

Reviews

A Review of Patient Satisfaction and Experience with Telemedicine: A Virtual Solution During and Beyond COVID-19 Pandemic

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Abstract

Introduction: This article reviews the studies examining patients' perspective toward telemedicine and their preference for virtual health care services.

Methods: An electronic literature search using PubMed was conducted to identify relevant research studies published between December 2019 and August 2020. Twenty-five studies were selected out of 1,041 studies based on inclusion and exclusion criteria, which highlight patients' satisfaction and experience with the use of telemedicine during the pandemic.

Results: The findings based upon 48,144 surveyed patients and 146 providers in 12 different countries revealed high satisfaction with virtual encounters across a spectrum of diseases. Telemedicine was found satisfactory on various outcome measures, such as addressing patients' concerns, communication with health care providers, usefulness, and reliability. Most common advantages were time saved due to lesser traveling and waiting time, better accessibility, convenience, and cost efficiency. Age and sex did not significantly impact the satisfaction levels. Physicians and patients both showed a strong preference for continued usage and agreed upon telemedicine's potential to complement the regular health care services even after the pandemic. Technical challenges (reported in 10 studies) and lack of physical examination (reported in 13 studies) were the main limitations encountered in virtual visits.

Conclusions: Long-term sustainability of telemedicine for all socioeconomic classes requires closer scrutiny of issues such as technology, training, reimbursement, data privacy, legal guidelines, and framework. Telemedicine must be adopted as a proactive strategy and scaled-up even beyond emergency usage due to its immense potential in complementing conventional health care services, such as diagnosis, treatment, follow-up, surveillance, and infection control.

Keywords: COVID-19, telemedicine, telehealth, virtual health care system, patients' satisfaction, patients' experience

Introduction

Unplugged digitization with smartphones as the hub has resulted in a new era of medicine, "The doctor will see you now- on your cell phone."¹ Telemedicine, a potentially disruptive innovation, has emerged as an indispensable pathway to provide continued health care services and improvise public health outcomes during the COVID-19 pandemic. COVID-19 has already impacted 223 countries/territories with more than 88 million cases and 1.9 million deaths as of January 10, 2021² leading to a severe burden on the health care system across the globe.³

Health care providers postponed several routines, elective care, and outpatient services^{4,5} due to extensive deployment of medical resources in the treatment of COVID-19 patients and to decrease the risk of virus transmission. Moreover, face-to-face consultations have been disrupted because of hesitation in consulting doctors in hospital setting. As per a WHO survey conducted in 155 countries, the majority of countries have reported partial or complete disruption of health care services for non-COVID diseases⁶: hypertension (53%), diabetes and diabetes-related complications (49%), cancer treatment (42%), cardiovascular emergencies (31%), and rehabilitation (63%). Notably, more than 50% of countries reported postponement of public screening programs (e.g., breast and cervical cancer screening).⁶ The most common reasons cited for disruption of health care services were lack of health workers' availability, diversion of health workers to COVID-19 management, cancellation of planned treatments, and risk of virus transmission during on-site patient visits. The emergent conditions posed by COVID-19 have sparked an urgent need for drastic modification in health pathways⁷ to reduce the impact of the pandemic on vulnerable groups and society in general. Telemedicine has emerged to be a useful alternative towards streamlined response to COVID-19 in the context of non-COVID-19 care.

As per WHO, telemedicine is defined as the delivery of health care services by health care professionals using technology entailing the exchange of medical information for the

diagnosis, treatment, and prevention of diseases and injuries.⁸ Telemedicine includes synchronous mode (e.g., video visits, audio visits), asynchronous mode (e.g., e-mails), and remote monitoring of patients.⁹ It plays an essential role in emergency situations¹⁰ by meeting the health care needs remotely, streamlining the burden on health care services, conserving the medical resources (e.g., personal protective equipment kits),¹¹ and directing the supply to the most urgent cases.¹²

Globally, 58% of countries that experienced service disruptions have resorted to widespread telemedicine adoption during the pandemic to meet health care needs.⁶ Therefore, it is worthwhile to study the patients' perspective and satisfaction levels toward telemedicine. A thorough understanding of patients' experience is imperative to ensure optimal use of telemedicine and overcome shortcomings and challenges encountered during virtual visits. Other studies have focused upon patients' perspective toward specific areas of care.^{13–17} In this study, we have conducted a review of studies focusing on patients' satisfaction and experience with telemedicine during the COVID-19 pandemic across a spectrum of diseases. We have also reviewed the shortcomings encountered during virtual consultations across various disease types. This study provides a comprehensive and holistic overview of the experience with telemedicine and also highlights the scope of telemedicine beyond the pandemic.

