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DIAGNOSIS FOR THE IMPLEMENTATION OF A TELEMEDICINE PROGRAM IN RURAL AREAS OF TUNGURAHUA

DIAGNÓSTICO PARA LA IMPLEMENTACIÓN DE UN PROGRAMA DE TELEMEDICINE EN ZONAS RURALES DE TUNGURAHUA

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ABSTRACT

Currently, new technological concepts such as telemedicine have appeared which justifies a study aimed at solving many problems and whose importance lies in the exchange of information for the diagnosis, treatment, and prevention of diseases. The objective tends to carry out a diagnosis that allows the future implementation of the Telemedicine service in rural sectors of the Tungurahua Province. The approach is qualitative, with applied research with a descriptive scope based on surveys carried out on populations of inhabitants of the rural sector of Tungurahua and medical professionals. The results show the importance of having in the future the Telemedicine service that will improve the quality of the medicine service.

Keywords:

Diagnosis, implementation, program, telemedicine, rural.

RESUMEN

En la actualidad, han aparecido nuevos conceptos tecnológicos como el de la telemedicina, lo cual justifica un estudio tendiente a solucionar muchos problemas y cuya importancia radica en el intercambio de información para el diagnóstico, tratamiento y prevención de enfermedades. El objetivo tiende a realizar un diagnóstico que permita a futuro la implementación del servicio de Telemedicina en sectores rurales de la Provincia de Tungurahua. El enfoque es cualitativo, con una investigación aplicada con alcance descriptivo en base a encuestas practicadas a poblaciones de habitantes del sector rural de Tungurahua y profesionales de la Medicina. Los resultados muestran la importancia de que a futuro se cuente con el servicio de Telemedicina que mejorará la calidad en el servicio de medicina.

Palabras clave:

Diagnóstico, implementación, programa, telemedicina, rural.

INTRODUCTION

During the XIX century, the first intents were made to send radiographic images through the telegraphy. In our days, these ideas have consolidated and it is already possible to make medical consultations in real time by means of systems of cameras, microphones, etc., as well as to carry out operations by means of on-line robots, directed by an expert surgeon to more than 1 000 km of distance. It is of vital importance the knowledge on the part of the professionals of the health of this new tool, because only one will be able to this way to work with the purpose of to develop it and to discover new techniques and applications. For the potentialities that the Telemedicine boasts in the medical attendance, education from distance and scientific investigation, is necessary to deepen in its definition, action field, its importance and the necessity to develop new techniques for its employment in function of incorporating it to the medical attention.

The medical attention has gone evolving with lapsing of the years, passing of an attendance, focused in the illness, to an attention directed to the patient. At the present time, the technologies of the Information and the communications have combined to give the Telemedicine as a result, in order to offer medical attendance to who requires it in distant places; they are included inside this field: the education for health, public health, the development of programs of health and epidemic studies, among others.

Parrasi Castaño, et al (2016), referring to the present time of the telemedicine points out that this is a tool not used only in the developed countries, but also in those that are in the way of development like it is the case of our country, mainly for their versatility to be applied in areas far from urban centers and of difficult access, thanks to the technological advances that contribute to the accessibility of the technology and the information, allowing the improvement of the communications. However, although the telemedicine mainly offer services of health from distance, today, it is also used for the training and exchange of knowledge, so much of professionals of the health like of the same users.

It is important to stand out that the telemedicine has been used in different fields of application of health, still, the advance of the technology allows the state of the patients' health and to improve its quality of life on time thanks to the benefit of medical services specialized in regions of difficult access.

Olivetti, Villa & Macarone (2019), they point out that lived is satisfactory and very encouraging. The demand of consultations from distance is more and more frequent and although the sample is scarce it represents an alternative that arrives from a more effective way to the doctor

through the consultation and its consequent answer from distance, optimizing the diagnoses and the opportune derivations.

The Telemedicine, without an experience has necessarily been had it is constituted in a complete tool that strengthens the net and it can be perceived as a consolidated system that it contains to the medical team and it integrates the patient; being constituted in an innovative model that could be replied in some medical specialties.

