

Original Research Article

Prevalence of dental caries in 5 and 12-years-old schoolchildren from two Brazilian capitals

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Abstract

Introduction: Tooth decay is still a highly prevalent disease in populations. Because of this, epidemiological studies are carried out frequently and allow the monitoring of the experience of the disease. **Objective:** To estimate the prevalence of dental caries of 5 and 12-years-old schoolchildren in the cities of Florianópolis, Santa Catarina, and Porto Velho, Rondônia, as well as to search hypotheses of association with social/economic determinants and access to dental services. **Material and methods:** Secondary data were used from the Brazilian Oral Health Survey of 2010, as follows: household income by city and dmft/DMFT index for ages by city and region of Brazil. **Results:** It was observed in the city of Florianópolis a 5-years-old dmft of 1.56, and 12-years-old DMFT of 0.55. In Porto Velho the means were 2.89 and 4.15 to the respective age. It was found that in Porto Velho 89.5% of surveyed had family income up to R\$2,500.00, while in Florianópolis 81.9% had R\$501.00 to R\$9,500.00. **Conclusion:** The city of Florianópolis had the best caries indices and socioeconomic conditions, suggesting an association between these variables, in detriment to the regions in the opposite situation.

Introduction

The dental caries is a multifactorial disease and its prevalence reflects factors determinative of biological, alimentary, behavioral, and socioeconomic order, as well as access to the consumer goods and the services of health [8, 17, 21]. In this sense, the dental caries can be described as a "social disease" [9].

Even that the prevalence and the severity of the dental caries have decreased among Brazilian children and adults at the two last decades [15], the difficulties to extend the access to the resources of prevention and control of the disease persist, to assure dental treatment to all population [9].

Because of this, epidemiological studies are carried out frequently and allow the monitoring of the experience of the disease. In Brazil four surveys had been carried through epidemiologists: in 1986 [2], in 1996 [3], in 2003 [4], and 2010 [5]. Such experiences stimulated the Brazilian government to acquire and produce data on oral health that compose a consistent historical series and that can subsidize the elaboration and the evaluation of public politics related to oral health and, consequently, the reduction of oral diseases [15].

The nationwide SBBrazil research had its beginning in 1999 with SBBrazil 2000, followed by SBBrazil 2003, which provided optimum and more complete diagnosis of oral health of Brazilians [19]. The most recent research is the SBBrazil 2010, which came to improve the research methodology from 2003 and has been the main strategy of national oral health surveillance, based on primary data production, contributing to the design of national oral health Policy [4, 20].

Based on the above, this study aimed to compare the prevalence of dental caries of 5 and 12-years-old schoolchildren from the cities of Florianópolis (Santa Catarina) and Porto Velho (Rondônia) and to investigate hypotheses of association with determinants as family income and access to the

dental services, according to data of the National Research of Oral Health, SBBrazil 2010.

Material and methods

This present study used the secondary databank base of the SBBrazil Research 2010 [5]. By means of this survey, oral examinations were carried through and questionnaires were applied in the 26 state capitals, in the Federal District and in 150 cities of the country, included by means of probabilistic drawing according to population inside of each region of Brazil. The primary units of sampling were composed by the cities by each region and by the tax sectors for the capitals. In total, the sample was composed by 37,519 individuals divided into groups of 5 and 12 years-old and the age group of 15 to 19 years, 35 to 44 years, and 65 to 74 years [5, 20].

In this study, the database was searched regarding to 5-years-old dmft and 12-years-old DMFT of both gender, from the cities of Florianópolis and Porto Velho. Florianópolis is located in Southern Brazil and is the capital of the State of Santa Catarina, with a population of 477,798 inhabitants. The city of Porto Velho is situated in the North, is the capital of the State of Rondônia and has a population of 511,219.

The database was searched regarding to: 5-year-old dmft and 12-year-old DMFT.

Results

Tables I and II showed the values for dmft and DMFT equal to zero in the surveyed cities. Table II displayed that the sample in the North was 56% higher than that in the South. The number of 5 and 12-years-old children with dmft/DMFT equal to zero in Porto Velho was less than that in the capital of Santa Catarina.

