

Telemedicine as the Future of Health Care Service Delivery

Summary

The utilization of digital technology in many aspects of life including in the provision of healthcare services has long been explored. The existence of telemedicine has been attracting a lot of attention, especially during the COVID-19 pandemic. The usefulness of telemedicine in improving service efficiency, protecting both providers and patients, as well as making the provision of healthcare services possible in rural areas, has been driving many countries to consider its permanent implementation and integration within the existing health systems. However, some issues persist regarding to telemedicine implementation. Concerns about legal and ethical aspects of telemedicine, its impact on patient safety, data security, and technical problems have been hampering the adoption of this technology. Furthermore, in countries with high preexisting socioeconomic disparities, telemedicine has the potential to worsen current health inequalities. Therefore, careful assessments are needed to formulate the best way to safely implement telemedicine and improve health equity.

The Rise of Telemedicine

Contrary to what most people believe, telemedicine is not a new technology that arises from the COVID-19 pandemic (Thay, 2021). Telemedicine is known as part of digital health—or the use of digital technologies for health—which has its roots in eHealth. The World Health Organization (WHO) defines eHealth as “the use of information and communications technology in support of health and health-related fields.” Meanwhile, telemedicine is defined as “the provision of health care services at a distance with communication conducted between health care providers and health care users” (WHO, 2019). In the WHO guideline on digital interventions for health system strengthening, telemedicine has been identified as a brilliant strategy to transform healthcare delivery in support of universal health coverage provision (WHO, 2019). The brilliance of telemedicine lies in its ability to provide health services at a distance, allowing the healthcare system to break down barriers to access and reach all those in need (Macariola et al., 2021).

The use of telemedicine for health care service delivery can take many forms, as telemedicine is sometimes simply defined as “the practice of medicine via a remote electronic interface.” Generally, there are three types of telemedicine services: synchronous, asynchronous, and remote monitoring. Synchronous refers to the delivery of health information or consulting in real-time, whether it is via voice call, video call, or text message, with or without assistance from other health care personnel. On the other hand, asynchronous telemedicine uses a “store-and-forward” technique, where medical history and medical reports are documented and then sent to a specialist physician for diagnosis and treatment. Finally, remote monitoring refers to a continuous evaluation of a patient’s clinical status, whether through direct video monitoring or remotely collecting and reviewing the patient’s tests and imaging. Nowadays, telemedicine can also be utilized through certain mobile applications developed solely for facilitating telemedicine via various means (Mechanic et al., 2022).

Since the 2005 World Health Assembly, where WHO urged member states to develop and implement eHealth, the rise of telemedicine has begun around the world. Many low- and middle-income countries (LMICs) have been accelerating the adoption of mobile internet connections to support telemedicine and other telehealth services (Elgazzar et al., 2020). Nevertheless, studies found that asynchronous telemedicine is more profound in LMICs due to limited resources allocated for telemedicine advancement as political will and supporting policies are lacking (Macasabag et al., 2016). Situations are a bit different in high-income countries (HICs), as these countries usually have a broader range of telemedicine applications and variations, likely due to already-established information and communication technology systems (Ajaz et al., 2022). Even so, both LMICs and HICs benefitted from the implementation of telemedicine to some degree.

The promising potential of telemedicine was recognized years ago, as the technology has helped to improve access to care and reduce the risk of infectious disease transmissions while maintaining continuous care and improving outcomes (Greiwe, 2022). For instance, telemedicine in the US has been proven useful for the management of acute and chronic infectious diseases such as hepatitis and HIV, supporting antimicrobial stewardship by increasing access to testing, health services, and care, increasing cost-effectiveness, and decreasing inappropriate antimicrobial prescriptions (Pham and Badowski, 2019). While in LMICs such as India and China, telemedicine has successfully been employed for follow-up and monitoring of patients with chronic diseases (Hoffer-Hawlik et al., 2020). Furthermore, the utilization of telemedicine during the COVID-19 pandemic has helped many countries protect healthcare workers during the worldwide shortage of personal protective equipment and maintain the provision of many essential healthcare services (Seivert & Badowski, 2020; Indra, 2022).

The usefulness of telemedicine has driven many countries to consider its permanent integration into healthcare systems, as depicted in the WHO Global Strategy on Digital Health 2020–2025. However, the implementation of telemedicine

can be seen as a disruptive process (WHO, 2021), and several issues must be kept in mind and addressed beforehand. These issues encompassed legal and ethical challenges, patient safety, and even the possibility of health inequalities widening (Babatunde et al., 2021; Nittari et al., 2020; Marshall, Shah, & Stokes-Lampard, 2018). Therefore, seeing the benefits but also considering the potential drawbacks of telemedicine, this paper aims to explore the possible positive and negative impacts and considerations of telemedicine for health systems, physicians, and patients.

