

ICTs and Telemedicine in Public Health in Ecuador

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Date of receipt: February, 12, 2020 | Approval date: September, 15, 2020

Abstract

Introduction and objective: This article provides an overview of the way in which telehealth is related to health care services in Ecuador, taking into account that health is a right guaranteed by the Ecuadorian State, whose realization is linked to the exercise of other rights, including the right to water, food, education, physical culture, work, social security, healthy environments and others that support good living. **Method:** The article was structured in three stages. Initially, a description of the assistance structure of the country was made, considering the following levels of system structure: primary, secondary, tertiary and quaternary. **Results:** The State guarantees the provision of health services through economic, social, cultural, educational, and environmental policies; and permanent, timely, and inclusive access; and that in one of the edges of this environment it is supported by Information and Communication Technologies (ICTs) in such a way that there is a favorable perspective for telemedicine to be considered as a tool to improve health care for remote populations that do not have access to specialists.

Keywords: Telehealth; Telemedicine; Technologies

Resumen

Las TICs e la telemedicina en la Salud Pública en el Ecuador.

Introducción y objetivo: El presente artículo proporciona una visión de la manera en la cual se encuentran relacionadas los recursos de telesalud con los servicios de atención de salud en el Ecuador, teniendo en cuenta que la salud es un derecho que garantiza el Estado Ecuatoriano, cuya realización se vincula al ejercicio de otros derechos, entre ellos el derecho al agua, la alimentación, la educación, la cultura física, el trabajo, la seguridad social, los ambientes sanos y otros que sustentan el buen vivir. **Método:** El estudio fue realizado en dos fases: una sistematización de la estructuración de los niveles asistenciales en Ecuador y adelante La situación de La telesalud. **Resultados:** El Estado garantiza la prestación de servicios de salud mediante políticas económicas, sociales, culturales, educativas y ambientales; y el acceso permanente, oportuno y sin exclusión; y que en una de las aristas de este entorno es apoyado por las Tecnologías de la Información y Comunicaciones (TICS) de tal manera que existe una perspectiva favorable para que la telemedicina sea considerada como una herramienta para mejorar la atención de la salud de poblaciones remotas que no tienen acceso a los especialistas.

Palabras-chave: Telessaúde, Teleeducación, Tecnologías

Resumo

As TICs e a telemedicina na Saúde Pública do Equador.

Introdução e objetivos: Este artigo oferece uma visão da forma como os recursos da telessaúde se relacionam com os serviços de saúde no Equador, levando em consideração que a saúde é um direito garantido pelo Estado equatoriano, cuja realização está vinculada aos exercício de outros direitos, incluindo o direito à água, alimentação, educação, cultura física, trabalho, segurança social, ambientes saudáveis e outros que apoiem uma boa vida. **Método:** o estudo foi realizado em duas fases: sistematização da estruturação dos níveis de atenção à saúde no Equador e posteriormente a situação da telessaúde. **Resultados:** O Estado garante a prestação de serviços de saúde por meio de políticas econômicas, sociais, culturais, educacionais e ambientais; e acesso permanente, oportuno e não exclusivo; e que uma das bordas desse ambiente é amparada pelas Tecnologias da Informação e Comunicação (TICS) de forma que haja uma perspectiva favorável para que a telemedicina seja considerada uma ferramenta para melhorar a atenção à saúde de populações remotas elas não têm acesso a especialistas.

Palavras-chave: Telessaúde; Telemedicina; Tecnologias.

INTRODUCTION

Today, we are facing the so-called fourth technological revolution, centred on the new Information and Communication Technologies (ICTs), which continues to transform our way of life in practically all aspects of individual and social life. In the field of health, the role of ICTs is decisive, making it possible for unattended populations in remote areas of countries to receive medical services, and for these services to be more efficient. The so-called e-health or e-care can reduce the exclusion of people at the base of the pyramid from health services, as it helps to provide patients with constant communication, access to information, new consultation interfaces, brings the knowledge of medical specialists to remote areas through telehealth and generates efficiency in the provision of related services (Mariscal, Rentería, & Arteaga, 2014).

Information and Communication Technologies (ICTs) are taking positions in the field of medical assistance. In Ecuador, an information system has been implemented throughout the National Health System, the PLATFORM FOR REGISTRATION OF HEALTH CARE (PRAS), which allows for the centralization of patient data, diagnostic tests and clinical records; but steps have not only been taken in the area of outpatient care.

