

Assessment of oral health literacy of principal caregivers and its association with dental caries in Mexican disabled pediatric patients

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Highlights

Disabled persons have a higher incidence of caries and periodontal disease than the general population.

Oral health literacy level of principal caregivers was significantly associated with disabled pediatric patient's high result in the DMFT index.

Low oral health literacy level of principal caregivers is a risk factor to have a high DMFT in disabled pediatric patients.

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Abstract

Aim: To assess oral health literacy (OHL) of principal caregivers (PC) and its association with dental caries in Mexican disabled pediatric patients (DPP).

Methods: 40 disabled patients and their PC were recruited from the pediatric dentistry Clinic (UAS) and the Center of Rehabilitation and Special Education of the Institute for Integral Development of the Family in Sinaloa, Mexico. Spanish Oral Health Literacy Scale (SOHLS) was used for the OHL assessment of PC. DPP were subject to clinical examinations to observe the mean number of decayed, missing, or filled teeth through the DMFT index. Disabilities were classified in neuromotor, auditive and language, visual, intellectual, or multiple. To estimate OHL differences, the variable was divided into 3 categories according to the obtained score: low (0-16), medium (17-22), or high (23-29). For the logistic regression model, the variable was categorized on 2 according to ANOVA results: lower (0-22) and high (23-29) to estimate the association between PC low OHL and DMFT percentual increase.

Results: Regarding DPP, there were no differences in age expressed in years (12.47(±8.16) (p=0.673)), DMFT (0.34(±0.26) (p=0.673)) or the number of teeth (23.32(±5.29) (p=0.653)). Besides, no differences were found in PC age expressed in years (41.22(±8.91) (p=0.795)), PC scholarship expressed in years (3.95(±8.91) (p=0.128)) or PC OHL (22.27(±3.99) (p=0.205)). The logistic regression model categorizing OHL on high (>22) and low (≤22) found 0.97% more risk to be a PC with low OHL per percentual unit of DMFT increment (p=0.041). **Conclusions:** The OHL level of PC is significantly associated with DPP's high result in the DMFT.

Keywords: Caregivers; Dental Caries; Dentistry; Literacy

INTRODUCTION

According to World Health Organization (WHO), about 15% of the world population lives with some form of disability, and 2-4% of them can experience significant difficulties in self-care functions given by developmental or sensitive disorder^{1,2}, which result in communicative or intellectual impairments³ that conducts to a long-term dependence.⁴ In this regard, critical aspects such as oral health care depend on the knowledge, attitude, and actions of the PC.^{5,6}

This is relevant since oral health is a major constituent of general health.⁷ It is widely reported that disabled persons (DP) have a higher incidence of caries and periodontal disease than the general population.⁸⁻¹¹ Oral health problems like caries and periodontitis can lead to pain¹² and eating difficulties, poor nutrition^{13,14}, digestive and respiratory problem associated to recurrent infections^{15,16}, sleep disturbance¹⁷, and decreased self-esteem⁵ (Figure 1). Furthermore, dental caries and gingivitis in DP (2-19 years old) have been strongly associated with the level of the mother's education.¹⁸

Oral health literacy (OHL) plays a central role in the relationship between the perception about signs and symptoms, perceived value of good oral health, and the ability to understand the health care system.¹⁹ This relationship has been associated with several oral health actions and outcomes. There is evidence that OHL of PC is a strong predictor of oral health in the DP under their care.²⁰ Health literacy includes the ability to understand instructions on prescriptions or basic health information, medical education brochures, and health personnel directions.²¹ PC are in charge of preventive oral care, diet, oral hygiene, and attendance at dental consultations.²² Besides, there is a strong relation between OHL of PC and decayed, missing, and filled teeth (measured by DMFT index) in the persons under their care.²³ This is relevant since dental caries is the most incidental disease of the oral cavity in Mexico and worldwide.²⁴ Therefore, the purpose of this study was to associate the OHL of PC with dental caries in Mexican DPP.

