English

Telehealth in colombia: digital hospital case - LivingLab university of Antioquia

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Abstract

Colombia faces challenges such as inequality and difficulty in accessing medical services, especially in geographically remote areas. ***Objective:*** *This work aims to present Telehealth as a promising solution to address these challenges, using an experience report from the LivingLab Telehealth - Digital Hospital of the University of Antioquia.* ***Results and Discussion:*** *This institution has implemented programs covering emergency care, mental health, monitoring of non-communicable chronic diseases, and maternal-perinatal care, demonstrating remarkable effectiveness in expanding access to specialized health services and meeting user needs.* ***Conclusion:*** *The article concludes by emphasizing the transformative potential of Telehealth to improve equity and the quality of medical care in Colombia and other Latin American countries, highlighting the importance of strengthening and expanding these initiatives to enhance regional public health.*

Keywords: *Telehealth; Telemedicine; Telehealth guidance.*

Resumen

Telesalud en Colombia: Caso Hospital Digital.

Colombia enfrenta desafíos como la desigualdad y la dificultad de acceso a los servicios médicos, especialmente en áreas geográficamente remotas. ***Objetivo:*** *El trabajo pretende presentar la Telemedicina como una solución prometedora para enfrentar estos desafíos, utilizando un relato de experiencia del LivingLab Telemedicina - Hospital Digital de la Universidad de Antioquia.* ***Resultados y Discusión:*** *Esta institución ha implementado programas que abarcan atención de emergencia, salud mental, monitoreo de enfermedades crónicas no transmisibles y cuidados materno-perinatales, demostrando una notable eficacia en la expansión del acceso a servicios de salud especializados y en la satisfacción de las necesidades de los usuarios.* ***Conclusión:*** *El artículo concluye enfatizando el potencial transformador de la Telemedicina para mejorar la equidad y la calidad de la atención médica en Colombia y otros países latinoamericanos, destacando la importancia de fortalecer y expandir estas iniciativas para mejorar la salud pública regional.*

Palabras-clave*: Telesalud; Telemedicina; Teleorientación en salud.*

Resumo

Telessaúde na Colômbia: O Caso do Hospital Digital

A Colômbia apresenta desafios como a desigualdade e a dificuldade de acesso a serviços médicos, especialmente em áreas geograficamente remotas. ***Objetivo:*** *o trabalho almeja apresentar o Telessaúde como uma solução promissora para enfrentar esses desafios, utilizando um relato de experiência do LivingLab Telessaúde - Hospital Digital da Universidade de Antioquia.* ***Resultados e Discussão:*** *Esta instituição implementou programas que abrangem cuidados de emergência, saúde mental, monitoramento de doenças crônicas não transmissíveis e cuidados materno-perinatais, demonstrando uma eficácia notável na expansão do acesso a serviços de saúde especializados e na satisfação das necessidades dos usuários.* ***Conclusão:*** *O artigo conclui enfatizando o potencial transformador da Telessaúde para melhorar a equidade e a qualidade do atendimento médico na Colômbia e em outros países latino-americanos, destacando a importância de fortalecer e expandir essas iniciativas para melhorar a saúde pública regional.*

Palavras-chave: *Telessaúde; Telemedicina; Orientação em Telessaúde*

INTRODUCTION

Colombian context

Colombia is a multicultural, multiethnic country with more than 52 million inhabitants, with six clearly differentiated geographical regions, making it highly diverse but with great challenges for its integration[1]. Geographically, its complex topography makes it difficult to connect human settlements, limiting the effective presence of the State throughout the territory[2], aggravated by the internal armed conflict, which had left more than eight million victims of displacement by 2021[3]. Added to this is economic inequality, with official figures from 2022, 36.6% of Colombians lived in monetary poverty and 13.8% in extreme monetary poverty[4].

