

## Relationship between social network and social support with early childhood caries

### Relação entre rede e apoio social e cárie da primeira infância

Luiza Maria Dias **FIRMEZA**<sup>1</sup>  0000-0002-5147-8253

Mateus Ramos Plutarco **LIMA**<sup>1</sup>  0000-0002-0599-4070

Lídia Nara Fernandes **EVANGELISTA**<sup>1</sup>  0000-0001-6444-9796

Jorge Luiz Moreira **FREIRE JUNIOR**<sup>1</sup>  0000-0001-5663-457X

Maria Eneide Leitão de **ALMEIDA**<sup>1</sup>  0000-0001-8389-7391

Ana Karine Macedo **TEIXEIRA**<sup>1</sup>  0000-0001-5923-1813

#### ABSTRACT

**Objective:** The objective of our study was to investigate the relationship between social network and social support with early childhood caries in preschool children. **Methods:** A transversal study with 100 children aging at most 5 years and 11 months was performed. The children underwent a clinical dental evaluation and their parents answered a structured questionnaire. **Results:** Dental caries was associated with time of bottle feeding ( $p=0.031$ ) ( $RP=5.203$ ) and number of dental appointment ( $p=0,010$ ) ( $RP=6,293$ ). Moreover, dental caries was also directly associated with the number of siblings living together in the same house ( $p=0.002$ ) ( $r=0.372$ ), while inverse correlation was found between dental caries and social support ( $p=0.028$ ) ( $r= - 0.219$ ). **Conclusion:** Preschool children whose supervisors had a better social support presented superior oral health, suggesting that social support from caregivers is associated with improved pediatric oral health.

**Indexing terms:** Dental caries; Social network; Social support

#### RESUMO

**Objetivo:** O objetivo do estudo foi investigar a relação entre rede e apoio social e a ocorrência cárie da primeira infância em pré-escolares. **Métodos:** Foi realizado um estudo transversal com 100 crianças de 4 a 5 anos e 11 meses de idade. Foi realizado exame bucal nas crianças por meio do International Caries Detection and Assessment System (ICDAS e os responsáveis foram entrevistados por meio de um roteiro estruturado de perguntas. **Resultados:** A análise estatística foi realizada considerando um intervalo de confiança de 95%, sendo realizado o teste qui-quadrado e a regressão logística linear e multinomial A cárie dentária foi associada com a duração do uso da mamadeira ( $p=0,031$ ) ( $RP=5,203$ ) e a ida ao dentista ( $p=0,010$ ) ( $RP=6,293$ ). Observou-se, ainda, correlação direta

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<sup>1</sup> Universidade Federal do Ceará. Fortaleza. Rua Alexandre Baraúna, 949, Rodolfo Teófilo, 60430-160, Fortaleza, Ce, Brasil. Correspondence to: LMD Firmeza. E-mail <luizafirmeza@gmail.com>.

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entre número de dentes cariados e número de irmãos morando na mesma casa ( $p = 0,002$ ) ( $r=0,372$ ) e correlação inversa com o apoio social ( $p = 0,028$ ) ( $r = - 0,219$ ). Conclusão: Os pré-escolares cujos cuidadores tinham melhor apoio social apresentaram uma melhor condição de saúde bucal, sugerindo que o apoio social dos cuidadores está associado a uma maior atenção em saúde bucal infantil.

**Palavras-chave:** Cárie dentária. Rede social. Apoio social.

## **INTRODUCTION**

Dental caries is one of the most prevalent chronic disease of the childhood. According to the American Academy of Pediatric Dentistry (AAPD) [1], early-childhood caries is characterized by the presence of one or more deciduous teeth affected by, restored or lost due to caries disease in children younger than 71 months. Although dental caries prevalence has declined in preschool children worldwide, such disease is still a concern when speaking of Brazilian preschoolers [2,3].

Preschool children rely on their caregivers, which has a direct impact on the child oral health. The quality of the care given to the children will depend on the stability of the socioeconomic and psychosocial conditions of their supervisors [4]. Under this light, the interest in researching the relationship between social determinants of health and caries is increasing [5].

