English

Teleconsulting's efficiency; monitoring of patients after receiving teleconsulting in programs in public hospitals: Chihuahua Mexico

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Abstract

This article shows the results of an analysis carried out in 1257 teleconsultations of patients that received medical attention inside the Chihuahua's Health Secretary Telemedicine program in 2017. The objective is to determine the percentage of patients that received one of the telemedicine's benefits; to avoid transfers, it was determined the percentage of patients that could carry out the treatment in the remote unit without needing transportation to any of the three specialty hospitals inside the network, located in Ciudad Juaréz and in the city of Chihuahua, Mexico. In addition to monitor the attention process immediately after the teleconsultations, the amount of time taken to receive the specialty consultation was counted. This grants us a concrete approach of benefited patients in the telemedicine programs and gives rise to determine attention standards.

Keywords: *Telemedicine; Telehealth; Standards; Teleconsultation; Evaluation.*

Resumen

Eficacia de la teleconsulta; seguimiento de pacientes después de recibir teleconsulta en programa en hospitales públicos: Chihuahua México.

Este artículo muestra los resultados de un análisis realizado en 1251 teleconsultas de pacientes que recibieron atención médica dentro del programa de telemedicina de la Secretaría de Salud de Chihuahua en México en 2017. El objetivo es determinar el porcentaje de pacientes que recibió uno de los beneficios de la telemedicina; evitar los traslados, por lo se determinó el porcentaje de pacientes que pudo llevar el tratamiento en la unidad remota sin necesidad de trasladarse a cualquiera de los tres hospitales de especialidad dentro de la red ubicados en Ciudad Juárez y en la ciudad de Chihuahua, México. Además de dar seguimiento al proceso de atención inmediatamente después de la teleconsulta, se contabilizó el tiempo para recibir la consulta de especialidad. Los resultados muestran que 62 de 97 pacientes reciben todo el tratamiento en su unidad de atención sin necesidad de trasladarse, y que reducen de 11.5 semanas a 1 semana en promedio para recibir consulta de especialidad. Esto nos otorga una aproximación concreta de pacientes beneficiados en los programas de telemedicina y da pie para determinar estándares de atención.

Palabras-clave: *Telemedicina; Telesalud; Estandares; Teleconsulta; Evaluación*.

Resumo

Eficácia das teleconsultorias; acompanhamento de pacientes após realização de teleconsultorias nos hospitais públicos: Chihuahua México.

Este artigo mostra os resultados de uma análise realizada em 1251 teleconsultas de pacientes que receberam atendimento médico dentro do programa de telemedicina da Secretaria de Saúde de Chihuahua, no México, em 2017. O objetivo é determinar a porcentagem de pacientes que receberam um dos benefícios de a telemedicina; evitar transferências de pacientes. A porcentagem de pacientes que poderiam fazer o tratamento na unidade remota foi determinada, sem ter que viajar para nenhum dos três hospitais especializados dentro da rede, localizados em Ciudad Juárez e na cidade de Chihuahua, México. Além de monitorar os cuidados processo imediatamente após a teleconsulta, o tempo para receber a consulta de especialidade foi contado. Os resultados mostram que 62 dos 97 pacientes recebem todo o tratamento em sua unidade de cuidado sem precisar se deslocar, e que reduzem de 11,5 semanas para uma semana em média para receber consulta especializada. Isso nos dá uma aproximação concreta de pacientes beneficiados em programas de telemedicina e dá origem a determinar padrões de atendimento.

Palavras-chave: *Telemedicina; Telessaúde; Padrões; Teleconsultorias; Avaliação.*

Background

The Health Secretary of the Chihuahua State[a] (SSCh), implemented in 2012 a telemedicine program that included the communication via videoconference between 8 medical units: 4 General Hospitals, three amplified health centers and the Women's Hospital of the Ciudad Juaréz[1], with the main goal to grant remote consultation and sessions of teleeducation in health, since then the program has strengthened in equipment, processes and human resources. In reality, it counts with 47 units equipped for Telehealth, from which 28 are actually used for telemedicine, 19 for telemanagement and teleducation. Of these 28 medical units 18 are actively working inside the network, treating an average of 130 patients a month especially from the General Hospital, Chihuahua's Women's Hospital and the Children's Hospital of Juaréz City.