With a health system based on social insurance, which by 2022 had a 99.6% coverage rate according to the Ministry of Health[5], access to health should be global, but this is far from reality. Those mentioned above geographical, social, economic, and political difficulties prevented many Colombians from effectively enjoying the right to health. According to the Colombian National Health Institute (INS) in 2019, most Colombian municipalities had a low or very low level of access to health services[6]. Additionally, this reports that 18.6% of all deaths in Colombia between 1998 and 2017 were preventable and attributable to the health system, which also highlights shortcomings in quality and efficiency[6]. From another perspective, in 2022, 135,785 legal actions were filed to claim the fundamental right to health, with a rate of 0.4 legal actions for every 1,000 cases of care[7], and the UN Human Development Report for Colombia reported in 2023 that when Colombians were asked how fair they considered access to health in their country, 74% responded that it was unfair or very unfair[8].

Given these difficulties, which are common to much of Latin America, the World Health Organization (WHO) proposes Telehealth as one of the tools that can be used to mitigate inequities in health systems by including Information and Communication Technologies (ICT) in health-related programs. This is based on potential benefits, such as: improved interaction between actors for better health risk management, complex decision-making based on scientific evidence and specialized support, improved quality of life for patients, greater personalization, integration and continuity of clinical interventions, overcoming geographic and temporal barriers, and more efficient use of time and available resources, which are often limited[9].

Regulations and definitions

Colombia, following the WHO proposals, developed regulations in 2006 to enable the provision of Telemedicine services[10], but in 2010, the guidelines for developing Telehealth in Colombia were established with Law 1419, defining Telehealth as *the set of health-related activities, services, and methods, which are carried out remotely with the help of ICTs. It includes, among others, Telemedicine and Tele-education in health*[11]. We consider this definition equivalent to Digital Health used by the WHO and other terms such as e-Health and CyberHealth used in other countries[12].

Subsequently, and with the participation of teachers and students of the postgraduate program in Telehealth at the University of Antioquia, Resolution 2654 of 2019 was constructed, which established the provisions for Telehealth and the parameters for the practice of Telemedicine in Colombia, affirming the definition of **Telemedicine** as the provision of remote health services in the components of promotion, prevention, diagnosis, treatment and rehabilitation, by health professionals who use ICTs, which allow them to exchange data to facilitate access and opportunity in the provision of services to the population that has limitations in supply, access to services or both in their geographic area[13].

The term **Tele-education** was also established as the use of ICT for remote health education, **Tele-guidance** as the set of actions developed through ICT to provide the user with information, counseling, and advice on the components of health promotion, disease prevention, diagnosis, treatment, rehabilitation and palliation, and **Tele-support** as the support between health professionals through ICT within the relationship between professionals[13].

Digital Hospital - LivingLab Telehealth

These regulatory advances responded to initiatives such as the LivingLab Telehealth - Digital Hospital of the University of Antioquia, which, given the need to innovate to have a more accessible and equitable health system, began activities in 2013 thanks to funds from the Colombian general royalty system. It was established on the pillars of Telemedicine care, Tele-guidance, Tele-education, and Data Analysis. The first activities consisted of providing the 125 municipalities of the Department of Antioquia with the necessary internet and equipment to carry out Telehealth activities. For this, the articulation of academia, the private and public sectors was necessary, allowing specialized medicine to be brought to municipalities with difficulties in access.

By 2020, there were already multiple developments and a stable work scheme, but the pandemic exponentially increased the work team, skills, and scope of the Digital Hospital. The pandemic care through Telehealth modalities was carried out thanks to the coordination with the Government of Antioquia, where it was agreed that any person within the limits of the department could consult the Digital Hospital for symptoms or situations related to COVID-19, to provide services in an organized, articulated, efficient manner and without saturating face-to-face services. Initially, Tele-orientation activities were worked on for mild cases and preventive isolation, but due to the growing number of cases and the saturation of hospital centers, telemedicine and tele-expertise actions had to be implemented, leading to improvised home care centers attended by patient caregivers, guided by professionals remotely. Coordination with the city's emergency system was also necessary to define the patients who required transfer from home to intensive care units. As Telehealth proved to be a feasible strategy during the pandemic, an agreement was reached early on with the country's largest health insurer to care for its patients with COVID-19-related situations anywhere in the country.