The above-mentioned has agreement with a study carried out by Martínez, et al (2019), when after executing an Initial Collaborative Project with Honduras for the Center of Integral Attention 1 of epilepsy of the High-priority Program of Epilepsy in Mexico with a Focus in Telemedicine, settles down that this is an option for monitoring of patient with chronic illnesses as the epilepsy and for the personnel's of health training; being considered that this it benefits the patients because it saves them time, money, trips and visits to hospitals of third level.

It is certain the effectiveness that has the Telemedicine in the treatment of diverse pathologies; situation that puts of apparent Segrelles & Godoy (2019) who through their article Telemedicine and other innovative programs applied to the treatment of the smokers", they manifest that after the revision of the studies published until the moment, you can conclude that the Telemedicine shows promising results, like a support tool to the habitual practice, in the treatment of the smokers; pointing out that they continue points that require a study in more depth existing and that they give place to future possibilities and that we can summarize in the cultural change on the part of the patients and the sanitary professionals.

The reality of a well applied Telemedicine establishes a progress of the Medicine clearly through the application of innovative tools that would pass to be part of the habitual clinic modifying the doctor-patient relationship and the technological competitions that the sanitary professionals should assume.

Riveiro de Jesus, et al. (2020), in a categorical way and after making the study Telecare helps to control the signs and symptoms of heart descompensation, control of weight and the patient's selfcare", he remarks that the patient's cooperation with the IC during the pursuit on the part of the interdisciplinary team optimizes the results of the pharmacological and not pharmacological treatment and it contributes to the reduction of the rehospitalization rate, the number of days of hospitalization, the mortality and the cost.

Without place to doubt, the Telemedicine depends besides the net design that has settled down; since, the impact of the project undertaken by many countries in the world is measured through it, since it has been able to settle down that at the end many difficulties exist in what has to do with the technological operation.

It is as well as Rivera & Ramírez (2019), in a study carried out on Design of a net of Telemedicine, they conclude that the carried out study of the conditions of technological infrastructure of the centers of health of the communities, it took to the team that developed the project to the conclusion that the most economic and quick technology to incorporate it to the net of health is the one presented, in the radiofrequency technology; however the success of the implementation of the telemedicine in the rural areas, is intimately related with the selection of appropriate of the technology to use, considering the technological resources with those that it counts.

Another element that has to do with the success in the application of the Telemedicine consists on the use that is given to the installed platform; situation that is approached on the part of Enderica, Galindo & Gordón (2020), through the topic Importance of the use of the telemedicine platforms in the education medical professional"; showing that have become several studies inside which that of more importance for the telemedicine education is the one that was carried out with the purpose of presenting a sketch of telemedicine platform for services of non urban health in Ecuador and techniques applied doctors, students and professors in Ecuador.

In this part, it is necessary to consider that, for several years, the telemedicine has been implemented in the humanity, occupying it in consultations doctors as; in wars, by the NASA and in attention to rural sectors of the world being this one of the main objectives of their creation. The telemedicine has been a great help for the advance of the knowledge of undergraduate students, since it implements technology, communication and information facilitating their studies and interaction, guaranteeing that the doctors are informed and they can offer a medical attention of quality.

I consider, particularly, that what is sought to demonstrate through the writing of this article is to clarify that the telemedicine is an effective principle to improve the knowledge, since it opens a whole world for interaction in conferences, forums and chats and professional practice being able to interact with colleagues to offer a correct answer in the attention. Inside the studies that has been carried out in the Ecuador, the telemedicine has been qualified as a reliable help as support of its studies and to the moment

to give medical attendance and at world level, the telemedicine has already been implemented by the successful results that have been able to demonstrate.

The above-mentioned is ratified on the part of Velásquez, etal (2019), when they affirm in an investigation that had as topic The telemedicine in Quintana Roo: The first steps" that the technology increment directed to the sector health, facilitates that medical teams with generic interfaces can be incorporate to teams of communications. For the case of the telemedicine, this type of technologies, or team doctor, allows to extend the services of health with the purpose that the population of Quintana Roo can receive treatment and supervision on the part of a specialist.

At the moment, we know that the telemedicine project has been implemented between consultants and Interconsultants units and they have been carried out consultations with patient of SESA State Services of Health. What would be important is that in the third stage of the project it is had the consultation statistics with the purpose of knowing the level of impact of the SACMED in Quintana Roo.

