsible for market growth. Furthermore, the growing usage of smartphones and internet consumption will boost the industry's development potential. In addition, as the senior population grows, so does the incidence of chronic conditions, driving up demand for telehome services. This will lead to a preference for telemedicine services in the region, resulting in future market growth.

The American Telemedicine Association recently reported that 80% of all US states have moved to improve telemedicine coverage or reimbursements over the past two years, according to their latest survey of state laws and policies. The most popular US states for telemedicine labor to be (in no particular order) California, Texas, Florida, New York , Arizona. Massachusetts is the most restrictive State for Telehealth.

KEY Providers :-

a. Teladoc (Best telemedicine company for nonurgent medical care)

- Year founded: 2002
- Location: New York, US
- Total revenue generated: \$172.9M

Teladoc Health is a telemedicine and virtual healthcare company based in the United States. Teladoc provides whole-person virtual care to patients from the convenience of their own homes. Teladoc is revolutionising the way consumers get healthcare, from on-demand urgent care to complicated healthcare requirements. They use simple software and medical-grade telehealth equipment to reach and communicate with patients. The physician team at Teladoc Health, in collaboration with Aetna and CVS Health Services, is introducing countrywide virtual primary care.

Pros:-

- covers a wide range of health issues
- can analyze lab results and send prescriptions to pharmacies

Cons:-

- some people report technical issues with the app
- account setup can be complex time-consuming

b. MDLive: (Best comprehensive telemedicine company)

- Year founded: 2009
- Location: Florida, US
- Total revenue generated: \$198.6M

MDLive is a major virtual on-demand healthcare company that provides comprehensive teletherapy, virtual consultations, interactive health monitoring, and mental health therapy. The company is continually building partnerships with healthcare systems across the United States. MDLive is launching an employee assistance programme (EAP) to assist employees in re-establishing a work routine.

Pros:-

- accepts psychiatry or therapy appointments for children 10 and up
- appointments can be made 24/7 for 365 days per year

Cons:-

- therapist availability may be limited
- certain medications cannot be prescribed

c. Doctor on Demand: (Best telemedicine company for choosing a specific doctor)

- Year founded: 2012
- Location: California, US
- Total revenue generated: \$235.7M

Doctor on Demand was named "Best Overall Digital Health Company" in the 2021 MedTech Breakthrough Awards. The company provides on-demand and planned appointments with

certified healthcare practitioners. Doctor on Demand's licenced physicians electronically inspect, diagnose, and prescribe the appropriate prescription.

Pros: -

- choose a therapist or psychiatrist based on their specialty and qualifications
- full team (primary care, therapist, and psychiatrist) is available to help you
- can select a “favorite” doctor

Cons:-

- without insurance, a short teletherapy visit might cost more than a longer in-person therapy appointment
- might take a few days to get an appointment

d. Amwell: (Best telemedicine company for general medical care)

- Year founded: 2006
- Location: Boston, MA, US
- Total revenue generated: \$866M

Amwell, based in Boston, Massachusetts, is a well-known telemedicine platform. Over 2,000 hospitals and 240 health systems use Amwell's virtual telehealth services. Amwell strengthens its virtual care platform with the acquisitions of SilverCloud Health and Conversa Health. Amwell's purpose is to give exceptional access to affordable, high-quality treatment. Amwell Solution does not provide appointments for consultations.

Pros:-

- easy enrolment
- choose your own physician

Cons:-

- only certain insurers cover services
- may experience technical issues

e. MeMD: (Best telemedicine company for fast, straightforward service)

- Year founded: 2010
- Location: Phoenix, AZ, US
- Total revenue generated: \$86.2M

MeMD provides on-demand telehealth services that are high-quality, convenient, and inexpensive. MeMD's highly skilled team of medical specialists specialises in telehealth services such as talk therapy, teen therapy, psychiatry, personalised hair, and women's care. The National Committee for Quality Assurance had awarded MeMD a three-year Accreditation certificate (NCQA).

Pros:-

- Easy and fast tool
- Known for good customer service

Cons:-

- Appointments may be rescheduled if healthcare professionals are not available

- Some people need to be referred to other clinics or doctors

f. Plush care: (Most affordable telemedicine company)

- Year founded: 2013
- Location: California, US
- Total revenue generated: \$31M

PlushCare is a virtual platform that links people with healthcare providers for same-day appointments across the United States. PlushCare is available 24 hours a day, 7 days a week to provide virtual medical consultation to patients. Patients may see their lab results virtually by just signing up for an account. Accolade, Inc has purchased Plushcare with the goal of providing seamless access to care for acute, chronic, and preventative health issues. PlushCare develops a dedicated research centre for the transmission of the covid-19 virus.

Pros:-

- Works with insurance plans
- Same-day appointments available

Cons:-

- Communication issues have come up
- Some drugs cannot be prescribed

g. Health Tap: (Best telemedicine company for consistent care provider)

- Year founded: 2010
- Location: California, US
- Total revenue generated: \$88.3M

Since 2010, Health Tap has been one of the top healthcare organisations, providing individuals with the greatest medical information. Using the health tap business app and a specialised AI symptom checker, the entire body is examined and a detailed report of symptoms for any ailment is provided.

