Telehealth and Telemedicine in Latin American Rheumatology, a New Era After COVID-19

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Abstract: Telemedicine is the delivery of health care services by health care professionals using information and communication technologies to exchange valid information for the diagnosis, treatment, and prevention of diseases. Telemedicine was further developed in Latin America during the COVID-19 (coronavirus disease 2019) pandemic, becoming the first line of defense for health professionals to stop the spread of infections and allow them to continue the care of their patients. During the pandemic, 79% of rheumatologists in Latin America reported the use of remote communication, the most frequent being the use of phone calls and WhatsApp voice messages. In contrast, 84% of the patients reported that telemedicine was appropriate for them during the pandemic, but only 54% considered telemedicine to be a valid option for rheumatic health care after the pandemic. Telemedicine and telehealth have advantages such as lower costs, improved access in rural areas, shortage of care providers, and reduction in waiting time for appointments. However, it also has some challenges, such as legal, technological, and organizational barriers. In this review, we explore the current state of telemedicine in Latin America and discuss its future.

Key Words: Latin America, remote consultation, telemedicine

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Telehealth refers to a set of health-related activities that are carried out remotely with the help of information and communication technologies. The concept of telehealth, including telemedicine, tele-education, teleorientation, and telesupport, refer to the possibility of providing health care or care at a distance.

In 2010, the World Health Organization defined telemedicine as: "The delivery of health care services, where distance is a critical factor, by all health care 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 for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities."[1]

In recent decades, the arrival of the Internet and the implementation of information and communication technology in health care practice have opened the gate to a new kind of medicine.

Technology, services, and tools used in telemedicine are increasingly becoming vital parts of the health care system, especially with the emergence of coronavirus disease (COVID-19).[2]

Telemedicine during COVID-19 has been the first line of defense for health professionals to stop the spread of infections; perform triage, remote monitoring of symptoms, and geolocation of patients; and improve epidemiological surveillance and action planning at low costs.[3,4]

Telemedicine facilitates screening to assess the need for in-person visits and referrals to the correct specialist, allows monitoring studies that do not require physical examination, and supports communication for shared decision-making to monitor disease maintenance and changes in therapy, thereby preventing the discontinuation of long-term treatments that may lapse without physician oversight (Table).[5,6]

Other clear advantages of telemedicine include reducing travel costs, especially in rural areas, and improve providers' shortages of care.[7]

In many countries in Latin America, before the COVID-19, the main telemedicine interaction used was between clinicians, allowing consultation with colleagues with or without the support of transferring data or clinical results.[8]

Not every patient-physician interaction or medical intervention using distance technology should be considered telemedicine. Whether information or interface communication systems use a good level of encryption, security, privacy, and confidentiality should be guaranteed to fulfill the current norms of data protection.[9]

To accomplish a successful medical patient encounter using telemedicine, both the patient and physician should dispose of the required technology and knowledge to use it correctly and effectively.[9]

In Latin America and other undeveloped countries, there is still great concern about vulnerable patients with limited access to the Internet and digital knowledge (technology barriers).[10,11] If telemedicine is widespread, it could increase health care disparities. However, it is challenging to implement telehealth in countries with outdated juridical frameworks.

Telehealth and telemedicine have raised technological, legal, social, and ethical issues that seem unbeatable in the past.[9-13]

Beyond these challenges, telemedicine is positioned today as a discipline with high added value to improve the health level of the population and the quality-of-care services, especially in the context of an aging population, which has higher health care needs.

From an economic point of view, telemedicine reduces the visit time and time interval between visits, reduces the costs and risks of mobilization, and increases productive times and labor presenteeism.[7,12,13]

According to a study by consulting firms PwC (PricewaterhouseCoopers) and GSMA (Global System for Mobile Communications Association), European doctors saved 42 million working days in 2017 because of telemedicine, in

TABLE. Advantages and Barriers of Telemedicine

Advantages	Barriers
Lower costs	Limited access to internet and digital knowledge
Reduces time interval between visits	Service payment
Increases productive times and labor presenteeism	Licensing requirements
Improves access in rural areas	Malpractice insurance
Allows access to highly qualified specialists	Technological costs
	Management of privacy of data
	Cultural and organizational

addition to reducing health spending by almost 100,000 million euros and being able to treat 126 million new patients.[14]

As far as rheumatology practice is concerned, throughout 2020, we have been forced to build a new way of monitoring our patients, and we have witnessed an accelerated process of digital transformation in all health fields.