Also, Camacho, etal (2019), after carrying out an investigation related with the connectivity Diagnosis and devices of telecommunications for the development of Telehealth of twenty hospitals in the Department of Tolima that has 47 municipalities, where the population's 32,51% resides in rural areas; it highlights the importance of the telemedicine where the use of the technology, infrastructure and specialized personnel, can help to offer an opportune service and of quality to the rural population.

The prototypes that settle down for the execution of any telemedicine project have at the end their importance; and for it makes an appointment to Cortez & Shade (2019) who in an investigation about the Evaluation of the design of a prototype of mobile station of telemedicine in Colombian rural areas", it points out that in the initial implementation of the station personnel's presence is required qualified to train the users; the above-mentioned due to the first floor escolarity levels presented in the rural areas, reason why it should be carried out a socialization and previous training to the local population in order to explain their operation and the important thing that this it can be for the health and people's well-being.

The carried out investigations show that, with the technological revolution, the interest for the telemedicine has charged a new impulse and has become a key element to make in front of the challenges that the socioeconomic changes outline to the sanitary systems of the XXI century. In spite of it, and of the resolved political impulse, the definitive normalization of the telemedicine presents

considerable difficulties, especially as for the obtaining of rigorous data about its clinical benefits and of cost effectiveness, problematic that generates a certain control in the taking of the sanitary agents' decisions. For the most part, the followed methodology for the obtaining of the evidence has been applied from the traditional models of evaluation of the medical interventions and its reference pattern, the clinical study, but this model finds problems difficult to solve when one tries to apply to telemedicine projects.

For it, the objective when carrying out studies of this nature is to offer to the future the telemedicine service in diverse complex hospital, clinical and centers of basic services in health, consolidating this way a better service, inside the parameters of the efficiency, effectiveness, the cost-benefit, equally in the medical personnel's growing satisfaction and the patients.

MATERIALS AND METHODS

The focus of the present investigation is quali-quantitative, that which is deduced fully starting from the information that we gather like part of the Questionnaire applied level of a group of inhabitants of the rural sector and professionals of the Medicine of the County of Tungurahua. According to the planning of the taking of data is a Prospective Investigation, since the data are picked up on purpose of the study by what they, possess control of the mensuration bias. On the other hand, the investigation type according to the objective or purpose is applied, since based on the carried out study strategies will be looked for to implement a Program of Telemedicine in the rural sector of the County of Tungurahua. Also, according to the number of occasions in that the study mensurations are made, it is a traverse investigation, because the mensurations are made a single occasion; and, lastly, according to the scope, the study is of descriptive type, since it is looked for to diagnose the state in which the Telemedicine is at level of the rural sector of the County of Tungurahua.

The population used in this investigation corresponds to inhabitants of the rural sector of the County and professionals of Medicine, of which have taken samples calculated, starting from the application of the formula and the data that are detailed next. The gathered information underwent a critical analysis to discard information of little relevance with the purpose of using only the specific and concrete data that help to determine the diagnosis for the implementation of a telemedicine program in rural areas of Tungurahua, in order to solve many patients' problems that suffer of certain pathologies that need an urgent attention.

The rural area of the County of Tungurahua constituted by 133187 people that in accordance with the last census is classified in 64825 men and 68362 women.

The type of sampling used is aleatory and the size was determined through the formula that is given to know next, keeping in mind the following data:

$$N = 133187$$

$$P = 0,487 \quad N = N \cdot Z^2 \cdot p \cdot q$$

$$q = 0,513 \quad d^2 \cdot (N-1) + Z^2 \cdot p \cdot q$$

Level of trust = 95%

$$Z = 1.96$$

$$\text{and} = 0,10$$

Of where $n = 96$

Population of Doctors in the County: 1174

It shows: Also the type of used sampling is aleatory and the size was determined through the formula that is given to know next and keeping in mind the following data:

$$N = 1174$$

$$P = 0.5 \quad N = N \cdot Z^2 \cdot p \cdot q$$

$$q = 0.5 \quad d^2 \cdot (N-1) + Z^2 \cdot p \cdot q$$

Level of trust = 95%

$$Z = 1.96$$

$$\text{and} = 0,10$$

Of where $n = 92$

RESULTS AND DISCUSSION

The community in the rural sector in 67% gives bill that knows the concept that one has of the telemedicine; that which, it is favorable in what has to do with the implementation of a Program of Telemedicine; since in same percentage it knows also, of the advantages that it would have the same one; also 100% affirms that the sector where inhabits doesn't have a Program as the one manifested; pointing out that one can see that in 60% of the population at rural level, the state of health is regulate-bad; to that which is added that 73% of relatives suffers of certain pathology; being necessary to add that 62% of the families requires of medical attendance that should be immediate to its approach to overcome its state and to improve its quality of life.