Table I - DMFT/dmft values equal to zero and confidence intervals (CI 95%) for the population of 5 and 12 years-old in the cities of Florianópolis and Porto Velho

City	5 years-old			12 years-old		
	n	%	CI (95%)	n	%	CI (95%)
Florianópolis	187	60.9	52,2 – 68.9	237	68.4	59.8 – 75.8
Porto Velho	171	36.8	30 – 44.2	166	25.6	18.9 – 33.7

Source: SBBrazil [9]

Table II - DMFT/dmft values equal to zero and confidence intervals (CI 95%) in the population of 5 and 12 years-old in the South and Northern Brazil

Region	n	5 years-old		12 years-old		
		%	CI (95%)	n	%	CI (95%)
South	927	39.4	33.9 – 45.3	1,005	40.9	34.0-48.2
North	1,774	33.9	28.4 – 39.8	1,703	28.0	23.6 – 32.8

Source: SBBrasil [9]

Table III presents the mean dmft/DMFT index and the rate of each component: decayed, missing, and filled of the studied capitals. Note that in Florianópolis, the 5-year-old (1.56) and 12-year-old dmft is smaller (0.55) than those of Porto Velho. The mean index per Brazilian regions of Brazil showed that the Southern region had lower values of 2.49 and 2.06, respectively for 5 and 12-year-old dmft than those of the North region (table IV).

Table III - Mean dmft/DMFT index and ratio (%) of the components in the population of 5 and 12 years-old of the cities of Florianópolis and Porto Velho

City	n	Mean dmft/ DMFT	5 years-old			
			Decayed	Filled/Decayed	Filled	Missing
Florianópolis	187	1.6	70.5	5.8	19.9	3.8
Porto Velho	171	2,90	84.0	3.1	9.3	3.1
	n	Mean dmft/ DMFT	12 years-old			
			Decayed	Filled/Decayed	Filled	Missing
Florianópolis	237	0.5	59.7	2.6	0.0	0.77
Porto Velho	166	4.1	67.5	3.6	23.4	5.3

Source: SBBrasil [9]

Table IV - Mean dmft/DMFT index and ratio (%) of the components in the population of 5 and 12 years-old of the South and North regions of Brazil

Region	n	Mean dmft/ DMFT	5 years-old			
			Decayed	Filled Decayed	Filled	Missing
South	927	2.5	80.7	3.6	13.7	2.0
North	1774	3.8	90.2	2.1	4.5	3.3
	n	Mean dmft/ DMFT	12 years-old			
			Decayed	Filled Decayed	Filled	Missing
South	1005	2.7	54.9	5.8	36.9	1.9
North	1703	3.7	67.4	4.4	20.6	7.6

Source: SBBrasil [9]

In the city of Porto Velho, 89.5% had family income up to R\$ 2,500.00. In Florianópolis, 81.9% of the sample had familiar income between R\$ 501.00 and R\$9,500.00 (table V).

Table V - Estimate of family income (in Reais) of the cities of Florianópolis and Porto Velho

City	n	Income						
		Up to 250	251 to 500	501 to 1,500	1,501 to 2,500	2,501 to 4,500	4,501 to 9,500	9,500 and more
Florianópolis	979	1.1%	2.3%	31.6%	32.3%	18.0%	11.8%	2.9%
Porto Velho	1.062	2.2%	9.4%	51.0%	26.9%	6.9%	3.0%	0.7%

Discussion

Based on the last Brazilian epidemiological survey, SBBrazil 2010, this study aimed to compare data from the cities of Florianópolis and Porto Velho, which allowed to observe a notable difference between them. The choice of these cities was because they had the smallest and the greatest dmft/DMFT value, respectively, in relation to all the too Brazilian state capitals.

Epidemiological studies throughout the last years demonstrate a decline of the caries indices in the Brazilian population [2-5]. Despite of this positive scene, the iniquity is persistent regarding to the disease distribution and the access to dental treatment and somehow, the population lack information on the correct oral health care [15, 22]. Evidences demonstrate that Brazilian cities with better index of human development have small DMFT values [10]. Similarly, populous localities and with more favorable socioeconomic condition are more benefited by measures of public health [11].

As for the social and economic characterization, findings indicate that children and adults from lower socioeconomic backgrounds have a higher prevalence of the disease and, consequently, a greater need for treatment [12].