Pros:-

- More affordable for people without insurance
- Option to have a free account
- Can use the same doctor for consistency

Cons:-

- Response times can be slow
- Depending on the issue, some consultations may be general or not specialized

h. Virtu Well: (Best telemedicine company for quick response time)

- Year founded: 2010
- Location: Minnesota, US
- Total revenue generated: \$3M

Virtuwell is an online medical clinic that gives access to a daily health balancing system 24 hours a day, 7 days a week. Real-time doctors and clinicians will give virtual diagnosis and treatment. People with high medical emergency benefit from virtuwell's automated therapy and rapid appointments.

Pros: -

- Advice available for a variety of conditions
- Easy-to-use platform

Cons:-

- Staffed by board certified nurse practitioners who cannot offer as many services as doctors
- Need to answer a questionnaire first before being connected with a nurse practitioner

i. United Health Group:

- Year founded: 1977
- Location: Minnesota, US
- Total revenue generated: \$287.60 Billion

UnitedHealth Group is a telehealth company devoted to assisting individuals in living healthier lifestyles. Optum provides services to payers, providers, employers, governments, life sciences businesses, and consumers in the healthcare industry. North Olympic Healthcare Network will receive a \$3.3 million award from UnitedHealth Foundation in July 2021.

j. SESAME: (best overall), America's affordable health care superstore, total revenue generated: \$28M

Sesame is the health care superstore that delivers convenient, high-quality, full-scope medical care at affordable prices. You can book a same-day appointment for an initial health visit. Prices vary by location, and reviewers say prices are overall affordable. Services provided are UTI visit, Virtual ED consult, Video skin consult, Video mental health consult, Video birth control consult, Video allergy consult, Video OG/GYN consult, In Person OG/GYN consult, MRI, STi testing, In-person dermatology visit, Plantar Fasciitis Video Visit, All New York City medical services.

Pros:-

- can book same-day appointments
- affordable prices

Cons:-

- wait times can be long
- documentation not provided.

II) Europe

The European telemedicine industry is on the rise because of recent legalisation of activities such as remote treatment and electronic prescriptions in most European countries. Considering the challenges posed by the COVID-19 pandemic, global attention has turned to the opportunities offered by telehealth and far-reaching developments have been rapidly accelerated. The number of suppliers in the European telemedicine industry is expected to increase soon with European countries already among the largest healthcare markets in the world.

The Europe telemedicine market was valued at USD 10,619 million in 2020, and it is expected to reach USD 29,975 million in 2026, registering a CAGR of 18.8% during the forecast period, 2021-2026.

The major companies operating in the Europe telemedicine market:

a. Babylon

- Year founded: 2013
- Location: London, United Kingdom
- Total revenue generated: \$244M

One of the fastest-growing digital healthcare start-ups in the world. Its objective is to make high-quality healthcare cheap and accessible to everyone on the planet. Babylon Health is a value-based care firm and a digital-first health service provider that blends an artificial intelligence-powered platform with virtual clinical operations for patients. Babylon offers text and video chat consultations with physicians and health care professionals in the United Kingdom, Canada, Rwanda, Saudi Arabia, and the United States. You may talk to a doctor by phone, video conference, or text in minutes, follow your health with their advanced monitoring system, manage chronic conditions, and access your medical history using Babylon's app. Therefore, a subset of its services are now offered in Cambodia, Hong Kong, India, Indonesia, Laos, Malaysia, the Philippines, Singapore, Taiwan, Thailand, and Vietnam.

But apart AI digital healthcare Babylon, other emerging digital health (telehealth, telemedicine) companies in Europe are:

b. KRY: (known as Livi outside of the Nordics)

- Year founded: 2015
- Location: Stockholm, Stockholms Lan, Sweden
- Total revenue generated: \$84M

Kry is Europe's leading digital healthcare service, allowing people to video consult with a doctor, nurse, or psychologist in minutes. Individuals may pay for healthcare on a pay-as-you-go basis, thanks to a collaboration with healthcare providers. Kry is a prominent digital healthcare firm in Europe, with the purpose to make healthcare better and more accessible. It's known as Kry in Sweden, Norway, and Germany. It is known as Livi in the United Kingdom and France.

c. Doctolib

- Year founded: 2013
- Location: Paris, Ile-de-France, France
- Total revenue generated: \$378M

Doctolib is a fast-growing healthcare technology company in Europe. Every day, work to achieve three entrepreneurial goals:

1. Improve the daily life of healthcare personnel
2. Improve patient access to healthcare and patient health
3. Build a team of entrepreneurs with humanist values.

It is Europe's third largest telemedicine firm, with an online and mobile booking platform that allows you to identify and schedule an appointment with a specialised doctor near you. Due to the epidemic, Doctolib has been giving its services to all French and German physicians in recent months.

KRY (Livi) and Doctolib are both market leaders in French telemedicine.

Other European AI digital healthcare firms that are worth mentioning include:

d. AccuRx

- Year founded: 2016
- Location: London, UK
- Total revenue generated: \$23M

AccuRx is on a mission to bring patients and their healthcare teams together. Its main product is Chain SMS, a messaging program used by doctor surgeries. More than 90% of primary care clinics in England are using it for online appointments. Since the pandemic in the UK, they integrated a videotelephony system.

e. Min Doktor

- Year founded: 2013
- Location: Lund, Skane Lan, Sweden
- Total revenue generated: \$59M

Aims to make health care available by allowing you to meet experienced doctors on your terms. When you have time, wherever you are and with technology you are used to using. With a clear vision, namely greater efficiency by simplifying the patient's journey through the system.

f. Ada Health

- Year founded: 2011
- Location: Berlin, Germany
- Total revenue generated: \$39M