Also, you can verify starting from the obtained results that 68% of people that are part of this investigation has not received an immediate attention after going to a Center

of Health; situation that worries and is forced to look for mechanisms that allow that; on the other hand, the administration carried out by entities of the public sector or private to strengthen political public that they contribute in the topic telecommunications and especially it has been bad; since, 75% of people answers in that way, that which if it worries, since it comes off that there has not been a clear concern in the topic of health.

Finally, it can settle down that the degree of preparation of the rural community in what refers to technology is faulty, in accordance with the statement of 77% of those interviewed, to weigh that most is willing to get ready in the topic and to support the implementation of a Program of Telemedicine; situation that would be important, since to say of them a benefit it would be achieved in what has to do with learning and it would be possible to overcome medical emergencies that are presented daily especially.

The urgency as for the telemedicine application is also important, since in accordance with the approach of the interviewed professionals, the prevention and the attention of medical urgencies as (accidents, heart problems, etc.) they would be the most favored services; in smaller degree the videoconsultation and remote monitoring to chronic patient jointly with a medical software that allows to carry out medical attendance (triaje). When referring to the medical emergency for which is crossing the world they say in 63.8% that the students of medicine of the country, carry out through the call center 171 an activity that oscillates between excellent and good; with the result that it is comprehensible the problems that were presented to the beginning of the pandemic and that they denote that the country is not the sufficiently prepared, thing to face this type of emergencies; situation that forces to that Programs of Telemedicine that not only put on to the service of people during this type of epidemics settled down.

As for the sectors that should support the implementation of Programs of Telemedicine, people interviewed in 80,6% coincide in manifesting that the private sector jointly with the public sector, they should be who contribute with the implementation of telemedicine systems at level of the rural sector of the County of Tungurahua, so that Ecuador is developed in this topic and achieve an effective connectivity that supports to the health; since 66,7 apparent % that our development is low; on the other hand, it is indicated that the results registered by telemedicine projects implemented at world level oscillate most among medium and first floor; opinion that is confirmed by 75,2% of the sector of interviewed professionals.

The access that has Tungurahua apparently at level of telecommunications in opinion of the population's 36,1% is

low and it partly has not allowed to implement a Program of Telemedicine in spite of the existent bias at level of the community and of the estamentos of health that would be willing to support the Program that would have applicability to the attendance from distance, administration of patient, sanitary information and professional formation. As for the inconveniences in the execution of this program type is pointed out on the part of the professionals that this, it would reside for the most part in what has to do with justness as for the access to the technology, obtaining of the information of the patients of sources not very reliable and great volume of stored information.

Finally, it is important that 77,3% of the professionals of the health, would be willing to support a Program of Telemedicine, facing this way any inconvenience that could be presented in what has to do with their execution and application.

The carried out inquiries shows that the incidence of the actors of the civil society in the decisions of political public and in the formulation of concrete projects as that of telemedicine is possible and necessary. However, so much the outline of planning that the institutions of the sector of telecommunications and the initiative lack and preparation of the social organizations and ONGs promote to come closer to the processes of public planning with proposals and concrete positions, they have determined that until the present, it dates there are very low participation and incidence in the public planning of TIC and still in programs of Telemedicine.

It becomes necessary to promote the decentralization of the public administration of the sector of the telecommunications, or to promote intermediate situations as the co-planning and the co-execution of the public politicians of TIC between the central government's organisms and the sectional governments from a dynamics coordination and articulation among these institutions; and on the other hand, effective mechanisms of rendition of bills of the organisms that negotiate to settle down political public of telecommunications that include participation of the civil society.

