



Systematic Reviews

Telemedicine in hematology; long-term implications of a short-term experience during COVID-19 pandemic

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ABSTRACT

Telemedicine is healing at a distance, and it was under-utilized ever since its reintroduction till this COVID-19 pandemic. COVID-19 has moved the field of telemedicine and almost every health specialty has embraced it to provide remote, timely, safe health-care services to their patients from the comfort of their home and prevent undesired exposure to COVID-19 infection. With the reach of smart phones and cheaper internet data, this has reached tier II/III cities and is also making inroads in the rural areas. Telemedicine in hematology is becoming increasingly popular because many of the hematology patients are immunocompromised and are more prone to various infections including COVID-19. It is very beneficial in follow-up visits for benign disorders such as anemia, immune thrombocytopenia as well as certain chronic leukemias such as Myeloproliferative neoplasms and for the patients on oral therapy. Astronaut getting treated on NASA mission from the earth is ultimate telemedicine. COVID-19 pandemic has reinvented telemedicine which is helping not only patients in getting medical advice but also physicians and medical students in attending medical conferences and keep them up to date with advances in their field. After this pandemic end, telemedicine is here to stay along with the age-old personal visit like a hand in gloves.

Keywords: Hematology services, COVID-19 pandemic, Telemedicine, Future

INTRODUCTION

Telemedicine is a concept of healing at a distance that has been available for health-care systems time since ages to assist patient care; however, it was not until recently that we realized the importance of telemedicine and that the field of telemedicine exploded. Ever since, the inconsistent coverage of telemedicine services and a general level of unfamiliarity and lack of awareness with the technology required to perform telemedicine services, all contributed to the lack of its widespread use. Indian Space Research Organization modestly began telemedicine in India with a Telemedicine Pilot Project in 2001.^[1] However, coronavirus disease (COVID-19) pandemic has put us all – payers, providers, and patients – on the proverbial “burning platform.”^[2] Problems are further compounded due to national lockdown, social distancing norms, and travel ban. Mandal *et al.*^[3] have shown the impact of COVID-19 on different sections of society, and because we all are in it together, we must put our act together. Hospitals are a hotspot and, therefore, a danger zone for immunocompromised patients, which means we need to minimize hospital visits and embrace digital therapy.^[4] COVID-19 has accelerated innovation at an unprecedented pace with both short- and long-term implications.

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The COVID-19 pandemic drove the institution of telemedicine in all areas of healthcare. The concept of telemedicine blossomed in this existential crisis for humanity. Telemedicine can help the patients reach out to healthcare workers whenever required without being present physically. Still, it has also assisted healthcare workers in treating many patients without being present physically. During this global pandemic with an extraordinary situation, telemedicine has not only helped to preserve the use of personal protective equipment during a worldwide shortage, but it has also helped to protect healthcare workers from being infected. It is the natural evolution of healthcare in the digital world. At the same time, it has allowed frequent monitoring of patients' medical illnesses without putting them at risk by attending hospital settings. Telemedicine is synonymous with telehealth, and it comprises tele-consultation, tele-practice, tele-education, and tele-research.^[5] It has also helped healthcare providers to expand their knowledge of the medical field by participating in several webinars being organized worldwide and being a part of it without being physically present there. The second opinion, if required, can also be taken with the help of telemedicine. We have taken gigantic leaps we might have thought impossible a few months ago.^[2]

TELECONSULTATION DURING COVID-19 PANDEMIC

World has learnt a lot from this COVID-19 pandemic in different aspects of life, more so about the importance of personal hygiene, respiratory hygiene/cough etiquette, unprecedented scientific collaboration, and telemedicine. [Table 1] summarizes the number of benefits of telemedicine.^[6-8] The benefits of telemedicine have quickly become more evident in the context of the current crisis, especially given the heightened risk of COVID-19 infection and severity of symptoms among the patients suffering from

hematological diseases including leukemia, lymphoma, bone marrow failures, immune thrombocytopenia (ITP), patients on immunosuppressives, thalassemia, and many more.^[9,10] Shah *et al.*^[11] described that by changing practice and embracing telemedicine, they could protect their patient and personnel, minimize resource utilization, better utilization of staff for indoor COVID patients, and continue providing safe essential care. Researchers from the Houston Methodist Cancer Center have shown that during the current pandemic, overall 92.6% of patients and 65.2% of physicians were satisfied with video-based hematology/oncology services during the pandemic.^[12]

