J Oral Res
oral and craniofacial sciences

Article

Effectiveness of dental emergency services in a community health center in Santiago, Chile.

Efectividad de los servicios de urgencias odontológicas en un centro de salud comunitario de Santiago de Chile.

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Receipt : 05/20/2020 Revised: 10/19/2020
Acceptance: 02/28/2021

Abstract: **Objective:** Describe the demographic characteristics of the population attending the dental emergency services in health Center Juan Petrinovic, located in Santiago, Chile, and examine the effectiveness of dental treatment given to this population. **Material and Methods:** Before-after study, where 45 patients were surveyed twice, first, before their dental care and then in phone call follow-up. Patients completed interviewer-administered surveys that asked about patients' self-reported pain level, oral health-related quality of life, and demographic information. Demographic information collected included age, sex, educational level, type of health insurance, and municipal district where patients lived. Self-reported pain level was measured using a Visual Analogue Scale (VAS), and oral health quality of life was measured using the Dental Health Status Quality of Life Questionnaire (DS-QoL). Statistical descriptive analyses were performed, and statistical tests were applied to determine if the care given was effective on pain relief and increased quality of life status. **Results:** Most of the patients seeking care at the dental emergency service were female (67%), adults (average age 46 years), with high school education (58%), and FONASA health insurance (98%). The most common reason for using dental emergency services was pain (51%). Dental treatment given to the patients was effective in relieving pain (reduction in VAS score was 34.34 between pre and post attention) and improving their oral health status (reduction in DS-QoL score was 3.18 between pre and post attention). **Conclusion:** This dental emergency service was effective in reducing pain and improving the quality of life of the patient.

Keywords: *Adult; Dental Health Services; Emergency Medical Services; Outcome Assessment, Health Care; Pain Measurement; Chile.*

Cite as: Pinto-Grunfeld C, Garay B & Majluf D.
Effectiveness of dental emergency services in a community health center in Santiago, Chile.
J Oral Res 2021; 10(1):1-8.
Doi:10.17126/joralres.2021.010

Resumen: **Objetivo:** Describir las características demográficas de la población que asiste a los servicios de emergencia odontológica en el Centro de Salud Juan Petrinovic, ubicado en Santiago de Chile, y examinar la efectividad del tratamiento odontológico que se le brinda a esta población. **Material y Métodos:** Estudio antes-después, donde se encuestó a 45 pacientes en dos ocasiones, primero, antes de su atención odontológica y luego en seguimiento

telefónico. Los pacientes completaron encuestas administradas por el entrevistador que preguntaban sobre el nivel de dolor autoinformado por los pacientes, la calidad de vida relacionada con la salud bucal y la información demográfica. La información demográfica recopilada incluyó edad, sexo, nivel educativo, tipo de seguro médico y distrito municipal donde vivían los pacientes. El nivel de dolor autoinformado se midió mediante una escala analógica visual (EVA) y la calidad de vida de la salud bucal se midió mediante el Cuestionario de calidad de vida del estado de salud dental (DS-QoL). Se realizaron análisis estadísticos descriptivos y se aplicaron pruebas estadísticas para determinar si la atención brindada fue efectiva para aliviar el dolor y mejorar el estado de la calidad de vida. **Resultados:** La mayoría de los pacientes que acudieron al servicio de urgencias odontológicas fueron mujeres (67%), adultos (edad promedio 46 años), con estudios secundarios (58%) y seguro médico FONASA (98%). La razón más común para utilizar los servicios de emergencia dental fue el dolor (51%). El tratamiento dental administrado a los pacientes fue eficaz para aliviar el dolor (la reducción de la puntuación EVA fue de 34,34 entre la atención previa y posterior) y la mejora de su estado de salud bucal (la reducción de la puntuación DS-QoL fue de 3,18 entre la atención previa y posterior). **Conclusión:** Este servicio de urgencias odontológicas fue eficaz para reducir el dolor y mejorar la calidad de vida del paciente.