Ada is a global health company created by doctors to improve human health by transforming knowledge into better outcomes. Ada's core system combines medical knowledge with intelligent technology to enable everyone to take control of their health and medical professionals to provide effective treatment. Work with healthcare systems and providers, insurers, payers and commissioners, life sciences, employers, governments, and non-profits all around the world to realise its mission for personal health and well-being.

g. Qare

- Year founded: 2016
- Location: Paris, France
- Total revenue generated: <\$5M

Qare is a video consultation platform for medical professionals. The teleconsultation skills of the practitioners on Qare are always being improved. They are all enrolled with the Council of the Order of Physicians and practise in France. Is a largest, fastest-growing provider of high-quality telemedicine services.

h. Zava

- Year founded: 2010
- Location: London, UK
- Total revenue generated: \$29M

It is an online medical service provider and offers consultations, diagnostics and medication without the need for a face-to-face visit.

i. Docplanner

- Year founded: 2011
- Location: Warsaw, Poland
- Total revenue generated: \$294M

DocPlanner is a software company that provides doctors with a booking platform and administration software. TuoTempo was their most recent purchase (an online medical management software). They developed remote video consultations powered by Vonage's Video API in response to strong demand for telehealth services during the pandemic.

j. Push Doctor: (built powerful tools to help clinicians, patients & healthcare leaders achieve their goals.)

- Year founded: 2013
- Location: Manchester, UK
- Total revenue generated: \$17M

Push Doctor is Europe's largest digital health brand. Connects patients to a smart network of UK qualified GPs in as little as 6 minutes. The brand is evolving to encompass the widest range of medical, health, wellness and lifestyle products - with the core goal of enabling its customers to live happier, longer lives.

III) Asia-Pacific

The Asia pacific telemedicine market size is estimated to grow from USD 10.33 billion in 2022 to USD 27.24 billion by 2027, with a compound annual growth rate (CAGR) of 21.4% during the forecast period. Though it is small part of the healthcare department presently, it is one of the fastest- growing sectors in the overall healthcare market. In addition, the recent healthcare reforms have transformed the telemedicine market and expanded the reach of these applications.

COVID-19 prevalence is quite high in India. People believe that providing medical care is a pressing issue. During the lockdown, telemedicine can assist diabetic and chronic illness patients. China recently employed all professional channels to engage with patients, including expert information and telemedicine. In this pandemic, it is advantageous to all types of patients. A telemedicine platform will play a vital role in managing the covid-19, according to a Chinese anti-epidemic specialists committee. The market will be driven by an increase in the use of telemedicine by dieticians and local physicians. In addition, the market's growth will be driven by the active engagement of patients.

Telemedicine market in Asia pacific region is driven by increasing population and a growing number of chronic diseases. The shortage of doctors in rural areas is a crucial opportunity for developing this market in the region. Limited reimbursement facilities and a lack of consumer awareness hinder the growth of the market.

In Japan, Telemedicine has been available since 2018, but the market shares have hit the highest mark due to the increasing number of Covid-19 cases. The rising geriatric population is also one of the factors for the market to grow. In South Korea, the government has recently allowed Telemedicine on a trial basis.

The market would be driven mostly by India and China due to expanding population and chronic illness prevalence. Japan is one of the few countries in the Asia-Pacific area that offers universal health care to all people. The Japan Medical Association has undertaken a number of steps to assist physicians in providing high-quality healthcare in Japan, including providing insurance coverage for telehealth services under the country's universal healthcare insurance system.

Key Market Players:

- AMD Global Telemedicine

- CISCO System Inc.
- Medtronic Inc.
- GE Healthcare
- Honeywell Life sciences
- Philips Healthcare
- McKesson Corp
- Aerotel Medical System
- CardioComm
- Cerner Corporation
- Apollo hospitals (India)
- Neosoft (China)

IV) Rest of the World (RoW) (Middle East and Africa)

The telemedicine market in the Middle East and Africa is expected to develop at a CAGR of 10.8% over the following five years, from USD 3.86 billion in 2022 to USD 6.44 billion in 2027. Even though it is a modest segment of the healthcare business. The telemedicine market has been revolutionised by recent healthcare changes, which have influenced the spread of such technologies.

COVID-19 impact on MEA Telemedicine Market:

During the COVID-19 epidemic, the demand for telemedicine is growing. To prevent the spread of COVID-19, higher authorities advised everyone to stay at home. The United Arab Emirates has taken a stride ahead in offering medical services to individuals over the internet, which is a major driver in the market's growth.

Telemedicine refers to the use of telecommunication to distribute healthcare services and information. From February 2020, the Middle East and Africa telemedicine market is expected to grow substantially. Residents in the Middle East and Africa will benefit from telemedicine's access to the greatest global healthcare services. Telemedicine will make it easier for older persons with mobility problems to communicate with doctors. It lowers total healthcare costs since many African countries cannot afford to spend much on healthcare and the average citizen's income is poor. Telemedicine is assisting in remote locations by providing healthcare services, as many communities in the Middle East and Africa lack basic healthcare. In Adu, there's a fictitious hospital. Telemedicine is assisting in remote locations by providing healthcare services, as many countries in the Middle East and Africa lack access to basic healthcare. Mubadala's Abu Dhabi telemedicine clinic, a virtual hospital in Adu Dubai, offers services 24 hours a day, seven days a week. These are some of the important elements that are propelling the Middle East and Africa telemedicine industry forward. The operation of telemedicine equipment necessitates the use of competent personnel. The scarcity of qualified technicians is a key stumbling block to the market's expansion. The market's demand is being hampered by a lack of internet access in rural regions and a lack of understanding.

