

ANALYSIS OF CLINICAL INDICATORS OF TELEDENTISTRY MANAGEMENT FOR THE ELDERLY POPULATION DURING THE COVID-19 PANDEMIC IN CHILE.

Análisis de indicadores clínicos del manejo de la teleodontología para la población adulta mayor durante la pandemia del COVID-19 en Chile.

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ABSTRACT:

Objective: To analyze clinical indicators of teledentistry management for the elderly population during the COVID-19 pandemic in Chile. **Material and Methods:** A pilot teledentistry project was developed for dental care of the elderly in 5 regions of Chile. The data obtained were recorded on the TEGO Platform to be subsequently selected and analyzed by the researchers in terms of clinical management indicators: degree of installed occupancy, degree of available occupation, degree of real occupation, interconsultation indicator per patient attended, urgencies according to reason for consultations, unpostponable prosthetic treatment according to reason for consultations, prevention in relation to granted benefits, prevention in relation to the patients cared for, and project absenteeism indicator. **Results:** The clinical management indicators obtained were as follows: The average degree of installed occupancy was 67%. The average degree of available occupancy was 78%, which accounts for the clinical time in which there are dental chairs and dentists willing to work. The average real occupancy degree was 86%. The average interconsultation indicator per patient observed was 25%. The indicator of urgencies according to the reason for the consultation was 95%, which indicates that the purpose of the study was fulfilled. The average unpostponable prosthetic treatment according to the reason for consultations was 5%. The prevention in relation to granted benefits reached 39%. Finally, the average indicator of absenteeism was 17%. **Conclusion:** The measurement of clinical management indicators contributes to meet the Chilean Ministry of Health Explicit Health Guarantees (GES), which are: Access, Timely Attention, Quality and Financial Protection.

KEYWORDS:

COVID-19; dental care; teledentistry; elderly; pandemics; clinical management.

RESUMEN:

Objetivo: Analizar indicadores clínicos del manejo de la teleodontología para la población de adultos mayores durante la pandemia de COVID-19 en Chile. **Material y Métodos:** Se desarrolló un proyecto piloto de teleodontología para la atención odontológica del adulto mayor en cinco regiones de Chile. Los datos obtenidos fueron registrados en la plataforma TEGO para ser posteriormente seleccionados y analizados por los investigadores en cuanto a indicadores de gestión clínica: grado de ocupación instalada, grado de ocupación disponible, grado de ocupación real, indicador de interconsulta por paciente atendido, urgencias según motivo por consultas, tratamiento protésico improrrogable según motivo de consultas, prevención en relación a las prestaciones otorgadas, prevención en relación a los pacientes atendidos e indicador de ausentismo del proyecto. **Resultados:** Los indicadores de gestión clínica obtenidos fueron los siguientes: El grado medio de ocupación instalada

fue del 67%. El grado medio de ocupación disponible fue del 78%, lo que da cuenta del tiempo clínico en el que hay sillones dentales y odontólogos dispuestos a trabajar. El grado de ocupación real promedio fue del 86%. El indicador medio de interconsultas por paciente observado fue del 25%. El indicador de urgencias según el motivo de la consulta fue del 95%, lo que indica que se cumplió con el propósito del estudio. El promedio de tratamientos protésicos imposterables según el motivo de consulta fue del 5%. La prevención en relación a las prestaciones otorgadas alcanzó el 39%. Finalmente, el indicador promedio de ausentismo fue de 17%. **Conclusión:** La medición de indicadores de gestión clínica contribuye a cumplir con las Garantías Explícitas en Salud (GES) del Ministerio de Salud de Chile, que son: Acceso, Oportunidad, Calidad y Protección Financiera.

PALABRAS CLAVE:

COVID-19; atención odontológica; teleodontología; ancianos; pandemias; manejo clínico.

INTRODUCTION.