We frequently read that "nothing will be the same as before," and, of course, when it comes to health care, many of the changes incorporated because of COVID-19 are here to stay.

It is important to note that telemedicine will never replace face-to-face care but presents an opportunity to provide more efficient, equitable, and sustainable health care for developing countries.

TELEMEDICINE IN LATIN AMERICA

Two recently published studies directed by the Investigational Unit of PANLAR (Pan American League of Associations for Rheumatology) attempted to evaluate the use of telemedicine during the lockdown period of the COVID-19 pandemic.[15,16] The first assessed the patients' views, and the second assessed the rheumatologists' impressions.

One thousand ninety-seven rheumatologists from 19 countries in Latin America completed the survey, of whom 78.9% (n = 866) reported the use of remote communication ("telemedicine") to look after their patients during the pandemic.[16] The most common method used was phone calls in 45.5% of the cases, followed by WhatsApp voice messages (38.6%), WhatsApp video calls (36.2%), and other technology video calls (14.4%).

Fifty-five percent of rheumatologists reported that telemedicine was used only for follow-up appointments, whereas the remaining rheumatologists used it for both follow-up and first-time appointments. Whereas 85.7% of rheumatologists considered telemedicine an adequate form of providing care during the pandemic, only 49.8% considered it appropriate for the postpandemic period.[16]

A total of 3502 patients from 19 countries responded to the survey.[2] Thirty percent (n = 1066) of the patients called off at least 1 appointment with their rheumatologists, in most of the cases because of fear of leaving home. However, patients reported that 42.5% of their appointments were canceled by physicians or the health care system. In 32% of these cases, patients were invited to attend a telemedicine visit, which was accepted by 91.5%.[15] Telemedicine was completed by phone calls in 50% of cases, video calls in 36%, and other systems in 23%. As found in the rheumatologists' survey, 84% of the patients reported that telemedicine was appropriate for them during the pandemic, but only 54% considered telemedicine to be a valid option for rheumatic health care after the pandemic. Because these studies were performed during the pandemic, they may have been biased. However, a previous study that included 243 patients with rheumatoid arthritis treated with telemedicine in Colombia before the pandemic also reported high levels of satisfaction by the vast majority of patients.[17] The authors also found a good correlation between the level of satisfaction with telemedicine and the number of previous telemedicine appointments and rural residences.[17]

Although these studies provide an overview of telemedicine in rheumatology in Latin America, there is still a lack of information regarding the use of telemedicine in the region.[15,16]

Challenges for Telemedicine

All new technologies encounter barriers for successful implementation.[18,19] In the case of telemedicine, most of these barriers were described before the pandemic, and although they were bypassed during the pandemic, they are still in place.[20–22] The most important barrier is service payments.[23] Some experts believe that, until this key point is overcome, it would be difficult for telemedicine to spread.[23]

In integrated health care systems, where the same organization provides funding (payer or insurer) and health care services, the system itself encourages the use of telemedicine as it reduces delays in appointments and costs.[24] Outside this ideal scenario, despite the acceptance of telemedicine during the COVID-19 pandemic, there is uncertainty regarding whether these benefits will be accepted in the long term.[25] To a large extent, it will depend on specific agreements between providers and insurers, and large insurers will define the market prices of different products.