In a recently published survey, most Italian hematologists have temporarily adopted teleconsultations for Philadelphia-negative myeloproliferative neoplasm (MPN) patients during the COVID-19 pandemic. They have shared a particular propensity to expand the use of telemedicine after the resolution of the pandemic.^[13] Ph negative MPNs include essential thrombocythemia, polycythemia vera, and myelofibrosis (MF) and are chronic conditions with increased infectious risk compared to the average population.^[14,15] Hence, these patients are at risk in a highly vulnerable place like hospital settings. Furthermore, as these conditions are not very aggressive and mostly do not need any inpatient treatment, and can be easily managed on an outpatient basis only; telemedicine has a role in such situations. Furthermore, ITP is an autoimmune disorder that may require prolonged and severe immunosuppressive therapy.^[16] ITP can also be managed most of the time on an outpatient basis only except few emergencies. Hence, the concept of telemedicine can be very well used in ITP patients. During this pandemic crisis, the indication to move outpatient clinics to telephonic or video-conferencing appointments was decided for the less aggressive ITP or MPN.^[17-19] In certain situations like hemophilia with a joint bleed, teleconsultation has been successful where patient/relatives send pictures of the

Table 1: Benefits of telemedicine.^[6-8]

Patient	Physician	Health-care system
Increased continuity of care	work from anywhere	Ability to provide care to underserved populations/ areas of the community
Access outside of typical clinic hours	Reduced commute time	Possibility to expand clinical services even when space does not permit expansion
Reduced travel burden	Can provide care to rural areas	Reduction in clinic congestion
Cost savings (parking, loss of workdays/wages from time off work, no need to keep child keeper)	Increased job satisfaction with the implementation of telecommuting	Decrease in in-person staff burnout with additional support from remote staff
More likely to return for follow-up visits when it is convenient for the patient	Virtual webinars save cost and helps improving knowledge	Decreased maintenance cost
Monitoring of their chronic conditions	Reduces exposure to infectious agents	Reduces exposure of staffs to infectious agents
Prevents unnecessary exposure to infectious agents and pollution	-	-

affected area. It has undoubtedly made life easier for patients' follow-up visits, especially for benign disorders like anemia, where simply sharing reports and teleconsultation can suffice and frequently replace in-person visits.^[20]

To know about patient's satisfaction for telemedicine, Palandri *et al.*^[21] developed a questionnaire (based on 16 questions) where patients could score each question from 0 (total disagreement) to 10 (total agreement); answers were finally grouped into two categories (low-intermediate or high agreement, score 0–6 and 7–10, respectively). Their study concluded that compared to ITP, MPN (particularly MF) patients were apprehensive about reducing future in-person visits and gave very little consideration to the economy, work, and time. A hematologist getting a call from the international space station to treat an astronaut's thrombus during a NASA mission is the example of ultimate telemedicine.^[22]

Kumar *et al.*^[10] from AIIMS (New Delhi, India) conducted a telemedicine feasibility study for various hematological patients and understood multiple factors responsible for a successful teleconsultation. During the COVID-19 pandemic, their tertiary care hospital started teleconsultation services for patients who could not attend the physical outpatient department. The patients took the teleconsultation appointment online, and doctors called the patients on the telephone number provided on the day of the meeting. Their study demonstrated that patients understood that teleconsultation helps prevent COVID-19 infection (71.4%) and avoids outpatient department rush (14.5%) associated with physical appointments. Around 80% of patients were satisfied with the teleconsult. With the emergence of COVID-19, many localities under partial lockdown with a constant fear of contacting viruses among patients and health care providers could see the advantages and feasibility of telemedicine services for their patients.^[10] According to Binder *et al.*,^[9] post-visit survey data (completed within 2 weeks of the telehealth visit) from their institution revealed that for all patients with cancer, 99% of patients were satisfied with their telehealth visit; 91% of patients agreed with that the telehealth visit system was easy to use; 94% said they would use telehealth visits again; and 87% felt it provided the same care as an in-person visit. A recently published report in the Lancet Hematology says that patients with hematological cancers being vulnerable to COVID-19 had a higher risk of acute respiratory distress syndrome and death.^[23] At a center in Spain, specialists managing patients with cancer rapidly adjusted practices to mitigate the potential dangers of COVID-19. Telemedicine was considered an option to support patients by minimizing hospital visits and avoiding exposure to COVID-19 infection. They decided to implement four telemedicine strategies – (a) activating a patient portal to keep in touch with the medical team, (b) providing a lymphoma-related and COVID-19

related symptoms questionnaire to complete at home and complement teleconsultations, (c) granting patients access to a patient-reported outcome program includes information on patients' well-being and patient-centered care, and (d) launching a new drug home-delivery system. They concluded that this program keeps the patient away from the hospital and helps avoid unnecessary coronavirus exposure without hampering the quality of his care. This experience made them wonder whether telemedicine, sometimes perceived as a threat to quality care in oncology, is an opportunity to revolutionize clinical practice moving forward.^[23]