Thanks to around two million COVID-19-related care services in different modalities, the team acquired multiple skills, expanding the reach of its programs. For this reason, since 2021, the Alma Máter de Antioquia Hospital's program for the care of Non-Communicable Chronic Diseases (NCDs) began to be supported with follow-ups through Telemedicine and Tele-guidance. Since January 2023, it began monitoring patients with NCDs and pregnant people throughout the country, in addition to strengthening in a transversal way in the provision of specialized telemedicine and telepsychology. Therefore, this work aims to present Telehealth as a promising solution to face these challenges, using a story of the successful experience of the LivingLab Telehealth - Digital Hospital of the University of Antioquia.

METHODOLOGY

This is an experience report. First, there was an analysis of the current health situation in Colombia in a Latin American context, highlighting the inequity in the provision of health services and the challenges in access for various reasons. Later, the platforms, official documents, and data from the LivingLab - Digital Hospital were reviewed comprehensively, describing its activities, purposes, results, and contrast with the available evidence. With different Telehealth programs put into context, reflections, and conclusions were generated to inspire the materialization of new Telehealth programs to achieve equitable and accessible health services in Latin America.

RESULTS AND DISCUSSION

Specialized telemedicine

The specialized telemedicine service offers consultations to hospitalized patients, in emergency services or outpatient settings, upon referral from general medicine, specialized medicine (follow-up request), or psychology. The telemedicine process is carried out through interactive telemedicine or tele-expertise that supports the health personnel from the referring hospital center to accompany the assessment and support in the physical examination of the patient. Through specialized telemedicine, various areas are covered such as internal medicine, pediatrics, psychiatry, gynecology and obstetrics, neurology, dermatology, physiatry, immunology, and emergencies, among others.

This service implementation requires that the referring hospital, with limited resolution capacity, submits the request directly to LivingLab – Hospital Digital through the designated platform. It is essential to provide the necessary documents, such as: medical history, informed consent of the patient, and results of paraclinical tests and diagnostic aids. After receiving and validating the request, the assessment is scheduled and confirmed with the patient and the referring hospital.

According to the specialized telemedicine program, 70% of emergency requests came from areas outside cities and metropolitan areas. This is relevant due to the distance from high-complexity hospitals [14], considering that the geographic location constitutes a significant barrier to access to health services in the country.

The average time to access specialized care was 2.06 hours in the emergency room and approximately 5 (five) days in the outpatient setting[14]. This improvement in the promptness of access to specialized consultations highlights its positive impact on patient care. According to research[14], the emergency telemedicine program enabled specialized and agile treatment of patients from low and medium-complexity hospitals, where the presence of specialized doctors is limited, and therefore the resolution in complex cases. The significant impact of this program is evidenced by the fact that complex cases could be resolved in a timely and quality manner without having to transfer the patient to other health centers of greater complexity thanks to the remote accompaniment of the specialist. This becomes important when considering the operational difficulties in providing medical care in rural areas of Colombia, where resources and personnel are limited[14].

Additionally, the specialized telemedicine program is presented as a valuable tool that facilitates the recommendation of therapeutic or follow-up options, the education of patients about their disease, the definition of a management plan, the request for necessary procedures, and the resolution of the patient's needs, finally allowing their discharge in the corresponding specialty[15].