Methods

The PubMed online database was used to identify relevant studies assessing patients' satisfaction with telemedicine during the pandemic. An elementary search was conducted on September 1, 2020, using a combination of keywords and Medical Subject Headings (MeSH) with Boolean operators (AND and OR).

The search strategy used in PubMed was as follows:
(COVID-19 [title/abstract] OR COVID19 [title/abstract] OR Coronavirus [title/abstract] OR Novel coronavirus [title/abstract] OR 2019-nCoV [title/abstract] OR Wuhan coronavirus [title/abstract] OR SARS-CoV-2 [title/abstract] OR SARS2 [title/abstract]) AND (Telemedicine [title/abstract] OR Tele-medicine [title/abstract] OR Telehealth [title/abstract] OR Tele-health [title/abstract] OR Telecare [title/abstract] OR Mobile health [title/abstract] OR mHealth [title/abstract] OR Electronic health [title/abstract] OR eHealth [title/abstract]).

We have focused upon patients' satisfaction with telemedicine, while another article used the same search strategy to report the role of telehealth services during the COVID-19 pandemic.¹⁸

We screened the titles and abstracts of all studies and assessed the full text of prospective articles. The electronic

search revealed 1,041 records, of which 640 were eliminated since they did not focus on patients' perception, and finally, 25 studies were selected based on inclusion and exclusion criteria mentioned in Table 1. The studies reviewed in this article have designed and modified questions in the light of COVID-19 and for particular areas of care. However, all of them centered around the common theme of assessing patient satisfaction. The terms telehealth, telemedicine, and virtual visits were used interchangeably throughout the study.

Results

CHARACTERISTICS OF STUDIES

Selected studies covered the effectiveness and feasibility of telemedicine across a wide range of diseases: Surgery (1), Head and Neck (2), Vascular (1), Rheumatology (1), Prenatal (1), Dentistry (1), Skin disorders (1), Sports and Musculoskeletal (1), Spinal disorders (1), ENT (1), rare cancers such as Sarcomas (1), Diabetes (1), post-operative Neurosurgical care (1), Orthopedic (1), Speech Therapy (Telerehabilitation) (1), Epilepsy (1), Ophthalmic care (1), initial Surgical consultations (1), Psychiatry (1), Multiple Sclerosis (1), and Inflammatory Bowel Disease (IBD) (1). Two studies assessed whether patient satisfaction differs between virtual visits and traditional in-person visits. One study evaluated the experience of patients who used telemedicine during pre-pandemic times and those who used telemedicine for the first time during the pandemic. The studies were undertaken in the United States (11), United Kingdom (2), India (2), Egypt (2), Spain (1), China (1), Italy (1), France (1), North Macedonia (1), Germany (1), Belgium (1), and Saudi Arabia (1).

PATIENT SATISFACTION

During this unprecedented pandemic, patients have considered telemedicine as a viable tool to consult health care

Table 1. Inclusion and Exclusion Criteria	
INCLUSION CRITERIA	EXCLUSION CRITERIA
Interviews/surveys assessing the patients' perception/experience with the use of telemedicine irrespective of type of disease.	Studies not evaluating the patients' perspective/experience with use of telemedicine.
Studies published from December 2019 (advent of COVID-19) to August 2020.	Studies published before December 2019.
Studies published in English language whether it be short reports, original studies, correspondence, and conference proceedings were included.	Studies not published in English.

professionals. New York-Presbyterian/Weill Cornell Medical Center reported an increase of 8729% in the use of video visits during the COVID-19 period as compared with the pre-COVID-19 period.¹⁹ *Supplementary Table S1* summarizes the studies on the experience of patients (48,144) and providers (146) during virtual visits across a spectrum of diseases. Gender of the surveyed patients was reported in 20 studies, and 59.73% were females and 40.18% were males. High satisfaction levels were observed across all telemedicine encounters irrespective of mode (synchronous or asynchronous) and disease type; for instance, all participants (114) were satisfied in vascular consultations,²⁰ median satisfaction 9 (IQR 8–10) was reported in rheumatology,²¹ and 99% of respondents reported that their needs were met for prenatal consultations through audio virtual visit only.²² In case of teledentistry, provided through virtual clinic and telephonic consultations, 97% of patients were satisfied with the virtual clinic and 94% were satisfied with telephonic consultations.²³ A cross-sectional observational study reported high patient satisfaction in case of skin disorders through synchronous model (live interaction between a patient and a dermatologist) and the store forward model (through e-mails).²⁴

