Trend and polarization of dental caries in pre-schoolers

Tendencia y polarización de la caries dental en preescolares

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ABSTRACT

Objective: to evaluate the tendency and polarization of dental caries in children 4-5 years of age, between 2006 and 2014.
Method: this is a comparison of two similar cross-sectional studies that included 226 children each year. Clinical data were collected according to the criteria proposed by the World Health Organization (WHO). A previously validated questionnaire was administered to parents or guardians of children, in order to obtain data related to family income.
Results: 32.7% of children in 2006 and 35% in 2014 had at least one decayed tooth. The dmft index was 1.25 in 2006 and 1.40 in 2014, with no statistically significant difference (p> 0.05). It was verified that there is a higher concentration of dental caries in populations of lower economic status (p <0.05) for the years of analysis.
Conclusion: the caries prevalence showed a tendency to remain constant after eight years of the baseline. Thus, the disease showed polarized, indicating a higher concentration of children whose families had worse socioeconomic conditions.

Keywords: dental caries, children, epidemiology, oral health, comparative study.

RESUMEN

Objetivo: evaluar la tendencia y la polarización de la caries dental en niños de 4-5 años de edad, entre 2006 y 2014.
Método: se trata de la comparación de dos estudios transversales similares que incluyó a 226 niños en cada año. Los datos clínicos fueron recogidos de acuerdo con los criterios propuestos por la Organización Mundial de la Salud (OMS). un cuestionario previamente validado, fue aplicado a los padres o responsables de los niños, con la finalidad de obtener datos relacionados con los ingresos financieros familiar.
Resultados: el 32,7% de los niños en 2006 y 35% en el 2014, tenían al menos un diente cariado. El índice ceod en 2006 fue de 1,25 y en 2014, de 1,40, no se encontró diferencia estadísticamente significativa (p> 0,05). Fue verificado que hay una mayor concentración de caries dental en poblaciones de menor estatus económico (p<0,05) para los años de análisis.
Conclusión: la prevalencia de caries dental presentó una tendencia a mantenerse constante después de ocho años del momento de la evaluación inicial. Con esto, la enfermedad se mostró polarizada, evidenciando una mayor concentración en niños cuya familia poseía peores condiciones socioeconómicas.

Palabras clave: caries dental, niños, epidemiología, salud oral.

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INTRODUCTION

The modern world has seen a declining trend in caries prevalence in both developing and developed countries.[1] In Brazil, this has also been reported, although there are marked differences in the distribution of the prevalence of this disease in different regions of the country and among various population groups.[2] Thus, caries remains a public health problem and toothache still a major cause for school absenteeism.[1,3]

The last Brazilian national report on oral health held in 2010 showed that 54.3% of children under 5 years of age had on average 2.43 carious teeth, and dental decay made up for about 80% of the index of decayed, extracted and filled teeth for the primary dentition (dmft).[2] The same report indicated that in the northeastern part of the country, this situation appears to be more severe, the mean dmft was 2.89, of which, 88.2% makes up for to the decay component of the index. The World Health Organization goal of oral health for the year 2000 had already proposed that 50% of children aged 5 and 6 years should be caries free. For the year 2010, this target was increased to 90% and in less bold perspective, the goal was reduced to 80% for 2020.[4]

By analyzing the process of epidemiological transition of dental caries in children in developed countries, it is clear that there is a phenomenon known as polarization of the disease, characterized by the social vulnerability of social groups that still have a great effect on preventing the decline of dental caries. Corroborating this, it appears that a greater burden of caries affects populations less economically favored.[5]

This way, it is essential to monitor changes in the distribution and severity of disease in society and assess the risk factors over time.[6] Thus, the aim of this study was to evaluate the trend and polarization of dental caries in children 4-5 years between 2006 and 2014.

METHOD

This study was approved by the Ethics Committee in Research of the University of Pernambuco under the Protocol 044/06 and conducted in accordance with the ethical principles that pertain to the Declaration of Helsinki.