In rheumatology care, patients are willing to adopt telemedicine even after the pandemic, as shown by a survey recently published in northern Italy.[26] Most patients (78%) were willing to perform routine telemedicine visits even after the pandemic, and 61% preferred it over an in-person visit.[26] However, as previously discussed, the rates are lower among Latin American patients with rheumatic disease.[16]

Costs are also a major barrier to telemedicine adoption.[13,19,22] Although it is relatively inexpensive to set up pilot systems, with few computers running on existing networks, achieving a large-scale operating system significantly raises costs.[27] Costs are driven by several components and depend on the baseline state of the health system and the type of telemedicine service provided.[25]

Beyond costs, there are other obstacles to telemedicine implementation, which can be grouped into technological, legal, and organizational or cultural.[28,29]

Technological success is based on achieving effective communication between parties. It is necessary to have both human resources and a technological infrastructure to implement a telemedicine system. In addition to effective communication, it is important to achieve interoperability between on-site and remote care systems to access and interchange the health information generated at both sites of the health care system.[30,31] For example,

many applications of smartphones exist for the remote monitoring of RA,[32] but the challenge is the integration of patient-reported data from these applications into routine clinical care and electronic health records that require substantial information technology resources.[33,34] Legal barriers are related to the licensing requirements for professionals to practice medicine in different jurisdictions or states, validity of telemedicine as a care modality, and privacy of patients and their data.[13,35,36] The practice of telemedicine across state or country lines exposes health care providers to licensing requirements of more than 1 state or country because many states and all countries require physicians to be licensed in the state or country to practice medicine.[13,35,36] However, compliance with different states' and countries' medical malpractice insurance coverage requirements is costly and complicated. Different countries and states have the authority to establish and regulate insurance for health care providers working there.[37,38]

In addition, different regulations in different states and countries force telemedicine providers to comply with multiple standards to protect the privacy of health care information, which is a process that is expensive, difficult, and time-consuming.[39,40]

The last general barrier that we will mention is related to cultural and organizational issues.[29,41–43] First, we need to understand the goals of the organization and how telemedicine strategy might help achieve these goals. Second, it is necessary to know the team of professionals and the local organizational culture to evaluate the best way to introduce telemedicine. It is advisable to effectively communicate the expected benefits and resolve conflicts and doubts before implementing a strategy. In addition, it is important to support multiple professionals who play different roles within an organization.[44] This support will provide a more holistic view of the project and mediate internally with users with greater resistance to accepting novelty.[45] Another source of resistance is the lack of knowledge of how technological tools work. Understanding how the telemedicine strategy should work together with the establishment of clear responsibilities for each actor in the process allows physicians to dedicate their efforts to patient care instead of wandering for responsibilities beyond their knowledge.[46]

The use of telemedicine in rheumatology (telerheumatology) is challenging for the diagnosis and assessment of new patients. US physicians expressed dissatisfaction and concerns about the utility of telemedicine when a diagnosis has not already been made, identifying it as the greatest barrier to the inability to perform a physical examination.[47] Observational studies, mainly in patients with inflammatory arthritis, have shown the effectiveness of telerheumatology, although evidence is scarce for autoimmune diseases.[48] In patients with stable, controlled rheumatoid arthritis, no differences in disease activity assessed by videoconferencing or in person were found in randomized clinical trials.[49] Some patients are deemed inappropriate for telerheumatology visits, as shown in a retrospective study, mainly because there was uncertainty regarding the underlying diagnosis or the disease was too complex.[50] Therefore, one of the challenges for telerheumatology is that it will be useful for patients with active rheumatological diseases, autoimmune diseases, or complex rheumatological conditions and those seen for the first time.[51]

The barriers and challenges faced by telemedicine are exponentially increasing. Hundreds of successful implementations are making a positive impact on patients, health care professionals, and organizations. For example, the use of telemedicine in emergency rooms is estimated to double over the next 2 years.[52]

The Future of Telemedicine

The future of telemedicine lies in artificial intelligence (AI).[53] With current progress in the development of diagnostic algorithms using AI mediated by machine learning, a new era of research applied to remote care and assessment of patients in different specialties has begun.[53,54] Artificial intelligence is a branch of computer science dedicated to the development of a set of algorithms and software techniques intended to emulate the intellectual processes characteristic of people, such as logical-mathematical reasoning, generalization of concepts, and discovery of meaning.[55] Artificial intelligence has 2 main characteristics: autonomy, which makes these algorithms capable of operating in a complex environment without the constant intervention of a user, and adaptability, which allows them to improve their performance as they learn from experience.[56]