South Africa now holds the greatest share of the Telemedicine market in the area, based on geography. Telemedicine companies are concentrating on strengthening their hardware, network, and software offerings. Telemedicine technology's return on investment (ROI) and clinical results are being calculated by healthcare firms. Tier 1 players see consolidation as a way to capitalise on telemedicine potential. Insurance firms are taking a hard look at telemedicine's capacity to boost e-Healthcare while also improving the bottom line.

Companies dominating in the MEA Telemedicine Market are:

- AMD Global telemedicine
- CISCO Systems Inc
- GE healthcare
- Honeywell Lifesciences
- Philips healthcare
- McKesson Crop
- Aerotal Medical system
- CardioComm
- Cerner Corporation

6.13 Opportunities & threat perceived by the online Healthcare service providers

Opportunities:

- Capability to work from anywhere.
- Reduced commute time.
- Ability to provide care to rural areas without having to move there or commute long distance.
- Increase in job satisfaction with the implementation of telecommuting.
- Telemedicine was also shown to improve the timeliness of care for patients.
- A customer segmentation analysis to identify profitable customer segments and categorize them as per their spending behaviors and demands.
- Conducting a competitive intelligence study to identify competitors' offerings, upcoming initiatives, and their current offerings.
- A market opportunity identification to procure relevant data regarding upcoming market trends, significant profitable market opportunities, and recent advancements.
- Business Outcome: The telemedicine industry participant gained comprehensive insights into their competitors' strategy, customer expectations, and current market trends by utilising Infiniti's market opportunity solutions. The engagement also assisted the client in identifying profitable customer categories and tailoring their offers to meet the demands of their customers. In addition, the telemedicine services provider assessed the strategies of their rivals and differentiated their current and planned efforts. In addition, the client identified relevant market possibilities, developed strategies to profit on them, and devised a strategy to reduce potential market risks. The market opportunity analysis assisted the telemedicine services provider in launching new features, receiving favourable user feedback, staying one step ahead of competition, and capitalising on considerable profit prospects.

Threats:

According to Peter Reilly, MS, North American healthcare practise leader and chief sales officer for Chicago-based HUB International, the top risks that produce possible liability for healthcare providers are misdiagnosis, data security, and privacy protection.

a) Misdiagnosis risk

The most serious malpractice risk, according to Reilly, is a doctor's misdiagnosis of a patient. He claims that technology faults might lead to a misdiagnosis. By having a third-party present during a telemedicine appointment, medical professionals can reduce the danger. Telehealth sessions with a nurse or physician assistant may be more expensive. If the provider has any

doubts that the picture or opportunity to examine the patient was not clear, they should advise the patient to seek medical attention in person. This may be difficult during the pandemic, but if a medical practitioner has any concerns that something is wrong, they should refer the patient to an outpatient clinic or an emergency department.

b) Data security risk

Healthcare providers face three primary risks in the realm of telehealth data security:

- relying on a data technology platform, which is useful but lacks the privacy of sitting in an exam room with a patient. An assault on the technical platform is possible.
- The physician must rely on the technological platform to assess the patient as well as offer a diagnosis or therapy suggestion. data can be hacked.
- It's possible that a patient's information is kept incorrectly. If a clinician uses that information to make future treatment decisions, he or she may be responsible for medical malpractice.

According to Reilly, healthcare practitioners should be aware of patient information custody and guidelines, including who has access to it and how it may be used. "There are checklists and other services available to assist establish data security recommended practises. There must also be employee training to learn how to manage data security risks and recognise when a breach has occurred."

c) Privacy protection risk

Healthcare professionals that use telehealth should be conversant with privacy standards and regulations. Privacy protection begins with an understanding and knowledge of state and federal privacy rules and regulations that must be provided or maintained if personal health information is stored. Telehealth providers must have strong policies, protocols, and safeguards in place to ensure that third parties do not steal data by mistake or on purpose. It is critical for medical offices, hospitals, and other healthcare institutions to have a breach response plan in place if data is stolen. The breach response is critical in order to comply with local, state, and maybe federal regulations for breach notification. Having a breach response strategy in place can help you avoid penalties and/or responsibility.

7. E-Healthcare in India & its Future -

a)India current scenario

In India, India is one of the top 10 countries in the telemedicine market in the world. Telemedicine is slowly but surely gaining traction. ISRO, the Department of Information Technology (DIT), the Ministry of External Affairs, the Ministry of Health and Family Welfare, and state governments all played important roles in the development of telemedicine in India.

With a Telemedicine Pilot Project in 2001, ISRO (Indian Space Research Organization) was the pioneer of telemedicine in India, connecting Chennai's Apollo Hospital with the Apollo Rural Hospital in Aragonda village in the Chittoor district of Andhra Pradesh.

The Ministry of Health of the Government of India has embraced activities, for example, the Integrated Disease Surveillance Project, the National Cancer Network (ONCONET), the National Rural Telemedicine Network, the National Medical College Network, and the Digital Medical Library Network lately to additional the reason. Other huge drives taken by the government incorporate the DIT's foundation of normalized telemedicine practice guidelines and the Health Ministry's foundation of a National Telemedicine Task Force in 2005. The External Affairs Ministry has additionally taken on international activities like as the Pan-African eNetwork Project and the SAARC (South Asian Association for Regional Cooperation) Telemedicine Network Projects, decisively situating Indian telemedicine in the worldwide situation. The Government of India has arranged and executed different national-level activities and furthermore stretched out telemedicine administrations to South Asian and African nations. Endeavors are occurring in the field of clinical e-advancing by laying out computerized clinical libraries. A few establishments that are effectively engaged with telemedicine exercises have begun educational plan and non-educational program telemedicine preparing programs.

