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High blood pressure and telemedicine: past, present and future

Hipertensión arterial y telemedicina: pasado, presente y futuro

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Palabras clave:
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ABSTRACT

In a contemporary world accelerated by the COVID-19 pandemic, telemedicine has become an excellent option to offer remote consultations to control chronic degenerative diseases of high prevalence, such as hypertension, diabetes, and dyslipidemias. This review discusses precedents, ethical and legal aspects, and their current implementations towards managing high blood pressure (HBP). Although there are several reasons and clear benefits for implementing telemedicine, there are legal, ethical, and practical limitations and poor knowledge of its application within healthcare professionals. Appropriate ethical practice and an adequate legal framework within telemedicine will bypass all considerable risks related to quality, safety, and continuity of care associated with this practice. Regarding practical aspects, physician's clinical judgment is fundamental to know if it is possible to give medical consultation through telemedicine according to every patient's health requirement. Through diverse electronic and technological tools, the physicians could guarantee an appropriate medical consultation and handle follow-up visits. In general medicine, it could be possible that telemedicine would help to reduce the burden of care for patients with chronic diseases, decrease bureaucratic procedures, and support physicians practicing in isolated areas.

RESUMEN

En un mundo contemporáneo acelerado por la pandemia del COVID-19, la telemedicina se ha convertido en una excelente opción para ofrecer consultas a distancia para controlar enfermedades crónico-degenerativas de alta prevalencia, como la hipertensión, la diabetes y las dislipidemias. En esta revisión se analizan los precedentes, los aspectos éticos y legales, y sus implementaciones actuales para el control de la hipertensión arterial (HTA). Aunque existen varias razones y claros beneficios para la implementación de la telemedicina, existen limitaciones legales, éticas y prácticas, así como un escaso conocimiento de su aplicación por parte de los profesionales sanitarios. Una práctica ética apropiada y un marco legal adecuado dentro de la telemedicina evitarán todos los riesgos considerables relacionados con la calidad, la seguridad y la continuidad de la atención asociada a esta práctica. En cuanto a los aspectos prácticos, el juicio clínico del médico es fundamental para saber si es posible dar una consulta médica a través de la telemedicina de acuerdo con los requisitos de salud de cada paciente. A través de diversas herramientas electrónicas y tecnológicas, los médicos podrían garantizar una consulta médica adecuada y gestionar las visitas de seguimiento. En el ámbito de la medicina general, es posible que la telemedicina ayude a reducir la carga asistencial de los pacientes con enfermedades crónicas, a disminuir los trámites burocráticos y a apoyar a los médicos que ejercen en zonas aisladas.

INTRODUCTION

The World Health Organization (WHO) defines *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 the 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 a contemporary world accelerated by the COVID-19 pandemic, telemedicine has become an excellent option to offer remote

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consultations to control chronic degenerative diseases of high prevalence, such high blood pressure (HBP), diabetes, and dyslipidemias. Furthermore, telemedicine has been postured as a novel strategy to increase the percentages of adequate treatment and pharmacological management to reduce cardiovascular morbidity and mortality. This review discusses precedents, ethical and legal aspects, and their current implementations towards managing HBP.

Telemedicine background

According to the definition of telemedicine, remote medical care has been implemented for centuries for giving medical consultations using diverse technological tools. In 1879, the first recorded history of a remote consultation was given between a physician and a patient by telephone. In 1915, besides telephone, it was also possible to give medical consultation and clinical advice on ships across seas by radio frequencies. In recent decades, with the widespread use of the internet, there has been an increasing trend of access for telemedicine worldwide. Nevertheless, its massive implementation was accelerated in 2020 during the COVID-19 pandemic. This worldwide crisis accentuated the need for accessible healthcare access for everyone regardless of social distance restrictions or socioeconomic circumstances.[2] Although there are several reasons and clear benefits for implementing telemedicine, there are legal, ethical, and practical limitations and poor knowledge of its application within healthcare professionals. These conditions have been described as restrictions to systematically apply telemedicine as a strategy for all care levels summarizes the current advantages and disadvantages of using telemedicine *(Table 1)*.

Telemedicine: ethical and legal aspects

Telemedicine has considerable possibilities that could benefit uncountable adults living with chronic degenerative diseases, such as patients living with HBP. Nevertheless, its implementation also poses diverse ethical and legal challenges related to a medical-patient relationship. Appropriate ethical practice and an adequate legal framework within telemedicine will bypass all considerable risks related to quality, safety, and continuity of care associated with this practice.