The two cross-sectional studies were conducted in the years 2006 and 2014, in the city capital of the State of Pernambuco, Recife, Brazil, which has an area of 217 km^2 and population of 1.561,659 inhabitants, representing 18% of the State population.[7]

The sample size calculation was based on a pilot study in which dental caries had a prevalence of 29.7%, considering a confidence interval of 90% and type I error of 5%, using a formula for cross-sectional studies in the program Epi info Version 2000 (Atlanta, Georgia, USA). It was soon established one sample calculation of 226 children for each year of analysis, totaling 452 children.

The Clinical exam for the detection of caries was conducted by four calibrated examiners according to the guidelines of the World Health Organization. [8] The Kappa coefficients for inter- and intraexaminer calibration were 0.89 and 0.83, respectively.

All children were examined at the knee to knee position, in a place with good natural lighting. The examiners wore appropriate clothing and personal protective equipment (PPE): gown, cap, mask, goggles and disposable gloves. The standards of biosecurity, both for infection control and for the elimination of waste followed the Manual recommended by the National Health Surveillance Agency: Dental Services: Prevention and Risk Control (BRAZIL / MS / ANVISA , 2006). Children with motor and mental disorders were excluded from the sample to assure better reliability for the data.

Dental caries was assessed by the index of decayed, extracted and filled teeth for the primary dentition (dmft). To assess the polarization of caries family income was registered for each examined child, based on the minimum Brazilian wage salary. A previously validated questionnaire was administered to parents or guardians of children, in order to obtain data related to family income.

Data was analyzed using absolute and percentage values of statistical measures: mean, standard deviation, confidence interval of 95,0%. The normal distribution of quantitative data was verified by the

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Kolmogorov-Smirnov test. The inferential statistics was assessed by the Pearson chi-square test to verify the association between categorical variables. The Mann-Whitney and Kruskal-Wallis tests assessed the association between categorical and numerical values (dmft). The margin of error used in the decision of the statistical tests was 5.0%. Statistical calculations were performed using SPSS (Statistical

statistically significant difference between the years of study (p> 0.05) (Table 2).

The component "d" (decayed) accounted for 87.2% of the index in 2006 and 89.2% in 2014, the component "e" (extracted) in 2006 accounted for 4% of the dmft and in 2014 to 5%. Finally, polarization looked at the socioeconomic features of the population, based on family income, values ranging from 1 to 2 minimum

Table 1. Evaluation of deciduous teeth decayed according to the variables: year of schooling and family income (in minimum wages)

Variables	Decayed primary teeth				Total group		P value
	Yes		No				
	N	%	N	%	n	%	
• Years							p (1) =0,345
2006	74	32,7	152	67,3	226	100,0	
2014	79	35,0	147	65,0	226	100,0	
• Family income							p (1) < 0,001*
Less than or equal to one minimum wage ($ 282.00)	98	48,3	105	51,7	203	100,0	
Between one and two minimum wages	46	31,7	99	68,3	145	100,0	
More than two minimum wage	09	8,6	95	91,4	104	100,0	
Total	153	33,8	299	66,2	452	100,0	

Significant difference at 5.0%.   (1): Using the Chi-square test

Package for Social Sciences) version 21.

RESULTS

Of the participating children, 32.7% in 2006 and 35% in 2014 had at least one decayed tooth (Table 1), and no statistically significant difference was found in relation to sex and age.

The dmft index was 1.25 for the year 2006 and 1.40 for the year 2014, with no statistically significant difference (p> 0.05) between the two years. Furthermore, the decay component of the dmft index (decayed, missing and filled teeth) separately did not indicate

Brazilian wage, indicating that children who had dental decay belonged to the lower wage income wage group (p <0.05) for both years of analysis (Table 2).

DISCUSSION

In Brazil and most part of the developed and developing countries, tooth decay is still a public health problem.[9] Therefore, trends to analyze by comparing different time frames of the state of the art of the problem are valuable for producing useful knowledge for planning and decision making in health care policies. The analysis of the prevalence of dental caries over time allows health planners to learn the relationship of health / disease

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Table 2. Analysis of the components of dmft as years of collecting and household income (in minimum wages)