Ecuador is a country that has particular social, geographical, demographic, economic and cultural conditions; these conditions are influenced not only by the country's geographical conditions but also by situations of concentration of development in large cities and in general towards the centre of the national territory, low levels of education in vulnerable and determining populations that have a direct impact on the emergence of inequities in access to goods and services. The country currently faces enormous challenges in health, mainly due to the insertion of global market trends, the reduction of inequity and social innovation aimed at achieving a more inclusive, equitable and sustainable society, and the provision of efficient, innovative and effective health services. In recent years, there has been a trend towards an increase in the demand for health services in scenarios that could be considered non-traditional.

The use of ICTs in health allows for the integration of the work of professionals, patients and society itself in order to make correct and efficient use of these technologies; it also requires interdisciplinary work in various areas of knowledge, not only in the health sciences, but also in engineering, technology, economics and administrative sciences, among others. The implementation of technological innovations in the health sector should be reflected positively in the optimization of the resources of the Health System through

the implementation and subsequent evaluation of the use of Health Technologies, as an instrument for decision-making at its different levels. This article aims to investigate how ICTs can be a contribution to improve access to health services, improving the quality of the same and timely care, efficiency in the management of health networks, as well as the achievement of improvements in the availability and timeliness of information for decision-making, as well as training of human resources and management.

METHOD

The article was structured in three stages. Initially, a description of the country's assistance structure was carried out, considering the following levels of structure of the system: primary, secondary, tertiary and quaternary. Below, the potential use of telehealth resources in Ecuador's health system was described, by assistance level, as well as the situation of their use. In the last step, the benefits that can be derived from the use of these resources in Ecuador's health system were described.

RESULTS

The National Government of Ecuador, through the Ministry of Public Health, has established the strengthening of the health sector as one of its management priorities, which has been expressed not only in a significant increase in the budget, but fundamentally in a profound restructuring of public institutions and the country's health work. Important steps have been taken to strengthen the health units of the MOH in terms of infrastructure, medical and computer equipment, and human resources, among others, in addition to the policy of free public services. The reorientation of the Health System's Care and Management Model, in order to achieve comprehensiveness, quality, and equity, with a view to obtaining results with social impact.

The MOH, as the national health authority, with the objective of articulating the Comprehensive Public Health Network and the Complementary Network, standardizes the typology of health facilities by level of care in the National Health System, which applies to the entire health sector of the country.

The organization of health services by level of care makes it possible to organize the supply of services to guarantee the resolution capacity and continuity required to respond to the population's health needs and problems. The level of care is a set of health facilities that, under a regulatory, legal, and juridical framework, establishes levels of complexity required to effectively and efficiently resolve health needs of varying magnitude and severity.



Figure 1: Levels of care in the national health system

The distribution of health services by level of care and according to typology has been defined according to the following table:

NIVELES DE ATENCIÓN, NIVELES DE COMPLEJIDAD, CATEGORIA Y NOMBRES DE LOS ESTABLECIMIENTOS DE SALUD			
NIVELES DE ATENCIÓN	CATEGORIA DE ESTABLECIMIENTOS DE SALUD	CATEGORIA DE ESTABLE. DE SALUD	NOMBRE
Primer nivel de atención	1° nivel	I-1	Puesto de salud
	2° nivel	I-2	Consultorio general
	3° nivel	I-3	Centro de salud – A
	4° nivel	I-4	Centro de salud – B
	5° nivel	I-5	Centro de salud – C
Segundo nivel de atención	AMBULATORIO		
	1° nivel	II-1	Consultorio de especialidad (es) clínico – quirúrgico médico u odontológico
	2° nivel	II-2	Centro de especialidad
		II-3	Centro clínico- quirúrgico ambulatorio (Hospital del Día)
	HOSPITALARIO		
	3° nivel	II-4	Hospital Básico
4° nivel	II-5	Hospital General	
Tercer nivel de atención	AMBULATORIO		
	1° nivel	III-1	Centros especializados
	HOSPITALARIO		
	2° nivel	III-2	Hospital especializado
	3° nivel	III-3	H. de Especialidades
Cuarto nivel de atención	1° nivel	IV-1	Centro de experimentación por registro clínico
	2° nivel	IV-2	Centro de alta Subespecialidad

Figure 2: Levels of care, complexity, category and names of health facilities

First Level of Care: The first level of attention is constituted in the entrance door and it must solve 80% of the health needs of the population and through the reference and counter-reference system the access to units and services of greater complexity is guaranteed until the resolution of the need or problem, considering that these needs are solved with simple technologies that must be accessible of immediate form to the population, by its direct contact with the community it must cover all the population, this level must solve the basic and/or more frequent needs of the community. The services will provide comprehensive care directed to the family, individual and community, emphasizing promotion and prevention. These activities will be intra and extramural.