On the other hand, it is indispensable, to recover for the State, the capacity to intervene directly in the sector of the telecommunications like lender of services, whenever it is strategic or socially necessary, mainly when it is to put to disposition of the impoverished sectors the potential advantages and benefits of the TIC.

It is also required that decisions are adopted so that the public and private institutions are interested much more in supporting the implementation of Programs of Telemedicine; taking into account that in any momento,

sanitary emergencies can be given as those that are crossing, where it would be of vital importance to have a medical system at distance that it would contribute somehow to the health of people.

In any event and in accordance with the carried out analysis can give ourselves bill that the Diagnosis carried out in Tungurahua at level of the application of Programs of Telemedicine is a so much negative and we would aspire that in a near future the Telemedicine reality is made especially in the rural sectors, being propitiated this way benefits in general terms by means of the application of the Telemedicine/Telehealth in the Population like they are: To the measure of the provided equipment, to obtain and to exchange information, data, images, audio and video, among the units of health (1st, 2nd and 3rd level) integrated to the net to carry out diagnosis actions, treatment, prevention and surveillance; this way, like for the administration of patient, benefit of the services and coordination-feedback among the central and local level.

Regrettably, this situation has not been completed; the perspectives of growth of this technological area of the medicine are limitless and they go of the hand with the development of the telecommunications and computer science. Although the possibilities at technology level are quite promissory. In countries like ours, the necessary resources for their application are relatively scarce apart from expensive and they have to compete with other urgent necessities of the services of health. To this, the fact is added that who live in places with smaller geographical access to an attention of health of quality, they usually belong to the sectors with smaller revenues and with smaller endowment of infrastructure of communications. However, we can affirm that to global scale a deeper impact exists in poor nations, since they harbor since to great quantity of marginal populations that would benefit with this service, they are not necessary of big resources to begin, the simplest structure to organize a tele clinic requires connection to a remote net from where it participates a patient that goes to consultation, a power station from where a doctor assists this patient and the will of doctors and nurses to serve. It is for sure we won't always have the most favorable conditions, many inconveniences that will be drawn will exist as: lack of knowledge in the use of new technologies, infrastructure lack, high costs in the services of communication, etc. But this it is the challenge, to achieve that the technology, in underemployed many cases, with which count many teaching centers, for example, takes advantage by means of agreements with very gifted public hospitals and specialist doctors to give service to people of limited resources, by means of the creation of small tele centers it consults that; as it was

mentioned previously, for their basic implementation, it is not required more than a videoconference team, desires to bring closer the shoulder and to offer to the biggest quantity in possible population, medical services of good quality in smaller time and at smaller cost.

CONCLUSIONS

The National Calendar of Connectivity in spite of having been declared as state politics and to be an instrument of public planning that has the objective of being constituted in the mark administration referencial through the one which, the state, articulating the initiatives of the multiple institutions promotes the Telecommunications, it has not been completed in an appropriate way; it is necessary to point out that the organism that coordinates it, this is the Commission of Connectivity it lacks, from our perspective of the competitions, resources and attributions that require to complete the command of coordination of the execution, pursuit and bring up to date of the programs and projects settled down in the National Calendar of Connectivity.

The implementation of a Program of Telemedicine is possible of agreement with the diagnosis for Tungurahua, of conformity with the requirement that shows the rural community of the County and the support desire on the part of the professionals of the Medicine.

They are the private institutions who jointly with the public ones, they should support a Program of Telemedicine in the County of Tungurahua. The health cannot wait and in times of pandemic by coronavirus gets complicated to attend, physically, to a medical appointment. Through the telemedicine (attention from distance) the patients can consent or to continue with their treatments in a virtual way, using all the available communication technologies, like it defined the World Organization of the Health, in 1988.

An inconvenience that could be overcome with will would be the justness as for the access to the technology, obtaining of the information of the patients of sources not very reliable and great volume of stored information; in such a virtue it will be all the necessary measures are adopted so that the program registers a level of appropriate success.

Personally; I conclude that, the implementation of the telemedicine in rural sectors of Tungurahua, will solve most of the light or simple cases that exists, a part of course where the patient's presence will be needed. The Telemedicine will constitute a real complement to the traditional medicine. The limitation will always be the part of the physical exam and more tests that are practiced.

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