

## Prevalence of Caries in Schoolchildren in the Rural Area of a Small Municipality in the South of Minas Gerais, Brazil

*Prevalência de Cárie em Escolares da Zona Rural de um Município de Pequeno Porte no Sul de Minas Gerais, Brasil*  
*Prevalencia de Caries en Escolares de la Zona Rural de un Pequeño Municipio del Sur de Minas Gerais, Brasil*

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### Abstract

**Introduction:** Despite advances in caries treatment, the disease still afflicts populations deprived of access to goods and services. **Objective:** To determine the prevalence of dental caries as well as the dental treatment needs for children aged five to twelve years old from rural public schools in Alfenas/MG. **Material and method:** Cross-sectional descriptive observational study, carried out through an epidemiological survey, in which data were collected through clinical examination of 364 children from five rural schools in the city. These tests were performed by a calibrated examiner (intra-observer kappa = 0.93), within the institutions, after signing the Free and Informed Consent Form by the person in charge. The prevalence of caries and the need for dental evaluation were observed, using the DMFT and DMFT-D according to the codes and criteria recommended by the WHO. For data collection and analysis, they were processed in the EPIBUCO program, version 2004. **Result:** At 5 years of age, there was a prevalence of caries in 70% of the children, dmft of 2.98 and a mean of 2.13 deciduous teeth in need of restorative intervention, corresponding to 71.44% of dmft. At 12 years of age, a DMFT of 2.20 and a mean of 0.8 permanent teeth in need of restorative intervention per individual were reported, which represents 36.44% of the index. **Conclusion:** The results show the high prevalence of caries in children from rural schools, thus showing a worse condition than that observed in the Brazilian population, being also below the O.M.S. goals.

**Descriptors:** Epidemiology; Oral Health; Dental Caries; Rural Population.

### Resumo

**Introdução:** Apesar dos avanços no tratamento da cárie, a doença ainda aflige populações privadas de acesso a bens e serviços. **Objetivo:** Determinar a prevalência de cárie dentária e as necessidades de tratamento odontológico em crianças de cinco a doze anos de escolas públicas rurais de Alfenas/MG. **Material e método:** Estudo observacional descritivo transversal, realizado por meio de inquérito epidemiológico, no qual os dados foram coletados por meio de exame clínico de 364 crianças de cinco escolas rurais do município. Esses testes foram realizados por um examinador calibrado (kappa intra-observador = 0,93), nas dependências das instituições, após assinatura do Termo de Consentimento Livre e Esclarecido pelo responsável. Observou-se a prevalência de cárie e a necessidade de avaliação odontológica, utilizando-se os índices CPO-D e ceo-d de acordo com os códigos e critérios recomendados pela O.M.S. Para apuração e análise dos dados, os mesmos foram processados no programa EPIBUCO, versão 2004. **Resultado:** Aos cinco anos de idade, houve prevalência de cárie em 70% das crianças, ceo-d de 2,98 e média de 2,13 de dentes deciduos com necessidade de intervenção restauradora, correspondendo a 71,44% do ceo-d. Aos 12 anos, registrou-se CPO-D de 2,20 e uma média de 0,8 dentes permanentes com necessidade de intervenção restauradora por indivíduo, o que representa 36,44% do índice. **Conclusão:** Os resultados mostram a alta prevalência de cárie em crianças de escolas rurais, mostrando assim uma condição pior do que a observada na população brasileira, estando também abaixo das metas da O.M.S.

**Descritores:** Epidemiologia; Saúde Bucal; Cárie Dentária; População Rural.

### Resumen

**Introducción:** Apesar de los avances en el tratamiento de la caries, la enfermedad aún aqueja a poblaciones privadas de acceso a bienes y servicios. **Objetivo:** Determinar la prevalencia de caries dental y la necesidad de tratamiento odontológico en niños de cinco a doce años de escuelas públicas rurales de Alfenas/MG. **Material y método:** Estudio observacional descriptivo de corte transversal, realizado a través de una encuesta epidemiológica, en el que se recolectaron datos a través del examen clínico de 364 niños de cinco escuelas rurales de la ciudad. Estas pruebas fueron realizadas por un examinador calibrado (kappa intraobservador = 0,93), en las instalaciones de las instituciones, previa firma del Término de Consentimiento Libre e Informado por parte del responsable. Se observó la prevalencia de caries y la necesidad de evaluación dental, utilizando los índices DMF-D y dmft-d según los códigos y criterios recomendados por la O.M.S. Para la recolección y análisis de los datos, se procesaron en el programa EPIBUCO, versión 2004. **Resultado:** A los cinco años de edad se presentó una prevalencia de caries en el 70% de los niños, dmft de 2.98 y promedio de 2.13 de dientes temporales con necesidad de intervención restauradora, correspondiente al 71,44% del dmft. A los 12 años se registró un CPD de 2,20 y un promedio de 0,8 dientes permanentes con necesidad de intervención restauradora por individuo, lo que representa el 36,44% del índice. **Conclusión:** Los resultados muestran la alta prevalencia de caries en niños de escuelas rurales, mostrando así una peor condición que la observada en la población brasileña, estando también por debajo de las metas de la O.M.S.

