



ORIGINAL ARTICLE

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History of dental caries and need for dental treatment among children with visual disabilities, Chile, 2014.

Abstract: Objective: To determine the history of dental caries and the need for dental treatment among visually disabled children between 6 and 12 years old attending special Schools in Chile during 2014. Material and method: Descriptive and observational cross-sectional study. The target population was children with visual disabilities from special schools in Chile. A clinical examination was performed to obtain a dmft/DMFT index and know the need for treatment. Two calibrated examiners performed the visual clinical examination, according to the WHO criteria. Additionally, clinically detectable enamel lesions on cavitated and non cavitated surfaces were recorded. The recorded data were analyzed using descriptive statistics. Results: Ninety-four children attending to seven special schools were examined. The average dmft index was 2.05 (SD±2.6) and DMFT index was 0.96 (SD±1.3). For 6 year olds, the dmft/DMFT index was 3/0, respectively. For 12 year olds, the dmft index was 0.17 and the DMFT index was 1.42. Caries prevalence was 56.3%. From the total, 95% of children needed sealants, 50% needed at least one restoration of one face, and 29% restoration of 2 or more surfaces. As for enamel lesions, 34% of children had at least one non cavitated lesion and 48% of them had a cavitated lesion. Conclusion: History of dental caries is similar to that reported in the general population; however, there is a high need for preventive treatment. Therefore, it is necessary to conduct more research to clarify whether these patients have a higher cariogenic risk due to their visual impairment in order to establish effective promotional/ preventive strategies.

Keywords: *Dental caries, history of dental caries, visual disability.*

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INTRODUCTION.

According to the WHO, there are approximately 285 million people with visual disabilities in the world. Out of these, 39 million are blind and 1.4 million are people under 15 years old who present irreversible blindness¹. In Chile, 890,569 people suffer blindness or visual impairment even when Wearing glasses².

Since 80% of the necessary information for living in society is obtained through vision³, a visual problem decreases the ability to integrate information, affecting personality and limiting functional performance of daily activities related to self-care and mobility⁴. Consequently, it is expected that the

oral health could be affected.

A study from India indicates that prevalence of caries among visually disabled children between 6 to 15 years old was 40% and 11.5% among children without disabilities. The mean dmft and DMFT for children with visual disabilities was 0.17 and 1.1, respectively, and 0.47 and 0.87, respectively, for children without visual disabilities⁵.

In Chile, there are no data on the state of oral health among adults or children with visual impairments, and their oral health needs are unknown.

The objective of this study was to determine the history of dental caries and the need for dental treatment

among children with visual impairments who are part of the special schools in Chile during 2014.

MATERIAL AND METHODS.

An observational descriptive cross-sectional study was conducted. It was requested the approval from the Health Services Ethics Committee from Valdivia, the Ministerial Health Ethics Research Committee (to perform this research at a national level) and the directors of the involved educational institutions.

The population of this study included all children with visual disabilities from special schools for visually impaired people. The selection criteria were the following:

Inclusion criteria: Children who were present on the day of the clinical visual examination; those who were between 6 to 12 years old.

Children who had authorization from their parents in the informed consent and each participant's verbal consent.

Exclusion criteria: Children who attended establishments which do not belong to Special Schools for visually disabled children belonging to the Education Ministry (Ministerio de Educación, MINEDUC)

Children with active pharmacological therapy causing an hypo-salivating effect.

Children with neurological, psychiatric or motor disorders which do not allow for completion of the examination.

Potential representativeness biases were avoided with a census implementation of the exam and the early coordination of directors and parents to achieve a high attendance on the day of the exam.

The examination was carried out by the two authors of the study, who were previously calibrated by a clinician with experience in the area, in two sessions of theoretical instruction-practice where the diagnostic criteria, the need for treatment and how to fill the sheet according to the recommendations of the WHO⁶ were unified. To determine intra and inter examiner reliability, 20 children between 6 and 12 years old were clinically evaluated in Valdivia obtaining a kappa value intra and inter examiner of 0.80.

The clinical examination was carried out at the educatio-

nal institutions, in a reserved room, with the patient sitting in a chair and the operator located behind him/her with a white-blue portable artificial led light with a headband.

