Telemedicine - the virtual healthcare

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Telemedicine was a relatively new subject before the 20th century; however, it has gained a lot of popularity since the beginning of the 21st century. It was blooming silently and slowly in developing countries like Bangladesh before the COVID-19 pandemic. However, since the COVID-19 pandemic of 2020-2021, telemedicine has seen a massive surge in adoption from doctors and other professionals in medical science. Lockdowns and social distancing measures necessitated the rapid adoption of telemedicine, the virtual healthcare consultations to ensure continuity of medical care. Telemedicine proved invaluable in managing non-emergency medical needs and reducing the risk of virus transmission. The pandemic acted as a catalyst for widespread acceptance and integration of telemedicine into mainstream healthcare systems.

Let us know what telemedicine is

Telemedicine refers to the remote delivery of healthcare services, including diagnosis, treatment, monitoring, and education, facilitated by communication technologies such as video conferencing, mobile applications, and remote monitoring devices.[1] It involves exchanging medical information between patients and healthcare professionals without requiring in-person visits. The term telemedicine means "healing at a distance" ("Tele" is a Greek word meaning "distance", and "mederi" is a Latin word meaning "to heal").[2]

The World Health Organization (WHO) defines Telemedicine 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 the continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities.[2] The concept of telemedicine has a fascinating history that spans several decades.

Brief historical evolution of telemedicine

Communication across long distances was revolutionized with the invention of the electric telegraph in the 1840s. The first major instance of telecommunications for medical purposes came about a decade later when 15,000 miles of telegraph cable were laid during the Civil War. The telegraph made remote wartime communication possible. It is used to order medical supplies and transmit casualty reports.[3] Later, in the late 19th century, the invention of the telephone opened new possibilities for telecommunication and, in the early 20th century, further facilitated telephonic medical consultations.[4] In the 1920s radio-telephony experiments were conducted to transmit medical information over long distances. However, these early efforts were limited by the technological constraints of the time. Dr Beecher was an American physician and anesthesiologist credited with coining the term "telemedicine" in a paper he published in the New England Journal of Medicine in 1966.[5]

In the 1960s, The National Aeronautics and Space Administration (NASA) pioneered a telemedicine system to provide medical care to astronauts during long-duration space missions, which led to the development of portable monitoring devices and the establishment of ground-based telemedicine technology.[6] In the 1970s, telemedicine became a viable healthcare delivery method. Medical institutions and universities began exploring its potential for extending medical services to remote areas. Telecommunication advancements, such as improved video and data transmission, contributed to the growth of telemedicine. Projects like the Space Technology Applied to Rural Papago Advanced Health Care

(STARPAHC) and the Alaska Federal Health Care Access Network (AFHCAN) demonstrated the effectiveness of telemedicine in remote locations.[7,8]

The widespread adoption of the internet in the late 20th century revolutionized telemedicine. The development of secure online platforms and electronic health records allowed for the secure exchange of patient information. This period saw the emergence of various telemedicine applications, including teleconsultations, remote monitoring, and telepathology. The proliferation of smartphones and mobile devices played a significant role in advancing telemedicine further. Mobile applications, connected medical devices, and wearable sensors enable patients to monitor their health parameters and transmit data to healthcare providers. Telemedicine has become more accessible and convenient, increasing adoption in urban and rural areas.

Telemedicine during this COVID-19 pandemic era

Now telemedicine has become a central piece in patient healthcare delivery.[9,10] It allows health care services to reach patients in their homes, keeping other patients safe through social distancing and self-quarantine. Telemedicine allows healthcare providers to focus more resources on pandemic usage and, at the same time, continue caring for the health of non-COVID-19 patients. During this time, clinicians are expanding their knowledge about telemedicine or telehealth capabilities, such as the application of forward triage as a tool to avoid patient contact in emergency departments.