The theoretical approaches regarding social determinants of health suggest that psychosocial factors have a role on the comprehension of the health-disease process. In general, it is known that income and social inequalities weaken social bonds, negatively impacting on the individual's health [6].

Considering the aspects of social bonds, two important concepts can be defined. They are social network and social support. The social network is defined as the group of people with which a person has a social attachment. On the other hand, social support is the functional aspect of the social network. In other words, social support is the availability of those who provide material, financial, emotional or affective resources in vulnerable situations [7]. In this aspect, it is known that having a supportive social network benefits people [8].

Social network and social support have been positively associated with oral health auto-perception and life-quality indicators related to oral health and negatively associated with caries [9,10]. Therefore, the aim of our study was to investigate the relationship between social network and social support of supervisors of preschool children from Fortaleza, CE, Brazil with early-childhood caries of children.

## **METHODS**

A transversal study with quantitative approach was performed in one school of Fortaleza (Secretaria Regional Executiva (SER) III). According to a study performed in Fortaleza from 2006 to 2007, the area in which the school chosen is located presented the highest DMFT index in children aging 5 years old, with the decayed component accounting for 78.77% of the index [11,12].

The population under study corresponded to 132 children aging 5 years and 11 months, at the most. Due to the population size, sample census was used to perform the investigation. Only children aging at the most 5 years and 11 months were included in our study in order to respect the criteria of the AAPD to classify caries as early-childhood caries. Misbehaved children who did not allow the performance of the oral examination and that the parents did not answer the questionnaire were excluded from the study. Thus, the final sample of our investigation was composed by 100 children and their parents.

The epidemiological evaluation was performed by two examiners at the school after the children had performed supervised oral hygiene. The examination was performed with the aid of gauze, periodontal OMS probe, buccal mirror, and a flashlight.

The International Caries Detection and Assessment System (ICDAS) was used to classify the caries lesions. The ICDAS scores are classified according to the disease severity, and they vary from 0 (absence of disease) to 6 (extensive

cavity) [12]. Given the impossibility of air drying the tooth surface to perform the evaluation, ICDAS score 1 was not considered, as well as was performed in other investigation [13].

The researchers were calibrated by a gold-standard examiner. The inter and intra-examiner calibration was performed by the evaluation of 40 children followed by the re-evaluation of 20 children. The Kappa index obtained from the intra and inter-examiner calibration were 0.83 and 0.84, respectively.

An interview was performed with those who took care of the children most part of the time. The interview was based on a structured survey that contained questions regarding social network, social support, socioeconomic conditions, oral health habits and use of dental services. The interviews were performed at the school. When the children's parents or supervisors were not found at the school, one of the researchers made a visit to the child's house. The questionnaire used was validated in Brazil by Chor et al. [14], and it is composed by two sections of questions (social network and social support).

The social network block consists of questions regarding the availability of friends and relatives with whom the participant could feel comfortable and talk about almost everything, in addition to addressing participation in different group activities and in unpaid voluntary work [14].

The social support block is composed by five dimensions of social support: material, affective, emotional, positive social interaction, and information. The questions were preceded by the expression "if you need, with which frequency can you count on someone to ...". The answers were codified from 1 (never) to 5(always). The sum of all items generated a score of social support, and the score of the five dimensions was a result of the sum of the items related to each dimension [14].

The data were analyzed using the software SPSS 2.0 version. Firstly, the descriptive analysis of the research was performed, then the relationship between dental caries with social network, social support, socioeconomic status, oral health habits, and use of dental service was evaluated by Chi-square Test. The prevalence ratio was calculated using a confidence interval of 95% and a significance level set at 5%. The logistic and multinomial regression was performed only with the variables that presented a  $p < 0.2$  on the bivariate analysis.

