

Analysis of the reach of telecardiology in its beginning in Brazil, Mexico and Spain

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Abstract

Introduction: A review of articles on the subject of telemedicine implantation, health policies and the development of telecardiology in Spain, Brazil and México was carried out. **Method:** variables such as policies in telemedicine, technologies used, evaluation processes, investment by each state, infrastructure, benefits and future were compared. **Results:** differences were found such as in investments. Mexico and Brazil has investment from their own countries. Spain has investment from its own countries and also from European Union. Advances in Brazil are worthy of replication and admiration since they have made great progress with a pilot project, with installed capacity to increase the coverage. Mexico and Spain for their part, have programs that are in progress. **Discussion:** the comparison in the telecardiology project in the three countries makes us see that despite the fact that they are at different points, in the process of complementing this consultation, everyone is clear that it is an excellent option to reduce the existing gap in urban coverage and rural, increasing the availability of a timely diagnosis despite the place where the patient is and taking the consultation to a technological level where not only the electrocardiograms can be assessed remotely but also, keep records of chronic patients, second opinions, device records implanted and sent electrocardiograms from ambulances before arriving at emergency centers. **Conclusion:** Medicine evolves from the hand of technology, but only if we invest in it and shape our thinking about medical consultation can we have a timely diagnosis within the future, whatever pathology we present.

Keywords: Telemedicine; Telecardiology; Technology.

Resumen

Análisis del alcance de la telecardiología en sus inicios en Brasil, México y España.

Introducción: Se realizó la revisión de varios artículos sobre la telemedicina, implantación, políticas de salud y el desarrollo de la telecardiología en España, Brasil y México. **Metodo:** se compararon variables como políticas en telemedicina, tecnologías usadas, procesos de evaluaciones, inversión por parte de cada estado, infraestructura, beneficios y futuro. **Resultados:** encontramos muchas diferencias como inversión México y Brasil tienen inversión de cada país, España tiene inversión país y unión europea, los avances en Brasil son dignos de replicar y admirar ya que han logrado grandes avances con un proyecto piloto, pero con capacidad instalada para ir aumentando la cobertura hasta lograr estar en red los 81 municipios, México y España por su parte tiene programas que van en evolución. **Discusión:** la comparación en el proyecto de telecardiología en los tres países nos hace ver que a pesar que están en distintos puntos, del proceso de complementar esta consulta todos tienen claro que es una excelente opción para disminuir la brecha existente en la cobertura urbana y rural, logrando aumentar la disponibilidad de un diagnóstico oportuno a pesar del lugar donde este el paciente y llevando la consulta a una plano tecnológico donde no solo se pueden valorar remotamente los electrocardiogramas sino también, llevar registros de pacientes crónicos, segundas opiniones, registros de dispositivos implantados y envió de electrocardiogramas desde las ambulancias antes de llegar a los centros de emergencias. **Conclusión:** La medicina evoluciona de la mano de la tecnología, pero solo si invertimos en ella y moldeamos nuestro pensar sobre la consulta médica podremos en un futuro tener al alcance un diagnóstico oportuno sea cual sea la patología que presentemos.

Palabras-clave: Telemedicina; Telecardiología; Tecnología.

Resumo

Análise do alcance da telecardiologia em seus inícios no Brasil, México e Espanha.

Introdução: Foi realizada a revisão de vários artigos sobre telemedicina, implantação, políticas de saúde e desenvolvimento de teleologia na Espanha, Brasil e México. **Método:** foram comparadas variáveis como políticas em telemedicina, tecnologias utilizadas, processos de avaliação, investimento por estado, infraestrutura, benefícios e futuro. **Resultados:** encontramos muitas diferenças, como investimento O México e o Brasil têm investimento de cada país, a Espanha tem país de investimento e a União Europeia, os avanços no Brasil são dignos de replicação e admiração, pois avançaram bastante em um projeto piloto, mas com capacidade instalada para a cobertura aumentará até a rede de 81 municípios, México e Espanha, por outro lado, possui programas em evolução. **Discussão:** a comparação no projeto de telecardiologia nos três países nos faz perceber que, apesar de estarem em pontos diferentes, no processo de complementação desta consulta, todos estão claros de que é uma excelente opção para reduzir a lacuna existente na cobertura urbana e rural, aumentando a disponibilidade de um diagnóstico oportuno, apesar do local onde o paciente está e levando a consulta a um nível tecnológico em que não apenas os eletrocardiogramas possam ser avaliados remotamente, mas também, manter registros de pacientes crônicos, segundas opiniões, registros de dispositivos implantado e enviado eletrocardiogramas de ambulâncias antes de chegar aos centros de emergência. **Conclusão:** a medicina evolui da mão da tecnologia, mas somente se investirmos nela e moldarmos nosso pensamento sobre a consulta médica poderão ter um diagnóstico oportuno no futuro, independentemente da patologia que apresentarmos.