Palabra Clave: *Adulto; Servicios de Salud Dental; Servicios Médicos de Urgencia; Evaluación de Resultado en la Atención de Salud; Dimensión del Dolor; Chile.*

INTRODUCTION.

Oral health matters and is an integral element of general health and well-being. Good oral health enables individuals to communicate effectively, to eat and enjoy a variety of foods, and is essential in the overall quality of life, self-esteem, and social confidence.[1] However, oral diseases affect a significant proportion of the world's population and exact a heavy toll in terms of morbidity and mortality.[2] Oral diseases are highly prevalent, and their impact on both society and the individual is significant. Pain, discomfort, sleepless nights, limitation in eating functions leading to poor nutrition, and time off school or work as a result of dental problems are all common effects of oral diseases.[3]

Although overall improvements in oral health have occurred in many developed countries over the last 30 years, oral health inequalities have emerged as a significant public health challenge because lower-income and socially disadvantaged groups experience disproportionately high levels of oral disease.[4]

Untreated dental caries is still a major oral health problem worldwide; in 2010 untreated caries in deciduous teeth was the 10th-most prevalent condition, affecting 621 million children, and untreated caries in permanent teeth was the most prevalent condition worldwide, affecting 2.4 billion people or 35% of the global population.[5]

Dental diseases are an economic burden on society.[6] In 2015 globally, dental diseases accounted for U$356.80 billion in direct costs and U$187.61 billion in indirect costs.[7] Adults have limited access to dental care, at which point they tend to put up with acute and chronic dental pain and decreased quality of life.[8]

Given that adults have limited access to primary care, they may use the Hospital Emergency Departments (ED) for treatment of conditions more appropriately managed in the primary care setting. Oral conditions constitute the reason for about 1 percent of all ED visits occurring in the United States each year. Hospital EDs charge close to $1 billion annually to treat these conditions. Uninsured people and those who reside in low-income areas are likely to seek hospital-based settings for oral conditions.[9] In England, during the financial year, 2014/15 over 3.7 million people received urgent dental care in a NHS dental setting.[10]

Dental emergency services have been the object of research in several countries. Worsley *et al*.,[10] summarize the literature on urgent care to identify research priorities in this subject. They found that the factors most often studied in the literature relating to urgent dental care were demographic and socioeconomic factors, perceived and evaluated need, and health behavior factors. Patient outcomes following service use were the least studied variables, except for patient

satisfaction. They conclude that there are gaps in the literature on urgent dental care, and future research should focus on patient health outcomes and quality of life following the use of urgent dental care.

In Chile, a study[11] on people aged 65-74 years, showed a mean DMFT score of 25.7 and an average number of missing teeth of 22.4. Dentate participants had 41% of their restorative care needs unmet, and 68.4% required oral hygiene instruction plus removal of calculus on their teeth. Almost 30.1% required complex periodontal therapy. 21% of those fully edentulous required full dentures.

Chile has a National Health Care System, which includes dental services in community health centers, specialty centers, hospitals, and emergency services.[12] Today in Chile, access to routine dental care services is available only for age-specific members of the population: children, as well as adults at age 60 and all pregnant women.[13] These restrictions produce a sizable gap between the offer and the need for treatment. For this reason, the majority of the Chilean population has to resort to emergency dental services to fulfill their needs for care and treatment.[11]

The Department of Statistics of the Chilean Ministry of Health reported that in 2014 there were 17,028,551 visits to the ED to the healthcare center managed by the Chilean government and 2,658,920 (15.61%) were due to dental causes.[14]

Quality measures are tools that help us assess or quantify healthcare processes, outcomes, patient perceptions, and organizational structure and/or systems that are associated with the ability to provide high-quality health care and/or relate to one or more quality goals for health care. These goals include effective, safe, efficient, patient-centered, equitable, and timely care.[15] Effectiveness in dental emergencies has also been measured in quality of service given by the dentist.[16-17]

Our literature review only found two papers about dental emergency services in Chile.[18] Fodor *et al.*,[19] studied demographic and socioeconomic factors associated with dental emergency visits. Bucchi et al. 2012[18] also studied demographic and socioeconomic factors related to dental emergency visits, but also added patient satisfaction. Besides these studies, there is no further research about dental emergency services in Chile. Given the high number of patients treated on emergency dental services, it is relevant to know more about the attention in these services.

