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Dental caries in children assisted on a dental school clinic: prevalence and associated factors

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ABSTRACT

OBJECTIVE: This study aimed to determine the factors associated with dental caries on primary and permanent dentition of a pediatric dental school clinic users.
METHODS: A retrospective study of information collected from 313 dental records obtained from 2011 to 2013. The prevalence of tooth decay on primary (dmft) and permanent dentition (DMFT). Sociodemographic factors, dietary and hygiene habits were analyzed, as well Data were analyzed using Chi-square or Fisher exact test ($\alpha = 0.05$).
RESULTS: Average dmft was 3.47 ± 3.78 and 3.46 ± 3.05 for 0-6 and 7-9 range age, respectively (p = 0.781). Average DMFT was 0.80 ± 1.25 and 3.16 ± 3.72 for the range of 7-9 and ≥ 10 years, respectively (p = 0.00). The restorative treatment need due to dental caries was highly prevalent (78% of dmft and 54% of DMFT). Dmft was associated with paternal education (OR: 0.37, 95% CI: 0.13-1.05) and OHI-S (OR: 2.39, 95% CI: 1.22-4.66). DMFT was associated with gender (OR: 2.36, 95% CI: 1.38-4.01).
CONCLUSION: Children assisted in this dental school clinic had a high prevalence of untreated dental caries, mainly associated with paternal education and OHI-S (primary dentition), and gender (permanent dentition).

Keywords: Health Services; Epidemiology; Dental caries

Cárie dentária na dentição decidua e permanente em uma clínica escola de odontopediatria: prevalência e fatores associados

RESUMO

OBJETIVO: Este estudo teve como objetivo determinar os fatores associados à cárie dentária na dentição decídua e permanente de usuários de uma clínica pública de Odontopediatria.
MÉTODOS: Foi realizado um estudo retrospectivo com informações coletadas de 313 prontuários odontológicos obtidos entre 2011 a 2013. Foram analisados a prevalência de cárie dentária na dentição primária (ceo) e permanente (CPO-D), assim como fatores sociodemográficos e hábitos dietéticos e de higiene oral. Os dados foram analisados utilizando teste Qui-quadrado ou exato de Fisher ($\alpha = 0,05$).
RESULTADOS: O ceo-d médio foi de $3,47 \pm 3,78$ e $3,46 \pm 3,05$ para as faixas etárias de 0-6 e 7-9, respectivamente (p = 0,781). O CPO-d médio foi de $0,80 \pm 1,25$ e $3,16 \pm 3,72$ para as faixas de idade de 7-9 e ≥ 10 anos, respectivamente (p = 0,00). A necessidade de tratamento restaurador devido à cárie dental foi altamente prevalente (78% do ceo-d e 54% do CPO-d). O ceo-d foi associado com educação paterna (OR: 0.37, IC 95%: 0.13-1.05) e IHO-S (OR: 2.39, IC 95%: 1.22-4.66). O DMFT foi associado ao gênero (OR: 2.36, IC 95%: 1.38-4.01).
CONCLUSÃO: As crianças atendidas nesta clínica escola de Odontopediatria apresentaram alta prevalência de cárie dentária não tratada, principalmente associada à educação paterna e IHO-S (dentição primária) e gênero (dentição permanente).

Palavras-chave: Serviços de saúde; Epidemiologia; Cárie dentária

INTRODUCTION

The epidemiological reduction of caries incidence in the last years is a tendency around the world [1, 2, 3]. However, the dental caries is still a critical issue in public health because it is highly prevalent in specific groups of the population and demands many costs for health services [4, 5, 6]. From the community perspective, dental caries had demonstrated multiple manifestations that demand special attention, mainly due to its psychosocial and functional consequences [4], especially in early ages.

In this framework, understanding the distribution of caries is necessary to improve dental services and planning oral health strategies [7, 8]. Therefore, epidemiological studies have evaluated the factors influencing the dental caries prevalence in children [9, 10, 11]. These studies are important to understand this disease in the public health context, promoting a movement of rational intervention at both community and individual levels. In this context, it is clear that public health services should have different dynamics considering some environmental, cultural and local factors that may influence the working process and the decision making of professionals [12].

Currently, the Unified Health System in Brazil has widely distributed Family Health Unities that promotes dental assistance in primary and secondary levels [13]. These services are established by Smiling Brazil policy approved in 2004. This policy also recognize that dental students must have access to an integral formation that considers all the aspects related to oral health diseases [14]. Thus, public dental schools clinics are an environment that promotes to the population a large variability of health services and provide a great contact between dental students and the community [15].

The services offered by public universities are commonly unpaid, have a good acceptability and are known as a reference service to the community. Therefore, these services are sought by patients with a diverse and complex treatment needs, which demand high versatility of management strategies and preventive tools [15, 16]. Consequently, it is necessary to update information regarding the population's profile, as well as their characteristics and oral health necessities. Thus, this study aimed to determine the factors associated with dental caries on primary and permanent dentition of public pediatric dental clinic user., investigating sociodemographic factors an. dietary and oral hygiene habits.