**Descriptor:** Epidemiología; Salud Bucal; Carie Dental; Población Rural.

### INTRODUCTION

Dental caries is one of the main oral health problems affecting countless people in

different periods of life. The disease may cause pain and tooth loss, restricting daily activities and affecting the quality of life of subjects. Its

occurrence involves biological, eating, behavioral and socioeconomic factors, as well as access to consumer goods and health services, being considered one of the basic principles in the public health practice<sup>1,2</sup>.

The importance of the epidemiological survey is clear, comprising a type of study that allows for knowing the profile of the health environment in a community, in a faster and lower cost manner. Prevalence is a very important measurement in these studies, enabling to measure a problem in a particular research object, being useful to plan and determine collective treatment needs<sup>3</sup>.

Several studies, based on the prevalence and severity measurements, have shown significant caries reduction in school-age children in Brazil in the last three decades<sup>3,4</sup>. Promising results were verified comparing the last national survey SB Brazil Project 2010 (DMFT 2.074) to the study conducted in 2003 (DMFT 2.783), in subjects at age 12, showing a reduction by 26.6% in 7-year old subjects, but still below the goals advocated by the WHO, in which the DMFT is aimed to be less than 1<sup>4</sup>.

Some studies have indicated that the global improvement in oral health levels has been followed by the polarization of the disease in some segments of the population<sup>2,6</sup>. Brazilian rural areas present worse income indicators, basic sanitation and educational levels than urban areas, in addition to the lower concentration of public health services. Therefore, it is suggested that subjects living in rural areas may represent an important concentration group for oral health problems<sup>7,8</sup>.

Thus, this current research study aimed at determining the prevalence of dental caries and the need for dental treatment. It is important to investigate the oral health conditions of this population, understanding their reality and the subsequent possibility of intervention to improve the rate and their quality of life.

#### **MATERIAL AND METHOD**

The study was authorized by the Education Department of Alfenas/MG-Brazil and the Regional Teaching Office, as well as by the principals of the participant schools, being the research approved by the Ethics Committee on Human Research of the Federal University of Alfenas (protocol No. 2,398,206). Following the inclusion criteria, all the enrolled school children from the age group of 5 to 12 years of age were selected to participate in this research study. Subjects who expressed an interest in participating and presented the Free and

Informed Consent Form signed by a guardian were also included. A total of 404 subjects were included in the study, all of them students enrolled in those mentioned schools, being divided into groups according to age and gender, coming from five schools located in the rural area of the city in question. From this universe, 40 children who participated in the selection process were not considered in the final study, as they were absent in the evaluation day. Thus, the final sample comprised 364 subjects, representing 90% of the study population.

An observational, descriptive, cross-sectional study was carried out through an epidemiological survey, in which data were collected using an intra-oral clinical examination. The working team was composed by two academics who participated as the examiner and the note taker. The calibration consisted of a theoretical stage, in which the indexes, the examination methodology and the execution protocol were informed to the examiners through an expository class. Then, a practical step was taken to standardize and systematize the information contained in the study.

To assess the dental condition in relation to caries, clinical examinations were carried out at the school premises, in which the examiner positioned himself in front of the examined subject, both accommodated in school chairs, under natural light, being that student had not undergone previous prophylaxis. The following sterilized and individual packaged instruments were used: WHO probes (ball point) and flat mouth mirrors.

