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Clinician perception and readiness for use of telemedicine technology with respect to Southern Haryana

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Abstract--Telemedicine is disseminating health-related information and services using electronic technology and telecommunications. Telemedicine enables long-distance patient-clinician communication and care as well as reminders and education. It also permits remote admissions. Health care providers, patients, and the public may benefit from easier access to information via Telemedicine. Telehealth is frequently considered to save the health care system money because of its digital nature. However, there is a wide range of data to back this claim. In performing economic assessments of telehealth services, the personnel assessing them must be informed of the possible results and extra clinical advantages of the telehealth service. There are several benefits of Telemedicine. During Covid-19, Telemedicine has become a huge platform for patients to interact with physicians with satisfactory telemedicine services. This review paper focused on Telemedicine, its advantages and disadvantages, its importance, and patient satisfaction.

Keywords--COVID-19, healthcare, patients, technology, telemedicine.

Introduction

In the medical community, Telemedicine is not regarded to be a unique field of study. In terms of information technology or the way healthcare is delivered, telemedicine goods and services are part of a bigger healthcare investment strategy [1,2]. In most cases, reimbursement payments do not distinguish between treatments offered through Telemedicine and those provided on-site. When it comes to remote services, there is no difference in billing and code. For years, the American Telemedicine Association (ATA) used the words "telehealth"

and "telemedicine" interchangeably. Telemedicine and telehealth services include video conferencing, e-health, electronic transfer of digital pictures, remote monitoring of vital signs, wireless apps for consumers, call centres, continuing medical education, and others[3]. Remote healthcare without clinical services may be described as "telehealth" in certain contexts. But the ATA refers to it as "health" or "medicine" in its use. Technology in the healthcare industry is intimately linked to Telemedicine (HIT). For the most part, HIT refers to electronic medical records and associated health information systems, whereas Telemedicine refers to different clinical services delivered through technology [4,5].

According to LeRouge and Garfield, Telemedicine in the United States has to be strengthened urgently. To be sure, Telemedicine can only be used to meet this demand once the difficulties associated with its implementation have been thoroughly analysed. Clinical adoption of Telemedicine is delayed because there is no rigorous assessment of its appropriateness in the current context. American Telemedicine Association (ATA), a worldwide advocate for Telemedicine, says Telemedicine is becoming an increasingly important part of health care in the United States. With several studies showing the cost-effectiveness of Telemedicine over in-person treatments, ATA claims that public and commercial insurers are increasingly paying payments for this kind of service. Telemedicine is expected to become a significant channel for healthcare delivery in the next years due to advancements in technology, patient and physician technological proficiency, a lack of physicians, and the effectiveness of Telemedicine and economic incentives. With Telemedicine, rural communities may benefit from reduced costs and enhanced accessibility and increased patient compliance [6].



Figure 1. Benefits of Telemedicine

Benefits of Telemedicine

There is a lot of information on Telemedicine, but there is a lack of statistics about its clinical usefulness and cost-effectiveness. Therefore, data is scarce on the advantages and disadvantages of using Telemedicine as a type of healthcare delivery. Based on early data and expectations, this evaluation is just a first impression[7]. A long list of possible advantages of using Telemedicine may be seen, including the following:

- Improved access to care- Over the last four decades, Telemedicine has allowed patients in outlying regions to get high-quality medical treatment. Telemedicine also enables physicians and healthcare institutions to extend to other locations outside of their network, enhancing patient access. In rural and metropolitan locations, Telemedicine seems to have improved treatment for millions of patients, even though providers are few.
- Improved cost efficiencies- Among the most fundamental benefits of telehealth is the capacity to cut or manage healthcare costs. Reduced travel time, shorter hospital stays, and the sharing of medical professionals are just a few ways Telemedicine may save money on healthcare.
- Improved healthcare quality- Telemedicine has increased healthcare quality, according to several research. Their quality is on par with what patients get from an in-person session. Telemedicine may outperform conventional treatments in certain cases, such as acute care or mental health. Telemedicine improves patient outcomes and satisfaction.
- Increased patient demand- Consumers are enthusiastic about Telemedicine. Telemedicine has tremendous effects on patients, their families, and their communities. Telemedicine reduces the amount of anxiety and time spent travelling for patients. Numerous studies conducted over the past 15 years reveal that telemedicine services are well-liked by patients. These services allow patients access to physicians that would otherwise be out of their reach and the ability to get medical care without having to travel significant distances.