In March 2020, a state of health emergency was decreed due to the COVID-19 pandemic in Chile. This situation accelerated the digitization of various processes including health care, which has increased telemedicine consultations. According to the Chilean Superintendency of Health, in March 2020, 1.883 remote care services were carried out and in October 2020 they increased to 30.418.¹

The elderly population has been the most affected during the pandemic, from 32.489 deaths related to COVID-19 in Chile until June 29th, 2021, 26.659 were adults over 60 years (82%).² Teledentistry is not a new concept. One of the earliest teledentistry projects was started by the US military in 1994 to serve US troops all around the world.³

Over the years teledentistry has proven to be beneficial for remote dental screening, and it is found to be comparable to real-time consultations in areas with limited access to facilities, and in long-term healthcare

facilities.⁴ To provide dental coverage and treatment for the elderly, a teledentistry platform was created to support the intervention of a general dentist located in a mobile dental unit, who performed urgent care and priority treatments, assisted remotely by a staff of specialists.

To analyze the data, a study of clinical management indicators was carried out. This concept is defined as the quantitative expression of the behavior and performance of a process, whose magnitude, when compared with some reference level, may be indicating a deviation over which corrective or preventive actions are taken, which is the basis for developing improvement plans.⁵

Data obtained were recorded, selected and analyzed by the researchers. The objectives of the study were to reduce waiting times for referrals and counter referrals, limit patient travel, reduce the number of appointments to obtain a diagnosis, prognosis and treatment plan, among others.^{4,6}

MATERIALS AND METHODS.

Based on teledentistry, a pilot project was developed for the dental care of the elderly, in 5 regions of the country. The enrollment of 135 people older than 60 years of age (48 male, 87 female, Mean age: 72), who signed an informed consent to participate in this pilot study.

Urgency and priority dental care attentions were carried out between 1 February and 30 May, 2021.

To develop the project, a teledentistry platform was created by a team of researchers, computer engineers and health professionals, to record data necessary for dental care, to communicate via internet with patients and to be in connection with a multidisciplinary team of support specialists.

The platform was used by a general dentist, located in a mobile dental unit, who performed urgent care and priority treatments, assisted synchronously or asynchronously (remotely) by a multidisciplinary team of specialists, to resolve queries and provide care for the patients.

The mobile dental unit was implemented with state-of-the-art digital equipment, specially conditioned according to the current sanitary regulations for dental care during the COVID-19 pandemic issued by the Chilean Ministry of Health.⁷

The data obtained from patient care were recorded on the TEGO Platform, to be subsequently selected and analyzed by the researchers in terms of clinical management indicators: degree of installed occupancy, degree of available occupation, degree of real occupation, interconsultation indicator per patient attended, urgencies according to reason for consultations, unpostponable prosthetic treatment according to reason for consultations, prevention in relation to granted benefits, prevention in relation to the patients cared for, and project absenteeism indicator.

RESULTS.

The clinical management indicators obtained were as follows (Table 1).

The average degree of installed occupancy was 67%. This result shows that there was capacity for more work days. However, given the specificity of the target population considered for the study, no more

clinical time was necessary. The highest value was recorded in the Región Metropolitana, specifically the district of Maipú (75%).

The average degree of available occupancy was 78%, which accounts for the clinical time in which there are dental chairs and dentists willing to work, *i.e.* clinical working days available. In this case the occupancy is within the acceptable margin to provide care with quality and safety standards, allowing time for cleaning, disinfection and aeration, following sanitary recommendations issued by the Ministry of Health.

The average real occupancy degree was 86%. This value refers to the real time of use of the dental chair. This result indicates that the days arranged for the project have been well calculated for the proposed clinical work, and the adequate use of the installed capacity was optimal, the most adjusted time to the highest number of treated patients was recorded in the district of Maipú (99%).

In contrast, the lowest adjusted time was observed in the city of Antofagasta (56%). The average interconsultation indicator per patient observed was 25%. This is a relevant result since, with measurement of parameters and use of a platform to activate synchronous or asynchronous interconsultation, the general dentist relied on specialists from the network to perform the treatment for 1 out of 4 patients.

The highest value was recorded in the city of Temuco, in the Región de la Araucanía (36%).

The indicator of urgencies according to the reason for the consultation was 95%, which indicates that the purpose of the study was fulfilled, achieving a high percentage of resolved urgencies, fully justifying the model of teledentistry in mobile dental units supported by a technological platform.

The average unpostponable prosthetic treatment according to the reason for consultations was 5%. This low value indicates that patients did not attend for priority treatments, such as the repair of fractured or misadjusted removable dental prosthetics, which can cause difficulties in eating or other types of discomfort.