The purpose of this study is to determine whether the care received by patients of dental emergency services of the Health Center CESFAM Juan Petrinovic of the municipal district of Recoleta, Santiago, Chile, is effective in relieving their dental pain and/or improving their oral health status.

MATERIALS AND METHODS.

Design and sample

The study design was an uncontrolled before-after study; intervention was treatment at the dental emergency service. The research protocol and informed consent form were approved by the Ethics Committee of the Medicine Faculty of Universidad del Desarrollo, Santiago, Chile.

We included all patients over 18 years that attended the dental emergency services of the health Center CESFAM Juan Petrinovic of the municipal district of Recoleta, Santiago, Chile, during the recruitment period and agreed to participate in the study and were available for the phone call follow-up. Individuals who were under age 18 or were unable to provide informed consent were excluded from the study.

To calculate the sample size, the prevalence of dental emergency visits was estimated. According to the Chilean national statistics center (DEIS), in 2015, the visits to the dental emergency were 419.474, and considering the population in FONASA was 13.321.148 for the same year, the prevalence of dental emergency visits was 3%.

With a level of confidence of 95% and an error of 5%, the calculated sample size was 45 persons. The expected loss to follow-up was set at 15%, resulting in a total sample of 53 to be enrolled in the study. Due to time constraints, we could only interview 45 persons, but we did not have any loss at follow-up. Convenience sampling was used.

Data collection

All patients who were waiting in the dental emergency services were approached to participate in the study during weekday work hours between April - November 2018. A trained interviewer briefly explained the study, including eligibility criteria, and asked if the patient would be willing to participate.

If the patient agreed to participate, they were taken aside, where the interviewer went over the informed consent paperwork. After the consent form was signed,

the patient completed an interviewer-administered survey. The date and time for the follow-up survey were determined. The follow-up interview was conducted by phone seven days later (with an allowable range of 5-10 days); patients were contacted up to three times and, if not reached by the third time, were declared lost to follow-up.

Questionnaires

The pre- surveys included demographic data, patients' self-reported pain level, and patients' self-reported oral health-related quality of life. Demographic information collected included age, sex, educational level, type of health insurance, and municipal district where they lived. Patient-reported level of pain was measured using a Visual Analogue Scale (VAS), which ranges from 0 to 100, with 0 indicative of feeling no pain and 100 feeling the worst pain imaginable.

Patient-reported oral health-related quality of life was assessed using the Dental Health Status Quality of Life Questionnaire (DS-QoL), which ranges from 6 to 18, where 6 was the best quality of life and 18 the worst quality of life possible.[17,20,21] The post-surveys included VAS and DS-QoL scores follow-up.

Statistical analysis

All statistical analyses were performed using STATA 16. Categorical variables were presented as frequency and percentages.

As a measure of precision, 95% confidence interval was calculated. Shapiro Wilk test was performed to determine the normality of the data. Analysis of the level of pain and oral related quality of life pre and post-treatment were made with Wilcoxon signed-rank test, and a *p*-value of <0.05 was considered statistically significant.

