

DIET AND DENTAL CARIES IN PRESCHOOLERS WITH AND WITHOUT CLEFT LIP AND PALATE IN LIMA, PERU

Dieta y caries dental en niños preescolares con y sin fisura labiopalatina en Lima, Perú

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ABSTRACT

Aim: To demonstrate the relationship between diet and dental caries in preschool children with or without cleft lip and palate (CLP).

Material and Methods: The participants included 142 children from 3 to 5 years old. The number of children with CLP was 91, and those without CLP were 51. The type of the study was analytical, comparative, and cross-sectional. The sampling was non-probabilistic for convenience, and the study variables were diet and dental caries. The study used the Health Behavior in School-aged Children (HBSC) questionnaire to get data on diet and the decayed, missing, and filled teeth (dmft) index for dental caries.

Results: The study found that participants with clefts had a higher prevalence of dental caries (86.8%) than those without (78.4%). Regarding inadequate diet, both groups presented a significant association with dental caries ($p=0.036$); cleft children who consumed sugar-free dairy products had less dental caries than those dmft did not ($p=0.023$).

Conclusions: In cleft children, inadequate diet had a significant association with dental caries having a great association with sugary dairy products.

Keywords: *Cleft palate; Cleft lip; Dental caries; Diet; Child, preschool; Peru.*

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RESUMEN

Objetivo: Establecer la relación de la dieta con la caries dental en niños preescolares que presentan o no fisura labiopalatina.

Materiales y métodos: La muestra estuvo constituida por 142 niños de 3 a 5 años, 91 presentaron fisura labiopalatina y 51 no presentaron fisura labiopalatina, que acudieron para evaluación general. Fue un estudio analítico, comparativo, transversal. El muestreo fue no probabilístico por conveniencia y las variables del estudio fueron dieta y caries dental, para la recolección de datos sobre dieta se usó el cuestionario Health Behaviour in school-aged children (HBSC), y para caries dental se usó el índice de caries para dientes cariados, extraídos y obturados (ceod) para dientes deciduos.

Resultados: Se encontró que los pacientes con fisura presentaron mayor frecuencia de caries dental (86.8%) en comparación con el grupo sin fisura (78.4%). Con respecto a la dieta inadecuada en ambos grupos presentaron una asociación significativa con la caries dental ($p=0.036$); los niños fisurados que consumieron lácteos no endulzados tuvieron menos presencia de caries dental que aquellos que no la consumieron ($p=0.023$). No se observó asociación en los no fisurados.

Conclusiones: La dieta inadecuada presentó una asociación significativa con la caries dental, siendo los productos endulzados los que presentaron mayor asociación en niños fisurados.

Palabras clave: *Fisura palatina; Labio leporino; Caries dental; Dieta; Preescolar; Peru.*

INTRODUCTION

Cleft lip and palate (CLP) is one of the most common craniofacial malformations that affects parts of the head and neck, constituting the second most common congenital deformity at birth. In children with CLP, feeding is one of the most frequent problems.^{1,2} This could condition the presence of nutritional problems in the newborn with CLP, generating an adverse impact on the growth and development of the child.³⁻⁵

One of the most frequently reported feeding problems in these patients is ineffective sucking generated by inadequate negative pressure in the oral cavity, regurgitation of milk through the nasal cavity, and suffocation as a consequence of incomplete facial development and structural defects in the palate, causing low food intake³ and conditions that can favor the presence of dental caries.⁶

The consumption of snacks and sugary drinks is considered an inadequate feeding habit.⁷ A cariogenic diet is a set of substances regularly ingested as foods that promote dental caries development.