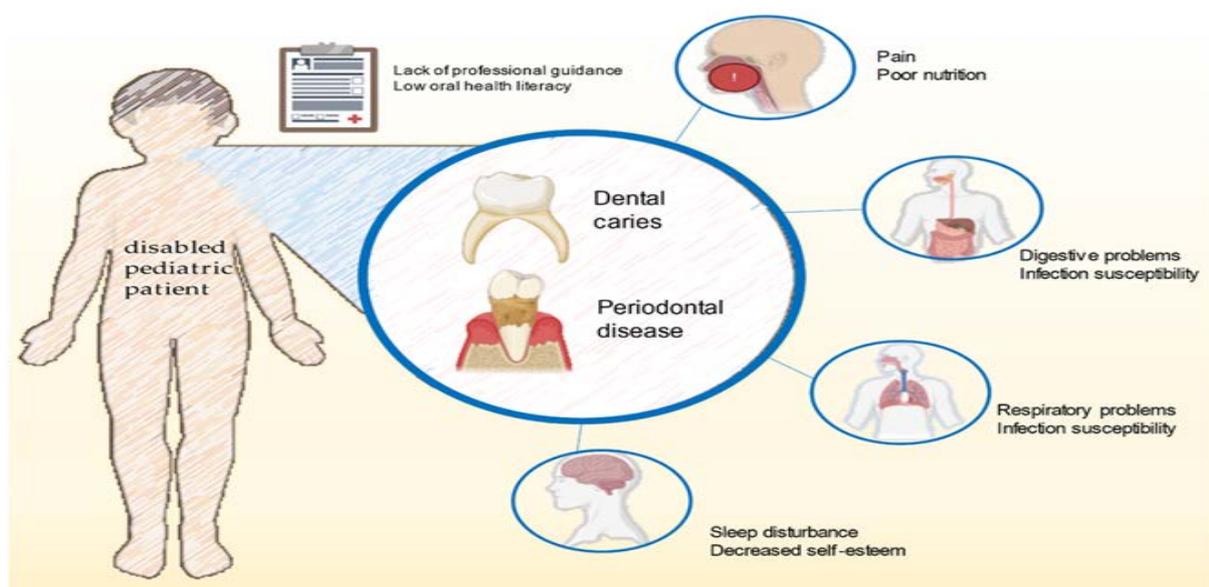


Figure 1. Oral health problems in DPP like caries and periodontitis can lead to other affections such as pain and eating difficulties, poor nutrition digestive and respiratory problem associated to recurrent infections, sleep disturbance, and decreased self-esteem. Lack of professional guidance or low OHL of PC could be key for the development of illness

METHODS

Study sample

A sample size of 8 per disability class was calculated for detecting differences between 2 proportions on DMFT index, estimated by a X^2 test, using epidemiologic data of Down's syndrome patients²⁵ that reports 37% on DMFT index vs 77% of cerebral palsy patients²⁶, using a $\alpha = 0.05$ and $\beta = 0.8$ for a 2 tailed test. In this cross-sectional study, 40 disabled patients and their PC were recruited from the pediatric dentistry Clinic (Universidad Autónoma de Sinaloa UAS) and the Center of Rehabilitation and Special Education of the Institute for Integral Development of the Family in Sinaloa, Mexico. Informed consent was obtained from all subjects involved in the study. This study was previously approved for ethical committee of Universidad Autónoma de Sinaloa. DPP included had more than 20 teeth and their PC accepted to participate and filled the instrument. DPP with genetic syndromes, systemic health problems, illiterate PC, or incomplete questionnaires were excluded.

Measurements

Spanish Oral Health Literacy Scale SOHLS (reliable and validated instrument)²⁷ was used for the OHL assessment of PC. This instrument is a self-answered questionnaire for Mexican Spanish speakers that evaluates how a person understands, processes, and applies specific information. It contains 29 items that assess five literacy skills: location, integration, generation, calculation, and return (9 correspond to cycling skills, 4 to location, 2 to formulation, 3 to generation, and 11 to integration skills). Each item has a value of one if answered correctly. The complete test has a summative score from 0 (lowest literacy) to 29 (highest literacy).