Palavras-chave: Telemedicina; Telecardiologia; Tecnologia.

INTRODUCTION

Cardiology is a specialty that is not located in all localities of a country; however, pathologies related to this specialty has special importance since it is the first causes of death worldwide, being the teleconsultation a very novel and useful option to achieve increased coverage and reduction of risks and consequences to the population with cardiovascular pathology. We were able to observe where each country is going and what elements can be improved and overcome to achieve success in digital health. This article aims to present the development situation of telecardiology in Brazil, Mexico and Spain supported on a review of the literature.

METHOD

The development of the telecardiology in Mexico, Brazil and Spain was reviewed to compare various elements, in articles that have addressed this issue in the last five years. Next, the bibliographic review of several articles on the subject of telecardiology is described, by country (Mexico, Brazil and Spain), considering the topics: Regulation, Technologies, Evaluation, State Investment, Infrastructure, Benefits and Future.

RESULTS AND DISCUSSION

Table 1 compares the variables of the Telehealth Program in Mexico, Brazil and Spain.

Table 1- Characteristics of telecardiology projects in Brazil, Mexico and Spain.

	Brazil	Mexico	Spain
Health Policies	Federal Council of Medicine (CFM) of Brazil, institution responsible for the supervision and regulation of Telemedicine, complying with CFM standards regarding the storage, manipulation, integrity, veracity, confidentiality, privacy and guarantee of professional secrecy of information.	All actions related to Telehealth must be in total compliance with the existing health regulations; The personnel involved in the Telehealth processes are responsible for providing maximum security, privacy and respect to the patient.	It is regulated by Directive 2011/24/EU on patients' rights in healthcare, including telemedicine; in addition to Articles 3(d), 7(7) and 14 of Directive 2011/24/EU. The treatment and supervision of the patient and, in this respect, ethical and professional rules relating to the provision of this type of service are of particular importance.
Technologies	Telecardiology activities began on June 20, 2006. The project had a specialized hardware and software structure for Telemedicine; not only to attend the number of municipalities supported, but also to support an expansion.	Telemedicine uses Information Technology and Telecommunications to provide support for health care services, regardless of the distance between those offering the service; The current trend in telemedicine leads to the design of medical devices with biosignals;	Telemedicine begins an era of globalization of health; The use in hospital management of ICT changes the way of working and creates new opportunities for access and consultation such as online records and continuous communication: collection of vital signs, electrocardiograms, images and depending on each file will be its complexity and technology required.

<p>Evaluation</p>	<p>Evaluation protocols are established that include information on general satisfaction with the operation of the system, positive and negative points, issues related to the ease or difficulty of operationalization of the system.</p>	<p>Monitoring strategies of the TeleSalud Program were implemented to provide information to disseminate to decision-makers the benefits of the program to request greater support for the development of the technological and operational environment in which the program operates to contribute to reducing health needs.</p>	<p>There are several health technology assessment agencies in Spain; one of them is the Spanish Agency for Health Technology Assessment (Agencia Española de Evaluación de Tecnologías Sanitarias). Telemedicine evaluation is still a young discipline, as are many of the new technologies it aims to evaluate. That is why it has some factors against it, such as the lack of sufficient quality evaluations or the existence of very specific projects that are difficult to evaluate.</p>
<p>Investment status</p>	<p>The intensive use of ICTs, promoting the development of e-health and telemedicine, with the coordinated and synergistic participation of universities, the public sector and the private sector. The United Nations has declared access to the Internet as a fundamental right, as "it may be one of the most important steps towards achieving the objectives of Telehealth.</p>	<p>Aspects of telemedicine should be considered by health administrators from federal, state, municipal, and public universities such as where they include the planning of strategies for the development and operation of the Telehealth program, and the elaboration of the Program Annual Operation and Investments, as well as how to apply the mechanisms issued by the Ministry of Health and/or Ministry of Public Education and State Government for the Planning and Programming of medical and/or educational services for telemedicine.</p>	<p>Progress in the implementation of telemedicine is seen thanks to public investment. Carlos Royo, director of the health division of Spanish technology company GMV, admits that its implementation is "very uneven" and, in terms of the fundamental aspect of assistance, "it is moving desperately slowly".</p>
<p>Infrastructure</p>	<p>The objective of the Telehealth network in Brazil is to contribute to improving the efficiency of management processes, exchange of experiences, support for research and formation of knowledge networks between the services of the Brazilian hemi-network, and its integration with the other Telehealth networks in the country.</p>	<p>Mexico has software, equipment and structural components of a telemedicine system, based on the information obtained in hospital institutions. as well as the telecommunications infrastructure of the sites that make up the health network.</p>	<p>In Spain, the performance of telemedicine systems depends fundamentally on the telecommunications infrastructure. In general, it includes terminal equipment for capturing biomedical signals, image capturers, computer terminals, workstations, videoconferencing systems, communication infrastructures, generic services and specific services.</p>