Variables		Components dmft							
		Decayed		Extracted		Filled			
	N	Mean	%	Mean	%	Mean	%	Mean	SD
• Years									
2006	226	1,09	87,2	0,05	4,0	0,11	8,8	1,25	2,52
2014	226	1,25	89,3	0,07	5,0	0,10	7,1	1,40	2,64
P value [1]		0,522		0,285		0,838		0,665	
• Family income									
Less than or equal to one minimum wage ($ 282.00)	203	1,68 [A]	89,4	0,08	4,26	0,12	6,4	1,88 [A]	3,03
Between one and two minimum wages	145	1,16 [B]	89,2	0,06	4,6	0,10	7,7	1,30 [A]	2,43
More than two minimum wage	104	0,18 [C]	66,67	0,01	3,7	0,08	29,6	0,27 [B]	0,99
P value [2]		< 0,001*		0,241		0,708		< 0,001*	

(*): Significant difference at 5.0%. (1): Using the Mann-Whitney test. (2): Using the K test

process, in particular those related to socioeconomic factors and the effectiveness of national public health policies.[5,10-12]

The dmft indices in this time frame, from the year of 2006 to 2014 increased by 7%, though there has not statistically significant difference (p> 0.05), the trend of dental caries in this population did not follow either the national tendency for reduction,[2,5,13] nor the international features.[14-16]

Among the components of the dmft index, component "d" (decayed) increased by 2.1% between 2006 and 2014, revealing a worrisome scenario due to the increased burden of the disease in this population sample. The component "e" (extracted) also increased by 1% between the years evaluated. Finally the component "f" (filled) declined in this time frame, 8.8% to 7.1%, meaning that more children presented with untreated decay. This result is consistent with the data from the IBGE (Brazilian Institute of Geography and Statistics)[7] which revealed that the poor have more disease and less access to dental care which by brazilian low it should be public and free. Therefore, although there was no statistically significant difference in any of the components of dmft between the years (table 1) this data set should be useful for helping health authorities on making decisions towards public dental health policies to ensure that preventive measures in respect to health promotion could result on greater collective impact.

Among the factors attributed to the reduction of dental caries in most parts of the developing countries like Brazil, fluoride plays an important role, since it is effective on reducing dental caries on public water supplies, on toothpaste, and the creation and implementation of prevention programs.[17-19] However, since it is predicted by state law that water supplies in Pernambuco should be fluoridated and it is still not available, the population can only count on fluoridated tooth paste to help prevent decay. The importance of the implementation of water fluoridation can be verified by the latest report of the Brazilian Oral Health Survey. This survey reveals that in regions where there is the addition of fluoride in the water, children 5-12 years have the double amount of carious teeth than those where water is already treated with fluoride,[2] which may reduce by 60% the prevalence of dental caries.[20]

The distribution of dental caries among the years has definitely changed from a uniform distribution to an increasing level of inequality. It also appears that despite advances in oral health status of the population, mainly for tooth decay, not all individuals are equally favored and some carry a greater burden of disease.[5,18,21]

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According to the Brazilian Institute of Geography and Statistics-IBGE,[7] 53.9 million Brazilians live in extreme poverty, which represents 31.7% of the population. In the Northeast, 76.5% of households earn less than one minimum wage. However, the results found in this sample showed that about 45% of the population of the metropolitan area of Recife may survive from a wage of one minimum salary per month, about U$300.00 for an average family of 4 members.

According to *Marmot, Bell* and *Goldblatt*[10] there is a convergence between unfavorable socioeconomic status and the presence of disease. The findings of this study show the existence of a greater disease burden among those who have a more unfavorable economic condition. Children whose family owned less than one minimum wage dmft, was 9.3 times greater than those from families that earned more than two minimum wages (Table 2).

Thus, it is evident that the more unfavorable is the socioeconomic condition of the family, more precarious is the condition of oral health of children. [1,3,6,9,12] Therefore, it would be inappropriate to refer dental caries by the uniqueness of its primary etiologic factors, such as microbe, host and substrate due to its multifactorial features that include the economic, social and comportamental.[22] Thus, it is necessary to report to the multidimensional perspectives of oral health to explain these differences and understand the factors that may contribute to its maintenance in the individual´s life contexts.[23]

CONCLUSION

The caries prevalence showed a tendency to remain constant after eight years of the baseline. Thus, the disease showed polarized, indicating a higher concentration of children whose families had worse socioeconomic conditions.

Statement of conflict of interest

All authors agree to publication of the article and declare no conflict of interest whatsoever.

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