In this study, we observed that the population of Porto Velho had 51.0% with family income up to R\$1,500.00, and is considered less economically favored [13]. Thus, we suggested an association of the socioeconomic background with the mean caries index was the highest in Brazil, at the age of 5 (dmft = 2.9) and 12 years (DMFT = 4.1). The dmft value is in accordance with the study of Guimarães *et al.* [12] and Almeida *et al.* [1], which assessed the 5-years-old schoolchildren and found the mean dmft respectively of 2.88 and 2.56.

In the studies of Mendes *et al.* [14] and Nicolau *et al.* [16], young of families with monthly income up to 2.4 minimum wages (R\$ 1,891.20) have a higher prevalence of decayed teeth in relation to those whose family have income exceeding this value. Thus, it is clear the association between low household income and dental caries experience.

The city of Florianópolis had the smallest caries index of Brazil, with mean dmft at 5 years-old of

1.56, and 0.5 at 12 years-old. Constante *et al.* [7] conducted an epidemiological survey on teenagers of 12 and 13 years-old, through the DMFT index. The results revealed a decline on mean DMFT, because in 1971 the mean was 9.17 and in 2009 was 0.78, a value close to the mean value of SBBrazil 2010. This reduction in caries index may have occurred because of the increase in the number of dentists in the city: one dentist per every 250 inhabitants in June 2009 [7]. This consideration is worth of noting, as the literature points to the possibility of increased DMFT due to misdiagnosis and clinical intervention [6].

Compared to the capital of Santa Catarina, Porto Velho had a high dmft/DMFT of 2.9 (5 years-old) and 4.1 (12 years-old). It can be suggested that is an influence of the access of the population to the dental services and a concern in carrying through routine appointments for larger prevention of caries. Florianópolis has 115 public dental services, while Porto Velho has only 75 [13].

To eliminate the barriers of access to dental service, the search of a bigger link between the user and the health system is necessary, therefore this will increase the use of the services. Basically, beyond guaranteeing the access, the dental assistance is constant, fair, efficient, universal, and resolute [18]. Health services are responsible not only for the offer of care, but also for making available the means necessary to change the conditions that create, maintain, or increase poverty [11].

Another fact that must be considered is that the region of Porto Velho has an agricultural population of 30%, which makes difficult the construction of units of health and enabling the access to proper dental treatments for isolated populations [22].

The study of Narvai *et al.* [15] found an excellent decline of DMFT in the period from 1980 to 2003 in the Brazilian population at 12 years-old, the most reasonable hypothesis might be the evolution in the access to the fluorinated water and dentifrice as well as the changes in the programs of collective oral health. However, the groups most vulnerable remain a challenge for the policymakers of public health in Brazil. The findings corroborate the data found in SBBrazil 2010, showing a higher rate

of caries and lower family income, in the region North making this population more vulnerable to develop oral diseases and with less access to dental treatment.

It is very important in daily dental practice, whether private or public, to treat both the collective oral health and the individual as a whole, so that access to services is universalized and equitable for the population, so that discrepant regional differences are reduced.

Conclusion

On the basis of the findings of this study, it can be concluded that the city of Florianópolis had less dmft/DMFT index of Brazil for the analyzed ages, while Porto Velho had the biggest values. It is suggestive that unfavorable socioeconomic conditions can influence on the vulnerability of the population, increasing the caries index. Thus, public politics that aim at reducing the social iniquities have impact on the reduction of diseases in the populations.