Mammography administrations at Sri Ganga Ram Hospital in Delhi, oncology at Regional Cancer Center in Trivandrum, careful administrations at Sanjay Gandhi Postgraduate Institute of Medical Sciences in Lucknow, and a lot more are only a couple of occasions of really evolved telemedicine administrations in India. Telemedicine has likewise supported gathering the test of health care during huge Indian social events. For instance, the Government of Uttar Pradesh utilizes Mobile Telemedicine framework vans furnished with videoconferencing frameworks for visual correspondence during Maha Kumbhamelas, permitting specialists in distant areas to associate with any telemedicine-empowered clinical emergency clinic or super specialty clinic for well-qualified assessment.

The private sector is also very interested in this area. Narayana Hrudayalaya, Apollo Telemedicine Enterprises, Asia Heart Foundation, Escorts Heart Institute, Amrita Institute of Medical Sciences, and Aravind Eye Care are some of the main Indian private sector telemedicine firms. They are supported by the federal and state governments, as well as organisations like ISRO, who provide them with relevant and up-to-date technology. ISRO's telemedicine network has gone a long way in the last five years. It now connects 45 rural and distant hospitals as well as 15 super specialty hospitals. The islands of Andaman & Nicobar

and Lakshadweep, the mountainous parts of Jammu and Kashmir, Medical College hospitals in Orissa, and rural/district hospitals in other states are among the distant nodes.

The latest study by Market Research Future (MRFR) has revealed that the telehealth market is expected to record a striking growth rate of 22.74 per cent from 2016 to 2024. By 2024, the market is anticipated to touch \$ 16,173.8 million.

b)Telemedicine in India during Covid Pandemic

In today's world, when the world is managing the world's biggest ever pandemic of Covid-19, a profoundly irresistible sickness with dramatically developing quantities of cases universally, even the world's top health-care frameworks face a remarkable test.

In India, the World Health Organization prescribed a doctor-to-population proportion of 1:1000, but the genuine proportion is simply 0.62:1000. With the beginning of COVID-19, this low doctor-to-population proportion turns out to be much really concerning.

There was no guideline or rules on the utilization of telemedicine in India before today, and the escape clauses in regulation and the absence of clearness in the principles made a gamble to the two doctors and their patients. Be that as it may, considering the COVID-19 scourge, telemedicine has unexpectedly turned into a hot subject.

The Medical Council of India (MCI) Board of Governors has issued the "Telemedicine Practice Guidelines," which incorporate both broad principles and a practical framework for telemedicine. While the underlying principles would apply to any future recommendations, the latter focuses on the immediate necessity in the aftermath of the COVID-19 epidemic. As a result, the Indian Medical Council (Professional Conduct, Etiquette, and Ethics) Regulations, 2002 have been amended, and the Ministry of Health and Family Welfare, Government of India officially accepted the revision on March 25, 2020.

c)Top players of India

a. Apollo Telehealth Services Private Limited

- Year founded: 2010
- Location: Telangana, India
- Total revenue generated: \$31.6M per year

Dr Prathap C Reddy in 1999 established Apollo Telemedicine Networking Foundation (ATNF) and Apollo Telehealth Services (ATHS), which is the largest and oldest multi-speciality telemedicine network in South Asia. Apollo is one of the major players in providing telemedicine services under PAN African network initiated by Government of India. In addition to providing healthcare services, it has been providing tele-education and tele-mentoring services as well.

Apollo Telehealth, which is part of Apollo Remote Health Care, one of the world's largest multi-specialty e-Health networks, offers specialised solutions such as Tele-Emergency, Tele-Radiology, Tele-Cardiology, Tele-Ophthalmology, Tele-Consults, NCD Management, and more, allowing consumers in remote locations to access specialised and high-quality services from Apollo's world-renowned doctors. Every day, Apollo TeleHealth's command centre processes around 25,000 transactions. It has enabled Connected Health and Continuum of Care by bringing healthcare within reach of every consumer via the use of cutting-edge technologies.

b. Practo Technologies Private Limited: (non-govt company)

- Year founded: 2008
- Location: Bangalore, Karnataka
- Total revenue generated: \$39M

Practo is the world's largest healthcare platform connecting millions of patients with hundreds of thousands of healthcare professionals. The company also develops software that enables healthcare providers to digitise and offer more efficient and high-quality treatment to millions of people every day all around the world. Practo has its presence in over 15 countries with their consumer and software business. It had around 200,000 doctors listed with them, with 50M appointments every year. The doctors listed on their platform are verified for a medical license, qualification, and specialization. They also follow the HIPAA compliance act to maintain the patient's privacy and confidentiality.

c. 1MG Technologies Private Limited

- Year founded: 2015
- Location: Gurgaon, Delhi
- Total revenue generated: \$195M

1mg is a consumer healthcare digital platform that makes healthcare more accessible, intelligible, and inexpensive. It enables users to obtain information about and purchase medications prescribed by doctors. Users may search for medications by illnesses, class, company, and brand. Its doctor platform seeks to revolutionise how consumers locate the correct healthcare provider for their requirements. Its diagnostics service makes lab testing more transparent and cost-effective. The organisation enables Indian customers and caregivers to choose the finest healthcare service at the greatest price.

