

The beginning of telemedicine in Guatemala : a background record

Rosa María Lucas

Ludwing Magdalena Barrios

Celeste Noemí Argueta

Francisco Gamaliel Hernández

Ruth Lizeth Larios

Sub-Director of the Nursing School UMG

teacher UMG

teacher UMG

teacher UMG

teacher UMG

INTRODUCTION

As a work team in Guatemala, with the experience we have in public health services and currently in the area of training, we believe it is necessary to implement a model of telehealth that is strengthened and has a presence in the most vulnerable areas of the country. However, at present, health indicators are not favorable, and inequality and poverty are increasing, which does not favor the development and welfare of the individual, family and community. To learn about the current situation of telemedicine and telehealth in Guatemala, determining the efforts, scope and limitations that have been presented, to implement a telehealth model that will contribute to universal health coverage and primary health care, given the current health indicators that show the prevailing need to strengthen health services, especially health coverage for the most vulnerable population that is economically, socially and geographically disadvantaged.

METHOD

The article shows the institutions that have begun to develop telemedicine in the country and then the methodology they have applied.

RESULTS

Background

In 2006, Eng. Fred Clark ¹, researcher of Guatemala's Superintendence of Telecommunications -, with the support of the National Fund for Science and Technology -FONACYT-, sponsored by the National Secretariat of Science and Technology -SENACYT- and the National Council for Science and Technology -CONCYT-, carried out a study to determine the "Penetration and adoption of the Internet and

the Information and Communication Technologies in the Republic of Guatemala", research that had as a fundamental objective to make known the real state of the ICT's situation in Guatemala where I determine: that there are 3 telephony providers, being Claro the one with the biggest coverage at national level. The Superintendence of Telecommunications of Guatemala -SIT-.

In the last report published in the second half of 2009 on the growth of fixed and mobile telephony in Guatemala, indicates that the number of fixed lines provided by the telephony service providers is 1,413,234 and in greater quantity the mobile telephony with a distribution of 17,307,459 lines and telephone numbers. This exceeds the existing population according to the national census conducted by INE 2019.²

Internet access: 32% of businesses have between two and three employees per computer, 32% have four employees per computer, 18% have five employees per computer and 18% have six or seven employees per computer [1]. According to the World Bank, the total number of computers in the country in 2005 was 19 per 1,000 inhabitants. The International Telecommunication Union reported that the number of computers was 2.08 per 100 inhabitants in 2005.

Current status of telemedicine in Guatemala

Telemedicine is relatively new worldwide and is only just beginning to be discussed in Guatemala. However, there is little history of pioneering organizations in the development and implementation of telemedicine systems, such as: Telehealth, Rafael Landívar University, Herrera Llerandi Hospital, Cyber-Sight program, private initiatives that promote tele-diagnosis, tele-education, second opinion, image delivery and tele-consultation. Social Security is promoting the digital clinical file, among other isolated initiatives. We will see the contribution of the institutions that at the moment have bet on telemedicine in Guatemala:

- **TulaHealth**

It's a Guatemalan, non-governmental, non-profit organization that, with the support of the Canadian Tula Foundation, supports the Ministry of Public Health and the School of Nursing in Cobán, Alta Verapaz, in improving medical services to the rural population under eHealth services. It collaborates in the areas of education, supporting the National School of Nursing in Cobán -ENEC-, preparing the future nurses that will attend the population; tele-education, through the implementation of distance education; tele-health, helping to improve the health of the inhabitants in the rural communities, using cell phones to communicate with the headquarters³.

In relation to the support given to the ENEC, it helps to: improve teaching, providing access to the Internet for the scientific updating of teachers and students; implementing distance education systems; and support in technological infrastructure for the support of educational services. In tele-education, the medical personnel that works in the different Health Centers, can access to virtual classes given in the ENEC, helping the formation of technicians and nursing assistants, with a cultural and gender equality approach.

In order to provide telehealth services, health volunteers living in the communities make consultations and inform Health Centre staff about emergencies, using their mobile phones as a means of communication, who in turn resolve doubts and make enquiries over the Internet. The benefits obtained consist of allowing primary health care to be brought to the communities, monitoring epidemics and educating the volunteers on health issues.