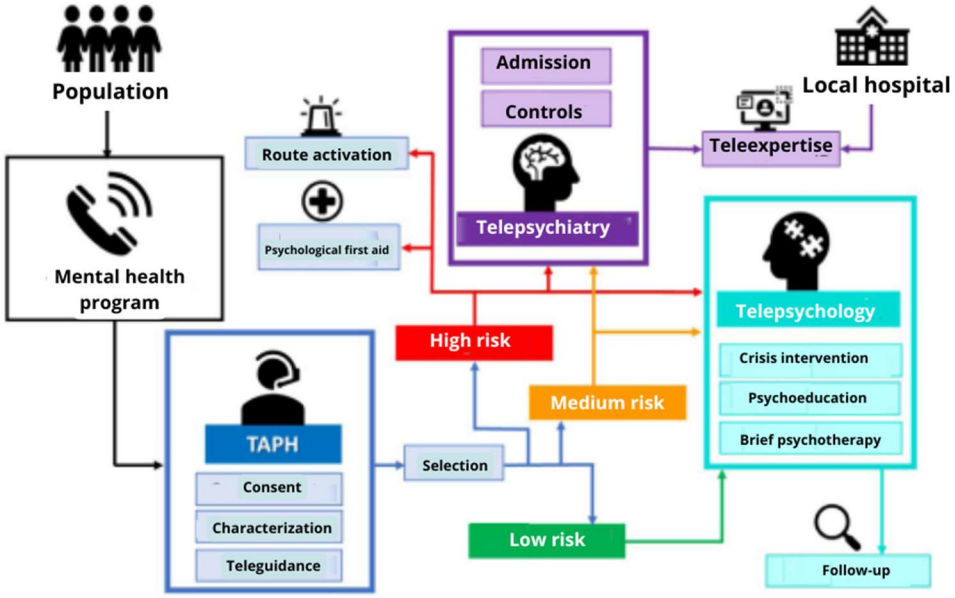
Mental telehealth

The telemental health program is configured as a strategy to provide, in a timely manner, primary psychological support through interventions such as crisis care, telephone counseling, and even referral to telepsychiatry when necessary.

Figure 1 shows the program's care pathway. It begins with a tele-guidance strategy, in which the patient communicates with a first responder who is a technical health professional. During this stage, basic contact information is collected and health triage is carried out, enabling the offer of self-care strategies.

Following the evaluation of the triage results, the case progresses to the telepsychology process, where psychological guidance and counseling is provided. During this phase, strategies such as active listening, crisis intervention, and psychological first aid are applied. The psychology professional also evaluates the patient's mental state to determine the need to activate complementary care pathways, referral to a health center, or request for telepsychiatry assessment using the interactive telemedicine modality.

Figure 1. Care Pathway Mental Telehealth Program (Zapata-Ospina et al., 2022)



Zapata-Ospina et al., 2022

Between March 28, 2020, and December 31, 2023, a total of 65,784 mental health tele-guidance sessions were recorded by LivingLab - Digital Hospital. In the field of telepsychology, care was provided to 11,610 patients, classified according to their risk level: 3,727 (32.1%) at high risk, 1,469 (12.7%) at medium risk, and 6,414 (55.2%) at low risk. Of the total number of patients treated through telepsychology, 11,005 (94.8%) received between 1 and 3 sessions, 465 (4%) between 4 and 6 sessions, and 140 (1.2%) had 7 or more sessions. The total number of care provided through telepsychology was 19,343.

In the area of psychiatry, 3,904 patients were treated and a total of 4,975 consultations were carried out using the telepsychiatry modality; of these, a total of 3,836 (98.3%) received between 1 and 3 sessions, 62 (1.7%) between 4 and 6 sessions and 6 (0.2%) received 7 or more sessions.