d. Online Health India Private Limited

- Year founded: 2016
- Location: Bangalore, Karnataka
- Total revenue generated: \$16M

Doorline is a brand that offers everyone a rapid online doctor consultation. Healthcare access has always been a concern across the world, particularly in India. We believed that healthcare accessibility and affordability should be one of the fundamental foundations offered to all humans. This must be straightforward, transparent, and trustworthy. DocOnline was based on this concept. To contribute to each patient's health and well-being by offering the greatest Healthcare services while rethinking the Patient – Doctor connection offered through digital technology platforms and processes, so that people live happier, healthier, and more productive lives. Doconline wants to accomplish the following goals within three years of its establishment. Be one of the top three healthcare service providers in South East Asia.

e. Lybrate

- Year founded: 2014
- Location: Faridabad, Haryana
- Total revenue generated: \$46M

Lybrate is a ground-breaking web and mobile platform that links patients and clinicians. The portal enables individuals to obtain numerous medical opinions for themselves or their loved ones. It's also a chat interface where people can exchange photographs of problem regions, medical reports, medications, and start a conversation with a specific doctor. Patients may also identify doctors near them and schedule appointments online

f. Medlife

- Year founded: 2008
- Location: Ahmedabad, Gujrat
- Total revenue generated: Rs 363 Cr in FY19

Medlife is India's value-driven enterprise for seeking prescription pick-up so that home-delivery of medicines is available. The app is simple to use and allows you to get medications delivered straight to your home while saving money. They deliver in Ahmedabad, Bengaluru, Bhopal, Chennai, Delhi-NCR, Hyderabad, Jaipur, Kolkata, Mumbai & Varanasi.

g. Portea Medica

- Year founded: 2013
- Location: Bangalore, Karnataka
- Total revenue generated: \$75.1M

Portea Medical provides hospital-quality healthcare in the comfort of your home. They provide doctors, nurses, and physiotherapists for home visits who have passed our rigorous hiring standards. We facilitate lab tests at home and medical equipment rentals, making health care more accessible. Aim to make essential healthcare more available, reasonable and responsible to our patients' necessities, convey top notch clinical consideration into patients' homes and expect to work on their personal satisfaction. Portea Medical expects to bring a-list clinical consideration into our patients' homes, intend to make essential healthcare more open, yet in addition more reasonable and responsible to patients' necessities.

d)The government's telemedicine platform: e-Sanjeevani

eSanjeevani aims to expand access to health-care services that were severely limited during the outbreak. As a result of COVID-19, movement limitations were implemented during the lockdown, as well as a shortage of adequate health facilities. eSanjeevani was built and deployed in record speed by the Centre for Development of Advanced Computing (CDAC).

The platform is available in the following two variations:

Doctor-to-doctor teleconsultations, provided through eSanjeevani Ayushman Bharat–Health and Wellness Centres (AB-HWC): This is available in 6,000 HWCs and 240 hubs, with specialists and physicians on hand. eSanjeevani AB-HWC has been trained by over 20,000 paramedics, physicians, and experts.

Doctor-to-patient teleconsultations provided free of cost through the eSanjeevaniOPD platform: Contactless consultations between a doctor and a patient are possible with eSanjeevaniOPD. Approximately 8,000 doctors were trained and enrolled in the eSanjeevaniOPD system.

e) The specific futures of E-Healthcare in India are as follows:

- Telemedicine market in India is expected to rise at a CAGR of 20% during 2016-2020, reaching US\$ 32 million by 2020
- The implementation of telemedicine technology could save India US\$ 4-5 billion every year
- There are 4,892 start-ups in the Indian health-tech space
- Health-tech start-ups in India raised a total of US\$ 504 million between 2014-2018
- According to the Future Health Index (FHI) 201 report, India is leading in the adoption of digital health technology with 76% of healthcare professional in the country already using digital health records (DHRs) in their practice.

- New digital tools and technologies are already having an influence on India's healthcare system, and they have the potential to alter health-care delivery in the near future by increasing efficiency and enhancing patient care.
- In both rural and urban regions, telemedicine may cut the time it takes to see a doctor down to 10-15 minutes. It cuts down on wait times by maximising the use of doctors and minimising the need to drive to a clinic or hospital. It can also save lives at a fraction of the cost of present healthcare systems.
- Electronic Medical Records (EMRs) may digitalize patient data from several sources in one location, allowing doctors to make more accurate diagnoses in less time.
- As more health data becomes available and analytic tools improve, AI will play a larger role in improving healthcare results. From clinical job automation to virtual staff nurses, the possibilities are endless. AI has the potential to revolutionise the way we manage our health.
- In an era where there is a pressing need to improve the durability and cost effectiveness of surgical intervention; robotics will play a key role through endosuturing, sensing, image guidance, materials, manufacturing, and surveillance strategies in surgical procedures.
- Smart health monitors may gather individual vital signs and test results in real-time, allowing for faster diagnosis and correct treatment at an early stage, reducing travel and waiting times. It also improves doctors' operational efficiency and provides patients with better assistance and feedback.
- VR has the potential to transform the way we think about pain management, stress management and rehabilitation. Human DNA analysis enabled by increased computer processing will enable truly personalised genomic testing and treatment options for certain genetic diseases. This could vastly improve the effectiveness and safety profile of the treatments.
- Mobile health apps can help in preventing serious diseases by increasing patient engagement, providing health education and expert guidance from healthcare providers.

