



ORIGINAL ARTICLE

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Oral hygiene, periodontal status and treatment needs among 12-year-old students, Castro, Chile, 2014.

Abstract: The present study aims to determine the level of oral hygiene, periodontal status and treatment needs, indicating if there are differences between men and women, in 12-year-old students from Castro, Los Lagos region, during March and April of 2014. A cross-sectional study was carried out. A total of 242 12-year-old students from municipal and subsidized private schools in Castro were selected through a stratified random sample representative of each school. Students were evaluated by a calibrated examiner to determine the Simplified Oral Hygiene Index (OHI-S) and the Community Periodontal Index of Treatment Needs (CPITN). Data were transferred to a Microsoft Excel spreadsheet and statistically analyzed to calculate the amount and percentage of the variables. Mann-Whitney U-test was used for comparison between genders. From the total, 59.5% of the students have regular hygiene. Also, 86.4% of the assessed adolescents have gingivitis and 13.6% of them have periodontitis. The periodontal treatment need indicates that 58% of the students require oral hygiene instructions and scaling. No statistically significant differences were found for gender. There is a higher prevalence of periodontal diseases associated with regular oral hygiene than the regional and national reference in 12-year-old adolescents in Castro. Then, it is necessary to teach and promote specific public health strategies based on epidemiological data.

Keywords: *Oral hygiene, CPITN, gingivitis.*

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INTRODUCTION.

Oral diseases are a public health problem because of their high prevalence and impact on individuals and society¹. In Chile, there is a national oral health plan which states that the approach to address these pathologies must be based on an epidemiological diagnosis².

Among the prevalent oral pathologies in the country, there are periodontal diseases² for which the predominant etiologic factor is the biofilm and their severity is correlated with the level of oral hygiene³ and can progress during adolescence compromising gingival tissues, the support system and teeth⁴.

The age of 12 years is considered as the age for in-

ternational surveillance in oral health according to the World Health Organization (WHO)⁵. Due to morbidity and progression of periodontal diseases, it is essential to get an early diagnosis and treatment⁶. In order to do this, it is first necessary to recognize the current periodontal status of the population to have a general idea of the disease and its progression. The Community Periodontal Index of Treatment Needs (CPITN), recommended by the WHO⁷, is used for this purpose. It is to a standard measurement system used as an epidemiological tool for making comparisons between populations⁸.

According to the National Diagnostic on Oral Health from 2007, prevalence of gingivitis among 12-year-old

schoolchildren is 66.9% and 88.9% of the assessed population require instruction on oral hygiene as treatment. In Los Lagos region, prevalence of gingivitis is 66.7% and, from the total number of students, 70.8% need instruction on hygiene and brushing technique².

For these reasons, it is necessary to know the periodontal health status to be able to take preventive measures at the local, regional and national level. On the other hand, there are no epidemiological studies on indices of oral hygiene and periodontal treatment needs in Castro, except for only some references at the regional level. Therefore, the purpose of this study is to describe the degree of oral hygiene, periodontal status and treatment needs, indicating whether there are differences between genders, among 12-year-old students from Castro, Los Lagos region, during March and April 2014.

MATERIALS AND METHODS.

Study and population design:

A cross-sectional study was carried out to determine the degree of oral hygiene, periodontal status and treatment needs among 12-year-old schoolchildren from the city of Castro, Los Lagos Region, Chile, during March and April 2014. The Research Ethics Committee of the Health Care Service of Valdivia approved the study (protocol number 051).

A total of twelve urban, municipal and private-subsidized schools offering primary education for 12-year-old children were selected. Request letters were sent to the Municipal Corporation of Castro and the directors of the respective schools. It is necessary to mention that there are no private schools in the city.

From the list of schools, a stratified random sample was obtained considering a total universe of 832 students as a benchmark for students enrolled from March to December, 2014. The sample was selected in proportion to each school by performing an internal simple random sampling. The sample size was calculated with an error of 5%, 95% level of confidence and 66.9% level of heterogeneity getting a sample of 242 students

from the total population.