[a]The state of Chihuahua is located in the north of the Mexican Republic and adjoins the States of New Mexico and Texas of the United States of America; And with the states of Coahuila of Zaragoza, Durango, Sinaloa and Sonora in Mexico. In 2018 the state population is 3 ´ 816,865 inhabitants approximately, according to figures of the National Population Council. The territorial extension of the state is 247.487 km2, representing 12.62% of the national territory; with a population density of 15.4 inhabitants/km^2.

For the integration and strengthening of this telemedicine network the programs adheres to the lines of action of the Programa Sectorial de Salud (Health Sector Programme)[2] 2013-2018 especially the numbers 2.3.7 and 4.3.3 that aim to incorporate telemedicine networks for the support in marginal areas and vulnerable groups. In addition, the Federal Health Secretary through the implementation of the Specific Action Evaluation Program and management of technologies[3] with the goal to ease the effective access of the population to the medical attention specialty.

Chihuahua's Health Services treats the population without rightbeing in the state, which for the year 2018 is estimated as 1'539,379, according to the data of the Department of Health Statistics, with projections of the National Population Council (CONAPO).

Among the main causes of morbidity in the state in 2017, there are acute respiratory infections, representing 52% of the diagnosis, followed by the intestinal infections caused by other organisms and the poorly defined ones, urinary tract infections, gingivitis and periodontal diseases and in fifth place the ulcers, gastritis and duodenitis with 3% of the total (Health Information System 2017).

Since the installation of the telemedicine program in medical units of primary care level, community hospitals and hospitals in mainly rural populations have developed remote consultations since Chihuahua's General Hospital and the Women's Hospital, though the existence of teleconsultations doesn't necessarily mean that the population increases its access to a second level of attention, therefore it is necessary to carry out an evaluation to determine if the consultations granted through the modality of telemedicine by specialists are effective and represent a real benefit for the population in the remote locations.

The methods to evaluate the telemedicine programs have found in general many barriers[4], in the planning and feasibility stage as well as in the operation's evaluation[5], the difficulty to apply these models consists in counting with a limited number of the specimen, and the complexity to isolate the intervention of the telemedicine in the development of the disease. The "Model Assessment of Telemedicine" (MAST)[6] is an evaluation model developed in the European community that presents many dimensions of measurement for the telemedicine projects and was developed to provide a framework structured to evaluate the effectiveness and contribution of telemedicine's applications and the quality of medical care, an aspect most relevant of this methodology is that it involves multidisciplinary processes and an analysis of medical, social and economic information as well as information about ethical aspects related to the project that is being analyzed.

In this same context the Pan American Health Organization in 2015 published the analysis and results of a community of practice in telemedicine where the theme of the definition of indicators to telemedicine projects were addressed[7]. This document recommends measuring the possible alteration of flows and processes that could have telemedicine in the delivery of health services, and moreover that the evaluation should consider the equality of conditions before another alternative in presence-based modality.

In order to contribute to the objectives and goals of the

program, specific in evaluation and management of technologies in health and based in the recommendations mostly from these publications that developed a series of surveys and diverse instruments to obtain a monitoring of indicators and evaluations of telemedicine projects in Mexico.

Introduction

To identify the impact of the incorporation of teleconsulting in the process of medical attention before an evaluation of the care previous to the teleconsulting in a telemedicine program in Mexico, using the review of a controlled group of patients treated by the telemedicine services of Chihuahua's Health Secretary.

Method

With the objective to carry out this study, a review of the literature was conducted to identify which could be the indicators that might have provided more information about the improvement of the process of medical attention granted by a telemedicine service in the Mexican Republic. In this way a fundamental part is to identify the impact that the incorporation of the teleconsulting services in the SSCh has had.

Considering the proposition developed by Agboolla S. et all[8] and as shown in figure 1, the SSCh's telemedicine program is considered with a certain degree of maturity, where the planning stage of the project was evaluated in the beginning by planning instruments such as the Methodological Guide for Evaluation of telemedicine projects, that uses the CENETEC as a planning instrument[9], subsequently during the implementation stage fulfilled what was committed according to the delivery and reception formats of the commissioning and operation of the project, most of all in the medical units that are the realm for this evaluation, therefore the main element in the moment of the evaluation is to identify the assessment of the impact and benefits of the attention by teleconsulting in the process of patient care.