Digital health start-ups are bringing novel technologies such as wearable tech, telemedicine, genomics, and artificial intelligence to the Indian healthcare system.

f) Top 5 Indian health-tech start-ups

i)Cure.Fit (Revenue:\$674.6M)

Bengaluru-based Cure.Fit was established in 2016 and offers wellness, nourishment, and mental prosperity arrangements through disconnected and advanced channels.

ii)Docsapp (Revenue: <\$5M)

DocsApp is a web-based clinical conference stage that was established in Bengaluru in 2015. DocsApp financial backers accept that DocsApp has emphatically changed the patient and doctor insight in additional ways than one — the stage on-sheets just expert doctors who are then associated with patients in less than 30 minutes. The stage goes above and beyond in grasping the patient's condition and, likewise, associating with the right doctor.

iii) Forus Health (Revenue: \$20M)

The target of Bengaluru-settled Forus Health is to utilize innovation to increment access, cut down the expense of determination (moderateness) and bring issues to light (the three As) for destroying the preventable visual impairment, which is a worldwide healthcare challenge.

iv) HealthPlix (Revenue: \$6M)

Established in 2014, HealthPlix's Electronic Medical Records (EMR) programming for clinics and centers is coordinated with AI-driven Clinical Decision Support (CDS) framework to help doctors while performing therapy on different illnesses.

v) Innovaccer (Revenue: \$252M)

New Delhi-settled Innovaccer helps healthcare association execute valuebased care models and further develop care conveyance with man-made consciousness applications for care the executives, doctor burnout decrease, and patient commitment.

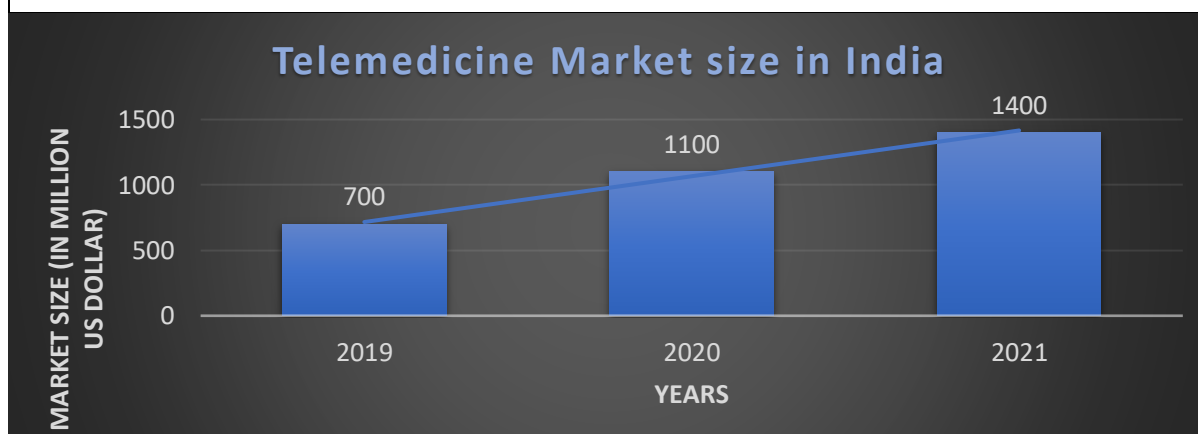
g) Telemedicine Market in India

This research relied on secondary data. Statista was used to gather the information. This information is being utilised to support the findings of the literature review that was conducted.