The inclusion criteria considered students who were 12 years old at the time of the study, had expressed their consent for the clinical evaluation and whose parents had signed a written informed consent. Students with fixed orthodontics appliances and/or a pathology which would hinder the clinical examination, such as Down syndrome, trismus and epilepsy, were excluded from the study. In such cases, the following student in the class roll was selected.

Clinical Evaluation:

The clinical examination was visually done with a headband light, a WHO probe and sterile basic test instruments. Oral hygiene was assessed using the Simplified Oral Hygiene Index (OHI-S)⁹ and the periodontal status and treatment needs with the Community Periodontal Index of Treatment Needs (CPITN)¹⁰ in the schools. Both indexes were evaluated by an operator who had been previously calibrated by a periodontic specialist in three theoretical and practical sessions getting a Cohen's Kappa coefficient of 0.86 for intra-observer variability in both the Simplified Oral Hygiene Index and the Community Periodontal Index of Treatment Needs. For this study, periodontitis was defined as an inflammation and loss of connective or support tissue around teeth which was determined through a code equal to or greater than 3 during probing. Gingivitis was defined as an inflammation of the gingiva without loss of connective tissue corresponding to CPITN codes 1 and 2.

In order to evaluate CPITN, WHO-type probes were used. The evaluation points on probing were mesial, midline and distal, both in buccal and palatine/lingual surfaces in each tooth. Values from 0 to 4 were given as stipulated by the World Health Organization⁷ (Table 1). The mouth was divided into sextants and the largest value determined the child's periodontal status. Thus, the need for periodontal treatment was (TN): TN 0 in case of gingival health, TN 1 need to improve oral hygiene (code 1 in the CPITN), TN 2 need of scaling, elimination of overhanging restorations and improving oral hygiene (codes 2 and 3) and TN 3 in case of com-

plex treatment (code 4)¹¹.

The OHI-S was determined by using a disclosing tablet (Sanoral®, Biotoscana Farma S.A. Colombia). For its calculation, six specific teeth were evaluated (vestibular surface of the first upper molars, upper right central incisor and lower left central incisor; and lingual surface of the lower first molars), indicating a minimum value of 0 and a maximum value of 3 (table 2). The average oral hygiene index was obtained by summing the values found and dividing them by the number of surfaces examined. The outcome was evaluated using a scale to finally determine the student's OHI-S: good when submitting a score from 0.0 to 0.6, regular between 0.7 and 1.8 and bad when submitting a score from 1.9 to 3.0.

Statistical Analysis:

The collected information was stored in a Microsoft Excel spreadsheet by an evaluator. Subsequently, analysis of the data was performed using the R statistical program for free access (version 3.0.3, R Development Core Team, Vienna, Austria). Tables were constructed using data from the students examined in the assessed categories (oral hygiene and periodontal status and treatment need), finally obtaining the values and percentages for each of them. Regarding gender, it was not possible to use a parametric test and the non-parametric statistical Mann-Whitney U-test for independent samples was used instead because comparison variables between the groups are categorical and do not have a normal distribution.

RESULTS.

Out of the twelve selected schools, eleven agreed to participate. A total of 242 students were evaluated, out of whom 129 were women and 113 men. Regarding oral hygiene, it was observed that 59.5% of the students presented regular hygiene (Table 3).

In regard to periodontal status, 86.4% of the children evaluated presented gingivitis (code 1 and 2), while 13.6% had periodontitis (Table 4). The need for

periodontal treatment indicated that 58% of the children need to improve their oral hygiene and require scaling (TN 2) (Table 5).

The non-parametric statistical Mann-Whitney U-test indicated that these variables: oral hygiene ($U=7236$, $p=0.913$), periodontal status ($U=6798$, $p=0.323$) and the need for periodontal treatment ($U=6849$, $p=0.345$) did not show statistically significant differences between men and women.

Table 1. Values for the basic periodontal examination (WHO, 1978).

Code	Features
Code 0	Healthy Tissue.
Code 1	Bleeding observed during or after probing.
Code 2	Calculus or other plaque retentive factors such as ill-fitting crowns or poorly adapted edges of fillings.
Code 3	Pathological pocket of 4 or 5 mm, or when the gingival margin is located in the black area of the probe.
Code 4	Pathological pocket of 6 mm or more, is not visible the black area of the WHO probe.
Code X	When only one tooth or no teeth are present in a sextant (excluding third molars unless they operate in place of the second molars).

