



Research Article

COVID-19: AN URGE FOR TELEMEDICINE

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ABSTRACT

The global feast coronavirus (COVID-19) pandemic has been declared as a huge emergency outbreak. As the COVID-19 is unceasingly spreading, its severity towards mortalities is going to cover the entire world. Our courageous scientists, researchers, doctors, and frontline workers are actively contributing their countless efforts towards treatments, virus diagnosis and vaccine developments. While biomedical efforts and treatments are being tried to fight with COVID-19, the technology and tech applications have also their own role to hold this emergency into an optimum level. Although various technology systems are handling this crisis, this article is focused on telemedicine and telehealth. Tele-medicine and tele-health systems are one of existing technology which can play a prominent role during this pandemic. This article is a small input to develop awareness towards telemedicine and telehealth specially in COVID-19 phase. Telemedicine and telehealth are almost same health care services in terms of online or remote health care. Telemedicine work for clinical services whereas telehealth work for non-clinical services. In this article the word "telemedicine" has been taken as general terminology for both services as "Telemedicine as well as Telehealth." The article reviews on benefits of telemedicine, resources, knowledge, survey, mid effect on crisis and opinion towards awareness during the pandemic phase.

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INTRODUCTION

Telemedicine is the promising outcome of information and communication technology in the healthcare system.^[1] This is a non-contacted service which gives a full advantage of social distancing and provides an armor to the health front liners from physical contact to COVID-19 patients. Telemedicine performs utmost all the necessary health diagnosis, treatments, monitoring and various health examinations via online infrastructure. Telemedicine service is exceptionally a time managerial service for both the patients and developers mutually, as patient no need to step- out from home. It is an essential requirement during this crucial COVID-19 phase that every person should be aware of telemedicine and should take benefits from this service to keep a decent social distancing. As COVID-19 is a respiratory virus disease, anyone may be confused about their allergic symptoms because already seasonal variation is running with full of viruses in the environment. Therefore, people can easily clarify their doubts about their allergic symptoms with the use of telemedicine without stepping out from home.^[2] The privilege of telemedicine facility can be taken by entire population. On the

other hand doctors, staff and front liners also find themselves burden less from pandemic-related patient overload (PRPO).^[3] It can be stated that there is one more aspect of this service is quality treatment of pandemic or COVID-19 patients. The health care system can easily focus on pandemic related patients if general patients are motivated to use telemedicine services.

Resources and Advancement of Telemedicine

Besides benefits, telemedicine and telehealth demand high resources like good internet infrastructure and smartphone applications. Many health care agencies and health management companies are developing commendably on infrastructure and providing advanced resources for telemedicine and telehealth facilities with their own technical assistance-ships. These resources should be efficient and advanced for the betterment of current pandemic situation.

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Table 1 Resources and service providers description with their uses

S. No	Examples of resources and No service technology	Use of resource	Service Mode	Provider
1.	During the period of COVID-19, The American College of Surgeon: (ACS) has been developed resources to navigate and participate the remote virtual service to better take care of patients near by the physicians. ^[4]	Navigation for virtual service	Online	(ACS) American College of Surgeons
2.	Telemedicine expanding and developing the technologies with advanced features such as real-time, audio-video communication tools (telehealth) for take care of patients specially in remote areas. Creating the Store-and-forward technologies that is used to collect images and data for transmission and interpretation.	Remote service	Online	Health care Agencies
3.	Telemedicine has developed remote patient-monitoring tools like blood pressure monitors, Bluetooth digital scales and various wearable devices to produce biometric data for diagnosis and review specially for mHealth apps.	Image transmission	mhealth	Health care Agencies
4.	Verbal or audio and virtual check-ins via online mode or mobile messaging modes	Biometric data	mhealth	Technical service provider health agencies
5.	The AMA Digital Health Implementation Playbook series have been developed a comprehensive guide for digital health solutions and telemedicine. It is easy and step-by-step guidance practice book based on insights from medical society. ^[5] PCDC is available to provide technical assistance on initiating and sustaining telehealth services.	Virtual checkup	mhealth	Technical service provider health agencies
6.	It teaches how to use telemedicine , telephonic or virtual consultations, and enhance billing and coding practices. ^[6]	Telemedicine guide	Telehealth and telemedicine	(AMA) American Medical Association
7.	A multimodal telemedicine network in Sichuan Province in Western China was activated immediately after the first outbreak in January 2020, during the COVID-19 emergency. The network established with 5G service, a smartphone app, and an existing telemedicine system ^[7]	Technical assistantship	Telehealth and telemedicine	PCDC Primary Care Development Corporation United states of America
8.	(WCHSU) West China Hospital of Sichuan University has officially opened a special hotline as COVID-19 telephone health service	5G services with smartphone applications	mhealth	China Health care system
9.		Telephonic service	mhealth	West China Hospital of Sichuan University (WCHSU)

The success stories of some COVID-19 controlled countries teach about the best use of telemedicine resources. They can be taken as valuable references for other countries and the entire globe.