Early childhood caries occurs in young children, progresses rapidly, and ends with the destruction of the deciduous dentition.⁸ Defects in the formation of the alveolus and palate in children with CLP located in the alveolar and palate areas would be associated with increased risk of dental caries and various environmental factors such as lack of fluoride, poor oral hygiene habits, and high consumption of diets rich in sucrose.⁹ These factors are difficult to control, added to the lack of formation of tooth germs in the cleft area, leading to alterations in the functions of the stomatognathic system, such as swallowing, chewing, and phono articulation, among others, representing a public health problem.^{3,10}

Nutritional supplements as infant formulas are indicated in cleft children to overcome their dietary problems. These products are rich in sugar and could promote the presence of dental cavities.^{7,11} Even many studies have shown a direct relationship between dental caries and the consumption of sugars between meals of cleft children. Furthermore, many parents of children with CLP have demonstrated poor oral health and little knowledge about the intake of foods that contribute to dental caries.¹²⁻¹⁵

Cavities at an early age and the premature loss of deciduous teeth in children with CLP can affect the success of surgical, orthodontic treatment, and speech therapy, among others.¹⁴ The risk factors can contribute to the increase in dental caries in these children, such as the problem of nasal pathology that alters the bacterial flora and tooth eruption. Therefore, there are important risk factors for cavities in early childhood, such as the extended use of feeding bottles to ensure adequate nutrition and problems in the hygiene, combined with abnormal teeth and cleft.^{16,17}

This study aims to demonstrate the relationship between diet and early childhood caries in preschool children with or without CLP.

MATERIALS AND METHODS

The sample size was 142 children from 3 to 5 years old who participated in this study, of which 91 children presented CLP and 51 did not. They received attention in the pediatric dentistry service of the non-governmental organization (NGO) Qorito (a center for patients with craniofacial malformations and CLP) for general evaluation in 2023.

This investigation was a cross-sectional comparative study, and the type of sampling was

non-probabilistic for convenience because of the review of all the dental medical records. The study variables were eating habits and early childhood cavities. Data on eating habits were collected using the 2014 Health Behavior in School-aged Children (HBSC) questionnaire in Spanish validated for Peru,¹⁸ which has the indicators structured based on a closed list, made up of 47 foods and beverages and snacks classified into 13 groups.

For the frequency of consumption, the parents or guardians of both cleft and non-cleft patients responded to a systematized questionnaire into five categories to record data. The categories were never, 1-3 times a month, 1 per week, 2-4 days per week, and 5-7 days per week.

Then, the children received a tooth brushing or a dental prophylaxis treatment before the clinical evaluation. Each child received a clinical dental inspection of their teeth and dental caries lesions were detected using the decayed, missing, and filled teeth (dmft) index: very low (0-1.1), low (1.2-2.6), moderate (2.7-4.4), high (4.5-6.5), very high (6.6-7).¹⁹

The researcher in charge of this study, who is a pediatric dentist from the Pediatric Dentistry Service of the NGO Qorito and a calibrated researcher in the dmft index, was responsible for extracting data to tabulate it according to the study variables and determining the values for each variable per patient. For the inclusion criteria, the study considered children from 3 to 5 years old with and without CLP and whose parents had signed the informed consent for the pediatric evaluation. The study excluded those children who did not meet the inclusion criteria. And those who did not have clefts also did not have any congenital malformations or diseases.

The values of descriptive statistics with absolute and relative frequencies were determined using the statistical software SPSS. Statistics 25 in Spanish: The association and the difference between groups were determined using the statistical analysis of the Chi-square of independence and homogeneity, always with a statistical significance of 5%.

The Ethics Committee of the Research, Innovation, and Entrepreneurship Unit of the National University Federico Villarreal, through Opinion No. 003-2023-Ethics Committee, approved this study.

RESULTS

The prevalence of caries is 86.8% in children with clefts while those without cleft was 78.4%, (Table 1).

Most children with clefts have a very high dmft (50.5%), and only 17.6% have a very low dmft. In contrast, children without clefts have a different distribution: the majority, 37.3%, have a very low dmft, and 29.4% have a very high dmft. All of this suggests that children with clefts tend to have more caries in their deciduous teeth compared to children without clefts, (Table 2).