DMFT

DPP were subject to clinical examinations through DMFT Index. This index is the most important used in epidemiological studies of the health status of the community.²⁸ The DMFT score of the samples was determined based on the results of clinical examination and calculation of the number of decayed (D), filled (F), and missed (M) teeth due to caries. The data were collected through observation and direct examination using a mirror number #4. During the inspection, the subjects under examination and the researcher sat close to the window to examine under the maximum natural light.

Disability classification

Disability classification was analyzed as a confusing variable and decoded in agreement to the Social Integration Law of Sinaloa for disabled people (neuromotor, auditive and language, visual, and intellectual or multiple).

Standardization

SOHLS standardization was performed with a pilot probe of 10 PC. Complications on lecture, understanding, or tiredness were evaluated during questionnaire filling without finding any problem. DMFT index standardization was performed using intraoral pictures of 10 patients. DMFT results of every patient were assessed by 2 evaluators, and exercises were repeated 3 times in 1-week intervals using the Intraclass concordance coefficient. A 0.998% concordance was obtained between evaluators.

Statistical analysis

Significance and differences were assessed across disability classes using different statistical tests. ANOVA was used for parametric variables. To estimate OHL differences, the variable was divided into 3 categories according to the obtained score: low (0-16), medium (17-22), or

high (23-29). For the logistic regression model, the variable was categorized on 2 according to ANOVA results: lower (0-22) and high (23-29) to estimate the association between PC low OHL and DMFT percentual increase.

RESULTS

Descriptive statistic was developed to find differences between disability classes (Table 1). Regarding DPP, there were no differences in age expressed in years ($12.47(\pm 8.16)$ ($p=0.673$)), DMFT ($0.34(\pm 0.26)$ ($p=0.673$)) or the number of teeth ($23.32 (\pm 5.29)$ ($p=0.653$)) showing homogeneity of the main confounding variables of the DPP.

Besides, no differences were found in PC age expressed in years ($41.22(\pm 8.91)$ ($p=0.795$)), and PC scholarship expressed in years ($3.95(\pm 8.91)$ ($p=0.128$)) or PC OHL ($22.27(\pm 3.99)$ ($p=0.205$)).

DMFT analyses associated with PC OHL raised lower values of DMFT related to high OHL group ($0.26 (\pm 0.21)$) when compared to medium OHL ($0.42 (\pm 0.29)$) or low OHL ((± 0.32) ($p=0.041$)) groups. Logistic regression model categorizing OHL on High (>22) and Low (≤ 22) found 0.97% more risk to be a PC with low OHL per percentual unit of DMFT increment ($p=0.041$) (Table 2). Considering the uniformity of the confounding variables, we assume that the differences detected were not influenced by the main confounding variables.

Table 1. Descriptive analysis for disability class

Disability class	DPP Age	DMFT	Teeth	PC age	PC scholarship	OHL
Neuromotor	$11.40(\pm 6.71)$	$0.32(\pm 0.3)$	$23.50(\pm 6.34)$	$39.90(\pm 7.82)$	$4.50(\pm 7.82)$	$23.2(\pm 3.11)$
Auditiva nd language	$11.80(\pm 6.80)$	$0.39(\pm 0.22)$	$24.30(\pm 3.40)$	$40.80(\pm 6.17)$	$4.10(\pm 6.17)$	$20.9(\pm 5.62)$
Visual	$15.30(\pm 12.72)$	$0.37(\pm 0.33)$	$21.50(\pm 7.33)$	$43.70(\pm 11.46)$	$4.60(\pm 11.46)$	$24.0(\pm 3.09)$
Intellectual or multiple	$11.40(\pm 4.83)$	$0.29(\pm 0.19)$	$24.00(\pm 3.23)$	$40.50(\pm 10.18)$	$2.60(\pm 10.18)$	$21.0(\pm 3.16)$
Total	$12.47(\pm 8.16)$	$0.34(\pm 0.26)$	$23.32(\pm 5.29)$	$41.22(\pm 8.91)$	$3.95(\pm 8.91)$	$22.27(\pm 3.99)$