It has been mentioned that the ethical aspects related to telemedicine should be identical to conventional medicine. The main objective of both practices is to prevent potential injuries that could happen to both patients and physicians. The medical-patient relationship is based on trust and mutual respect

Table 1: Remote Monitoring and Telemedicine

Advantages	Disadvantages
1. Save time 2. Save money 3. Increased control of degenerative chronic diseases (T2DM, HTN) 4. Greater coverage and accessibility 5. No transfer required 6. Lower risk of accidents, contagion, etc., 7. Increased coverage at remote sites 8. Especially useful in the elderly with limited mobility and patients with transfer problems 9. Reduction of absenteeism 10. Patient can upload data to the platform and doctor can make therapeutic modifications remotely achieving higher percentages of control in HTA, DM2, etc	1. Lack of acceptance from doctors and patients 2. Cannot be applied to all diseases 3. Requires technological equipment and internet access 4. Not all patients could be able to handle electronic devices. 5. Limited physical examination

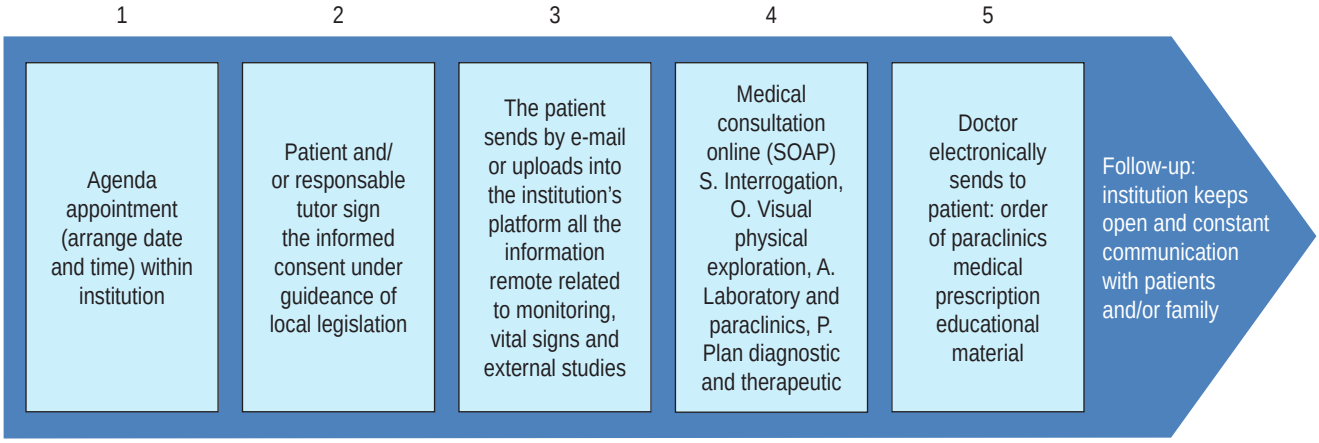

Figure 1: Suggested process of telemedicine for the control of high blood pressure in public medicine.

for both cases. Furthermore, it is necessary to guarantee privacy and confidentiality of all the clinical information using adequate data protection systems. This practice seeks to comply with the current regulatory and legal aspects from international, national, and regional institutions. We can rely on the guidelines set out in the Declaration of the World Medical Association (WMA) on the Ethics of Telemedicine. This declaration was adopted in the 58th General Assembly of the WMA in Copenhagen, Denmark, in October 2007 and subsequently amended in the 69th General Assembly of the WMA in Reykjavik, Iceland, in October 2018. Nevertheless, there are currently no international laws regulating telemedicine for most countries, including Mexico. During the COVID-19 pandemic, telemedicine's legal implications accelerated without a current positioning by any authority. However, it has been recognized that privacy and security standards practices are needed to guarantee appropriate security protocols. Like the American HIPAA *protocol (Health Insurance Portability and Accountability Act).*[2,3]

Telemedicine in high blood pressure

In this review, we will not analyze all the studies that have been published related to telemedicine implemented in the management of HBP.[4-7] Sufficiently is to mention that there have been multiple publications that show the potential benefits of telemedicine over the usual clinical consultations for several years. The use of telemedicine for the management of HBP provides more significant reductions in systolic and diastolic blood pressure and twice the number of patients that will reach blood pressure goals compared with traditional clinical visits. Recently the American Heart Association (AHA) has published a positioning related to telemedicine for controlling HBP.[8]

Telemedicine: practical aspects

The physician's clinical judgment is fundamental to know if it is possible to give medical consultation through telemedicine according to every patient's health requirement. The administrative staff who assist each physician must ensure that all patients and relatives have: a stable internet connection, electronic devices with connectivity (cell phones, computers, electronic tablets) and that they can handle them properly.

Physicians will need to use different platforms to conduct the video consultation that complies with HIPAA regulations to guarantee privacy. Some platforms could be the following: a) Zoom (healthcare version), b) Google G Suite, c) Microsoft Teams, d) Skype, e) WhatsApp. The last one itself does not amend to HIPAA compliant; however,

it is very accessible and has call and text functions. Its enterprise version is relatively more secure, but it still does not comply with all HIPAA regulations and, therefore, can only be used for healthcare practices that do not use sensitive patient data.

Although telemedicine can be applied for all patients living with HBP for the first consultation, it will depend on each patient for the subsequent or «already known» in person by the doctor. For these cases, the physical examination has already been performed and is only intended for follow-up care to evaluate adequate management of HBP and other cardiovascular risk factors.