Considering that there is no reference point to establish what is an adequate level of social support on the research instrument used, it was decided to verify the correlation between number of decayed teeth and social support variables (material, emotional, affective, information support and positive interaction) using Spearman's Correlation. A multivariate analysis using linear regression adjusted by family income per capita, number of siblings living in the same house, and family agglomeration, considering a significance level of 5%.

This research protocol was approved by the Ethics Committee of the Federal University of Ceara (2.396.420).

## RESULTS

Forty-one percent of the studied sample consists of female participants. Most of these children (74%) were supervised by their mother. Dental caries prevalence reached 57% and at least two teeth per child were affected by caries. Forty-three percent of these children were caries-free, thirteen percent presented only one caries lesion restricted to the enamel, whilst forty-four presented dentine caries lesions.

A significant association between the presence of caries and number of siblings living in the same house ( $p = 0.012$ ) was found. A higher prevalence of dental caries was found in those who had two or more siblings living together (66.7%) (RP=1.77) when compared with single daughters or with the ones living with just another sibling (41%). An association between caries and a dental appointment was also found ( $p = 0.011$ ). Children who had been to dental appointments presented higher prevalence of dental caries (RP = 1.99) in relation to those who have never been (Table 1). No significant relationship existed between the presence of dental caries and the social support variables under investigation (Table 2).

**Table 1** – Presence of caries according to the sociodemographic variables, oral health habits, and use of dental services. Fortaleza, 2018.

	Caries-free		Caries-affected		P-Value	RP(IC)
	N	%	N	%		
Mother's schooling						
Until 10 years	28	45.9	33	54.1		
11 years or more	20	55.6	16	44.4	0.358	0.82 (0.55-1.23)
Father's schooling						
Until 10 years	23	50.0	23	50.0		
11 years or more	18	50.0	18	50.0	1.000	1.00 (0.64-1.54)
Daily caregiver						
Mother	36	48.6	38	51.4		
Other	13	50.0	13	50.0	0.906	0.97 (0.62-1.52)
Number of siblings living in the same house						
Only child/1 sibling	36	59.0	25	41.0		
2 or more siblings	13	33.3	26	66.7	0.012	1.77 (1.08-2.89)
Bolsa Familia program						
Yes	31	44.9	38	55.1		
No	18	58.1	13	41.9	0.224	0.77 (0.52-1.15)
Family income per capita						
Until ¼ minimum wage	29	46.8	33	53.2		
> ¼ minimum wage	15	48.4	16	51.6	0.883	0.96 (0.61-1.51)
House						
Own	24	50.0	24	50.0		
Rented	25	48.1	27	51.9	0.848	1.04 (0.69-1.55)
Breastfeeding						
Yes	40	46.0	47	54.0		
No	09	69.2	04	30.8	0.118	0.66(0.43-1.01)
Bottle feeding						
Until 2 years	06	35.3	11	64.7		
> 2 years	27	61.4	17	38.6	0.067	0.57(0.29-1.14)
Night bottle						
Yes	31	44.3	39	55.7		
No	18	60.0	12	40.0	0.150	0.73 (0.49-1.09)
Toothbrushing frequency						
Until 2x/day	30	48.4	32	51.6		
3x or more/day	19	50.0	19	50.0	0.876	0.96 (0.64-1.45)
Dental visit						
Has not attended	41	56.9	31	43.1		
Has attended	08	28.6	20	71.4	0.011	1.99 (1.07-3.70)
Reason for the last dental visit						
Pain/ dental treatment	03	20.0	12	80.0		
Routine	05	38.5	08	61.5	0.281	0.52(0.15-1.76)
Oral health orientation						
Yes	18	39.1	28	60.9		
No	31	57.4	23	42.6	0.068	0.68(0.44-1.04)

Additionally, bottle feeding duration ( $p = 0.031$ ) and dental appointment ( $p = 0.010$ ) maintained in the adjusted model upon multinomial logistic regression, showing association with early-childhood caries. Children who were bottle-fed for longer than two years ( $RP=5.20$ ), as well as those who had been to the dentist ( $RP=6.29$ ), were more likely to be affected by dental caries (Table 3).