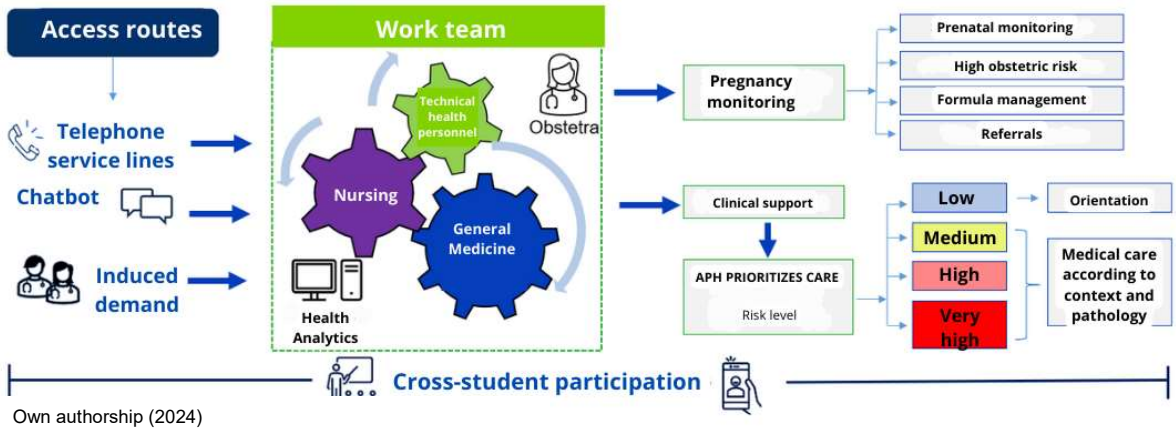
According to the study by Zapata et al. [16], not only has it been possible to serve a large number of patients, but a high level of satisfaction has been achieved; in asurvey of 234 patients, 76.7% of patients were very satisfied with the care received and 93.2% would recommend the program.

Maternal Perinatal Route mediated by telehealth

This strategy focused on health promotion, disease prevention, early diagnosis, and treatment to pregnant women throughout the country. Its goal is to provide comprehensive and timely care while optimizing the resources of the health system.

Figure 2 details the telehealth care route for pregnant women. The program begins with a tele-guidance strategy in health in which the pregnant woman, through different care channels such as a telephone line or Chatbot, has contact with a first responder, who can classify the risk, schedule and carry out clinical and administrative follow-ups, assess compliance with prenatal control activities, activate a face-to-face care route when required, offer self-care strategies and educate on the warning signs and symptoms during pregnancy.

Figure 2 Care route for pregnancy monitoring program through telehealth



Own authorship (2024)

The program involves monthly monitoring of pregnant women to identify factors that require immediate intervention. The number of follow-ups is established according to the risk classification and is carried out by tele-guidance, applying the following criteria:

- Low Risk: Up to the postpartum and newborn consultation.
- Moderate Risk: Up to the postpartum and newborn consultation.
- High Risk: Up to 42 days postpartum.
- Very High Risk: Up to 42 days postpartum.

During the tele-guidance sessions, the first responder could refer the case to general medicine. This professional, through telemedicine, assumes the responsibility of evaluating the patient's clinical status, providing therapeutic or follow-up recommendations, offering educational guidance, establishing a management plan, referring to the specialized telemedicine program, or activating the in-person care route for emergency or outpatient services.

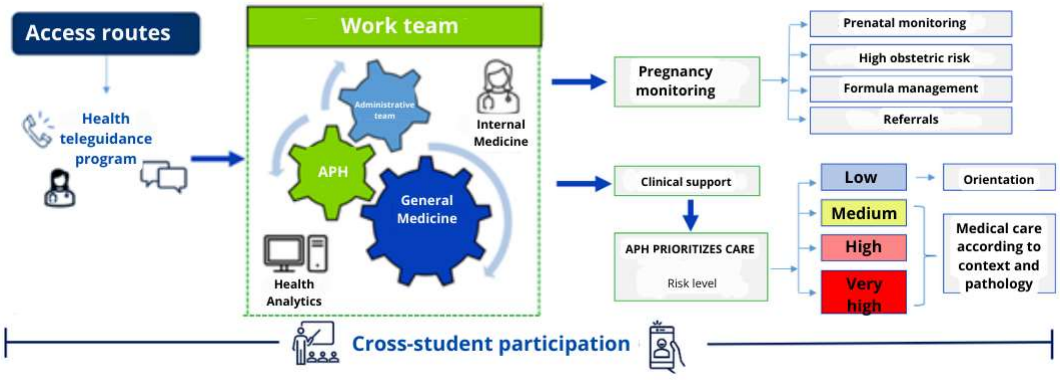
During 2023, the telehealth pregnancy monitoring program managed to effectively manage a total of 21,600 pregnant women, of which 82 were diagnosed with HIV, 717 with syphilis, 34 with diabetes mellitus, and 133 with high blood pressure. Additionally, it was observed that within this group of users, 517 have extreme maternal mortality alerts due to diagnoses such as Pregnancy-Associated Hypertensive Disorder (PAHD), preeclampsia, and postpartum obstetric hemorrhage, among others. This program has enabled continuous monitoring during pregnancy, providing support to high-risk pregnant women, offering education, and intervening immediately when necessary.