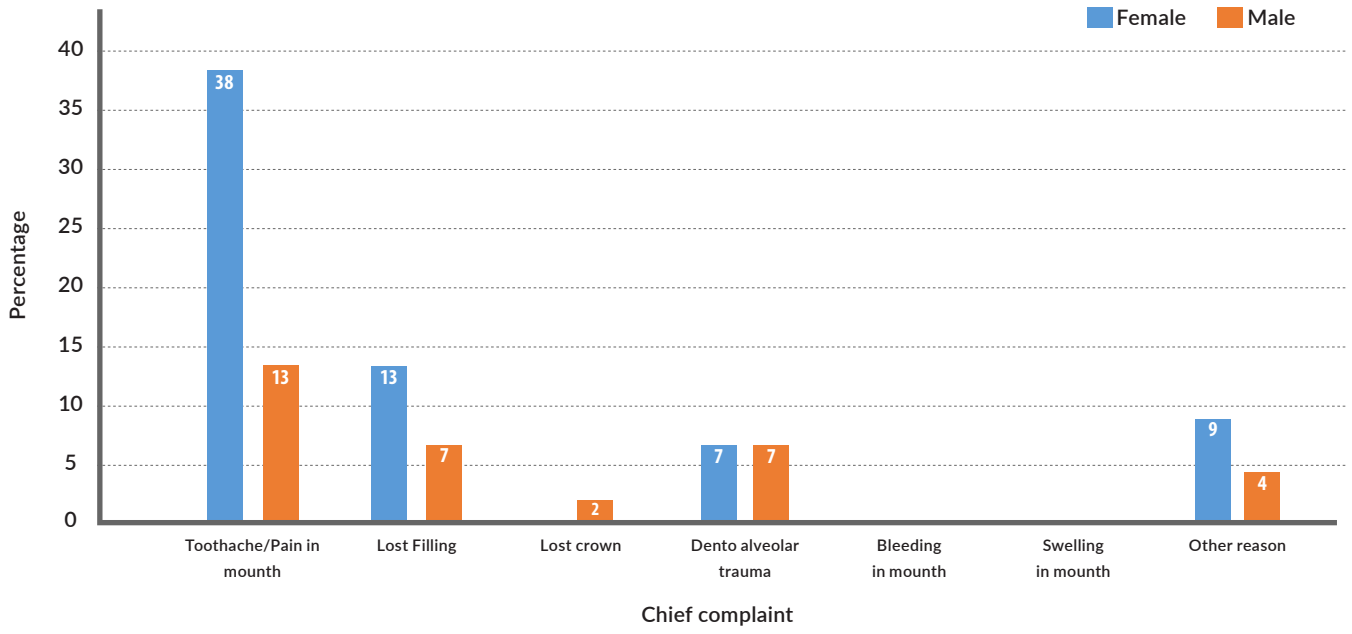
RESULTS.

In this study, we interviewed 45 participants, and there was no loss at follow-up. The average age was 46 years (range 18-83 years), and more than two-thirds were females. Almost half of the participants had a high school education, followed by those with elementary school education. Most of the participants were covered by the State-provided health insurance FONASA. For details about the demographics, Table 1.

The chief complaint was toothache/pain in the mouth (51%), followed by loss of filling (20%) and dento-alveolar trauma (13%), and other reasons (13%). For details of chief complaint by sex, see Figure 1.

The Shapiro-Wilk test determined that the level of pain (VAS) and oral health quality of life (DS-QoL) data were not normally distributed. Therefore, the median was used as the measure of central tendency, interquartile range (IQR) was used as the measure of dispersion, and 95% confidence interval (C.I.) was

Figure 1. Chief complaint by sex.



ISSN Print 0719-2460 - ISSN Online 0719-2479. www.joralres.com/2021

Figure 2. Distribution of pain levels as measured by a visual analogue scale (VAS) pre- and post-treatment.