While telemedicine was previously used mainly for primary care needs, specialized and urgent care health is now being utilized more than ever. These advantages come with limitations, including a limited physical examination, lack of access to diagnostic testing or imaging, and many other pitfalls and persistent unmet needs. The 2020 pandemic has led to significant improvements leading to the next-generation telemedicine.[11]

Telemedicine in Bangladesh during the COVID-19 pandemic

Bangladesh is a country with 63.3% of its population living in rural areas (according to data provided by World Bank). And among this population, it has around only 6 doctors per 100,000 citizens, which is very low.[12] The first Covid positive patient was reported in our country on 08 March 2020. The government of Bangladesh declared a lockdown on 23 March 2020 to prevent the spread of Covid virus-19.[13,14] Still, similar to other countries, Bangladesh is also facing difficulties in managing the gradually increasing number of Covid -19 patients as well as the other non-Covid patients. Hospital visits were restricted in this situation, and most doctors stopped practicing in person for self-protection. As a result, public and private organizations introduced telemedicine services.

During the COVID-19 pandemic, Bangladesh faced various obstacles to promoting and implementing telemedicine. Some major threats and challenges are identified such as the high cost and the lower liability of internet access, lack of appropriate information and technology policy, lack of coordination, and lack of awareness of government and citizens.[15] Moreover, the insufficient power supply might be the primary challenge and barrier to telemedicine implementation in Bangladesh.[16] Even though the traditional health care system is more in use, the electronic health care system in Bangladesh than before. According to the Directorate General of Health Services (DGHS), at present, 94 facilities in Bangladesh have the equipment to provide healthcare via videoconference.[17] Some other previously established companies also started providing Telemedicine facilities i,e Seba ghar, Tonic by Grameenphone, Pulse Healthcare, My Health, Daktar Bhai, e-Hospital Ltd., Dhaka University Telemedicine Program (totally free of cost service) etc.

Dhaka University Telemedicine Program (DUTP) is one of the pioneer telemedicine programs in the field of e-health in Bangladesh. DUTP was established by the Department of Biomedical Physics and Technology (BMPT) at the University of Dhaka (DU) as a project in 2013 that officially started its journey in 2015 with center-based telemedicine service in rural areas across the country.

Therefore, at the earliest time during the 1st week of April 2020, the DUPT has launched a free telemedicine service for the people all over the country. In those centers, patients can communicate with doctors online with the operator's help using tele-diagnostic tools and dedicated software.[18-20] Here, patients could call an auto-hunting phone number (audio service) and get any medical advice from an MBBS doctor. This service is available from 9 a.m. to 8 p.m. seven days a week, free of cost.[20] Specialist of different branch of medical science (Medicine, Surgery, Gynae and Obstetrics, Paediatrics ect) are also available for a predetermined fixed time given as a list in the DUTP website. Initially, there was a total of 30 doctors, among which 6 came on behalf of the Bangladesh Society of General Physicians, which extended up to 70 with 23 specialized doctors.[18] Starting from April 6, 2020, till 28 June 2020, DUPT serves 3500 patients so far by General practitioners and different specialists.

I have had the opportunity to provide telemedicine service with DUTP as a Paediatrician since April 2020. Later I have been extent my telemedicine service through My Health (audio service but e-generated prescription) and Pulse Healthcare (Video consultation). As a Paediatrician, during a consultation, I got mainly the non-covid cases of both genders of different age groups (newborn to 14 years old). It is a very new

experience for me as well of my patients also. Telemedicine and digital healthcare are new ideas in our country, and most people live in villages and are unaware of this. Therefore, we must create awareness about telemedicine programs among them because they should take telemedicine services. They should realize that the main advantage of telemedicine is - patients can take healthcare services while staying at home. It has been possible to provide telemedicine in isolated areas where modern medical facilities are absent. Therefore, this system will be a blessing for our people now and in the future. During this pandemic, telemedicine in Bangladesh also stepped forward a lot.

Future of telemedicine

Previously it has been demonstrated that telemedicine could help cover the gaps in health care in remote locations.[21-23] Today, the expanded capabilities have transformed telemedicine delivery, and from the beginning of the coronavirus pandemic, it has remained one of our biggest allies. As telemedicine continues to evolve, it has the potential to revolutionize healthcare delivery, particularly in underserved areas and for populations with limited access to medical services. The ongoing research, innovation, and collaboration in the field are expected to bring about exciting developments, making telemedicine an integral part of modern healthcare systems.

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