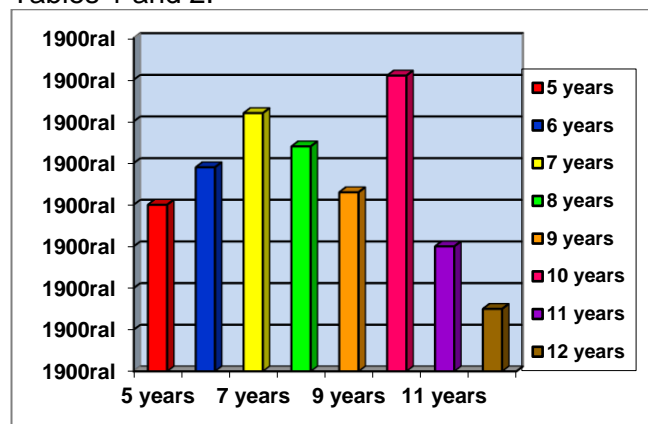
In accordance to the WHO codes and criteria, the prevalence of caries and dental treatment needs were observed, using the DMFT and the dmft indexes, expressing the sum of decayed and missing and filled teeth<sup>4</sup>. The data analysis and verification were processed using the EPIBUCO software version 2004. The Kappa intra-examiner test was applied to verify compliance with the calibrated examiner, obtaining a value of 0.93.

#### **RESULTS**

The sample comprised 364 children from five public schools located in the rural area of Alfenas/MG. Among those, 196 were male subjects (53.84%) and 168 were female subjects (46.16%). The distribution of students according to age is shown in Chart 1.

About 30% of 5-year old children were free from caries lesions. The dmft found at this age was 2.98, presenting an average of 2.13

deciduous teeth needing restorative intervention, corresponding to 71.47% of the dmft. The other age groups presented a variation in the composition of the dmft/ DMFT, as shown in Tables 1 and 2.



**Graph 1:** Sample Distribution according to age, Alfenas-MG, Brazil.

**Table 1.** Mean Distribution of dmft and DMFT indexes' components and mean of dmft index according to age, Alfenas-MG, Brazil

Age	Healthy	Decayed	Filled with caries	Filled without caries	Lost	dmft/ DMFT	n
05 years	17,83	1,98	0,15	0,78	0,08	2,98	40
06 years	17,91	2,47	0,41	0,84	0,12	3,84	49
07 years	18,13	2,65	0,51	0,97	0,46	4,59	62
08 years	18,71	2,53	0,46	0,87	0,31	4,17	54
09 years	18,63	2,24	0,53	1,47	0,33	4,57	43
10 years	20,38	1,42	0,18	0,93	0,06	2,59	71
11 years	22,66	0,73	0,30	0,63	0,03	1,69	30
12 years	21,27	0,73	0,07	1,40	0,00	2,20	15

**Table 2.** Percentage distribution of components in relation to total dmft, DMFT according to age, Alfenas-MG, Brazil

Age	Healthy	Decayed	Filled with caries	Filled without caries	Lost	dmft/ DMFT	n
05 years	17,83	1,98	0,15	0,78	0,08	2,98	40
06 years	17,91	2,47	0,41	0,84	0,12	3,84	49
07 years	18,13	2,65	0,51	0,97	0,46	4,59	62
08 years	18,71	2,53	0,46	0,87	0,31	4,17	54
09 years	18,63	2,24	0,53	1,47	0,33	4,57	43
10 years	20,38	1,42	0,18	0,93	0,06	2,59	71
11 years	22,66	0,73	0,30	0,63	0,03	1,69	30
12 years	21,27	0,73	0,07	1,40	0,00	2,20	15

For 12-year-old subjects, fifteen children were examined, being the DMFT 2.20 and an average of 0.8 permanent teeth in need for restorative intervention per student, representing 36.44% of the index. The composition of the DMFT for the other age groups varied, as shown in Tables 1 and 2. Decayed teeth were the main component of the DMFT and the dmft. The severity of affected teeth decreased as age increase.

## DISCUSSION

The lack of data for the evaluation of the oral health conditions of the population can lead to inadequate planning by public health managers. As far as our knowledge goes, the city of Alfenas has no previous published data on the subject, therefore, the results obtained in this study are relevant information regarding the prevalence and severity of dental caries and

indicators to be analyzed for the incorporation of new strategies in oral health care. These data are fundamental for the implementation of oral health actions in the rural area of Alfenas, contributing to planning and the allocation of resources from health policies.