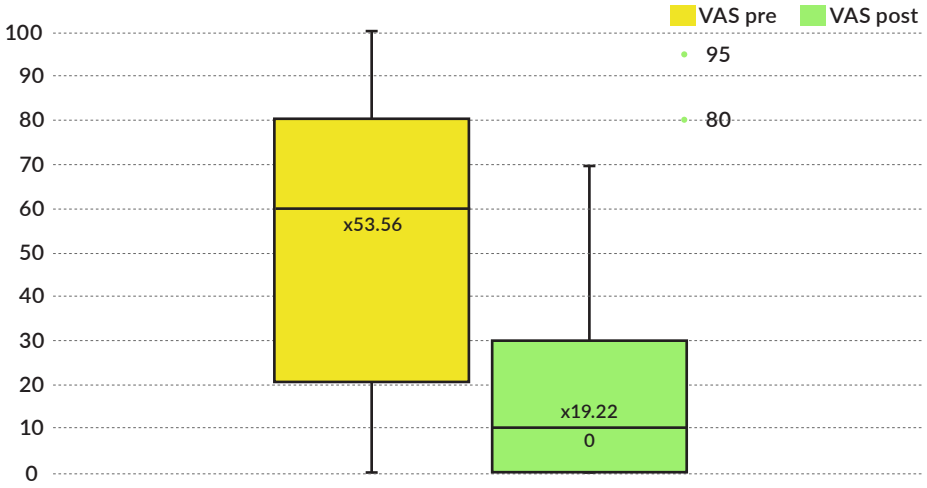


Figure 3. Distribution of oral health-related quality of life (DS-QoL) pre- and post-treatment.

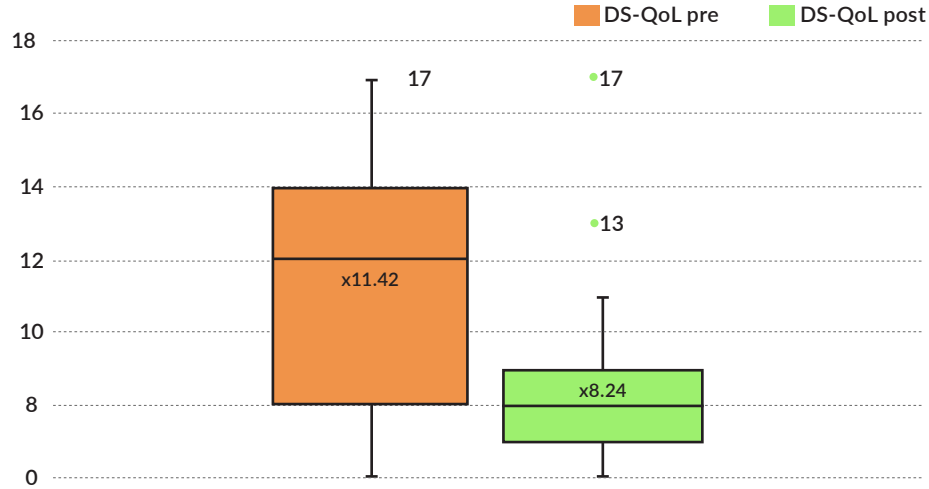


Table 1. Demographic characteristics of all the study participants (N= 45).

VARIABLE	Category	N	
Age	Mean	46	
	Standard dDeviation	13.43	
	Minimum	18	
	Maximum	83	
		N	**%**
Sex	Female	30	67
	Male	15	33
Educational Level	Elementary School	10	22
	High School	26	58
	Trade School	7	16
	College	2	4
Health Insurance type	FONASA A	20	45
	FONASA B	11	24
	FONASA C	8	18
	FONASA D	5	11
	ISAPRE	1	2
	Other	0	0
Municipal District of residence	Recoleta	41	91
	Other	4	9

Table2. Distribution of level of pain based on a visual analogue scale (VAS) and oral health quality of life (DS-QoL) pre- and post-treatment.

VARIABLE	Treatment Category	Median	Interquartile Range	Confidence Interval
VAS	Pre	60	100	43.18 - 63.93
	Post	10	70	12.08 - 26.37
DS-QoL	Pre	12	6	10.43 - 12.41
	Post	8	4	7.64 - 8.84

calculated as a measure of precision (Table 2).

Median levels of pain before and after the emergency visit were 60 (range 0-100) and 10 (range 0-100), respectively. The pre- and post-treatment medians of quality of life scores (DS-QoL) were 12 (range 6-18) and 8 (range 6-18), respectively (Figure 2 and Figure 3).

Patients reported much lower pain levels (VAS) between their initial visit to the dental emergency services and a week after receiving treatment ($p<0.00001$), the difference between pre and post on the VAS score showed a reduction of 34.34 points in the instrument's score. The difference between pre and post on the DS-QoL score showed a reduction of 3.18 points in the instrument's score. Wilcoxon matched-pairs signed-ranks test for oral health quality of life (DS-QoL) yielded $p<0.00001$, which showed there was a statistically significant difference for patients reported oral health-related quality of life before and after receiving treatment for their dental emergency.