The univariate analysis showed that children with CLP and inadequate feeding habits had a statistically significant association with dental caries ($p=0.036$). Packaged beverages presented a statistically significant association in the univariate analysis ($p=0.011$), finding that those who consumed them twice to four times a week had six times the risk of dental caries than those who did not. Those children who consumed sugar-free drinks had fewer dental cavities than those who did not ($p=0.003$).

Table 1

Relationship of the prevalence of dental caries according to the presence of fissure

Dental caries		No		Yes		Total	
		n	%	n	%	n	%
Cleft lip and palate	With cleft	12	13.2	79	86.8	91	100
	Without cleft	11	21.6	40	78.4	51	100
Total		23	16.2	119	83.8	142	100

Table 2

Relationship of dmft according to the presence of cleft

dmft WHO		Very low		Low		Moderate		High		Very high		Total	
		n	%	n	%	n	%	n	%	n	%	n	%
Cleft lip and palate	With cleft	16	17.6	6	6.6	10	11	13	14.3	46	50.5	91	100
	Without cleft	19	37.3	5	9.8	5	9.8	7	13.7	15	29.4	51	100
Total		35	24.6	11	7.7	15	10.6	20	14.1	61	43.0	142	100

dmft: Decayed, missing, and filled teeth index. **WHO:** World Health Organization.

Table 3

Ordinal regression to establish the relationship between feeding habits and caries dental of children from 3 to 5 years old with and without cleft lip and palate.

Factors		N	%	With cleft			Without cleft		
				p-value	Odds (95% IC)	p-value	p-value	Odds (95% IC)	p-value
dmft WHO	Very low	16	17.6				19	37.3	
	Low	6	6.6				5	9.8	
	Moderate	10	11.0				5	9.8	
	High	13	14.3				7	13.7	
	Very high	46	50.5				15	29.4	
Sex	Male	57	62.6	0.219	1 0.640 (0.248-1.653)	0.357	34	66.7	0.323
	Female	34	37.4				17	33.3	
Age	3 years	33	36.3	0.531			19	37.3	0.349
	4 years	28	30.8		12	23.5			
	5 years	30	33.0		20	39.2			
Feeding Habits	Suitable	22	24.2	0.036	1 0.510 (0.143-1.820)	0.300	4	7.8	0.999
	Inadequate	69	75.8				47	92.2	
Fruits	Never	46	50.5	0.157	1 468943346.2 1.327 (0.117-15.079) 0.494 (0.169-1.445)	0.610	41	80.4	0.58
	1 to 3 month	0	0				1	2	
	1 day week	1	1.1				0	0	
	2 to 4 week	4	4.4				0	0	
	5 to 7 week	40	44				9	17.6	
Vegetables	Never	68	74.7	0.568			48	94.1	0.999
	2 to 4 week	6	6.6		0	0			
	5 to 7 week	17	18.7		3	5.9			
Sweetened Milk	Never	12	13.2	0.922			9	17.6	0.919
	1 day week	1	1.1		0	0			
	2 to 4 week	5	5.5		3	5.9			
Unsweetened Milk	5 to 7 week	73	80.2	0.029	1 0.143 (0.027-0.768)	0.023	39	76.5	0.553
	Never	82	90.1				46	90.2	
	2 to 4 week	0	0				1	2.0	
Yogurt	5 to 7 week	9	9.9	0.432			4	7.8	0.964
	Never	28	30.8		33	64.7			
	1 to 3 month	1	1.1		0	0			
	1 day week	3	3.3		0	0			
	2 to 4 week	23	25.3		2	3.9			
Sweet cookies	5 to 7 week	36	39.6	0.307			16	31.4	0.575
	Never	44	48.4		17	33.3			
	1 to 3 month	3	3.3		0	0			
	1 day week	5	5.5		6	11.8			
	2 to 4 week	21	23.1		14	27.5			
Salty crackers	5 to 7 week	18	19.8	0.375			14	27.5	0.828
	Never	63	69.2		36	70.6			
	1 to 3 month	1	1.1		2	3.9			
	1 day week	3	3.3		0	0			
	2 to 4 week	11	12.1		2	3.9			
5 to 7 week	13	14.3	11	21.6					

dmft: Decayed, missing, and filled teeth index. **WHO:** World Health Organization.