**Table 2** – Presence of caries according to the variables related to social network and social support. Fortaleza, 2018.

	Caries-free		Caries-affected		p-value	RP(IC)
	N	%	N	%		
Partner help						
Yes	26	55.3	21	44.7		
No	15	44.1	19	55.9	0.320	1.25(0.79-1.98)
Relative's support						
Yes	42	50.0	42	50.0		
No	07	43.8	09	56.3	0.647	1.14(0.63-2.07)
Friends' support						
Yes	19	45.2	23	54.8		
No	30	51.7	28	48.3	0.522	0.87(0.57-1.32)
Sport						
Yes	04	40.0	06	60.0		
No	45	50.0	45	50.0	0.548	0.80(0.36-1.75)
Participation in groups						
Yes	10	38.5	16	61.5		
No	39	52.7	35	47.3	0.211	0.73(0.42-1.24)
NGOs/voluntary work						
Yes	07	43.8	09	56.3		
No	42	50.0	42	50.0	0.647	0.87(0.48-1.58)
Social support						
Low	22	44.9	27	55.1		
High	27	52.9	24	47.1	0.421	0.84(0.56-1.27)
Material support						
Low	18	45.0	22	55.0		
Hight	31	51.7	29	48.3	0.514	0.87(0.57-1.32)
Affective support						
Low	25	55.6	20	44.4		
High	24	43.6	31	56.4	0.236	1.27(0.85-1.89)
Emotional support						
Low	20	42.6	27	57.4		
High	29	54.7	24	45.3	0.225	0.77(0.51-1.17)
Supportive information						
Low	21	48.8	22	51.2		
High	28	49.1	29	50.9	0.977	0.99(0.66-1.48)
Interaction						
Low	18	40.9	26	59.1		
High	31	55.4	25	44.6	0.151	0.73(0.48-1.13)

A direct correlation between the number of teeth affected by dental caries and house agglomeration factors ( $p = 0.013$ ) ( $r = 0.248$ ) and the number of siblings living in the same shelter ( $p = 0.002$ ) ( $r = 0.307$ ). The higher is the house agglomeration and the more is the number of siblings, the more is the number of teeth that will be affected by dental caries (Table 4). Besides, a significant weak inverse correlation existed between number of affected teeth by caries and social support ( $p = 0.028$ ) ( $r = -0.219$ ), as well as emotional support dimension ( $p = 0.041$ ) ( $r = -0.204$ ), and positive interaction support ( $p = 0.028$ ) ( $r = -0,220$ ). The stronger are the social and emotional support, as well as the positive interaction support, the fewer teeth will be affected by caries (Table 4).

Upon adjusting the multivariate model according to per capita family income, house agglomeration and number of siblings remained in the multivariate model, showing significant direct and inverse collinearity, respectively, the parameters number of siblings living in the same house ( $p = 0.001$ ) (beta = 0.372) and total social support ( $p = 0.028$ ) (beta = - 0.211) (table 4).

**Table 3** – Multivariate model adjusted to categorical variables with p value < 0.2 at the bivariate analysis. Fortaleza. 2018.

	Caries-free		Caries		p-Value	RP(IC)	Adjusted p-value	Adjusted RP (IC)
	N	%	N	%				
Number of siblings in the same house								
Only child/1 sibling	36	59.0	25	41.0		1.77		2.729
2 siblings or more	13	33.3	26	66.7	0.012	(1.08-2.89)	0.158	(0.677-10.999)
Breastfeeding								
Yes	40	46.0	47	54.0		0.66		0.413
No	09	69.2	04	30.8	0.118	(0.43-1.01)	0.303	(0.077-2.221)
Bottle use								
Until 2 years	06	35.3	11	64.7		0.57		5.203
> 2 years	27	61.4	17	38.6	0.067	(0.29-1.14)	0.031	(1.164-23.254)
Night bottle use								
Yes	31	44.3	39	55.7		0.73		1.240
No	18	60.0	12	40.0	0.150	(0.49-1.09)	0.734	(0.358-4.295)
Dental visit								
Has never attended	41	56.9	31	43.1		1.99		6.293
Has attended	08	28.6	20	71.4	0.011	(1.07-3.70)	0.010	(1.553-25.498)
Oral health orientation								
Yes	18	39.1	28	60.9		0.68		0.703
No	31	57.4	23	42.6	0.068	(0.44-1.04)	0.570	(0.208-2.374)
Interactive support								
Low	18	40.9	26	59.1		0.73		0.658
High	31	55.4	25	44.6	0.151	(0.48-1.13)	0.520	(0.184-2.355)