Table 1
Difference between Telemedicine and In-Person doctors

Difference	Telemedicine	In-Person Doctors
Advantages	<ul style="list-style-type: none"> ➤ Limited risk and exposure to infection. ➤ No or little waiting time ➤ No need for transportation. ➤ Convenient. 	<ul style="list-style-type: none"> ➤ The enhanced rapport between patients and doctors. ➤ Conduct routine physical assessments. ➤ Ease of billing and claiming
Consequence	<ul style="list-style-type: none"> ➤ Technological limitation. ➤ Physical examination is limited ➤ Healthcare data breaches 	<ul style="list-style-type: none"> ➤ Limited for patients with mobility difficulties. ➤ Long waiting time. ➤ Increased risk of infection.

	➤ Lack of physical interaction.	
Cost	➤ Affordable	➤ Expensive

Services Provided Through Telemedicine

To better understand Telemedicine, it is important to look at the services and techniques utilised to provide such services [8,9]. Some instances are as follows:

- As part of obtaining referrals for specialist treatment, primary care and allied healthcare practitioners may consult with a patient or expert to help determine a diagnosis. This may be done via an interactive video feed or by storing and sending diagnostic pictures, vital signs, and video along with the patient's data for later review through a computer network or other means.
- Remote patient monitoring, including home health care services.
- A diagnostic testing centre or a home health service may utilise devices to gather and transmit patient data. For example, a homebound patient's vital signs may contain findings from blood glucose tests and information on the patient's ECG. Using Telemedicine to augment the services of visiting nurses is a good idea.
- Consumers can acquire specialised health information and participate in peer-to-peer assistance using electronic connections or the internet.
- Patients who live in rural areas may have access to specialised medical education by taking Continuing Medical Education courses.

Patient and public information

The internet may be accessible via computers in many locations, including schools, offices, and local libraries. A "superhighway" of information regarding health and illness has opened up, which may be utilised for a variety of purposes:

- It is their job to make sure patients are well-informed, so they may make an informed decision about their treatment options and choose the best course of action. A shared decision-making process between patients and healthcare providers might be established if people got this information, empowering them and promoting self-care. Because of this, data must be specific to a certain situation [10-12].
- For example, in health promotion or health education for individuals, institutions of higher learning, and healthcare facilities, to disseminate knowledge to the public, focusing on the disadvantages or underserved. This may prove to be the most cost-effective method of enhancing our understanding of health and illness and the link between a person's way of life and their overall well-being. But in fact, the usefulness of this technique of conveying information will ultimately rely on the quality and presentation of the material itself [13-16].

Improved access to Primary care

Telemedicine in primary care may make it easier for patients to communicate with their primary care physician (PCP) and get treatment from the comfort of their own homes. Immediately after a diagnosis is established, treatment must be continuously monitored. The video link may be able to deliver this. Additional prescriptions may be transmitted through the internet to a neighbouring pharmacy, which would arrange for medicine delivery to the patient. A patient may benefit from such an approach, particularly if they are too ill to travel. Health professionals and pharmacies might benefit from teleconsultation since it is possible to do it on any day or night. Such a strategy is effective. Improved care and efficiency might be achieved by monitoring and treating patients with a broad spectrum of conditions at home. Here are a few real-world instances of how Telemedicine might contribute to better health outcomes [17,18].