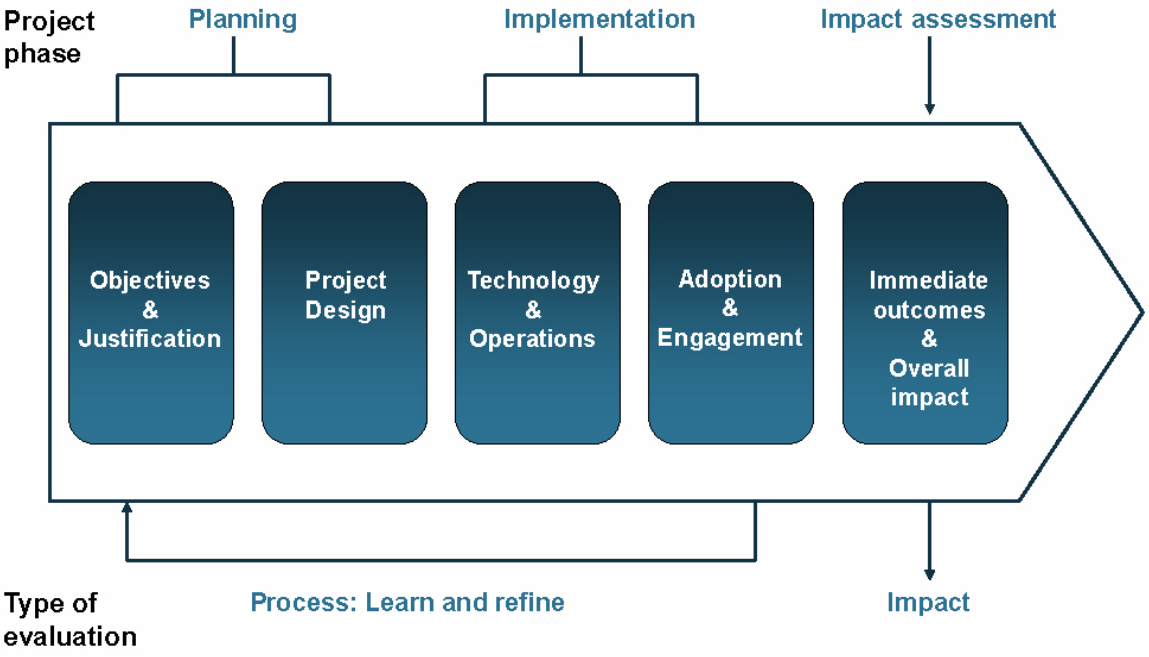


Figure 1. Stages of the project and types of evaluation. Source: Agboola S, Hale TM, Masters C, Kvedar J, Jethwani K. "Real-World" Practical Evaluation Strategies: A Review of Telehealth Evaluation JMIR Res Protoc 2014;3(4):e75

With the objective to count with information that will support us in the evaluation of the impact, objectives were identified and redesigned and allowed us to establish in a direct way the indicators and variables that were going to be measured. Therefore, based in the development of objectives of the SMARTER model[10] we tried to meet the following criteria:

- Specific. It was sought to obtain specific results of the impact of the telemedicine program in the usual model of patient management. To evaluate the possible benefits of the healthcare offered with telemedicine.
- Measurable. It was explored in what way it was possible to obtain quantifiable results, in order to carry out clear measurements.
- Achievable. It was sought to carry out a research and the results of it were achievable and easily duplicated for subsequent follow-up assessments.
- Relevant. The results of this research were focused in the aspect of the direct benefits to the patient's care.
- Time bound. A sample taking of a window of time was carried out, from the automation of the data of a digital platform to the beginning of this research.
- Evaluated. The progress of the telemedicine project's executions has been evaluated in the different stages of development. Being this research an evaluation that allows to identify the real impact for the benefit of the patient.
- Rewarding. Finally, the quantitative evidences of the benefits that have represented the telemedicine program before the usual management of the patient were sought.

To define the follow-up realm the following criteria of inclusion for the participation of the medical units were considered:

- Units with at least 6 months of implementation of the telemedicine project.
- Units with a stable internet service.
- Medical units that don't have connective failures in the last months.

Regarding the patients the following clinical cases were included:

- Patients that received an appointment by general medicine and that require to be referred to a second level of attention, being referred by telemedicine.
- Patients that were teleconsulted.

The patients with the following characteristics were excluded from this investigation:

- Patients that were booked to receive a teleconsultation but didn't show up.
- Patients that were booked to receive a teleconsultation but were submitted to second level due to presenting some medical emergency.