Most common usage of telemedicine was found in follow-ups and routine activities; for instance, 70.6% of virtual visits were for follow-ups in case of sports and musculoskeletal encounters.²⁵ In case of orthopedic, majority of patients (391/399) belonged to the non-operated follow-up group.²⁶ For rehabilitation, 80% of the virtual visits were for follow-ups for established issues.²⁷

The main benefits of telemedicine reported by patients were time saved due to lesser traveling^{3,7,20,22,23,27–33} and waiting in queues,^{20,23,29,31,34} cost efficiency,^{3,27,29,30,32,33,35} convenience,^{7,26,27,31,33,36–38} and accessibility.^{7,25,32,35–36,39} Telemedicine was found satisfactory on various outcome measures such as addressing patients' concerns and questions,³⁸ communication with health care providers,^{3,32} development of a treatment plan,^{25,27} comprehensibility of disease,³¹ usefulness,^{23,24,32} and reliability.^{23,24,32} The patients recognized telemedicine as a feasible proxy to conventional in-patient visits and preferred virtual encounters rather than foregoing appointments due to fear of infection.²⁰ A moderate positive correlation ($r^2=0.67$, $p=0.025$) was observed between patients choosing teleconsultation and number of COVID-19 cases in Kerala.²¹ In case of rheumatology, three-fourth of respondents agreed that they would have discontinued drugs or relied on self-medication in the absence of teleconsultation.²¹ In case of eye care (ophthalmology), 49% of respondents ($n=45$) stated that they might have postponed seeking care in the absence of virtual video option.³³

Patients agreed that video visits provided the same satisfaction as talking in person, and they were able to explain their medical problems and doctor was able to understand the same.^{20,23–25} Ramaswamy et al.¹⁹ found that the patients reported significantly higher satisfaction with video visits (94.9%) than in-person visits (92.5%, $p<0.001$) and also satisfaction was higher during COVID-19 than pre-COVID-19 period (93.4% vs. 92.5%, $p<0.001$). Patients across various disease domains expressed their willingness to continue the use of telemedicine in future.^{7,20–26,29,30,33,40} However, in case of surgery, only minority of patients (34.2%) agreed to continue telemedicine after the COVID-19 pandemic.³

Few studies examined the factors affecting the satisfaction levels,^{19,25,27,40} preference for continuing consultation,²¹ and method of consultation.²⁸ Age, sex, education, and dependence on others for the use of WhatsApp or accessibility of private vehicle did not significantly impact the preference for continuing teleconsultation.²¹ Also, overall satisfaction was not dependent on factors such as age, type of therapists, type and duration of visit, travel time, and inclusion of patient care advocate ($p>0.05$).²⁷ The method of consultation was also not affected by sex and education level.²⁸ However, one study found lower satisfaction in females, younger-age persons and first time visits.¹⁹

PROVIDER SATISFACTION

Health care providers were also satisfied with the experience of teleconsultations^{3,25,28–30,39,40} and agreed that it was not associated with increased workload.²⁸ Zhu et al.³ found that most of the doctors were able to effectively answer patients' concerns (23/26, 88.5%), review laboratory tests with patients (22/26, 84.6%), and see and hear patients suitably (20/26, 76.9%). Ashry and Alsawy³⁰ found that 90% of doctors were satisfied with audio and video transmission and 80% were able to perform remote examination satisfactorily. In case of surgery,³ rare cancers such as sarcomas,²⁸ and sports and musculoskeletal medicine practice,²⁵ the providers found telemedicine to be well suited for follow-up encounters. In six out of seven studies, health care providers expressed willingness to use telemedicine in the future.^{3,25,28–30,40}