- *Diabetes*-To avoid long-term consequences, people with diabetes need to be regularly monitored. Increasingly, younger people with demanding job schedules and other obligations are diagnosed with diabetes. Regular trips to patient hospitals, which are time-consuming and disruptive to hectic work or home schedules, are no longer necessary for monitoring. Many benefits might be realised by delivering at least some monitoring needed through teleconsultation methods. Medical practitioners might visit patients at home more regularly and with less disruption to their everyday lives if this became commonplace. Glucose levels in blood and urine may now be checked at home using assays, which adds to the convenience already mentioned. It is possible to get exact findings from these tests if they are conducted appropriately. This is understandable, given that patients often lack the education and experience necessary to perform laboratory tests. Using teleconsulting technology to view patients while doing tests might significantly improve this condition. Patients may call their doctor's office and have the results of their blood glucose tests sent directly to their home glucose monitors by telephone. Marcolino et al., 2013 concluded that glycemic control was improved in diabetic individuals who received Telemedicine in addition to standard medical treatment. LDL-c, as well as blood pressure, were not affected by Telemedicine, although there was a trend to lower BMI in diabetic patients who utilised it [19]. Eberle et al., (2021) evaluated that clinically, telemedical treatments might help improve diabetes management and HbA1c levels. If HbA1c levels can be reduced, people with T2DM may have an advantage over those with T1DM. There is a need for further research that are longer and include bigger populations [20].
- *Hypertension*- Patients with high blood pressure often see doctors to check their blood pressure, which is an essential part of their care. Patients may now take their blood pressure with the help of electronic blood pressure monitors. Following the transmission of findings, medicine prescriptions might be established based on the readings. Because blood pressure readings are more accurate when collected at home and work, it may be predicted that the number of people with 'white-coat' hypertension might be reduced. Initially, patients could be observed through a cheap video connection to check that readings were correctly recorded. Taylor et al.,

(2022)found that the treatment of hypertension with inadequate control was greatly aided by the establishment of doctor-patient connections in a video-first telemedicine approach [21].

People's perception of Telemedicine

No matter how useful Telemedicine may be in clinical settings, it's crucial to learn how patients feel about it. In addition, it is vital to evaluate the understanding of the users of the technology before starting a telemedicine program. Indeed, Telemedicine's future viability depends on the level of understanding and acceptance among medical professionals [22,23]. Telemedicine adoption is hampered by a lack of technical competence, high startup costs, and challenges with insurance payment [24]. Lack of training and education are also major hindrances. However, a thorough grasp of telemedicine technology, particularly among doctors, is critical to its effective development and deployment. It is predicted that the more people know about the advantages and possibilities of Telemedicine, the better their views about this technology would be. Consequently, they will feel more comfortable using this new technology [25-27]. To put it another way, individuals will have greater confidence when they see that their colleagues are using new technology, leading to a larger degree of positive attitude.

Telemedicine is expected to become a significant channel providing healthcare delivery in the next years due to technological advancements, patient and physician technology proficiency, provider shortages, success stories in Telemedicine, and monetary incentives. Telemedicine has the potential to provide better treatment at lower costs, with more accessibility, and with higher levels of patient compliance for those living in remote areas [28,29]. In-person care must be supplied by telephone or video technology thanks to COVID-19, which has sped up the virtualisation of medical services. Half of healthcare primary care consultations were given in April 2020 compared to 0.1 percent delivered before the epidemic in February 2020. Since the start of COVID-19, experts have recognised a quick acceptance of virtual care, despite Seema Verma (administration, Centers for Medicare, and Medicaid Services) stating that "the gold standard in in-person care" would never be replaced by telehealth [30,31].

Telephonic and video SUD services have been reluctant to take off, despite these developments [32]. Organisational type (e.g., health system, specialist treatment clinics) [33] and geography (suburban, rural, urban, etc.) [34] seem to affect the preparedness to employ these technologies, according to newly available data. Financial resources and perceptions of simplicity, customisation, clinical effectiveness, and the potential to optimise workflow are two further organisational elements that influence the preparedness to use these technologies [35-38]. Additional issues include time for employee training and acceptability, accessibility of technology, and availability to information technology professionals. In addition, it's critical to consider how patients see and use technology. Whether patients adopt new patient care technology may impact the doctor-patient interaction [39-44]. Staff and patients' acceptance of these technologies and their perceptions of their usefulness impact their judgments on whether or not they should be used in the future. Majmundar et al., (2022)

evaluated patient satisfaction ratings for Telemedicine in endovascular neurosurgery during the COVID-19 epidemic. Their findings support using Telemedicine for outpatient treatment during the pandemic, suggesting its potential for regular usage in neurosurgical practice. These results show that Telemedicine's regulatory extension during the COVID-19 pandemic should be applied retroactively, but we urge that Telemedicine should not replace all in-person consultations once they can be safely done again. Patients and neurosurgical providers alike may benefit from Telemedicine as an alternative to face-to-face encounters [45]. Tholemeier et al., (2022) also found that virtual visits increased over time, but in-person satisfaction levels remained constant during the COVID-19 pandemic. Patient satisfaction was not significantly different between in-person and virtual visits despite a reported greater understanding of the patient's medical history during in-person encounters. This shows that Telemedicine may be a non-inferior option for delivering treatment for minimally invasive gynecologic surgical procedures [46].