The dmft index and each participant's need for treatment were obtained in accordance with the criteria of the oral health survey of the WHO⁶. In addition, clinically detectable enamel lesions on cavitated and non cavitated surfaces were registered⁷.

At the end of each evaluation, each participant was given a hygiene kit (toothpaste and brush) as a gift. They were also instructed about oral hygiene according to the particular needs observed. Besides, the individual oral health diagnosis was given to the parents or legal guardians in a written form.

Data collected by each examiner during the clinical examination were recorded manually. Then, they were analyzed in EPIDAT 3.1 (Servizo de Epidemioloxía de la Dirección Xeral de Innovación e Xestión da Saúde Pública de la Consellería de Sanidade) and a descriptive statistical analysis was carried out.

RESULTS.

The total population of children between 6 and 12 years old was 138, and the eligible population (the one which met the selection criteria) corresponded to 94 children (57 men and 37 women). Thirty-six children did not attend on the day of the exam, 6 children did not verbally assent before the examination and 2 children did not have the informed consent. The involved children attended any of the seven special schools for children with visual impairments in Chile, in Antofagasta, La Serena, Viña del Mar, Santiago (La Cisterna and Ñuñoa), Concepción and Valdivia. Three schools were excluded (CRISOLVI in Arica, Jan Van Dijk in Ñuñoa, URCAE in Concepción) because the children did not meet the inclusion/exclusion criteria.

Caries prevalence among visually disabled children from the special schools investigated is a 56.3%.

The average dmft index was 2.05 (SD±2.6; minimum value 0, maximum value 13) and the DMFT index was 0.96 (SD±1.3; minimum 0, maximum 6). The average dmft and DMFT value for 6-year-old visually disabled children was 3

Table 1. Index of history of caries according to age.

Age children	No. of (Average)	dmft (SD)	dmft (Min-max)	dmft (Average)	DMFT (SD)	DMFT (Min-max)	DMFT
6	18	3	±3.9	0-13	0	±0	0-0
7	9	2.7	±2.3	0-6	0.6	±1	0-3
8	9	3.2	±2.5	0-6	0.7	±1	0-3
9	17	1.06	±1.2	0-4	1.2	±1.7	0-6
10	10	1.75	±1.9	0-5	0.8	±0.9	0-2
11	19	1.2	±2	0-4	1.3	±1.4	0-4
12	12	0.5	±0.6	0-1	1.4	±1.5	0-4

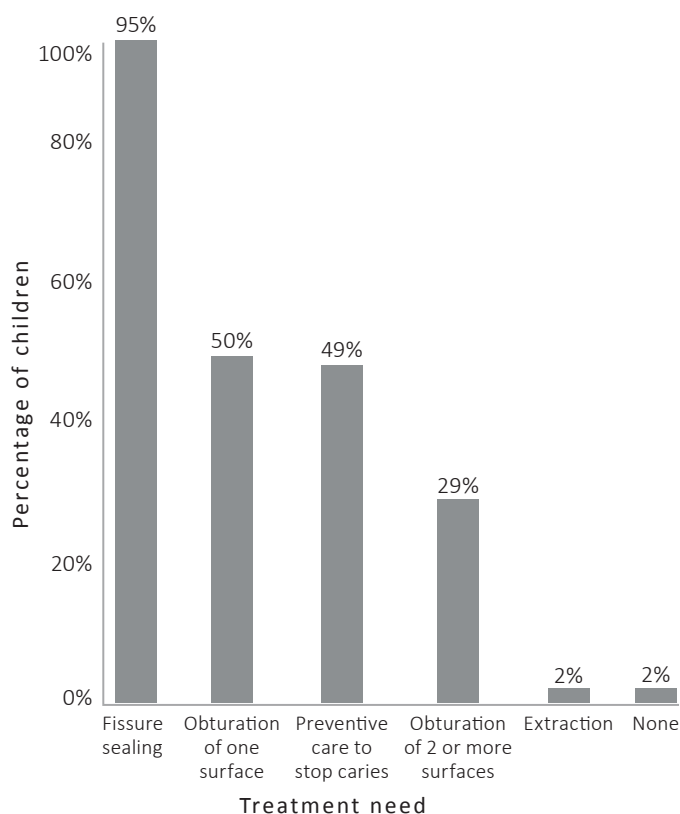


Figure 1. Percentage of visually disabled children between 6 and 12 years old according to their treatment needs, Chile, 2014

and 0, respectively. For 12 year olds, the dmft and DMFT value was 0.17 and 1.42, respectively (Table 1).