CHALLENGES

The patients faced certain roadblocks and challenges while using telemedicine that need to be addressed for sustained usage and greater satisfaction. Technological difficulties (reported in 10 out of 25 studies)^{7,22,25,27,31,32,35,38–40} and inability to perform physical examination (reported in 13 out of 25 studies) were the main limitations encountered during virtual visits.^{3,7,21,25–32,35,40} Ashry and Alsawy³⁰ reported that patients

who did not have smartphones or internet connection were excluded from the study. Another study found that 15.9% of patients used audio-only visits due to lack of access to necessary equipment, technical difficulties, and preference.³² About one-fifth of patients experienced discomfort without a physical consultation in rheumatology,²¹ 44% reported lack of personal contact, and 45% stated further diagnostics need as the main disadvantage of telemedicine appointments in epilepsy.³¹ In the case of orthopedic consultations, several patients were recommended outpatient visits during virtual encounters due to the requirement of physical examination (70.17%) and failed communication between the doctor and the patient (15.78%).²⁶ Evaluation of muscle strength requires a hands-on examination and thus was not feasible through telemedicine.³⁰ Lack of personal contact and diagnosis (electroencephalogram [EEG] recordings, blood analysis) were observed in epilepsy³¹ and it was impossible to perform audiometry.⁴⁰ In the case of initial surgical consultations, 72% of respondents believed that the physical exam, comfort and trust building (55%) usually occurs during in-person consultations.³⁵

Surgery patients stated that “Doctor can’t check weight, blood pressure or physical exam”; “Doctor was unable to look into my ears and couldn’t make a diagnosis without a physical exam.” Similarly, the health provider stated, “I was unable to palpate abdomen on a patient complaining of pain and unable to evaluate wounds.”³ Both patients and doctors were less inclined to use telemedicine in the immediate post-operative settings due to difficulty in assessing and managing wound-related issues through telemedicine.³ For surgical consultations, Sorensen et al.³⁵ found that preference for telemedicine would decline from 72% to 33% when social distancing restrictions end. A large percentage of female patients refused telemedicine visits possibly due to embarrassment and lack of a sense of privacy in sharing wound images in post-operative neurosurgical care.³⁰ Itamura et al.⁴¹ observed that audio/video lag caused inconvenience and frustration during provider/patient conversations, thereby resulting in missing of important details during teleconsultations.

The health care providers reported concerns relating to limited physical examination,^{3,28,30} technology,²⁵ reimbursement,²⁵ and lack of knowledge/training.²⁵ Another challenge faced by providers was cancellation of sessions by a few patients because they did not feel comfortable.³⁹

Discussion

The COVID-19 pandemic has provided a much-awaited thrust and impetus to telemedicine, which was earlier an underutilized means of delivering health care services. Patients

were concerned about their health during the pandemic and agreed that they would have postponed health care services if the telemedicine option was not available. Patients recognized that it is necessary and desirable to interact with physicians through telemedicine during the ongoing pandemic.^{42,43} Virtual encounters were also found helpful during Middle East Respiratory Syndrome coronavirus and severe acute respiratory syndrome coronavirus (SARS-CoV)⁴⁴ and once again proved indispensable during the current pandemic (SARS-CoV-2)^{11,12,45} with an exponential use across the globe for multiple disease types. The mean daily number of telehealth appointments rose from 8.30 in February to 195.5 in April in a tertiary hospital in Australia.⁴⁶ A comparison of more than 8,000 e-visits and office visits found virtual encounters cheaper and popular with no compromise on quality.¹

Consistent with previous studies,^{47–52} we observed overall high patient satisfaction with virtual encounters across various disease types such as epilepsy, dermatology, diabetes, cancer, IBD, and multiple sclerosis. The satisfaction levels reported might be overestimated due to the psychological support provided by teleconsultations during the lockdown.⁴⁰ Age^{25,27,40} and gender^{25,40} were not found to be significant factors in determining the satisfaction level of patients; however, it varied across disease type. For instance, for post-operative neurosurgical care, many women refused telemedicine due to privacy concerns³⁰; on the contrary, women participation and satisfaction was higher in telerehabilitation.²⁷ Age did not hinder attending virtual consultations, rather elderly patients who faced logistical difficulties benefitted through virtual visits⁴⁶ as not many alternatives were available during pandemic.⁵³ The older patients, however, usually required assistance for electronic communication.²⁴ Whatsapp,³⁹ facebook,³⁰ facetime,^{7,32} and various software packages were used to provide a wider reach.³⁹ The efficacy of telemedicine depends upon the quality of video, and images especially in the case of neurosurgical care, surgery, and dermatology.^{3,24,30}