Management of patients with NCDs

Technologies for remote care and monitoring aim at monitoring users with chronic non-communicable diseases, ensuring comprehensive management with an individualized approach in four areas: clinical, functional, mental, and social.

Figure 3 shows the telehealth care route for monitoring patients with chronic non-communicable diseases. The program begins with a tele-guidance strategy in health, in which the patient or his/her caregiver establishes contact with a first responder. This professional can classify the risk, monitor the patient's health status, identify pending administrative matters (appointments, authorizations, medications, diagnostic aids, among others), define the frequency of follow-up, and refer the case to the medical team (if necessary) and to the psychosocial assessment team of the Digital Hospital.

Figure 3. Telehealth follow-up route for patients with NCDs



Own authorship (2024)

The follow-up includes a psychosocial assessment to identify cognitive, affective, and socio-familial alterations. These assessments are carried out by professionals who are experts in the clinical approach, and determine the protocol to be applied, depending on the patient's condition. A distinction is made between patients with neurocognitive disorders and those with chronic diseases not associated with dementia. The specific protocols are detailed in Table1.

Table 1. Protocols used for psychosocial assessmentl

Dimension to be assessed	Dimension to be assessed	Dimension to be assessed
Cognitive	T – MoCa: Montreal cognitive assessment (Version Telefónica)	T – MoCa: Montreal cognitive assessment (Version Telefónica)
Emocional y comportamental	FAST: Functional Assessment Staging Tool	DAS - 21
	NPI: Inventario neuropsiquiátrico	
Emotional and behavioral	FAST: Functional Assessment Staging Tool	DAS - 21
	NPI: Neuropsychiatric inventory	
Socio-family	Zarit	Zarit
	Apgar familiar	Apgar familiar

As of December 31, 2023, 14,948 patients and 288 caregivers had been impacted through the implemented strategy. Among these, there were 4,887 diagnosed with diabetes, 12,607 diagnosed with high blood pressure, 1,916 with Chronic Obstructive Pulmonary Disease (COPD), and 1,916 with chronic kidney disease.

Psychosocial assessment was applied to 496 patients using the TMOCA scale, revealing that 219 of them had possible cognitive impairment. Regarding the DASS21 scale, applied to 604 patients, it was identified that 38 experienced extremely severe depression, 49 extremely severe anxiety, and 11 extremely severe stress. Also, 59 caregivers experienced intense overload, while 40 experienced mild overload.

These patients were assessed by a multidisciplinary team consisting of a psychologist, neuropsychologist, social worker, general medicine, and supporting clinical specialties such as neurology and psychiatry.

These support strategies through Telehealth activities have proven to be efficient in reducing mortality and hospitalization, as demonstrated by the meta-analysis by Zhu et al. for patients with heart failure [17]. On the other hand, diabetes management supported by Telehealth activities has positively impacted its clinical outcomes when implemented in primary care programs [18].

CONCLUSIONS

Colombia is a country with difficulties in accessing health services due to its geographic, social, economic, and political particularities, which are not far from the reality of many Latin American countries. This is why Telehealth has been seen as one of the solutions to impact health inequalities, improving access, quality, and efficiency of the Colombian health system. An example is the LivingLab Telehealth - Digital Hospital, which with multiple programs has sought to improve people's health together with academia, the state, and health insurers. It is also important to highlight the importance of maintaining comprehensiveness and providing health care, guidance, and education at a distance. These programs are an example that technologies are a viable, feasible, and useful solution to improve health inequalities on the continent, and are reflected in this document seeking to be a reference for establishing new Telehealth programs or strengthening existing ones.

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