Table 2
An overview of research on Telemedicine

Author	Conclusion	Reference
Ravindrane et al., (2022)	Reduced greenhouse gas emissions from travel were determined to be an advantage of Telemedicine over face-to-face consultations in all 14 investigations. In three trials, the usage of telemedicine equipment resulted in lower greenhouse gas emissions than the use of telemedicine consultations.	[47]
Lloyd et al., (2022)	Haematologists must consider the advantages of adopting telemedicine technology into standard-of-care procedures to promote patient-centred treatment and ensure equitable access for all patient groups.	[48]
Chan et al., (2021)	The advantages of Telemedicine in dealing with psychological and physical side effects, but not in other aspects of post-treatment cancer survival care	[49]
Gordon et al., (2020)	Patients were pleased with the ease of scheduling appointments, reduced travel time, and reduced time spent waiting in the lobby.	[50]
Buysse et al., 2020	Patients were pleased with tele-education and would suggest it to their friends and family. Adding a tele-component was motivated by "a need for a fresh boost" in treatment, better time management, and the desire to obtain more regular feedback and communication. They were pleased with the timely delivery of favourable comments.	[51]

Doctors' perception of Telemedicine

Technology and electronic information are combined in Telemedicine. It links healthcare over large distances, benefiting both patients and physicians. 80% of patients and all of the physicians were satisfied with the level of care provided through Telemedicine, according to the study. It was cost-effective by 90% of the

participants, and 61% of the doctors found increased patient traffic outside of their regular practice. Doctors had 47 percent technical issues, 39 percent scheduling issues, and 31 percent patient discomfort with looking into the camera, while 24 percent of patients had technical issues when using Telemedicine. Shahpori et al., (2011) found that critical care doctors expressed significant doubt and concern about the potential of Tele-ICU to meet the constraints of human resource restrictions and also the delivery of excellent treatment. This underscores the need for more study and education on the systemic implications of this new technology beyond patient outcomes [52]. Garavand A et al., (2022) stated that management and regulators could make better judgments regarding telemedicine adoption by looking at doctors' views of Telemedicine as a crucial participant, particularly in the early stages of deployment [53].

Drawbacks of Telemedicine

The advantages of Telemedicine are undeniable, but so are the drawbacks. Some of the negatives of Telemedicine include a breakdown in patient-professional relationships, challenges with information quality, organisational and logistical obstacles, and a lack of trust amongst health professionals. In a video consultation, patients with impaired vision or persons with hearing impairments have difficulty processing the information they are receiving. However, these constraints may be solved by showing questions in the text and employing sign language. Patients with disabilities have been able to benefit from video consultations. There is a broad feeling of satisfaction among patients and health professionals about the majority of the uses of Telemedicine, including teleconsultation. Although some health professionals are sceptical or outright hostile to the use of Telemedicine, it is becoming more widely accepted. Only the results of well-conducted clinical studies will be able to alter people's minds about this.

Conclusion

It is common for healthcare practitioners to utilise telemedicine tools like videoconferencing to offer distant health care services. In recent years, the use of Telemedicine in paediatrics has increased. A better healthcare system has resulted in better disease management, better monitoring of health issues, and less exposure to individuals with diseases. Telemedicine has a lot to offer, provided that additional studies can lessen or remove the clear negatives. In addition, patients are satisfied with telemedicine technology, which is why they are accepting it. Especially in the context of the COVID-19 situation, doctors highly approve of Telemedicine. Telemedicine will make high-quality health care available to everyone, no matter where they live, in the future. Telemedicine has the potential to assist achieve this aim by increasing accessibility and enabling its exchange throughout healthcare.

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