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Factors		With cleft				Without cleft					
		N	%	p-value	Odds (95% IC)	p-value	N	%	p-value	Odds (95% IC)	p-value
Sweets	Never	46	50.5	0.85		26	51	0.912			
	1 to 3 month	1	1.1			0	0				
	1 day to week	4	4.4			3	5.9				
	2 to 4 week	15	16.5			10	19.6				
	5 to 7 week	25	27.5			12	23.5				
Chocolate	Never	71	78	0.668		35	68.6	0.241	1	0.435	
	1 day to week	4	4.4			5	9.8		0.277 (0.028-2.713)		
	2 to 4 week	9	9.9			4	7.8		2.783 (0.353-21.922)		
	5 to 7 week	7	7.7			7	13.7		1.375 (0.246-7.702)		
Sugary cereals	Never	31	34.1	0.434		21	41.2	0.386			
	1 to 3 month	2	2.2			0	0				
	1 day week	5	5.5			1	2.0				
	2 to 4 week	20	22.0			9	17.6				
	5 to 7 week	33	36.3			20	39.2				
Unsweetened cereals	Never	87	95.6	0.458		45	88.2	0.902			
	2 to 4 week	0	0			1	2.0				
	5 to 7 week	4	4.4			5	9.8				
Fries at home	Never	89	97.8	0.83		48	94.1	0.957			
	1 day week	1	1.1			0	0				
	2 to 4 week	0	0			2	3.9				
	5 to 7 week	1	1.1			1	2.0				
Fried food outside the home	Never	83	91.2	0.406		48	94.1	0.097	1	0.218	
	1 to 3/month	1	1.1			0	0				
	2 to 4/week	1	1.1			3	5.9		5.461 (0.367-81.269)		
	5 to 7/week	6	6.6			0	0				
Packaged drinks	Never	52	57.1	0.011	1	0.143	35	68.6	0.399		
	1 to 3 month	2	2.2		1.101 (0.077-15.682)		2	3.9			
	1 day week	9	9.9		1.338 (0.307-5.835)		4	7.8			
	2 to 4 week	12	13.2		6.384 (0.981-41.524)		4	7.8			
	5 to 7 week	16	17.6		4.564 (1.018-20.470)		6	11.8			
Sodas	Never	56	61.5	0.232	1	0.688	27	52.9	0.074	1	0.439
	1 to 3 month	2	2.2		2.707 (0.193-38.027)		6	11.8		4.531 (0.681-30.142)	
	1 day week	12	13.2		0.892 (0.224-3.556)		6	11.8		4.744 (0.457-49.213)	
	2 to 4 week	16	17.6		2.268 (0.493-10.432)		8	15.7		2.606 (0.568-11.956)	
	5 to 7 week	5	5.5		2.710 (0.386-19.036)		4	7.8		2911974238	
	Unsweetened water or juices	Never	77		84.6		0.03	1		0.342	
2 to 4 week	1	1.1	0.328 (0.014-7.458)	0	0						
5 to 7 week	13	14.3	0.344 (0.080-1.493)	5	9.8	4.932E-10					
Sweetened soft drinks or juices	Never	66	72.5	0.83		44	86.3	0.589			
	1 day week	0	0			1	2.0				
	2 to 4 week	2	2.2			0	0				
	5 to 7 week	23	25.3			6	11.8				

dmft: Decayed, missing, and filled teeth index. **WHO:** World Health Organization.