Second Level of Care: It is the organization of the services in which more resources are added and grouped with a greater level of complexity, which attends the less frequent but more complex events and which require skills and technologies of average type, it includes all the actions and services of specialized ambulatory attention and those that require hospitalization. It constitutes the immediate reference step of the I Level of Care.

Third Level of Care: Organization of the services in which more resources with a higher level of complexity are grouped to attend to highly complex events of lesser occurrence and for whose care specialized skills and advanced technology are required; these facilities provide outpatient and inpatient specialty and specialized services, the hospital centers are of national reference; it solves highly complex health problems, has state-of-the-art resources, high-severity surgery, performs transplants, intensive care, and has subspecialties recognized by law; the following are included

Fourth Level of Care: It is the one that concentrates the clinical, pre-registration or procedure experimentation, whose evidence is not enough to be able to establish them in a population, but that have demonstrated good results casuistically or by studies of less complexity.

Components or structure of telemedicine systems

The structure of the national health system is described above, and there are cases in which a first- or second-level operating unit that lacks professionals in a specific area(s) will be assisted by a higher-level operating unit, which will have specialists to care for patients remotely, who will be physically located in the city where the lower-level operating unit is located. This will save patients time and money and improve the management of remote health centers.

For such a system to work well, the following elements must be in place:

- Equipment capable of communicating (preferably videoconference)

- Means of communication (satellite, Internet, etc.)

- Information interoperability standards and protocols (HL7 and DICOM).

- The operational support unit that must manage the necessary resources (infrastructure, time and especially specialists) to provide the medical services.

In Ecuador, most third- and fourth-level hospitals have specific equipment equipped with cameras, speakers, computers and recording devices.

In the Baca Ortiz Pediatric Hospital, a fourth level of care establishment, for several years international congresses on hypostadies have been held, which have been transmitted via Internet in real time to the entire world where students from various universities in the world have been able to participate in the surgeries performed in the environment of the hypostadies where they have also been able to interact with the medical specialists who have carried out the same.

On the other hand, the Ministry of Public Health has organized trainings mainly in obstetric and pediatric issues, video conferences and virtual trainings with the following topics

- Course for training tutors in obstetric emergencies.

- Management of nutrition in the newborn.

- Intestinal volvulus in pediatric patients

- Hypertensive disorders in pregnancy 1.

- Hypertensive disorders in pregnancy 2.

- Bleeding disorders.

In Ecuador, one of the largest health service providers after the MSP is the Ecuadorian Institute of Social Security (IESS), which in July 2019 implemented a pilot plan in five first-level health centers in six locations in the country: Coca, Macará, Santa Cruz, Zaruma, La Troncal and Cuenca; in which they applied the system with 2,000 patients, generating savings of \$300 million annually.

The program focuses on serving citizens who live in remote areas so they can receive specialized care without having to move, where a general physician from the IESS can contact a specialist by video conference to issue a diagnosis, prescription or examination orders. This process allow the follow benefits :

- Access to specialized services from remote regions or locations.

- Development of regional reference centers.

- Retention of local experts.
- Improvement in diagnostics and treatment continuity.
- Facilitates and improves inter-consultation.
- Referral and counter-referral.
- Cost reduction, including transport costs.
- Improvement of practice through continuous education of health personnel, the medical team is updated from their location.
- Contact between primary and specialized care.
- Clinical data, not patients, are what move.
- Stimulates cooperative work and integration of research groups.
- Optimization of administrative management.
- Optimizes emergency services.
- Decreases the feeling of professional isolation in remote places technovigilance.
- Use of digital medical records (PRAS)

CONCLUSIONS

ICTs in health systems make it possible to serve the population in remote areas and generate efficiency through new consultation interfaces. There is evidence that savings have been generated through applications for telemedicine care (IESS).

Telemedicine plays a fundamental role in the sustainable improvement of the health of communities, at a global level, becoming a tool to improve the scientific performance of health personnel, taking into account that it will not solve all the existing problems in the health sector, but with the advances generated in recent years, it undoubtedly plays an important role in all countries.

Telemedicine can be considered a fundamental pillar that will make it possible to resolve many of the difficulties that exist in access to health services in Ecuador.

In the case of health care, ICTs are a tool for improving the impact of these factors, providing more equitable, effective and efficient access to health services, substantially improving the timeliness of care and the cost-effectiveness of treatment, and promoting the generation of knowledge and access to medical care.

ICTs are a wide range of services, applications, and technologies, which use various types of equipment

and software, and are often transmitted through telecommunication networks mainly via the Internet; and whose main foundation lies in strengthening and boosting a country's economic and social development.

The confidentiality of information in any telemedicine system is important because the medical information of patients belongs only to them and not to governments, health institutions or the physician, and is totally confidential.

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