The rampant expansion of social media, technology, and telemedicine tools at hand has made a widespread implementation of teleconsultations feasible.^{30,31} Investment in telemedicine has already yielded positive results in several countries.⁴² Telemedicine has been scaled up in the United States,^{54,55} United Kingdom,⁵⁶ China,⁵⁷ and Australia⁵⁸ to avoid virus transmission due to in-patient visits. It was found useful in forward triage that is, assessing the degree of emergency over virtual platforms before in-patient visits to the emergency department.^{23,24,42} It has proved to be a viable option to provide better care to patients living in rural and distant areas from medical centers.^{23,24,55} However, there are challenges in providing telehealth services to people

belonging to socioeconomically disadvantaged backgrounds and having learning and physical disabilities.⁵⁹ Rare cancer clinics and access to cancer specialists may also have become feasible due to telemedicine.²⁸

Telemedicine is considered useful but not sufficient⁷ and it is widely accepted that telemedicine cannot replace in-patient services, especially where physical examination is required. It complements traditional visits by reducing the workload of frontline physicians and help in optimizing time toward patients with critical conditions.²⁸ Most participants advocated for both on-site and telemedicine appointments, with the latter being an additional option rather than a substitute.³¹ For instance, a 57-year-old female stated, "I would definitely use telehealth again as long as there wasn't something that needs a thorough examination."⁷ In case of prenatal²² and rare cancer²⁸ follow-up activities, patients preferred a combination of in-patient and virtual visits. Telemedicine could also be used for long-term oral therapies and active surveillance.²⁸ However, specific diagnoses, such as audiometry,⁴⁰ cosmetic surgery,²⁴ EEG recordings,³¹ blood analysis,³¹ and examination of mouth²³ were difficult to conduct through telemedicine. In line with previous studies,^{60,61} tele dermatology was found inadequate in undertaking swelling examination, biopsy, and full-body check for skin cancer and importantly, showing skin lesion on only one body part can also lead to a misleading diagnosis.²⁴ Telemedicine is again bounded in case of profound hearing loss, where communication is limited.⁴⁰

Limitations pertaining to examining muscle strength virtually can be overcome by demanding the patient to do few movements such as walking and outstretching arms or conducting examination remotely with the help of patients' relative to assess motor power.³⁰ Telemedicine was found to be well suited for regular clinical applications of preoperative consultations, assessment of test results, and surveillance but not in postoperative settings.³ Gunter et al.⁶² explained an image-based application for vascular surgery patients, which was used to monitor wounds and surgical-site infections. Radical innovations such as devices with tiny cameras and microphones can perform complete-body check-up.⁶³ Moreover, smartphones can be used to undertake the physical exam of the eyes, ears, neck vessels, heart, lungs, abdomen, and fetus.⁶⁴

Despite several challenges faced during tele visits, its benefits have been already proved and the concentration should be on its effective integration into the public health system.⁴³ Lack of proper funding, infrastructure, access to technology, internet connectivity, inadequate regulatory framework and guidelines, and insurance coverage and reimbursements are a few of the roadblocks in the successful implementation of

telemedicine.^{11,42,43,65–67} Other major concerns regarding the usage of telemedicine involve legal, privacy, and security risks.^{43,65,68} To incentivize the usage of telemedicine and for its long-term implementation, reimbursement for virtual^{22,53} and telephonic visits¹¹ should be considered in health care financing. The Australian government has introduced funding for all patients without geographic restrictions for all telehealth consultations and also extended the funding to telephonic consultations.^{46,69} In 2020, the U.S. Congress passed an act (P.L. 116–123) that permitted qualified providers to bill Medicare for services delivered through telehealth during this public health emergency.^{34,70} France has also authorized, promoted, and reimbursed telemedical services to scale up its usage.⁴³ Telemedicine involves the exchange of sensitive health information between patients and health care providers digitally.¹² Efforts such as data encryption, face-to-face patient identity, and authentication of patients' device, and regulations such as European General Data Protection Regulation^{71,72} and federal law Health Insurance Portability and Accountability Act can protect against the security risks and help in building public trust in telemedicine.⁷³

Conclusion

Telemedicine has proved to be beneficial, cost efficient, and satisfactory for patients and providers across various disease types, unless the need of physical examination becomes imperative. Overall, good experience substantiates telemedicine's ability to complement traditional health care pathways even after the pandemic. Projections state that up to 50% of consultations could be done through telehealth by 2025 for rural patients,^{46,74} thereby resulting in increased access to cost-efficient medical services. Long-term sustainability of telemedicine for all socioeconomic classes requires closer scrutiny of issues, such as technology, internet, training on the part of providers and patients, reimbursement, data privacy, legal guidelines, and framework. Our study mainly focuses upon patients' experience; however, experience of providers is an equally important metric and can be an area of future research.

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Supplementary Material

Supplementary Table S1

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