It is important to mention that data collectors noticed that patients with high levels of pain were not inclined to participate in the study.

DISCUSSION.

The present study constitutes the first effort to measure the effectiveness of dental emergency services in a primary care dental setting in an urban area in Chile. The purpose of this paper was to describe the demographic characteristics of the population that uses dental emergency services health Center CESFAM Juan Petrinovic of the municipal district of Recoleta, Santiago, Chile, and to examine the effectiveness of dental treatment provided to this population.

Overall, the mean age of the study participants who attended this dental emergency service was 46 years, which coincides with several studies; two in Chile and three international.[9,17-19,22] were the people that attended the dental emergency were adults. More than two-thirds of the participants were female, which coincides with the findings of four other studies[9,18,22,23] and differs from three different studies.[17,19,24]

This suggests that attendance to emergency services is not determined by sex. However, this concurs with a study[25] about gender differences in attendance to routine health care services, which makes sense given that this dental emergency service is located in a community health center, where most of the services are routine health care services.

The distribution of the total sample according to educational level, from highest to lowest percentage, was high school, elementary school, trade school, and college, which is similar to another study from Chile[18] about visits to dental emergency services.

Most of the people attending this dental emergency service had Chilean public insurance (FONASA), which makes sense given that municipal community health centers provide free services to people with that insurance, and also corresponds with the results of a study[19] about dental emergency services at a Chilean hospital.

Nearly all of the participants in the sample lived in the same municipal district where the community health center is located. This was expected given that people can belong to a community health center in the municipal district where they live or work.

The principal chief complaint in this study was toothache/pain in the mouth, which is similar to other studies about dental emergencies in England,[17] UK,[24] and Chile.[18]

In this study, the median VAS score before dental care was 60, and the median VAS score at follow-up was 10, which is similar to what Anderson *et al.*,[17] found in their

study. Besides, Wilcoxon signed-rank test comparing VAS score before and after the care received yielded $p<0.00001$, which showed there was a statistically significant difference in change of level of pain.

The median oral health-related quality of life (Ds-QoL) score before dental care was 12, and the median score at follow-up was 8. The Wilcoxon matched-pairs signed-ranks test for oral health quality of life (DS-QoL) yielded $p<0.00001$, which showed there was a statistically significant difference for patients reported oral health-related quality of life before and after receiving treatment for their dental emergency.

However, the present investigation has certain limitations. In the first place, the sample size of this study was small and only represented the population studied. Second, the study was carried out in a community health center, not considering dental-care–related emergency visits that occur across various types of healthcare settings in Santiago. Finally, the people who presented the worst pain were not inclined to respond to the survey, which could have generated a selection bias; for future research in the topic we would recommend asking people that do not want to participate in the study to value their pain level (VAS score).

CONCLUSION.

Most of the patients seeking care at the dental emergency service at health Center CESFAM Juan Petrinovic of the municipal district of Recoleta, Santiago, Chile were female adults with high school education and Chilean public health insurance (FONASA).

The most frequent reason to seek care was dental pain. This dental emergency service was effective in relieving pain and improving their oral health status. Future research on this topic is recommended to increase sample size, and include more settings where dental emergency services are performed.

Conflict of interests: The authors declare no conflicts of interest.

Ethics approval: The study was approved by the Ethics Committee of the Medicine Faculty of Universidad del Desarrollo (Proyecto Tesis PG-147 2016), Santiago, Chile.

Funding: This research did not receive any specific grants from funding agencies in the public, commercial, or non-profit sectors.

Authors' contributions: This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

Acknowledgements: We would like to thank all the people who participated in the study and Dra. Maria Eugenia Chadwick, Health Director of the municipal district of Recoleta, and Dra. Rosa Ester Vergara, Oral Health advisor of the municipal district of Recoleta.

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