COVID -19 and Telemedicine: Challenges

Although telemedicine has an immense potential to hold this pandemic at a regulated level, it has some limitations and challenges also. The major challenge is lack of awareness among population towards telemedicine and lack of technology infrastructure. Having this much of aids in telemedicine service, it is not followed by everyone even in

this modern era due to lack of resources or lack of wisdom to use it. According to a survey of 813 responses it is found that 52% respondents have lack of information about it and only 12% respondents are taking advantages of telemedicine service. Rest 15% respondents felt legal and supervisory system fear and 11% have an emotional and physiological aspect to treat themselves only by face to face contact to doctors.^[8] Although it is easily stated that challenges in telemedicine stands at distinct levels such as patients, health care system, service provider agencies and funding agencies, an adoption and acceptance of this health care advancement is must for everyone.^[9] These limitations and challenges are defined in following Table.2 with their existing levels.

Table 2 Challenges for telemedicine at different level

S. No	CHALLENGES	ATDIFFERENT LEVELS
1.	Lack of awareness	Patient
2.	Lack of legal and regulatory environment	Health care system
3.	Reimbursement issues	Health care system
4.	Desire to see a physician face-to-face	Patient
5.	Smaller clinical infrastructure	Health care system
6.	Lack of internet access to broadband in rural areas	Technical service provider health agencies
7.	Lack of widespread adoption of smart phones	Technical service provider health agencies
8.	Increasing availability of public hot spots	Technical service provider health agencies
9.	Lack of quality training of both nurses and physicians	Health care system
10.	Older patients worry about their privacy	Patient
11.	Unsuitable hospital workflows	Health care system
12.	Lack of financial resources	Funding agencies
13.	Lack of technological infrastructures	Technical service provider health agencies
14.	Lack of balanced management	Health care system
15.	Only 68% having a computer, smart phone, or tablet with internet access	Patient

Solution and Opinion

After a deep discussion about benefits, resources, challenges, current scenario, and future hopes of telemedicine one major aspect have been extracted from this is a general awareness of telemedicine. It is must to develop an awareness and to create a wonderful environment of telemedicine with advanced features. Looking forward to creating this environment a telemedicine and telehealth education should be compulsory subject in health education. Health care agencies, health care system and funding agencies should provide enough funds, infrastructures, and internet access with easy applications. An education of online business model also must involve in health education. Health care agencies should work and enhance the quality of policymakers with balanced arrangements and managements. The solutions are listed in respect of improvements of telemedicine services.

Table 3 Solutions to improve awareness and quality of telemedicine service

S. No.	Solution	System levels
1.	Health system should start digital care in medical school	Health education system
2.	System should improve the internet access quality and application features of 5G networks for effective video transmission	Health technical agencies
3.	Health education should include the lesson of online business model	Health education system
4.	Should build a strong technological infrastructure and good management of policymakers	Technical service provider health agencies

5.	Should gain a quality management experience in health care	Health care system
6.	Telehealth education should be compulsory	Health education system
7.	Reminders and alarm functions should be included in applications	Technical service provider health agencies
8.	Health care system should increase more hotline and smartphone apps for consultations via internet	Technical service provider health agencies
9.	Health care technical should make easy handling application for telemedicine service	Technical service provider health agencies

Concluding all, each person needs to inform and educate own circle about the telemedicine service and people should support for the useful needs. On the other side, in this unfortunate era of COVID-19 pandemic, health care management should strengthen the infrastructure of telemedicine.

Before and After COVID-19

Looking forward to telemedicine adoption in the globe and effects of post and prior effect of telemedicine in COVID-19, telemedicine could not achieve a full coverage even in the developed countries. The main reason behind it was lack of reimbursement by health care system specially in pastoral areas but now the scenario is rapidly changing since early March due to COVID-19 emergency. The access of this service is expanding frequently. According to a Massachusetts report, telehealth visits have risen steeply 190-fold nearly 200 to 38,000 per day, since the early stage of the emergency.^[10]

In another survey it is found that in-office or hospital visit take an average of 194 minutes while a telemedicine consultation take 37 minutes which is a measurable time saving. Before this pandemic, telehealth was providing only severe conditions, but in this present state it also delivers its services about all cases. Day-by-day people are obtaining satisfaction using telemedicine without missing their important tasks and keeping themselves socially distant with full time management in this COVID-19 outbreak.

Future Aspects

Rewards of telemedicine are developing speedily, and it will be remarkably interesting to see the advancement and progress of this service after this unfortunate pandemic. Patients will save their cost by cutting the amount of caretaker’s payment, parking, fuel, and transportation fees. According to health care system, in coming days, the lab testing will also be going virtual with some advanced testing kits so that anyone can test virtually under the surveillance of telemedicine technical assistantships.

Health care developers are continuously working on advanced and easy handling devices for patients such as to identify coughing sounds whether it is due to bronchitis, asthma, pneumonia, or any other allergic condition. The telemedicine also will have advanced features of real time video and audio graphics to identify patient’s illness by their voice tone and frequency whether he is suffering from cold, fever or any type of depression. Hopefully, after this pandemic telemedicine will grow with an outstanding level having best policies and regulatory backgrounds.^[11]

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