It is noted that 95% of the children required the use of sealants as treatment, 50% needed at least one side restoration, and 29% a restoration of 2 or more surfaces (Figure 1).

Regarding enamel lesions, 34% of children had at least one non-cavitated lesion and 48% of them had a cavitated lesion.

DISCUSSION.

This is the first research on history of dental caries and the need for dental treatment among visually disabled children attending special schools in Chile.

Conventional methods for teaching oral hygiene imply the use of visual perception, because they use revealing agents to see plaque and how to brush teeth in order to remove it. Unfortunately, these measures are not beneficial for children with visual disabilities because they depend much more on feeling and hearing to learn. The main differentiation factor between patients with and without visual impairment is the difficulty in the elimination of dental plaque⁸.

The American Academy of Pediatric Dentistry believes that people with disability have an increased risk of developing oral diseases⁹.

In a literature review, it was concluded that the majority of disabled people do not receive dental treatments to suit their needs at a global level. Actually, most of them could be seen by the specialist, with good vocational-technical preparation, integration with a multidisciplinary health team and management of psychological aspects with a family and social focus in primary health care¹⁰.

Jain *et al.*¹¹ reported that dental treatment is the most unattended health need among people with disabilities.

Some of the reasons are inadequate recovery systems, practical difficulties during session, underestimation of treatment needs, communication problems and problems of cooperation from the patient¹¹. Despite the fact that the disabled, particularly the blind population, has the right to the same standards of health and care as the general population, it is evident that they experience worse general and oral health¹¹.

In Chile, the policy for the social integration of people with disabilities is part of the social action objectives for the country. In this process, the State must lead the strategies aimed at achieving greater equality of opportunity through the implementation of social programs⁹. In Peru and Argentina, they are performing actions which tend to create community spaces to include oral health in the daily routine of special educational institutions¹².

Bekiroğlu *et al*¹³ indicated that only 2.2% of the students with visual disabilities investigated have good oral hygiene and 26.4% of the children did not have decay. This coincides with the present investigation since 25.53% of the children examined were caries free in Chile.

In a study conducted in Santiago, Chile, among a population of visually disabled children between 3 and 13 years old, it was determined that 33.32% of the sample did not have caries¹⁴. This difference can be associated with assessing a smaller population of younger age.

In Chile, the prevalence of caries among visually disabled children between 6 and 12 years old attending the special schools investigated is 56.3%. This is opposed to a 40% of caries prevalence described in a population of children between 6 and 15 years old from India⁵. Regarding the experience of caries described in a population of children between 11 and 13 years old in Sudan, it was observed that it was up to 46.8%¹⁵. In Chile, this value was 76.5%. This difference could be due to the fact that in both cases, the age of the study population is higher compared to that of Chile. Therefore, it would possibly generate a decrease in the caries indices for presenting teeth with less time in the mouth because of dental replacement.

In Chile, as in the other research mentioned above, children with visual disabilities have a greater prevalence of den-

tal caries than those without them. According to the National Diagnostic on Oral Health carried out in 2007, the prevalence of dental caries for 12 year olds is 62.5%¹⁶ and the present investigation obtained a prevalence of caries of 66.6% among 12-year-old children with visual disability from the special schools investigated. This presumed trend is different compared to the values obtained for history of caries, since the dmft/DMFT rate obtained for 6-year-old visually disabled children was 3 and 0, respectively, and DMFT rate was 1.4 for 12 year olds. These values are lower than what is described in the diagnosis of national oral health for children without disabilities, which says the dmft/DMFT value is 3.71 and 0.16, respectively, for 6 year olds and COPD is 1.9 for 12 year olds¹⁶. This could be explained by the marked difference in the size of the samples investigated. Besides, a greater emphasis has been gradually placed on health promotion and prevention of oral health using varied strategies during the last decade.