The experience worldwide has paved the way for exponential growth in telemedicine. The success of telemedicine will depend on a multidisciplinary approach, considering the quality of medical care along with the implementation of health-care IT tools, smartphone health apps uses, medical-legal aspects, patients consent, and the overall satisfaction of the patient with their doctor.^[21] Artificial intelligence (AI) in healthcare is coming in a big way after technology giants have shown their interest. Google's DeepMind is one such AI service which is helping in the management of acute kidney disease.^[24] AI including DeepMind can diagnose many eye diseases with image algorithms accurately.^[25] During COVID-19 pandemic Google cloud has launched another AI service for unstructured data. During this pandemic and severely affected economy, telemedicine somehow has helped different sectors to sustain and generate revenue. Apart from helping healthcare to generate revenue, telemedicine also helped communication software/hardware industry as their demands increased. In 2020, the global telemedicine market was valued at USD 58 Billion, with an expected compound annual growth rate of 20% and projected at USD 202 Billion by 2027.^[26]

MAJOR OBSTACLES IN TELECONSULT

Telemedicine has picked up the pace, but there are concerns regarding its use both for the patients and physician, including privacy and legal issues such as consent, penalties, and liabilities. Countries are coming with their own laws and guidelines to handle these legal issues with telemedicine. However, opportunities lie for us to improve telemedicine access so that vulnerable patients, especially single, older, under-insured, poor and digitally deprived, can benefit from it. Here, we describe the obstacles related to the implementation of telemedicine at a large scale and summarized in [Table 2]. Many patients understandably fear the future risk of cancer recurrence than the immediate threat posed by the virus. These are not easy decisions, and we do not have a crystal ball.^[28] There are significant unknowns like when and how long to delay? Because of daily new information and recommendations, we want to learn what kind of approaches might be right for our patients in

Table 2: Major obstacles in providing telemedicine services.^[9,23,27]

Patient	Provider	Health-care system
Lack of in-person handholding	Lack of thorough physical examination	Lack of widespread IT infrastructure
Insurance problems	Inability to do Bone marrow studies and other invasive procedures	Lack of audio-visual facilities in every room
Lack of satisfaction	Lack of satisfaction	Digital divide
Privacy issues	Uneasiness in breaking bad news	Medico-legal issues
Education and cultural issues	Uncertainty in payment gateway	-
Difficult to break the age-old custom	Difficult to break the age-old custom	-
Limited reach in socio-economically challenged community	-	Limited reach in small health care facilities and tier II cities/town

real-time. The sharing of information – financial, clinical, and even personal – will make it possible to build a more holistic picture of individuals.^[2]

PRACTICE OF TELEMEDICINE IN INPATIENTS AND OUTPATIENTS

For hematology patients, certain problems can be sorted without in-person visits. For outpatient visits, telemedicine helps patients from rural or underdeveloped areas to be seen without much ado, more prompt appointment with a physician, and more efficiently managed doctor's schedule, while there are certain drawbacks like inability to perform bone marrow procedures and insurance problems with health plans for televisits.^[28] People without appropriate hardware experience a “digital gap,” while those without a robust internet connection experience a “digital desert.”^[28] Shah *et al.*^[11] have shown that by incorporating “home-based chemotherapy, telehealth, and remote patient monitoring, we can provide the right treatment, at the right time, to the right patient, and in the right place.”

HEMATOLOGY EDUCATION AND AWARENESS

Telemedicine has also helped health-care providers to expand their knowledge of the medical field by participating in several webinars being organized worldwide and being a part of it without being physically present there. Many doctors, including resident trainees, had attended virtual classes who otherwise were unable to attend regular academics either due to COVID duty isolation or COVID contracted quarantine. Telemedicine is also increasing patients' understanding of disease and their awareness by delivering digital education through audiovisual and print media, using formal and informal teaching methods in multiple languages.^[29] This encourages them for active participation and also helps in decision-making.

CONCLUSION

Telemedicine is about to stay for long, make our lives easier and healthier, and we will embrace it the way we are hooked

to our smartphones. With the advancement in AI and the active involvement of technology giants, it will be easier and more accessible to the masses, including the underprivileged ones, and it will help to overcome the issues of dissatisfaction and confidentiality both among patients and their physicians. With everything around us changing fast, we believe there is something that will and must remain constant. Healthcare shall always be a deeply personal endeavor, no matter how much social distancing and physical barriers we employ between our patients and us. Hopefully, the pandemic will ultimately end, and new programs and processes are going to survive long. With the help of telemedicine, we are aiming for a win-win in terms of patient care, health related education and awareness.

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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Conflicts of interest

There are no conflicts of interest.

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