Finally, for the univariate analysis, children who consumed sugar-free dairy products had less presence of dental caries than those who did not ($p=0.029$). It was the only endorsed value in the multivariate analysis with a $p=0.023$. Feeding habits and dental caries did not present a statistically significant association in children without CLP from 3 to 5 years old, (Table 3).

DISCUSSION

The study sample consisted of 142 children aged 3 to 5 years, with and without cleft lip and palate, assessing dental caries with their feeding habits. This study observed that children with CLP presented caries at high (65%) and very high (75.4%) levels in comparison with those children who did not present CLP in the high (35%) and very high (24.7%) levels confirming a lower prevalence of caries at these levels. This evidence coincides with a systematic review and a scoping review that observed caries experience between children and adolescents with CLP and non-cleft children.^{20,21}

These reviews found a higher risk of dental caries in infants and children with CLP and deciduous dentition than in non-cleft children. Although, the risk of caries seems to have decreased in mixed dentition due to tooth replacement. Indeed, this study concluded that the prevalence of dental caries in children with CLP and deciduous dentition was higher than in non-cleft children. The present study considers that the higher prevalence of dental caries in children with cleft palate may be due to anatomical and functional defects in the oral cavity bound to inadequate feeding habits.

Relative to feeding habits, this study found that the cleft children had 75.8% inadequate

eating habits, which had a significant relationship with the presence of dental caries ($p=0.036$). A study explains this evidence, indicating the presence of CLP can influence the oral health of affected children.⁷

Moreover, the study observed a direct positive correlation between the experience of dental caries and the intake of sugary foods and drinks between meal times but not during mealtimes.

In addition, this study found that children who consumed sugar-free dairy products had less presence of dental caries than those who did not ($p=0.023$). Children with cleft palates are introduced to refined sugars early in life to prepare them for primary reconstructive surgery. However, these poor eating habits persist over time, creating favorable conditions for the development of dental caries. These factors are likely associated with a lack of dietary counseling in the early years of life.^{7,22}

Regarding the consumption of packaged beverages, the study found that children with CLP who consumed these products 2-4 times a week had 6 times the risk of having dental caries than those who did not ($p=0.011$). Additionally, those who consumed sugar-free drinks had fewer dental caries than those who did not ($p=0.003$). The frequency of consumption of sugary foods is a key factor since each exposure to sugar generates an acidic environment in the oral cavity for approximately 30 minutes, which increases the time teeth are exposed to acids, increasing the risk of dental caries.

The consumption of snacks between meals shows that these foods that combine sugars and starches have greater cariogenicity because starch prolongs the contact time with the teeth, increasing the risk of cavities. On the other hand, there is more saliva during

food consumption between meals than three main meals. It is worth mentioning that saliva acts as a natural barrier against dental caries by neutralizing acids, remineralizing enamel, and eliminating food debris.^{23,24}

This study highlights the importance of the intervention of the pediatric dentist in the multidisciplinary team that treats these patients in their first years.

Therefore, the study recommends dietary counseling as part of preventive treatment. Promoting healthy eating habits, reducing the frequent intake of sugars and starches, and encouraging a balanced diet are essential for preventing tooth decay.

Recommendations

The study suggests preventive oral health programs that promote healthy eating and reduce sugar and starch consumption in children with and without cleft lip and palate in the early years of life.

CONCLUSIONS

Poor diet and the presence of dental caries showed a significant link. Sugary dairy products were the most consumed foods by children with cleft, demonstrating a stronger association with the presence of dental caries and highlighting the importance of adequate feeding habits in the first years of life.

CONFLICT OF INTERESTS

There is no conflict of interest to declare.

ETHICS APPROVAL

The Ethics Committee of the Research, Innovation, and Entrepreneurship Unit of the National University Federico Villarreal, through Opinion No. 003-2023-Ethics Committee.

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PEER REVIEW

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