- **Rafael Landívar University**

Universidad Rafael Landívar is a higher education institution with a Catholic vocation and scientific-technological careers. With the support of the organization Medical Missions for Children -MMC-, which operates the Global Telemedicine and Education Network -GTTN-, it is in charge of implementing a Telemedicine project for the exchange of medical knowledge between the university at its headquarters and regional offices, hospitals, national and international health organizations and foreign universities.⁴

The project includes the use of video-conferencing and diagnostic systems for minors with serious illnesses. It uses as a communication platform the Advanced Network of Guatemala for Research and Education -RAGIE-, integrated by the universities Mariano Gálvez de Guatemala, San Carlos de Guatemala, Valle de Guatemala, Galileo, Francisco Marroquín and Rafael Landívar, by the Internet service provider Telgua, by research institutes and institutions dedicated to research and education, through the use of communication networks.

RAGIE is formed by a Telgua optical fiber ring of 1 Gbps speed, operating in IPV4 -Internet Protocol Version 4- and with dynamic communication routing. This platform is better known generally as Internet 2.

- **Herrera Llerandi Hospital**

Based in zone 10 in Guatemala City, the Herrera Llerandi private hospital signed an agreement to operate under a telemedicine system between the center and Miami Miller University in the United States. Through the implementation of virtual clinics, doctors and specialists exchange knowledge and opinions through videoconferences. Doctors and professionals at the Guatemalan hospital receive weekly training. In addition, patients access online consultations and perform surgeries supported by specialists.

Guerrero Milián ⁶ states that "in May 2009 the hospital began implementing the technological infrastructure necessary to have telediagnosis (e.g. remote diagnostics) and teleradiology services to transmit patient x-rays to specialists in order to obtain second opinions.

The hospital has contemplated making its telemedicine system available so that public hospitals of the Ministry of Health can consult about special cases".

- **Cyber-Sight in Guatemala**

Founded in 1982, ORBIS50 is an NGO whose function is to preserve and improve patients' vision. They support different countries through local collaborative programs to prevent blindness in patients of participating centers.

Guerrero Milián ⁶ says that "initially the organization equipped an airplane to turn it into a mobile hospital, with ophthalmic surgery equipment, operating rooms, recovery and treatment. They have made stops in more than 75 countries worldwide, including the Latin American region, including Guatemala. They have permanent offices in countries such as China or India, from which they coordinate programs for the participating countries, working on long-term projects. The hospital-based program consists of training and sharing experiences in hospitals affiliated with the program. The airplane and hospital programs have a duration of less than two weeks per country.

In Guatemala the participating centers were the Rodolfo Robles and Esperanza hospitals, both in 2003" (p.61)

ORBIS developed a platform accessed through the Internet called Cyber-Sight51, to make consultations and obtain advice on clinical cases, which would be answered by international expert medical consultants, from different specialties in ophthalmology. In 2003 Cyber-Sight was part of the ORBIS programs.

Among the services offered are: e-Resources (e.g. educational material, books, manuals, videos, clinical cases, questions and resolutions), e-Learning (e.g. books and clinical courses) and e-Consultations (e.g. sending, monitoring and resolution of clinical cases by expert personnel).

Two ORBIS telemedicine programs were established as a result of a recommendation made by Dr. Ximena Velasco in Quito, Ecuador. "Retinoblastoma is the third leading cancer in children, with a mortality rate close to 50%. Improving these statistics is another challenge for ORBIS telemedicine". To this end, an alliance was established with St. Jude Children's Research Hospital52 and the Hamilton Eye

Institute, with the objective of forming a cancer treatment center for children's eyes, a pilot project in Central America based in Guatemala. A RetCam54 (i.e. an ophthalmic imaging system for taking deep photographs of the eye) and special equipment was donated to the project.

The doctors were trained in the use of the equipment for diagnosis and treatment of retinoblastoma. The project had the collaboration of Dr. Margarita Bernoya, an ophthalmologist, and staff from the above-mentioned institutions. Through this pilot project and the e-Consultation program, the sight as well as the life of many children in Guatemala has been saved.

CONCLUSION

There are no standards bodies related to telehealth in the country. Besides that only 23% of the population has telehealth coverage, through NGO projects such as Tula Health, UNICAR, private universities and other private institutions.

The services provided by institutions that promote telehealth at the private and NGO levels are Teleconsultation, Epidemiological surveillance, and Telecapacitation; the following should be mentioned more specifically: Counseling in health and obstetric-portable ultrasonography, developed by Tula Health, Telecardiology Network, UNICAR, Teleconsultation Network, UNOP, Mobile health for mothers in Chimaltenango, Ophthalmology Network, Electrocardiogram.

The implementation process of telehealth in Guatemala is in an incipient phase and requires the elaboration of a national telehealth policy, promoted by the government, to be implemented in the entire health services network.