Telemedicine for Better Health Care Service Delivery

In relation to climate mitigation and environmental sustainability, the remote provision of healthcare has been thought of as an answer to reducing the carbon footprint of healthcare services (Purohit et al., 2021). In American and European countries, the use of telemedicine eliminates the need to travel, thus reducing carbon emissions from any transportation used by both patients and providers to reach healthcare facilities (Purohit et al., 2021). Moreover, studies in the US have found that telemedicine helps reduce the use of resources in healthcare facilities through the provision of care that does not require much direct patient-provider interaction, such as psychological services (Fortney et al., 2007). Remote initial screening for infectious disease symptoms also helps to preserve personal protective equipment and improve safety for both patients and providers, as seen in Canada (Wax & Christian, 2020).

Furthermore, telemedicine has been proven beneficial in providing non-emergency and/or routine care, such as monitoring non-communicable chronic diseases (Monaghesh & Hajizadeh, 2020; Chauhan et al., 2020). Telemedicine improves patient engagement, self-management skills, and adherence to healthy lifestyle habits by allowing patients to easily and continuously communicate and interact virtually with their physicians (Bouabida et al., 2022). Finally, telemedicine provides comfort and reduces stress associated with accessing medical care (Gajarawala & Pelkowski, 2021; Powell, 2017), encourages

patients to return for follow-up visits, and increases continuity of care, all of which lead to better patient outcomes and improved patient safety (Seivert & Badowski, 2021). In addition, a study in the US accentuated telemedicine's potential to reduce healthcare spending by decreasing problems like medication misuse, unnecessary emergency department visits, and prolonged hospitalizations (Casella, 2018; Rutledge et al., 2017).

Another benefit for the health system is that the existence of telemedicine, which transcends geographical borders, allows for greater healthcare provision, even in settings with limited resources due to shortages and maldistribution of healthcare workers (Pham & Badowski, 2019). Hence, this advantage of telemedicine makes the provision of basic care to rural and underserved patients possible (Rutledge et al., 2017; Gilman & Stensland, 2013) by expanding clinical services with lower resources and space (Seivert & Badowski, 2021). Certainly, this will be a great contribution to achieving universal health coverage in low-resource settings, such as in LMICs (Macariola et al., 2021).

Many studies have also demonstrated the benefits of telemedicine usage during the COVID-19 pandemic, providing evidence that telemedicine effectively helped to reduce the transmission of COVID-19 (Bouabida et al., 2022) and solidifying the claim that telemedicine can prevent the transmission of infection among health workers (Alvandi, 2017), as well as protecting patients from cross-transmission and nosocomial infection (Ceradini et al., 2017). In China, the use of telemedicine offers better outbreak management, as the mortality rate of COVID-19 in areas with limited resources declined immediately after the introduction of telemedicine and other remote monitoring platforms (Bouabida et al., 2022).

For healthcare providers, remote medical care provision allows more freedom by providing the capability to work from anywhere and improve productivity as commuting from home to healthcare facilities is no longer needed. When providing care to rural areas, providers are also in an advantageous position as they do not need to move or commute long distances to provide medical care to rural areas

(Seivert & Badowski, 2021). Some studies also indicated that physicians can save more time when providing remote healthcare services for certain patients, thus reducing their workload (Hassibian & Hassibian, 2016). Eventually, these benefits will lead to higher job satisfaction with the implementation of telecommuting. Higher satisfaction can also be seen from the patients' side, as they enjoy lower waiting times and costs due to improved efficiency and the elimination of travel to healthcare facilities, as is the case in Saudi Arabia (Mubaraki et al., 2021). Telemedicine offers comfort and convenience for many US patients as they can have a medical consultation anytime and anywhere, even with the companionship of a family member from far away if they so desire (Hasselfeld, n.d.). The flexibility to receive medical assistance at any time allows patients to have regular monitoring, which can help them detect diseases earlier (Babatunde et al., 2021), contributing to further cost savings and a higher cure rate.

Adoption and Safety Concerns of Telemedicine for Health Care Delivery

The implementation of telemedicine has been hampered by various issues. Among those issues, legal and ethical concerns are some of the most prominent and complex ones. The implementation and adoption of telemedicine are complicated by an unprepared legal system. A robust legal framework is needed to support the protection of patient autonomy, patient privacy and data, and patient safety when delivering healthcare services remotely through telecommunications technologies. However, the lack of understanding and consensus on many issues regarding telemedicine makes it difficult to develop a regulatory framework to ensure safety (Nittari et al., 2020).

The lack of uniformity can be seen in the efforts to protect patient confidentiality and data. Although many people agree that medical information is sensitive data and must be protected, there are yet clear boundaries to the extent to which data protection must be carried out with regard to telemedicine services (Nittari et al., 2020). Moreover, a study in France found that many doctors are quite concerned about patients' data privacy and security, especially if the collection is done through an application from private parties (Sarradon-Eck et al., 2021).