Table 2. Values to determine the degree of soft deposits on the tooth surface.

Code	Criterion
Code 0	Absence of soft deposits or pigmentations in the surface of the tooth.
Code 1	Presence of soft deposits covering no more than 1/3 of the tooth surface or presence of pigmentations.
Code 2	Presence of soft deposits covering more than 1/3 but not more than 2/3 of the tooth surface.
Code 3	Presence of soft deposits covering more than 2/3 of the tooth surface.

Table 3. Number and percentage of students according to the oral hygiene score obtained.

Oral hygiene	Women		Men		Total	
	n.	%	n.	%	n.	%
Good	29	22.5	28	24.8	57	23.6
Regular	80	62	64	56.6	144	59.4
Bad	20	15.5	21	18.6	41	17

Table 4. Number and percentage of students according to periodontal status.

Periodontal status		Women		Men		Total	
Code	Condition	n.	%	n.	%	n.	%
0	Healthy	0	0	0	0	0	0
1	Bleeding	58	45	44	38.9	102	42.2
2	Calculus	55	42.6	52	46	107	44.2
3	Pocket 4-5mm	16	12.4	17	15	33	13.6
4	Pocket 6 mm +	0	0	0	0	0	0
Total		129	100	113	100	242	100

Table 5. Percentage of students in relation to need for periodontal treatment.

Need for periodontal treatment (TN)		Women		Men		Total	
Code	Condition	n.	%	n.	%	n.	%
0	Healthy	0	0	0	0	0	0
1	Reinforcement of hygiene	58	45	44	38.9	102	42
2	Reinforcement of hygiene and scaling	71	55	69	61.1	140	58
3	Complex Treatment	0	0	0	0	0	0
Total		129	100	113	100	242	100

DISCUSSION

In Castro, there are more than 800 12-year-old students and, according to the calculation of sample size, approximately 30% of the total was evaluated in this study. Regarding the objective, it was observed that the most of the sample have regular oral hygiene, present deficiencies in brushing techniques and lack of motivation to keep their oral hygiene.

As for the periodontal status, the whole sample presents deficit since none of the evaluated students had good periodontal health condition since 86.4% had gingivitis, while a lower percentage of the students examined (13.6%) already presented periodontitis. This correlates with the need to improve educational strategies for oral health.

The results of this research are consistent with those obtained by other authors who have evaluated oral hygiene among 12 year-old students. When assessing pupils from different

schools, Vadiakas *et al.*¹² found that 75% of them have regular oral hygiene. Similarly, in India, 1,045 children between 10 and 12 years old were examined revealing that 68% of them were in the same category¹³.

As for gingivitis, the present study showed a higher prevalence than the one found by Soto *et al.*², who observed it was 66.7% in Los Lagos region. The difference may be due to the fact that the latter did not use a sample size proportional to the amount of children in the region. Similar results were obtained by Hamasha & Albashair⁶ who noted that 54.3% of the evaluated pupils have gingivitis while 17.6% already have periodontitis. This corresponds to the percentage obtained in the present investigation for both categories.

With regard to the need for periodontal treatment, the results of the present study show that all examined schoolchildren need instruction in oral hygiene and/or scaling, agreeing with the results obtained in the diagnosis of National Oral Health 2007, which indicates that 68.9% of adolescents aged 12 years require reinforcement in oral hygiene, and 29.3% of them also need prophylaxis. However, Soto *et al.*² observed that 31.1% of the children evaluated do not need any treatment. On the other hand, a study conducted in Jordan showed 72.5% of the students need instruction in oral hygiene and, from the total number of students with periodontal disease half of them require scaling⁶. This correlates with the present results which show 58% of the schoolchildren require a similar treatment.

At the national level, epidemiological studies on periodontal diseases among schoolchildren present differences as to design and methodologies so prevalence levels vary between 40% to 98%¹⁴ covering local samples and different ages and making it difficult to compare them. According to the results of this research, gingivitis prevalence was found in 86.4% of the cases, which is higher than the national and regional rates. Also, periodontitis prevalence was 13.6%, a number which has not been reported by the national surveys on oral health and which, in turn, denotes an increase and evolution of these pathologies in the age range studied.