References

1. Almeida DL, Nascimento DOR, Rocha ND, Dias AGA, Castro RFM, Closs PS. Avaliação da saúde bucal de pré-escolares de 4 a 7 anos de uma creche filantrópica. *RGO*. 2011;59(2):271-5.
2. Brasil. Ministério da Saúde. Divisão Nacional de Saúde Bucal. Levantamento epidemiológico em saúde bucal: Brasil, zona urbana. Brasília; 1986. 137 p.
3. Brasil. Ministério da Saúde. Secretaria de Assistência à Saúde. Departamento de Assistência e Promoção à Saúde. Coordenação de Saúde Bucal. Levantamento epidemiológico em saúde bucal: 1ª etapa - cárie dental - projeto. Brasília; 1996.
4. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Coordenação Nacional de Saúde Bucal. Projeto SBBrasil 2003: condições de saúde bucal da população brasileira 2002-2003: resultados principais. Brasília; 2004.
5. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Secretaria de Vigilância em Saúde. SBBrasil 2010: Pesquisa Nacional de Saúde Bucal: resultados principais. Brasília; 2012.
6. Bucker WCV, Pessoa CP, Alves TDB, Oliveira MC. Associação entre severidade de cárie dentária e aspectos sociocomportamentais em escolares de 12 anos no município de Feira de Santana, Bahia. *Rev Baiana Saúde Pública*. 2011;35 (Supl 1):103-17.
7. Constante HM, Bastos JL, Peres MA. Trends in dental caries in 12- and 13-year-old schoolchildren from Florianópolis between 1971 and 2009. *Braz J Oral Sci*. 2010;9(3):410-14.
8. Freire MCM, Reis SCGB, Figueiredo N, Peres KG, Moreira RF, Antunes JLF. Individual and contextual determinants of dental caries in Brazilian 12-year-olds in 2010. *Rev Saúde Pública*. 2013;47(Supl 3):1-10.
9. Frias AC, Antunes JLF, Junqueira SR, Narvai PC. Determinantes individuais e contextuais da prevalência de cárie dentária não tratada no Brasil. *Rev Panam Salud Publica*. 2007;22(4):279-85.
10. Gabardo MC, da Silva WJ, Moysés ST, Moysés SJ. Water fluoridation as a marker for sociodental inequalities. *Community Dent Oral Epidemiol*. 2008;36(2):103-7.
11. Gabardo MC, da Silva WJ, Olandoski M, Moysés ST, Moysés SJ. Inequalities in public water supply fluoridation in Brazil: an ecological study. *BMC Oral Health*. 2008;8:9.
12. Guimarães HB, Silva AR, Porto RB. Avaliação da experiência de cárie e necessidade de tratamento de pré-escolares de 5 e 6 anos das redes pública e privada do município de Porto Velho, Rondônia. *Odontol Clín-Cient*. 2010;9(1):49-53.
13. Instituto Brasileiro de Geografia e Estatística - IBGE. Manual do recenseador: CD 1.09. Rio de Janeiro; 2015.
14. Mendes LGA, Biazevic MGH, Crosato ME, Mendes MOA. Dental caries and associated factors among Brazilian adolescents: a longitudinal study. *Braz J Oral Sci*. 2008;7(26):1614-9.
15. Narvai PC, Frazão P, Roncalli AG, Antunes JLF. Cárie dentária no Brasil: declínio, iniquidade e exclusão social. *Rev Panam Salud Publica*. 2006;19(6):385-93.
16. Nicolau B, Marcenes W, Bartley M, Sheiham A. A life course approach to assessing causes of dental caries experience: the relationship between biological, behavioural, socioeconomic and psychological conditions and caries in adolescents. *Caries Res*. 2003;37(5):319-26.

17. Peres MA, Latorre MRDO, Sheiham A, Peres KG, Barros FC, Hernandez PG et al. Determinantes sociais e biológicos da cárie dentária em crianças de 6 anos de idade: um estudo transversal aninhado numa coorte de nascidos vivos no Sul do Brasil. *Rev Bras Epidemiol.* 2003;6(4):293-306.
18. Rohr RIT, Barcellos LA. As barreiras de acesso para os serviços odontológicos. *UFES Rev Odontol.* 2008;10(3):37-41.
19. Roncalli AG, Frazão P, Pattussi MP, Araújo IC, Ely HC, Batista SM. Projeto SB2000: uma perspectiva para a consolidação da epidemiologia em saúde bucal coletiva. *Rev Bras Odont em Saúde Col.* 2000;1(2):9-25.
20. Roncalli AG, Silva NN, Nascimento AC, Freitas CHSM, Casotti E, Peres KG et al. Aspectos metodológicos do Projeto SBBrazil 2010 de interesse para inquéritos nacionais de saúde. *Cad Saúde Pública.* 2012; 28(Supl):40-57.
21. Shaffer JR, Polk DE, Feingold E, Wang X, Cuenco KT, Weeks DE et al. Demographic, socioeconomic, and behavioral factors affecting patterns of tooth decay in the permanent dentition: principal components and factor analyses. *Community Dent Oral Epidemiol.* 2013;41(4):364-73.
22. Silva RHA, Castro RFM, Cunha DCS, Almeida CT, Bastos JRM, Camargo LMA. Cárie dentária em população ribeirinha do estado de Rondônia, Região Amazônica, Brasil, 2005/2006. *Cad Saúde Pública.* 2008;24(10):2347-53.