Data management

It was started the data collection of each teleconsultation from May 11th, 2016 to October 31st, 2017 and that are made in 4 units regarding with 11 consultant medical units of the telemedicine network from the Chihuahua State. The registration was carried out in a web platform created by the SSCh personnel with the goal to have a better coordination of the teleconsultation agenda. Capturing the following categories:

1. Date and time of the teleconsultation request.
2. Performance date of the teleconsultation.
3. Consultant unit or unit that requested the teleconsultation.
4. Consultant doctor.
5. Age and gender of the patient.
6. Initial diagnosis.
7. Final diagnosis.
8. Background.
9. Current condition.
10. Prior treatment.
11. Indicated treatment.
12. Referring physician.
13. Specialty.
14. Result of the attention.
    a. The patient attended in the primary care unit.
    b. The patient was referred to a second level unit.
    c. The patient was referred to emergencies.

The aggregate and exclusive categories for the present analysis are the same of the number 14.

For the development of the analysis the following formulas for the calculation of indicators were applied:

- Deferral of teleconsulting = Performance date of the teleconsulting – Date of application of the teleconsultation (measured in days)
- Efficient attention = Total of teleconsultations – Teleconsultations that continued the management in consultant unit. (whole number of teleconsultations)
- Reference to external consultation of referring unit = Total of teleconsultations = Total of teleconsultations referred to external consultation of the concerned unit. (whole number of teleconsultations)
- Reference of emergency = Total of teleconsultations – Total of teleconsultations referred to emergencies in the concerned unit. (whole number of teleconsul-

tations) where:

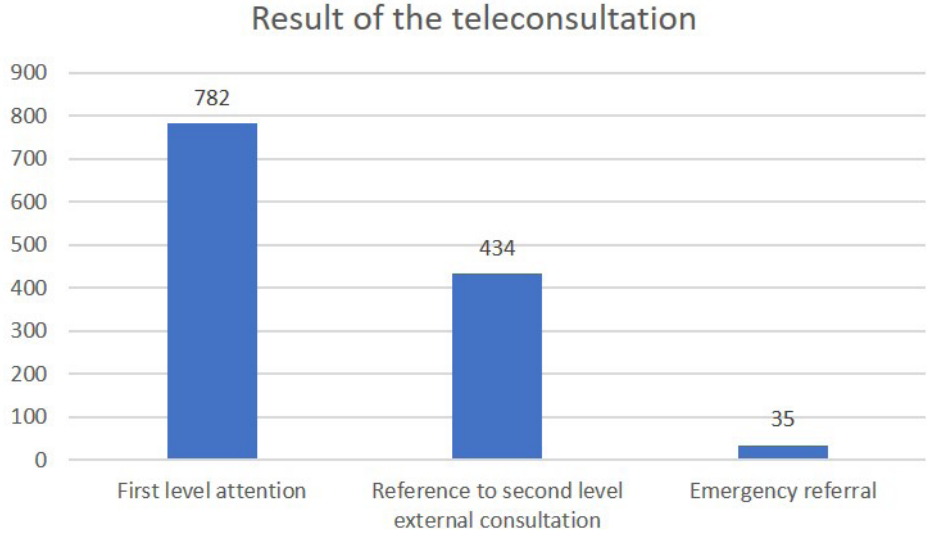
- Remote consultation or teleconsultation consists in a specialty consultation from Chihuahua's General Hospital or the Women's Hospital in a telemedicine system shaped by a team of videoconference and software to send clinical information. The patient is at one of the hospitals and health centers located many kilometers away from the hospital where the specialist is at. It is worth mentioning that the patient is followed by a general doctor or an inter of social services, that is always following the remote consultation.
- Performance date of the teleconsultation is considered in the moment in which the patient receives the attention via videoconference by the telemedicine system.
- Date of application is understood as the moment in which the patient is informed that he or she will be addressed by a specialist without need to travel to the Chihuahua city.
- Total of teleconsultations is the sum of the consultations carried out in the period understood between May 11th, 2016 to October 31st, 2017 and meet the inclusion criteria pointed previously.
- The teleconsultations that continued the management in the consultant unit are the ones where the patient after receiving the teleconsultation took the treatment and the management in the same remote unit, without the need to travel. It was considered the patients that count with a bigger benefit of the program given that all his or her treatment was in a rural unit.
- Teleconsultations referred to external consultation of the concerned unit are the ones where it was determined that the patient had to travel to the nit where the specialist was or the unit of biggest resolution by studies of additional diagnosis.
- Total of teleconsultations referred to emergencies in the regarding unit are the consultations where the patients in an immediate way given his or her health condition was transported to emergencies in the regarding unit, and if the transportation can't be avoided, it is found a benefit given that in a timely manner the one that attends to the patient is the person that in addition benefits from the coordination of services among the different level of attention.