Telemedicine market size in India

YEAR	Market size in million U.S. dollars
2019	700
2020	1100
2021	1400

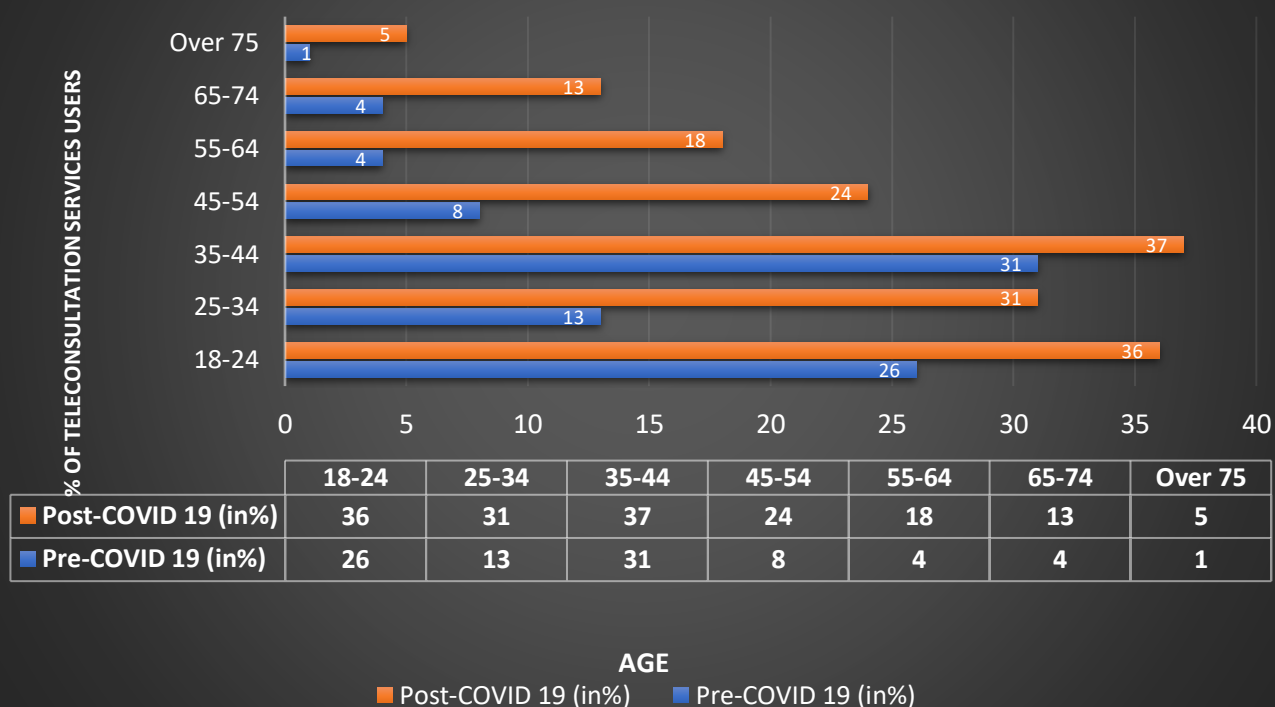
Source: Statista



Age-Wise distribution of inclination to use Teleconsultation services during COVID-19 in India

Over the last three years, there has been a noticeable growth in the usage of Telemedicine services, as seen in the graph above. Between 2019 and 2020, there is a 57 percent growth in the utilisation of telemedicine. Although there was still a 27 percent growth in usage, it was not as high as it had been in 2020.

Age-Wise distribution of inclination to use Teleconsultation services during COVID-19 in India



The graph above depicts the age distribution of people's ability to use telehealth consultation services in India during the COVID-19 epidemic. We can see that people are more eager to use telehealth services in general. The same is true for persons aged 65 and above. There is a 4% increase for people who are 75 years old or older. In comparison to other categories, this is a relatively low increase, which might be due to the causes mentioned above, such as a lack of education, sufficient equipment or internet access, or a fear of privacy invasion.

8.Conclusion:-

This research was conducted to study the possible reasons and need behind the beginning of this new era of online healthcare consultation. The research has shown that Telemedicine having a direct effect in improving their healthcare and is growing at a rapid range. But is not a special thing; it is just an upgraded version of traditional healthcare. Telemedicine is beneficial and help us to reach the healthcare provider without travelling and also most beneficial in the remote areas where there is shortage of healthcare providers. In urbane areas it saves a lot of time, especially businessmen who do not have time to visit the clinic.

Telemedicine was considered cutting edge and exploratory a few a long time prior, but it may be a reality nowadays. It is presently rising as an imperative apparatus for specialized healthcare, especially for patients in farther areas were restricted to get standardized healthcare services. The rising usage of mobile phones is a major element driving this field's growth. Patients may self-monitor their health state thanks to the availability of health applications. As a result of this proactive attitude, they are more likely to embrace alternate methods of healthcare delivery, such as telemedicine.

Telemedicine and virtual consultations are primarily used to deliver high-quality healthcare services throughout India. This involves making healthcare more accessible to both rich and impoverished people, allowing individuals with mobility challenges, such as the elderly and physically disabled, and enabling faster, cheaper, and better communication for treatment, professional follow-up, and record storage. It aids in the removal of geographical obstacles to healthcare, particularly in remote places with limited access to transportation.

A medical practitioner or hospital can engage with many specialists via telemedicine, regardless of their location. Telemedicine allows patients to communicate with their doctors more consistently and in a more feasible way, perhaps improving the doctor-patient bond. Patients' prognoses are expected to improve as a result of better follow-up. In general, telemedicine has the ability to improve the quality of healthcare for the general public. Nowadays, we are able to notice noteworthy headways in telemedicine, such as synchronous and asynchronous telehealth services. Asynchronous telemedicine alludes to the "store-and-forward" strategy, in which a persistent or doctor accumulates restorative history, pictures, and pathology reports and transmits them to a specialist doctor for determination and treatment. Synchronous telemedicine alludes to the conveyance of wellbeing data in real-time and permits real-time observing of hospital patients and builds compatibility between clients.

Since of its virtual character, telemedicine has a few downsides. Framework and specialized training are required. It may decrease coordinate engagement between patients and specialists since online discussions are indifferent, and physical examinations are required to form a careful determination. There's no routine system for the contact, and there's no consent frame for either tolerating or denying the benefit. Telemedicine is still not instructed in medical schools. Aside from ambiguities encompassing commitments in cases of carelessness, there are issues concerning security, privacy, quiet data security, and treatment. There's no agreement on medicolegal difficulties beginning from telemedicine. Right now, no health insurance coverage in India takes telemedicine under consideration.

Telemedicine has its uses especially in patients requiring remote monitoring during the onset of infectious diseases such as COVID-19 with mild symptoms. Telemedicine use increased during COVID-19, but it can future be utilized in the coming years due to potential benefits.

The use of telemedicine will increase very fast in the coming years. However, like all revolution, telemedicine cannot be painless. But it can help you to provide all the medication

and healthcare. Still, there are some issues which are faced. These issues include medico-legal malpractices, inter-state licensure, jurisdiction, as well as technological, security, and ethical aspects. However, telemedicine implementation requires a strong infrastructure including a good internet connectivity especially in areas hard to reach, such as the rural area. Also, Telemedicine cannot address all the primary care problems such that it cannot replace a human touch during a medical emergency, hence there needs to be doctor available physically as well. Many studies have also suggested lack of awareness among people and reluctance towards the usage of technology by professionals could also be challenging.

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