METHODS

After approval of the local ethics committee (Health Science School – Paraíba Federal University. protocol 0186/2014), a retrospective study was carried out based on the analysis of dental records from the Cariology Clinic of Federal University of Paraiba (UFPB).

Three hundred and thirteen (313) records were selected from the population assisted from 2010 to 2013. Data were collected systematically considering demographic (Gender and Age), socioeconomic (Household Income and Paternal Education), dietary habits (Frequency and Type of Diet), hygiene habits (Frequency of Toothbrushing, Sulcus Bleeding Index – SBI and Simplified Oral Hygiene Index – OHI-S) – **Box 1**. Oral examinations were performed to estimate the dental caries experience on primary (dmft) and permanent (DMFT) according to WHO guidelines [8].

Data were analyzed using SPSS Statistics for Windows version 13.0 (SPSS, Inc., Chicago, IL, USA). The Chi-square (χ^2) and Fisher's exact tests were carried out to test the association between variables, as well the *odds ratio* (OR). The significance level was set at $p < 0.05$ (two-tailed).

Box 1. Theoretical framework of dmft and DMFT

Part 1. Socioeconomic and Demographic	
Variables	Category
Gender	Male; female
Household Income	1-3 minimum wage (MW), >4 MW
Paternal Education	≤5 years; >5 years
Maternal Education	≤5 years; >5 years
Part 2. Dietary Habits	
Variables	Category
Sugar Intake	≤5 times; >5 times
Type of Diet	Cariogenic; Non-Cariogenic
Part 3. Hygiene Habits	
Variables	Category
Toothbrushing	< 2 times per day; ≥3 times per day
SBI Activity	High; Low
OHI-S	Good; Regular; Poor

RESULTS

The most common age group was 0-6 years (42.9%), followed by 10-16 years (31.4%) and 7-9 years (25.6%). The gender proportion was 1:1. The demand of restorative treatment was highly prevalent, demonstrating a proportion of 0.78 and 0.53 of dmft and DMFT index, respectively. The need for tooth extraction was found in merely 0.06 and 0.03 of the sample.

Table 1 demonstrated that there was no difference between dmft in 0-6 and 7-9 groups (p=0.781). A significant difference was found between DMFT in 7-9 and ≥10 age range (p=0.000). There was a significant association between dmft and paternal education, as well as dmft and OHI-S (**Table 2**). DMFT was associated with gender (**Table 3**).

Table 1. Dental caries experience in each age group

Range age	Caries Experience	
	dmft (± SD)	DMFT(± SD)
0-6 years	3.47 (± 3.78)[a]	–
7-9 years	3.46 (± 3.05)[a]	0.80 (± 1.25)[b]
≥10 years	–	3.16 (± 3.72)[a]

Distinct letters are statistically different by Student t-test (p<0.05).

Table 2. Factors associated with dental caries experience in primary dentition

	Independent Variables		Caries Experience						Odds ratio CI (95%)	p
			dmft = 0		dmft ≥ 1		Total			
			n	%	n	%	n	%		
Socioeconomic	Gender	Male	37	15.7	90	38.1	127	53.8	0.68 (0.39-1.17)	0.16
		Female	41	17.4	68	28.8	109	46.2		
	Household Income	1-3 MW	45	27.4	101	61.6	146	89	0.70 (0.25-1.92)	0.48
		>4 MW	7	4.3	11	6.7	18	11		
	Paternal Education	≤5 years	5	3.1	22	13.6	27	16.7	0.37 (0.13-1.05)	0.05*
		>5 years	51	31.5	84	51.9	135	83.3		
	Maternal Education	≤5 years	6	3.5	16	9.4	22	12.9	0.76 (0.28-2.07)	0.59
		>5 years	49	28.7	100	58.5	149	87.1		
Dietary habits	Sugar Intake	≤5 times	35	15.5	76	33.6	111	49.1	0.89 (0.51-1.56)	0.70
		>5 times	39	17.3	76	33.6	115	50.9		
	Type of Diet	Cariogenic	20	8.7	29	12.6	49	21.3	1.53 (0.80-2.95)	0.19
		Non-Cariogenic	56	24.3	125	54.3	181	78.7		
Hygiene habits	Brushing Frequency	<2 times	40	17.2	81	34.8	121	51.9	0.96 (0.55-1.65)	0.88
		≥3 times	38	16.3	74	31.8	112	48.1		
	SBI Activity	High	2	1.1	12	6.4	14	7.5	3.26 (0.70-15.0)	0.14
		Low	61	32.6	112	59.9	173	92.5		
	OHI-S	Regular	25	13.9	26	14.4	51	28.3	2.391 (1.22-4.66)	0.01*
		Poor	37	20.6	92	51.1	129	71.7		

MW: Minimum wage (s); * Chi-square or Fisher's exact significant.