The literature shows a wide variation in the prevalence of dental caries in several locations and between age groups<sup>2,7,8</sup>. In the present study, only 30% of 5-year-old children were free from dental caries lesions, which is lower than the values observed in the SB BRASIL 2010 survey (46.6%)<sup>4</sup> and far from the goals set by the WHO for 2010 (90%)<sup>5</sup>. For the same age group, other surveys carried out in cities in the countryside of Brazil showed a lower prevalence of caries. In urban areas, it was observed in Avaré-SP/Brazil<sup>8</sup>, 47.55% of children were free of caries at 5 years of age and 43.9% in Jerônimo Monteiro-ES/Brazil<sup>9</sup>. In Cascavel-PR/Brazil<sup>10</sup>, 30% of children aged 4 to 10 years were free of caries in primary teeth; Manaus-AM/Brazil<sup>11</sup>, 43.07% of children aged 4 to 6 years free of caries; Umuarama-PR/Brazil<sup>2</sup>, 94.49% healthy teeth 5-year-old children. These studies show a better result in several regions of the country, compared to the present study. According to the ceo-d/CPO-D index, in Sarandi-PR/Brazil<sup>13</sup>, there was 70% prevalence of dental caries, according to the ceo-d/CPO-D index in 6–14-year-old school children. In Patos-PB/Brazil<sup>14</sup>, dmft found of 3.11 in 5-year-old.

Data obtained in Alfenas-MG/Brazil are worse than those observed in Indaiabira/MG in 2017 (38%)<sup>15</sup> and a municipality in the midwestern region of SC/Brazil in 2020 (74.5%)<sup>16</sup>. In Araruna-PB/Brazil<sup>17</sup>, in 2018, an average DMFT index of 5.29 was found in urban and rural schools, in children aged 5 to 10 years. Considering this scenario, it is of fundamental importance to reinforce the necessity of dental treatment for the primary dentition and prevention strategies of dental caries, focused on the rural population.

Although epidemiological surveys carried out in Brazil in 1996, 1998, 2003 and 2010 indicate the decline in the prevalence of caries<sup>3</sup>, the need for investigation and intervention is still necessary, considering the high prevalence of children with untreated caries. The dmft found for 5-year-old subjects (2.98) in the rural area of Alfenas-MG/Brazil showed that 71.43% consists of decayed and filled teeth with caries (Table 2), suggesting that this population has insufficient dental health care coverage. This data may be related to the population's lack of access to

dental care, due to the great distances to be covered, transportation difficulties and low-income rate. These associated factors, the lack and precariousness of prevention and health promotion programs in this age group of rural areas, contributed to the increase in the index. Furthermore, the untreated caries of 5-year-old children reflects on their quality of life<sup>9,18</sup>.

In the present study, the filling component of the DMFT index was the highest at the ages of 9, 11 and 12 years of age (Table 2). The decayed was higher than the filling component at age of 6, 7, 8 and 10 (Table 2), highlighting the severity of the disease and indicating that promotion and prevention actions did not target these students, or they did not have access to services, being that the city must develop public policies so that these children can be included in oral health programs. These data also suggest that the negative relation between the goals recommended by the WHO and the index values may be a result of epidemiological investigations focused primarily in 5 and 12 years-old children and, consequently, actions of promotion, prevention and rehabilitation are neglected for those who are in the intermediate age in these age groups<sup>5</sup>.

Considering the permanent dentition of 12-year-old school children, the present study found a DMFT of 2.20 (Table 1). In 2019, this index in the city of Pedra Branca-CE/Brazil was 2.60<sup>19</sup>, and 2.47 in Jerônimo Monteiro-ES/Brazil<sup>9</sup>, however, far from the expectations of the WHO for 2010<sup>5</sup>. In urban areas in the interior of the Midwest region, in 2020, this index reached an average of 2.14 teeth per examined individual<sup>20</sup>. The one held in Cascavel-PR/Brazil in 2016 showed a dmft of 3.03 in children from 4 to 10 years old and DMFT of 0.76 for the same age<sup>10</sup>. In the city of Estação-RS/Brazil, in 2019<sup>21</sup>, the CPOD found was 0.78 for children aged 12 years and in the city of Umuarama-PR/Brazil<sup>12</sup>, CPOD was 0.60 for children aged 9 to 11 years, demonstrating better situations than those registered in this study<sup>22</sup>. In 2017, only 38% of children in the rural area of Indaiabira/SP were free from caries and the DMFT at 12-year-old children was 4.19<sup>17</sup>. In Nova Roma do Sul-RS/Brazil, in 2016, DMFT 0.41 and dmft 2.94 were found in children aged 7 to 10 years, with a low caries prevalence of only 2.45%<sup>23</sup>.

The 12-year-old rural population of this study presented better oral health condition than the same population at 5 years of age, although the index values are still below the

recommended values of the WHO. The main component of the DMFT was decayed and filled teeth with caries representing 36.44% at the age of 12 years and 71.43% at the age of 5 years (Table 2). The need for dental restorative interventions in the primary dentition can be translated as difficulties in the primary care level in relation to preventive and curative actions in oral health. In addition, other factors could be involved, such as low level of education of parents, beliefs and cultural factors, difficulty in incorporating new hygiene habits and the question of the high prevalence of dental caries in children with five years of age, which shows that primary dentition is still neglected<sup>9,12</sup>.