A similar situation happens in the US, where concerns about data breaching and threats of hacking are increasing (Gajarawala & Pelkowski, 2021). A lack of consensus is also observed in relation to protecting patient autonomy, where studies in the EU (Botrugno, 2018) and the US (Balestra, 2018) have emphasized the importance of imposing informed consent with regard to telemedical services but pointed out different purposes and formats. This discrepancy leads to multiple consents, which raises concerns about telemedicine's validity and vulnerability (Nittari et al., 2020).

Another unclear issue is the potential for malpractice due to telemedical services. A review by Nittari et al. (2020) found that many studies have highlighted the concerns of medical malpractice in telehealth, but no insight into potential outcomes has been provided. There is also a concern about how telemedicine can introduce a new form of malpractice that has yet to be anticipated, which adds to the unknowns about telemedicine and its potential adverse impacts (Kramer et al., 2015).

Concern about adverse impacts on patient care is expressed by health professionals in many countries such as the US, Australia, and India, as they are worried that restricted clinical examination may cause misdiagnosis and/or prescription drug errors that will lead to medico-legal issues (Heath & Porter, 2019; Caffery et al., 2017; Petimani, 2021). A study in the US conducted by Marshall et al. (2018) backed up this worry, as the study found that telemedicine poses a threat to patient safety through a tendency to overprescribe antibiotics and analgesics. Moreover, a study by Iyanna et al. (2022) revealed UK physicians' concerns about misdiagnosis due to the inadequacy of information shared by patients and unnecessary self-diagnosis. Besides, not all medical consultations can be conducted virtually, as certain specialties require direct visual inspection (Iyanna et al., 2022).

Furthermore, for many health professionals, telemedicine is considered a disruptive and complex innovation that requires them to learn new methods of medical care consulting (Green et al., 2016; Bagot et al., 2015; Ekeland et al., 2010). Some studies highlighted workflow concerns from doctors and clinical staff, noting

that these professionals are concerned about committing additional time to integrate and navigate through the system during their practice (Iyanna et al., 2022; Kelly et al., 2017). Other studies highlighted organizational behavior, such as change management issues in the form of a lack of training and infrastructure (Hossain et al., 2019; Ser et al., 2014). Concerns regarding system functionality and complexity (Heath & Porter, 2019; De Wit et al., 2019) and misalignment between technology and the logic of care (Parr & Westbrook, 2017) are also thought to be hindering problems that can hamper the delivery of high-quality care.

Common technical issues such as problems with audio, video, and internet connectivity are also concerning for many health professionals, as they are perceived as external disturbances that might significantly impact the overall clinical quality of remote consultation (Shaw et al., 2020; Petimani, 2021). In addition, physicians also highlighted issues regarding the unavailability or insufficiency of the internet in rural or underserved areas, unfamiliarity with using technology, lack of universal access among patients with incompatible electronic devices, and language barriers as some usability barriers that must be addressed before implementing telemedicine (Iyanna, 2022; Gajarawala and Pelkowski, 2021).

Although not much literature is available concerning patients' barriers to accessing telemedicine, scholars have acknowledged that patients' limited resources may hinder the adoption and subsequent usage of digital health innovations such as telemedicine (Dubin et al., 2020). For instance, as most telemedicine services require a good network such as a 4G or 5G internet connection, patients without access to these connections will also have no access to telemedical services. Other than hindering adoption, patients' limited resources may also widen health inequalities between users and non-users of telemedicine services, especially in LMICs where preexisting socioeconomic disparities are high (Latulippe et al., 2017).

Besides, many LMICs are composed of low-income earners with a low level of education and literacy rate, which may restrict their ability to access telemedicine, although they have access to the internet and compatible

electronic devices. Moreover, the internet is widely dominated by very few languages, especially English and French. Hence, the disparity in language influences access to online health information and will disproportionately disadvantage a significant proportion of the population with proficiency only in a native language (Babatunde et al., 2021).

Conclusion

Despite all the benefits telemedicine has to offer to improve the healthcare system and even protect the planet while providing comfort and convenience to both providers and patients, there are several issues that have to be taken into consideration and solved. Telemedicine has definitely gained a lot of attention and proven highly useful in the past few years; however, it is still considered a disruptive process in the usual healthcare provision and delivery that we all know. Hence, further assessment and study are needed to plan the best way of permanently implementing and integrating telemedicine into the clinical care workflow and the health system itself. A careful and thorough plan is certainly needed to avoid errors in implementing safe telemedicine services, which may lead to widened health inequalities instead of the provision of universal access to healthcare, especially for the most disadvantaged in rural areas.

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Further Reading

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