<p>Benefits</p>	<p>Implementation of a low-cost tele-cardiology system in small cities in the interior of Brazil; improving the quality of care and reducing the cost of health care.</p> <p>It is a network of evidence-based information sources focused on primary care to subsidize the processes of clinical decision-making, training and management of the Family Health Teams, Second Opinion professional and participant in the Telehealth project.</p>	<p>This type of consultation is effective, as the times of both the health personnel and the patient must be taken into account; The time for diagnosis may be shorter since the specialist would only concentrate on the analysis of the images and the clinical history; Once the information has been received, it is displayed on the screen in order to examine it and issue a diagnostic opinion, and then suggest the most convenient specialized treatment.</p>	<p>Among the benefits are highlighted:</p> <ul style="list-style-type: none"> - Reduces distances. - Promotes education. - Improves the monitoring of chronic patients. - Increases patient recruitment. - Decreases morbidity and mortality in patients in emergencies.
<p>Future</p>	<p>Telemedicine is a natural evolution of health care in the digital world," say experts who, after several debates, regulated telemedicine in Brazil.</p> <p>Although the feasibility and acceptability of the programme have been established in this study, it is essential that the criteria for the cost-effectiveness of the proposed strategy be evaluated.</p>	<p>Among the needs to standardize the future of Telemedicine in Mexico, is that there must be a telecommunications infrastructure based on international standards, as well as open communication standards, function to transmit and receive ECGs via Web, allowing the review of remote information.</p>	<p>Telemedicine has transformed the management of chronic diseases since through its different applications (telemonitoring, tele-consultation and tele-education) a closer follow-up is possible. It also promotes the autonomy of the patient and improves the knowledge of his disease, which optimizes the treatment at every stage of the disease evolution. Progressively other pathologies are added to its use and it is investigated in this modality of attention of health services and monitoring.</p>

In general, based on the telecommunications infrastructure, the countries already adopting international standards, which even in Mexico is in process and not all the medical equipment used in the remote consultation complies with international standards.

The results of telecardiology consultation still under study since teleconsultation is the commitment of several actors and we do not have the same horizon of the three countries that were analyzed.

In Spain there is a comparison between patients who were treated with the connection to telemedicine and those who were not, especially in extra-hospital AML and it was seen that those treated with the help of technology had better opportunities, reducing complications.

The cost effectiveness evaluation of telecardiology is still under discussion and research and the one with the best developed evaluation process is Brazil. Mexico and Spain still do not have an adequate evaluation, which is important to correct soon, since only a constant evaluation reflects the benefits of the program, and thus achieve replicating and improving the process.

The proposal to compare the advances in telemedicine is a challenge since each telemedicine program is connected to its own health policies. In addition there is a correlation between investment and program development.

Regarding the future prospects, it can be said that telecardiology is the future for having chronic cardiac patients monitored. Even today cardiovascular diseases are the leading causes of death, so every effort to increase coverage is a great step for public health.

CONCLUSION

Telecardiology projects are being developed in the three countries, with different characteristics and at different speeds in terms of the evaluation process. I point out that in all the countries analyzed, the perspective is the expansion of telecardiology actions, since they can contribute to the impact on patient morbidity and mortality.

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