The physician must provide each consultation within a suitable, private, and quiet place, with the appropriate lighting to show his face and generate trust in every patient. The camera should be pointed at eye level and a one-arm distance from the camera. It is also encouraged that a pre-established executive or assistant order a follow-up visit to achieve quality in medical care, which is very similar to when a face-to-face visit is granted. As shown in *(Figures 1 and 2)*, the consultation must be scheduled appropriately to connect the patient and a family member. At the time of the scheduled appointment, the patients and their relatives must sign an electronic informed consent understanding the advantages and limitations of telemedicine are specified. Likewise, the patient or close relative must send electronically to the physician the vital signs measurements that were taken at home (blood pressure, heart rate, temperature, oxygen saturation, weight, glucometer, etc.). The physician may access the clinical record platform with integrated remote monitoring, laboratory tests, X-rays, or cabinet studies that the patient has, whether appropriate. The physician must also send the electronic link with the date and time for the connection.

For preventing the patient does not comply with the scheduled appointment, «no-show» policies must be established. This means that the consultation must be paid for at least one hour before the scheduled appointment (electronic transferring or payment within convenience stores such as OXXO, PayPal, Mercado Pago, Stripe, and other platforms that have already been integrated within several electronic clinical records). It is advisable to send a personal reminder of the appointment with a text message 5 minutes before the consultation to avoid making the video call when family members or patients are not yet ready to receive it. At the time of the telemedicine consultation, the doctor must document all the information in the

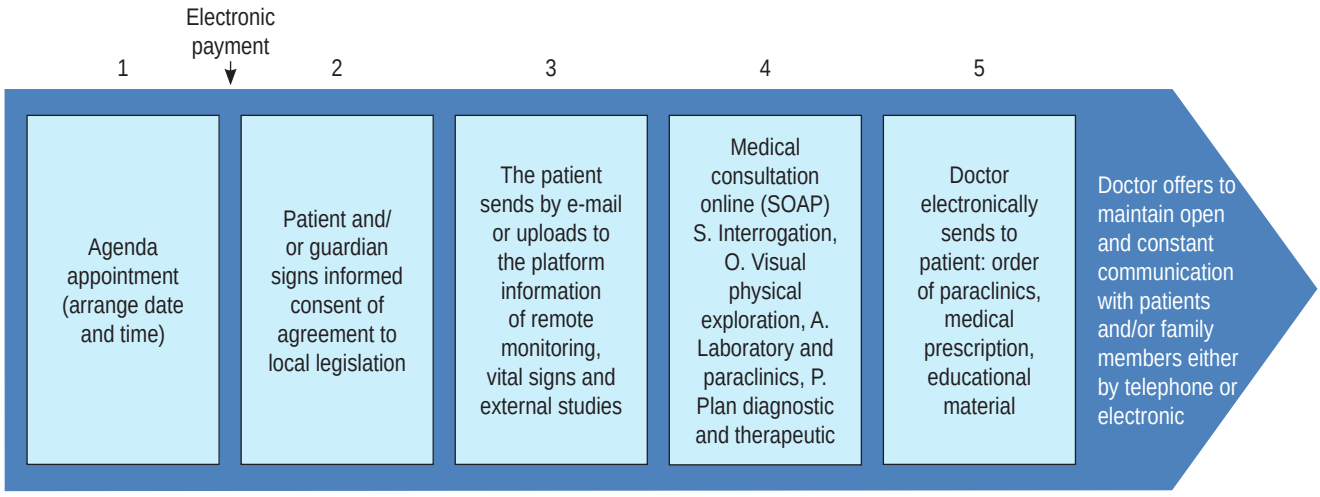

Figure 2: Suggested telemedicine process for high blood pressure control in private medicine.

electronic clinical record, including symptoms and signs, visual, physical examination perceived through the devices, paraclinical tests, and provide a digital prescription and lifestyle recommendations. At the end of the consultation, the doctor will make closing and will schedule a follow-up appointment either in person or by telemedicine, also will send the electronic prescription and laboratory tests to be carried out. He may also send written educational material, infographics, videos, or any information that can be considered helpful in educating the patient's disease. Finally, let the patient know that doctor-patient communication will always be open through different electronic channels to solve doubts, treatment adjustments, medical emergencies, or any communication. It is important to mention that this can be concluded by a telephone call in case of technical problems with the video call.

CONCLUSION

In the field of hypertension, telemedicine is an opportunity to achieve higher blood pressure control rates. Through remote monitoring, any physician could access home blood-pressure parameters and will be able to assemble various therapeutic changes that each patient requires. In general medicine, it will be possible to reduce the burden of care for patients with chronic diseases, reduce bureaucratic procedures, and support physicians practicing in an isolated area. Telemedicine is an excellent alternative to traditional medical practice but in no way replaces it. This practice is expected to grow significantly in the future.

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