Artificial intelligence has great potential for telehealth and telemedicine programs based on personal health data to improve medical care in hospitals and offices of doctors or health professionals. A recent publication[57] defined 4 emerging trends in telemedicine and AI based on different health care purposes: patient monitoring, intelligent assistance and diagnosis, medical information technology, and information analysis collaboration. We focus on the first two because we consider them to be more relevant.

Remote monitoring or telemonitoring provides a faster and more cost-effective way of performing periodic consultations between a doctor and his/her patient to evaluate his/her condition, and the results of his/her tests without being in the same geographical location.[58] The goal of telemonitoring is to provide accessible, easy, efficient, and cost-effective patient monitoring compared with physical patient monitoring. In rheumatoid arthritis, it was already shown some years ago that tight control using telemonitoring using a specifically developed program (REmote TElemonitoring for MAnaging Rheumatologic Condition and HEaltcare programmes: RETE-MARCHE) was more effective to achieve remission than conventional management strategy.[59] Another recently published study showed that a smartphone app to telemonitor gout flares was technically feasible and had high adherence and good patient acceptability, allowing rheumatologists to act on flares as they occur in established gout.[60]

Robotics is another field of telemonitoring. Robots are designed to move autonomously around a house by remote control through a software interface that connects the user with the robot via a Wi-Fi connection, combining AI and vision systems for navigation and obstacle detection.[61] Dr. Rho Medical is an example of a mobile body and screen for doctor-patient communication.[62] It features an intuitive vision system that tells cameras to follow the doctor's movements and gestures, and a microprojector for collaborative examinations and procedures.

Telemonitoring will also bring greater focus on self-diagnosis techniques and the application of telemedicine, not only in hospitals but also in homes,[63] facilitating, as mentioned previously, the arrival of medical care in geographically remote areas.

The application of AI to both capture and process data can serve different purposes. Information can be reflected in the electronic health records, improving them, subsequently feeding different AI-based clinical decision support systems, and detecting dangerous health conditions early by alerting users and their doctors about possible risks or updating treatments to improve results. For example, AiCure,[64] a New York–based company, has developed a platform that allows doctors to track a patient's treatment progress based on facial expressions. However, although decision support systems have not been successful de novo diagnosis of rheumatic diseases, they seem to be useful in guiding medication

selection, dosing, treatment duration, and tapering.[65–67] Further research and development are needed in rheumatology.

Technologies promote the use of AI diagnosis with different types of software and phone applications in telehealth.[68] There has been a profuse development of self-diagnostic devices and applications in the market for quick evaluation of vital signs.[69] In rheumatology, there is a delay in the application of AI, although several attempts have already been made.[70]

Currently, AI in rheumatology is mainly focused on supervised learning methods for e-diagnosis, disease detection, and medical image analysis.[70–72] However, machine learning will soon be likely to assist rheumatologists in predicting the course of the disease and will probably be able to make treatment propositions and estimate their expected benefit.[70]

One of the fears related to AI is that in the end, it will replace physicians. However, AI is unlikely to replace human beings. A more likely scenario is the development of a hybrid solution that benefits from both artificial and human intelligence.[72] Because humans are less capable of analyzing large amounts of multidimensional data, AI may help reduce dimensionality or recognize patterns that are not apparent to the human eye and brain.

In summary COVID-19 pandemic accelerated the use of telemedicine in Latin America, although, in general, the methodology used was far from the standards required for the good practice of telemedicine. There are many challenges to the generalized use of telemedicine in Latin America, which will delay its utilization for some time. Undoubtedly, the future of telemedicine is associated with AI and rheumatology; however, somehow behind in our days, it is rapidly catching up with several successful attempts.

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