Results

The information was analyzed taking a sample of 1251 teleconsultations, being the source of information the telemedicine control panel of Chihuahua's Health Secretary.

Percentage of teleconsultations that issue references to second level: of the 1251 teleconsultations, 434 issue references to second level of attention, of which the 35% was sent to the service of external consultation, avoiding with this the reference and the transportation of the patient to second level of attention (Graphic 1).

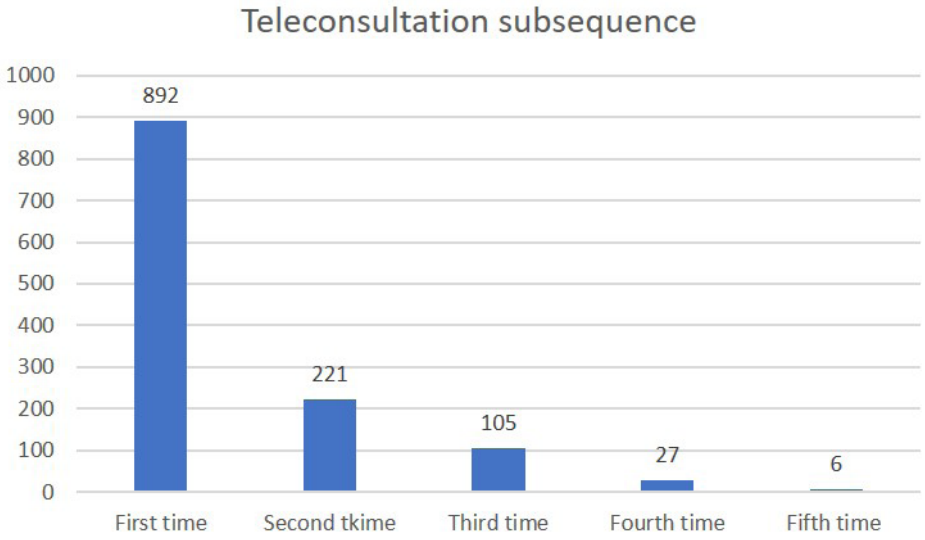
Graphic 1. Result of the teleconsultation.



Source: Control Board of Telemedicine SSCh 2016-2017, own creation.

In relation to the teleconsultations of first time and subsequent, in the sample the teleconsultations of basic specialties showed that the percentage of the patients consulted of first time was 71% and subsequent 29% (Graphic 2).

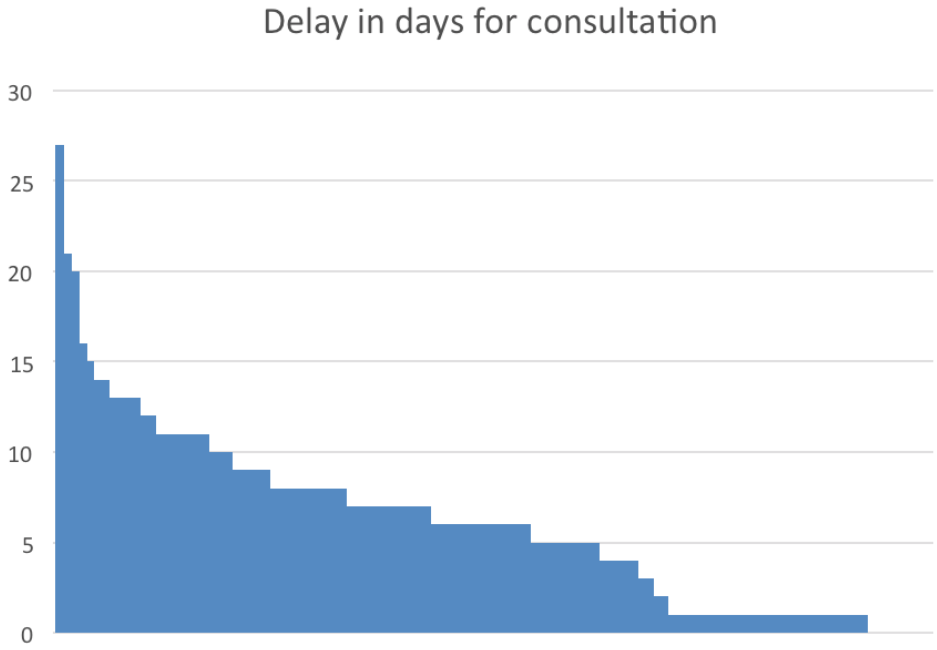
Graphic 2. Substring of teleconsultations.