On the other hand, most of the studies have shown the prevalence of periodontal disease is higher in men than in women^{2,3,12}. Nagarajappa *et al.*¹⁵ observed that 13.7% of men showed CPITN code 2 compared to only 4.6% women in this category. This can be attributed to the fact that women have a greater awareness about oral hygiene and care^{12,15}. On the other hand, the studies by Varas *et al.*¹⁴, Jordão *et al.*¹⁶ and Marulanda *et al.*¹⁷ did not show statistically significant differences between genders, as in the present investigation, showing men and women are equally affected. This can be explained by the period of mixed dentition, tooth replacement, hormonal changes¹⁸ and the absence of oral education programs in schools.

Among the limitations of the study, OHI-S reflects the oral hygiene at the time of the exam, not on subsequent occasions in order to perform a causal interpretation⁸, thus it can be affected by the time of the day on which the measurement was performed.

According to Varas *et al.* (2011)¹⁴, the CPITN index can be used to indicate the periodontal conditions in a simple, fast and universally accepted way¹², and facilitates comparison with other populations⁸.

CPITN registers the more common and treatable periodontal conditions: gingival bleeding, calculus and periodontal pocket¹². However, when using teeth indices, the extent and severity of the illness may be underestimated⁸. Even though all teeth in the mouth were considered in this study, one should be cautious with the interpretation of the

results since it is finally the highest value found in the mouth the one which determines the student's need for periodontal treatment in a general way, without considering the clinical characteristics of the gum tissue or the clinical insertion loss¹⁹, so it is necessary to consider other support indices, together with CPITN, to assess the periodontal status and thus make an accurate diagnosis.

It is recommended to perform more studies on oral hygiene and periodontal treatment need in populations, with a simple and homogeneous methodology to allow the comparison of data obtained at both the national and international levels.

The results of this study showed a higher prevalence of periodontal disease associated with conditions of oral hygiene which are not compatible with health in the population examined than the average regional and national reference. Therefore, it is necessary to teach and promote specific measures and public health strategies for each community based on epidemiological data from the local research.

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Higiene bucal, estado y necesidad de tratamiento periodontal en escolares de 12 años, Castro-Chile, 2014.

Resumen: El presente estudio, pretende determinar el grado de higiene bucal, estado y necesidad de tratamiento periodontal en escolares de 12 años de la ciudad de Castro, región de Los Lagos, durante el año 2014, indicando si existen diferencias entre hombres y mujeres. Corresponde a un estudio observacional descriptivo transversal. Se seleccionaron 242 escolares de 12 años de la ciudad de Castro de establecimientos municipales y particulares subvencionados a través de una muestra aleatoria estratificada representativa de cada

colegio. Los alumnos fueron evaluados durante marzo y abril de 2015, por un examinador calibrado ($K=0,86$) para determinar el Índice de Higiene Oral Simplificado (IHO-S) y el estado y necesidad de tratamiento periodontal a través del Índice Comunitario de Necesidad de Tratamiento Periodontal (CPITN). Los datos fueron traspasados a una planilla de Microsoft Excel y analizados estadísticamente calculando cantidad y porcentaje de las variables. Para la comparación entre género se utilizó el test estadístico U de Mann-Whitney. Se observó que un 59,5% de los alumnos presentan una higiene regular. Asimismo, un 86,4% de los escolares evaluados

presentan gingivitis y un 13,6% periodontitis. La necesidad de tratamiento periodontal indica que un 58% requiere desatrasaje supragingival e instrucción en higiene bucal. No se encontraron diferencias estadísticamente significativas entre género. Existe una mayor prevalencia que la referencia a nivel

regional y nacional de enfermedades periodontales en escolares de 12 años asociadas a una higiene bucal regular. Es necesario inculcar y fomentar estrategias de salud pública específicas basadas en datos epidemiológicos.

Palabras clave: *Higiene bucal, CPITN, gingivitis.*

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