Table 3. Aspects associated with caries experience in pemanent teeth

	Independent Variables		Caries Experience						Odds ratio IC (95%)	p
			DMFT = 0		DMFT ≥ 1		Total			
			n	%	n	%	n	%		
Socioeconomic	Gender	Male	82	35.3	41	17.7	123	53	2.36 (1.38-4.01)	0.00*
		Female	50	21.6	59	25.4	109	47		
	Household Income	1-3 MW	75	50.7	55	37.2	130	87.8	0.68 (0.24-1.92)	0.46
		>4 MW	12	8.1	6	4.1	18	12.2		
	Paternal Education	≤5 years	15	9.8	8	5.2	23	15	1.37 (0.54-3.47)	0.49
		>5 years	75	49	55	35.9	130	85		
	Maternal Education	≤5 years	12	7.2	9	5.4	21	12.6	1.01 (0.40-2.55)	0.98
		>5 years	83	49.7	63	37.7	146	87.4		
Dietary habits	Sugar Frequency	≤5 times	64	29.1	50	22.7	114	51.8	0.94 (0.55-1.61)	0.83
		>5 times	61	27.7	45	20.5	106	48.2		
	Type of Diet	Cariogenic	31	13.8	15	6.7	46	20.4	1.70 (0.86-3.38)	0.12
		Non-Cariogenic	98	43.6	81	36	179	79.6		
Hygiene habits	Brushing Frequency	>2 times	61	26.5	47	20.4	108	47	0.93 (0.55-1.57)	0.79
		≥3 times	71	30.9	51	22.2	122	53		
	SBI Activity	High	11	5.8	7	3.7	18	9.4	0.75 (0.28-2.04)	0.58
		Low	94	49.2	79	41.4	173	90.6		
	OHI-S	Good	38	19.6	24	12.4	62	32	–	0.39
		Regular	49	25.3	47	24.1	95	49.4		
		Poor	18	9.3	18	9.3	36	18.6		

MW: Minimum wage (s); * Chi-square or Fisher's exact significant.

DISCUSSION

Dental records analyzed in this research demonstrated a reality of individuals who are economically vulnerable and that have high experience of dental caries. This tendency highlighted the necessity of tools development for identifying environmental and social needs beyond the dental needs.

Children who attended this public clinic have high necessity of dental treatment, presented expressive scores of "decayed" component. This result demonstrated the lack of health care access to these children. Many factors contribute to the absence of dental care access to low-income children. These factors might be the socioeconomic and psychological status of parents, difficulties in booking a consultation or transportation, fear of the dentist, and oral health myths [17, 18]. In this sense, more important than use this information to preview and planning the health services in dental clinic schools is to understand this reality as a peculiar one, that demands a better comprehension by professors and students [18, 19, 20, 21].

Socioeconomic status was not associated with DMFT and dmft. These outcomes are important because prove that little improvement in educational qualification and household income did not reduce significantly the disease prevalence. In this context, it is prudent to notice that in this study the volunteers mostly had low household incomes (below three minimum wages) and schooling (until high school). Some studies have considered the individual contribution of socioeconomic context or the development of dental caries in children [22, 23]. These studies found that social status, low paternal education, and low family income provide worst oral health conditions [24, 25, 26, 27, 28, 29]. On the other hand, other studies have demonstrated that these factors cannot be considered a determining factor [30].

Paternal education was a protective factor (OR: 0.37) for dental caries in primary dentition. This results contrast with another author that considered the maternal education as the most important predictor for early childhood caries [26, 27]. In this sense, this investigation was not able to find any significant difference between maternal education and their effective contribution to dental caries prevalence. These results can be explained by the sample composition that has low level of schooling. Besides, it is difficult to make a more accurate comparison from this variable due to the different perspectives of the learning process and teaching quality.

Dietary habits were not significantly associated with dmft and DMFT. These results can be considered a paradox, considering the etiology of dental caries [30, 31, 32]. Therefore, we considered that these results are consequence of the lack of information regarding the fulfillment of dietary diary. This question could be more accurately assessed if the dentist makes an interview to complement the information of the dietary diary.

The toothbrushing frequency was not associated with DMFT. At this point, it is important to evidence that verbal information about poor habits of hygiene is commonly hidden by the parents [33, 34]. Clinically, the parameters frequently used to sign poor oral hygiene are OHI-S and SBI [35]. However, in our investigation we did not find any association with the prevalence of dental caries. These outcomes possibly indicated that these parameters were not good predictors of dental caries in a sick population who is attended in public pediatric clinics. Similarly, Cascaes et al. [34] suggests that the frequency of brushing alone is not enough to assess oral hygiene in children. Thus, we considered that this tendency can be explained by two important pathways: firstly, it is common that children brush better their teeth before going to dental consultations; secondly, parents and children usually hide information about their daily habits.

CONCLUSION

Children attended in a public dental clinic had a high prevalence of untreated dental caries, mainly associated with paternal education and OHI-S (primary dentition), and gender (permanent dentition). Moreover, our findings highlighted the necessity of developing educational strategies for dental students take effective care of children with social deprivation.

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