Another factor which could influence the results described above is that, for the present investigation, enamel lesions on a cavitated surface were not classified in the "D" component of the dmft and DMFT index. It was classified independently by adding this code to the card traditionally used by the WHO. This is because they were easy to solve lesions so, with preventative treatments such as the sealing of grooves and fissures they would not longer be part of the history of tooth decay indexes. However, the evidence is clear that if there are not preventive actions regarding these lesions, they will evolve into dentin caries with time and will have to be obturated and therefore be included in the rates of history of caries⁷.

Dental treatment may be invasive and significantly threatening. A visual impairment can make this even more so. Therefore, there is a need to organize management session for these cases. Many people with visual impairment can only search for oral health care when there is a problem like pain. This is especially true for older people, since up to 80% of them do not know that it is advisable to have regular dental examinations¹⁷.

Tagelsir, *et al*.¹⁵ mentioned that the need for treatment

is urgent in 25% of the blind student population between 11 and 13 years old in Sudan. This makes it relevant to offer greater attention in the process of prevention, diagnosis and treatment.

According to the results obtained concerning the need of treatment, 95% of the children examined require the use of sealants. This reality demonstrates some deficiencies on the access to the GES state programs of 6 years or JUNAEB since this type of treatment should be considered in these instances or by other qualified personnel. In the same sense, 49% of children require preventive treatment (mechanical removal of plaque and/or fluoride), thus confirming one of the biggest challenges for this population is plaque control. This makes it necessary to improve strategies for promotion and prevention.

One of the limitations that the present investigation faced was the lack of ideal conditions for the realization of the clinical examination to obtain more accurate results. Among them, there is the inability to get dental surfaces dry in an appropriate manner and the use of supplementary examinations as bitewing radiography.

These results strongly suggest that educational measures for oral hygiene should be implemented among people with visual disabilities. Also, there should be periodic assessment to evaluate access and opportunity for the programs that the State of Chile has for the entire school population in order

to check the real attention given to the entire population without any discrimination.

CONCLUSION.

History of tooth decay is within the normal parameters; however, there is a high need for preventive treatment. Therefore, it is necessary to research more to see causality of what was described, to clarify if they have a greater caries risk due to their visual impairment, and to create inclusive public policies for the visually disabled regarding promotion and access to preventive treatment.

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Historia de caries y necesidad de tratamiento odontológico en niños con discapacidad visual, Chile, 2014.

Resumen: Objetivo: Determinar la historia de caries y la necesidad de tratamiento odontológico de niños con discapacidad visual entre 6-12 años, pertenecientes a Escuelas Especiales de Chile, el año 2014. Material y método: Estudio observacional descriptivo de corte transversal. Se examinaron niños con discapacidad visual de escuelas especiales en Chile, según los criterios de la OMS, para obtener el ceod, COPD y la necesidad de tratamiento. Se registraron las lesiones de esmalte clínicamente detectables en superficies cavitadas y no cavitadas. Los resultados se analizaron me-

dante estadística descriptiva. Resultados: 94 niños fueron examinados, pertenecientes a 7 escuelas especiales. El ceod promedio fue 2,05 (SD \pm 2,6) y el COPD fue de 0,96 (SD \pm 1,3). A los 6 años el ceod/COPD fue de 3/0 respectivamente. A los 12 años el ceod fue 0,17 y COPD fue 1,42. La prevalencia de caries fue de 56,3%. El 95% necesita sellantes, el 50% necesita a lo menos una restauración de una cara, y el 29% una restauración de 2 o más superficies. En cuanto a las lesiones de esmalte, el 34% de los niños presentaban al menos una lesión no cavitada y un 48% de ellos tenían una lesión cavitada. Conclusión: La historia de caries es similar a lo descrito en la población general, sin embargo, existe una alta necesidad de tratamiento preventivo. Es necesario rea-

lizar más investigaciones que permitan esclarecer si poseen un mayor riesgo cariogénico debido a su alteración visual, para así establecer estrategias promocionales/preventivas efectivas.

Palabras clave: *Caries dental, historia de caries, discapacidad visual.*

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