DPP: Disabled pediatric patients; DMFT: Index to measure Decay, Missing or filled teeth; PC: Principal Caregivers; OHL: Oral Health Literacy

Table 2. Logistic regression analysis found more risk to be a PC with low OHL per percentual unit of DMFT increment

OHL	N	DMFT	CI (95%)	Significance		
Low (10-16)	4	$0.54 (\pm 0.32)$	0.29 - 1.05			
Medium (17-22)	15	$0.42 (\pm 0.29)$	0.26 - 0.57	$p=0.041$		
High (23-28)	21	$0.26 (\pm 0.21)$	0.17 - 0.36			
Total	40	$0.35 (\pm 0.26)$	0.26- 0.43			
Logistic regression	N	DMFT %	X ²	CI (95%)	Exp (B)	Significance
High	19	$44 (\pm 29)$	$p=0.019$	30-58	0.970	$p=0.041$

OHL: Oral Health Literacy; DMFT: Index to measure Decay, Missing or filled teeth; CI: confidence interval; X²: squared Chi; Exp (B): exponentiation of the B coefficient.

DISCUSSION

The results demonstrate that the OHL level of PC is significantly associated with DPP's high result in the DMFT index. Besides, improving the OHL of PC is the best option to help strengthen their abilities to promote oral health and DPPs general health. These findings are opposite to those obtained by Divaris and Cols in 2012²⁹, who found poor correlations between the assessment of PC clinical needs of patients. This difference could be explained given the age of children included in the study who were less than two years old. Besides, as mentioned by Baskaradoss & Cols in 2018²⁰, parents of very young children may overestimate the oral health status of their child.

This study has some limitations regarding the use of the DMFT index for dental caries detection, which fails to detect interproximal and incipient lesions. Besides, the DMF score is a count that does not indicate the number of teeth that are at risk and does not discriminate between the mix of decayed, missing, and filled teeth or surfaces, and whether teeth are lost for reasons other than caries; therefore, the validity of the DMF can be considered as reduced.³⁰ Also, a larger or multi-centered study can improve the validity of results. In this regard, more work is required to further explore the different aspects of OHL. On the other hand, the strength of this work is the sampling method employed since aimed to provide a comprehensive picture of the DPP in this country, as patients of the study come from different attention centers of Sinaloa and have different socioeconomic and cultural statuses.

In 2019, 1.2 million of DPP were reported in Mexico. The results of this study suggest that the age of DPP, teeth number, as well as descriptive data of PC, have no differences regardless of disability class. These similarities are given by the presence of physical or communicative barriers at

the time of oral health care. This could be due to a lack of experience of professionals in the management of information and the lack of adequate guidance to their PC.³¹

Findings showed that Low PC OHL is a risk factor to have a high DMFT in DPP which agrees with data suggesting that patients with lower values of health literacy had a poor general and oral health status.²⁰ Besides, there is evidence that shows that PC with high OHL are more attentive to prevent oral health of the patients they take care.^{32,33} As has been previously reported³⁴, knowledge and oral health literacy of PC are important predictors that must be taken into account to reduce social inequalities in health through actions undertaken at the local level in patients with disabilities.

Dental caries in Mexico is a public health problem. Therefore, the promotion of primary prevention and understanding of oral health care in DPP should be an integral part of dentistry. These individuals are a risk group³⁵ since from a young age they require specialized dental care. Besides, it is important to ensure PCs adequate literacy given by trained professionals that allows understanding preventive care, the importance of diet, frequency of visit to the dentist, and other instructions to guarantee oral health of DPP.

CONCLUSIONS

The OHL level of PC is significantly associated with DPP's high result in the DMFT index. Improving the OHL of PC might, therefore, help strengthen their capacities to promote oral health, thus helping to improve DPP general health.

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Declarations

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