Source: Telemedicine Control Panel SSCh 2016-2017, own creation.

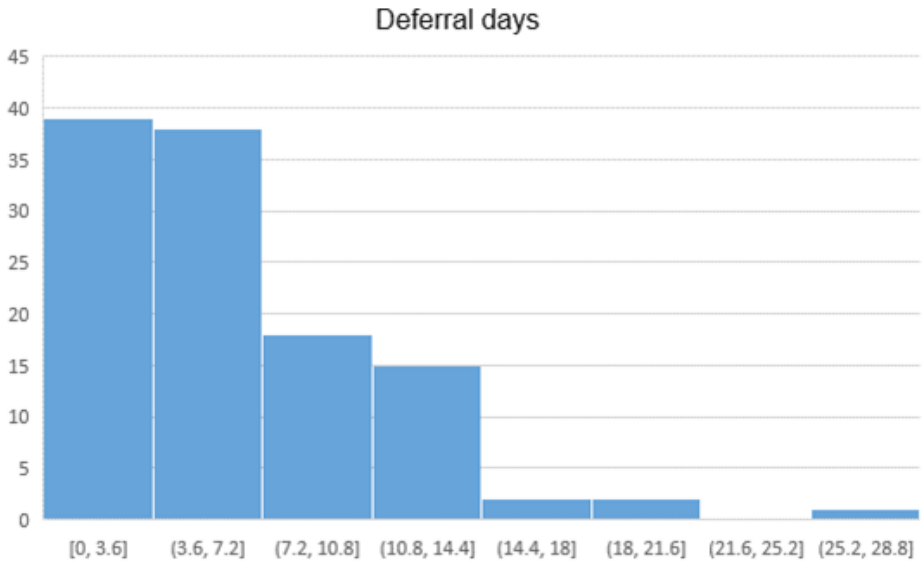
While analyzing 166 teleconsultations from September 19th to October 17th, 2017 it was possible to obtain the average deferral days of the teleconsultation which is of 6.001 and the median 13.5 days. Graphic 3 and 4.

Graphic 3. Substring of teleconsultations.



Source: Telemedicine Control Panel SSCh 2016-2017, own creation.

Graphic 4. Histogram of deferral days.



Source: Control Board of Telemedicine SSCh 2016-2017, own creation.

Discussion

As it was commented in the beginning of this document and according to MAST there are many dimensions that can be valued and evaluated in the telemedicine programs, therefore for the present review it is analyzed the impact only about the procedure that the patient undertook before the incorporation of the telemedicine program, it is considered a totally controlled representative sample of the posterior process of the patient's attention. In many publications it has been commented that one of the biggest benefits of telemedicine is to avoid the unnecessary transportations. The document shows and establishes the percentage of the patients that avoid the transportation, considering it one of the biggest benefits of the modality. Of the total of teleconsultations among the studies a 3% of them necessarily merit a transportation, since the patient's condition indicated second level of emergency attention. Consequently, it cannot be considered that these patients could avoid such transportation. The remaining sample (97%) is the realm of the patients susceptible to avoid a transportation as for that 62 of the 97 people attended by telemedicine is the direct benefit of the implementation of the program. We can intuit a bigger number of benefits considering, not only a reduction of costs in the attention to avoid the transportation, moreover in an indirect manner a shorter waiting time and a better continuity of the attention to name a few. This evaluation is centered in finding the reason of patients benefited in a direct manner.

A subsequently analysis can find the reasons and motives for the transportation of a patient even when the specialist is treating him by telemedicine, whom can be diverse such as the lack of consumables, team, infrastructure, even if the modality finds obstacles for the diagnosis and treatment of the patient. Following this path, we could identify which are the specialties that count with a bigger number of transportations and which can be more decisive through this modality.

The waiting times to be treated in a specialty consultation vary according to the specialty, however, taking an average between 11 and 12 weeks according a study from the National Doctor's Public Health Institution in 2011[11] the average of the study of 6 days is an indicator that shows a direct benefit to the patient and the opportunity in the attention of its affliction.

Conclusions

In the present study it can be identified a noticeable reduction of the transportations that the patients who receive the benefit of the care through telemedicine conduct, the 62% of the total of patients in the sample received attention in the same medical unit, without the need to transportation in addition that the time to receive specialty consultation reduces 11.5 week on average to 1 week. The process of medical attention receives in a direct manner an improvement with the application of the teleconsultation model.

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