**Table 4** – Correlation between number of teeth affected by dental caries and social variables. Fortaleza. 2018.

	Means	Standard deviation	r Value	p-value	Beta	Adjusted p-value
Decayed teeth	2.54	3.25	-	-	-	-
Total social support	73.53	15.05	- 0.219	0.028	- 0.211	0.028
Material support	14.90	4.16	- 0.171	0.088	-	-
Affective support	13.36	2.26	- 0.032	0.756	-	-
Emotional support	14.75	4.80	- 0.204	0.041	-	-
Informative support	15.30	4.30	- 0.135	0.179	-	-
Interactive support	15.21	3.82	- 0.220	0.028	-	-
Number of siblings in the house	1.45	1.22	0.307	0.002	0.372	0.001
House agglomeration	1.13	0.36	0.248	0.013	0.134	0.228
Income ( <i>per capita</i> )	243.72	152.20	- 0.114	0.279	0.127	0.218

## DISCUSSION

The dental caries prevalence found in pre-schoolers in this study (57%) was higher compared to previous epidemiological surveys in oral health carried out in Brazil [3] (53.4%) and in the City of Fortaleza [15] (45%) considering children in the first five years of life. The criterion used in this study (ICDAS) considers non-cavity caries lesions, differing from the one used by WHO (DMFT Index), which includes only cavity caries lesions and was employed in the epidemiological surveys mentioned. Thus, the higher prevalence found here can be accounted for this difference between the two indexes.

A higher number of siblings living in the same shelter directly correlated with early-childhood caries, as well as it did in other studies [16,17]. Families at higher social vulnerability might present more difficulties in care management

between its members [17]. Contrarily, children who live in small families would have better health conditions due to more personalized health care and more time available to children and parents to interact [18].

The number of siblings living in the same house is a parameter that must be highlighted as it prevailed over house agglomeration, maintaining itself in the multivariate model. This suggests that the number of children living in the same shelter would be the influencing factor on oral health care of the children in this study, regardless of the number of individuals living together.

In this study, early-childhood caries was associated with prolonged bottle-feeding use just as another study reported [19]. It is common that bottle-feeding use with sweetened drinks such as milk, juice, and soft drinks; thus, representing a potentially cariogenic nutritional habit, which in turns integrates childhood care in pre-schoolers and their weaning represents a challenge. As such, preventative programs should consider this habit when proposing changes to nutritional intake as it represents a risk for oral health [20].

The association between dental appointments and early-childhood caries occurrence assumes that children are taken to dental care only when they already present a condition that may compromise oral health such as dental caries. These results could be related to the difficulty of the oral health care system to replace healing procedures with preventative practice. We also reinforce the importance of integrating the oral health care with the maternal and infant health care practices, such as in preventative programmes of childcare and prenatal care, in which the inclusion of orientation regarding oral health care would be an effective way of offering a holistic care to children, would increase the supervisor's autonomy, and would encourage the use of dental services in a preventative manner [17,21]. The study performed by Almeida and Almeida<sup>1</sup> revealed a higher percentage of mothers who reported that carried out hygiene protocols in their children and had more knowledge of caries disease when a dentist took part in the childcare programs.