This indicates that the main motivation for attending patients was to resolve emergencies, given the great accumulated deterioration in times of pandemic. The prevention in relation to granted benefits reached

Table 1. Clinical management indicators per city in five regions in Chile in which the teledentistry model for the elderly population was applied.

CLINICAL INDICATORS	ANTOFAGASTA (%)	SANTIAGO (%)	CONCEPCIÓN (%)	TEMUCO (%)	TALCA (%)	VILCÚN (%)	TOTAL (%)
Degree of Installed Occupancy	42	75	61	72	63	83	67
Degree of Available Occupation	75	72	84	85	80	100	78
Degree of Real Occupation	56	99	72	84	79	83	86
Interconsultation indicator per patient attended	17	25	28	36	18	25	25
Urgencies according to reason for consultations	82	97	100	100	91	100	95
Unpostponable prosthetic treatment according to reason for consultations	18	3	0	0	9	0	5
Prevention in relation to granted benefits	45	48	0	0	0	0	39
Prevention in relation to the patients cared for	58	64	0	0	0	0	42

39%. It indicates the relevance of the study with respect to prevention in its first level of "promotion and education", since 4 out of 10 clinical actions were associated to prevention.

If we analyze this indicator and relate the Oral hygiene Instruction action with the total number of patients cared for, the value increases to 42% (prevention in relation to the patients cared for), thus revealing more informed, educated, and committed patients to their treatment.

Finally, the average indicator of absenteeism was 17%, which shows the great adherence of patients to the project (83%). This could account for the high need of Dental care by the elderly in the context of the COVID-19 pandemic, demonstrating the value of Teledentistry and the confidence that patients demonstrated for safe and high-quality dental care without unnecessary trips that would put their health at risk.

DISCUSSION.

The current growth of digitization in the health area allows for a team of specialists to remotely guide, direct and resolve, synchronously and/or asynchronously, the difficulties that the health personnel who are in contact with a patient may encounter.

Our teledentistry model increases the resolution and presence of specialists, not only in a pandemic situation but also in remote or difficult-to-access locations, where their presence is scarce or non-existent. The implementation of the model decreases the number of appointments, and increases access to timely care both in the first consultation and in the second level of care.

The clinical management indicators observed in this study made it possible to successfully resolve urgencies in a mobile dental unit equipped with state-of-the-art digital technology, in addition to observing that it can be used even more frequently and in more optimal ways, which will allow for future proposals to obtain better clinical performance.

However, a teledentistry system must have the support of personnel trained with basic computer knowledge, have a staff of specialists who provide support to the treating professional and feed the system, and handle clinical records fast and confidently. In addition, it is important to have adequate mobile Internet access around the patient's place of residence.

In summary, a digital operating platform such as TEGO facilitates, sequentially orders and simplifies teledentistry care in situations of difficult access to

dental care for elderly people who present physical limitations, immobility, a degree of dependence, or live in difficult-to-access geographic locations.

CONCLUSION.

Teledentistry supported by a platform specially designed for the elderly population and implemented in a mobile dental unit allows to provide solutions to emergencies and priority treatments to a population which is highly vulnerable in pandemic conditions.

In addition to providing highly specialized care, this model allows for the expedite execution of interconsultation with a staff of specialists in different areas of dentistry and geriatrics. The measurement of clinical management indicators contributes to meet the Chilean Ministry of Health Explicit Health Guarantees (GES), which are: Access, 83% of those evaluated were able to access their care in their places of residence.

Timely Attention, patients' pathologies were resolved during the time that the project was in operation in their cities of residence. In addition, 94% of the care was urgent, which was the main purpose of the program.

Quality was granted by the use of state-of-the-art digital equipment, supported by a teledentistry platform and a network of duly certified specialist interconsultants, 1 in 4 patients used the Teledentistry Interconsultation methodology referred by their treating general dentist.

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Conflict of interests:

The authors declare no conflicts of interest.

Ethics approval:

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Conceptualization: Beltrán V, von Marttens A, Ly P, Fonseca J. Research, methodology and supervision: Beltrán V, von Marttens A, Ly P, Ly A, Fonseca J. Data gathering: Ly P, von Marttens A. Data analysis: Ly P, von Marttens A, Ly A. Writing—original draft: von Marttens A, Ly P. Writing—review and editing: Beltrán V, von Marttens A, Fonseca J.

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