This study observed a correlation between early-childhood caries and social support from caregivers. The social support from friends, relatives, and neighbours at any mother's disposal has been increasingly associated with indexes related to childhood oral health such as tooth brushing frequency [22], more access to dental services [23], a better quality of life related to childhood oral health [24], more access to preventative practices in dental services, as well as a closer attention to mothers in relation to children's oral healthcare [25]. The support from friends and relatives helping in making appointments (material support), as well as accompanying mothers during dental appointments for their children (emotional support) were factors strongly associated with the use of dental services by children [23]. Besides, a more cohesive neighbourhood can provide mothers with more access to information/orientation about oral health and resources to help and support during the necessary procedures for making dental appointments. Neighbours can also be willing to help solve problems that may impede the access to dental services, they can offer means of transportation to dental visits or take care of one of the siblings left at home while a mother takes the other to the dental visit [25]. The insufficient social support and absence of efficient psychosocial resources increase the maternal stress, anxiety, and depression, affecting the perception of available resources to fight off stressing events and health perception [9].

In this study, the financial support provided to families by the social program "Programa Bolsa Família" was not associated with early-childhood caries occurrence. However, Calvasina et al. [26] argued that children from families supported by "Programa Bolsa Família" for at least two years were less prone to be affected by dental caries in relation to those who never had been supported by this financial aid. Even small increases in income would contribute to an improvement of the oral health condition through better nutritional quality and a possible reduction of stressing factors related to children's health care.

It is believed that the association between social network and social support with health conditions can be explained by four mechanisms. First, the influence of material support exemplified by financial aid. Second, information support, in which individuals, through their social network, acquire knowledge of health care and promotion habits and the ones that represent risks for their integrity, leading them to adopt health-promoting behaviours. The third mechanism is about emotional support that would help individuals deal with disease states and risks to general health, acting as a protective factor for psychosocial health, lowering fear, anxiety, and stress levels, as well as increasing self-esteem, which mediators of oral health-related behaviours. Lastly, through the influence of the host resistance [27].

Even though a positive influence of the social network and social support on oral health conditions is observed, stronger social support from neighbours was associated with reduced use of dental services [28].

In this scenario, we emphasize the importance of understanding the relevance of behavioural and cultural factors in the context of information diffusion in a cohesive society with high levels of social support; considering that in the same way that healthy habits can be widespread, erroneous information about health matters can also be disseminated. Therefore, acknowledging social support and social cohesion without recognizing the attitudes and knowledge related to oral health can have detrimental consequences to health.

The absence of social network was correlated with social instability and low participation in social activities, resulting in insufficient emotional and material support, which can negatively influence health-related behaviours [9]. Albeit social network might be intimately related to social support, a subject can have a social network without necessarily receive support from it. The social network is arranged like the social structure through which support is given [26]. This fact can explain the findings of this study in which a relationship between early-childhood caries and social support was found, but not with social network.

This study has limitations such as the impossibility to establish a temporal relationship between cause and effect, considering its transversal aspect. In relation to the sample, homogeneity of social and economic conditions is also a fact to consider. Additionally, the diversity of tools to measure social and network support is a factor that limits group comparisons. Another limitation relies on the memory bias related to questions asked to caregivers.

From the association observed between social support and early-childhood caries, longitudinal studies are suggested to evaluate the long-term impact of social support on childhood oral health.

Children whose caregivers had a better social support presented superior oral health condition, suggesting that the social support from caregivers is associated with more attention to childhood oral health. Thus, it can be suggested that public health policies that offer resources to socially support families can be a means to facilitate the promotion of a better care for children's oral health by caregivers.

## Collaborators

LMD FIRMEZA, this author contributed to the development of the study idea, to the data collection and analysis, and to the manuscript writing. MRP LIMA, this author contributed to the data collection. LNF EVANGELISTA, this author contributed to the data collection. JLM FREIRE JUNIOR, this author contributed to the data collection. MEL ALMEIDA, this author contributed to the study development and to the definition of the experimental design. AKM TEIXEIRA, this author contributed to the study development, planning, data analysis and interpretation, and to the critical review and approval of the final version of the manuscript.

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