Recent studies have indicated that the prevalence of tooth decay has decreased in most countries. However, the phenomenon of polarization of this disease has shown that such decline does not occur in a homogeneous way, since there is still a significant number of people belonging to minority groups, socially unprotected, more vulnerable, concentrating oral diseases, as they are more susceptible or more exposed to risk factors. The greater concentration of public health services in the urban area compromises and hinders the access of the population living in the rural area to dental care, being that these individuals may represent an important pole of concentration of oral health problems. In addition, few studies have been conducted on the behavior of the main oral diseases in small Brazilian cities and rural areas<sup>6</sup>.

Considering also distant populations that do not have fluoridated water, as evidenced in the study by Frazão et al.<sup>1</sup> carried out in the municipality of Acrelândia-AC/Brazil, the CPOD found is 2.15 and, of these, 37.1% were free of caries<sup>1</sup>. In 2017, another study carried out in riverside communities caused scientific alarm because the dmft for the age of 5 was 5.3 and the DMFT at 12 years of age was 4.0<sup>23</sup>. These data confirm the great inequality in oral health care throughout the Brazilian territory. But a proof of this inequality can be found in the study in Crato-CE/Brazil, in 2020, where children in social vulnerability, present 66.7% children free of caries at 6 years and only 12.5% at 12 years. In addition to presenting high dmft at 5 years old (4.66) and DMFT at 12 years old (2.25)<sup>24</sup>. These studies in regions of great social fragility show the impact that limited access to health services may have in maintaining the oral health of the populations of more isolated locations, as well

as the consequences of the population's lack of information regarding self-care with oral health.

Dental caries is still one of the most prevalent oral diseases in Brazil, although there is an improvement in the indicators at the global level, this condition has not reached the entire population homogeneously, presenting a tendency to concentrate in more remote rural communities<sup>19</sup>. In addition to the caries experience, other factors may be influencing their oral health condition, such as self-care, access to the service, fluoridation of drinking water<sup>2</sup>, demanding from the basic units and specialty health centers, and the socio-economic situation of the population.

These results show the importance of having epidemiological surveys conducted in macro-regions as well as in small localities<sup>3</sup>, to enhance the effect of health actions to meet the needs of the entire country. Such surveys can subsidize the implementation of more effective care measures for the population, ensuring greater resolution, especially in children and adolescents, which are extremely important ages to monitoring oral health. A special focus on the primary dentition and measures in terms of prevention and promotion of oral health, including strategies of education in oral health, also involving parents, are some suggestions that can be made from the results found here.

#### CONCLUSION

In this study, only 30% of 5-year-old children were free from caries lesions, and a DMFT of 2.20 in 12-year old children was observed. These results show a high prevalence of caries in school children in the rural area, as well as a high need for dental restorative treatment of decayed and/or filled teeth with caries. Both data have shown a worse condition than the one found in the Brazilian population. It is clear the lack of access to oral health care for this population and, even more significant, the absence or lack of preventive and health programs, especially in the 5-year age group. Thus, it is necessary to implement more effective and resolute measures of care and programs of promotion and prevention focused on the rural population.

#### REFERENCES

1. Frazão P, Santos CRI, Benicio DEA, Marques RAA, Cardoso MA, Narvi PC. Dental caries in 12-year-old schoolchildren in a municipality without fluoridated water in the Western Brazilian Amazon, 2010. *Epidemiol. Serv. Saúde*. 2016;25:149-58.
2. Avellar-Silva ABV, Oliveira LMC, Silveira, RG, Miasato JM, Neves MA. Prevalence of dental caries in preschoolers from a private school in a rural region of the State of Rio de Janeiro. *Rev Bras Pes Saúde*. 2012;14:49-56.
3. Roncalli AG, Cortes MIS, Peres KG. Epidemiological profiles of oral health in Brazil and surveillance models. *Cad Saúde Pública*. 2012;28:58-68.
4. Brazil. Ministry of Health. Health Care Secretariat. Health Surveillance Secretariat. SB Brazil 2010: National Oral Health Survey: Main Results. Brasília: Ministry of Health; 2012. Available em: <[http://bvsms.saude.gov.br/bvs/publicacoes/pequisa\\_nacional\\_saude\\_bucal.pdf](http://bvsms.saude.gov.br/bvs/publicacoes/pequisa_nacional_saude_bucal.pdf)>.
5. World health organization. Oral health surveys: basic methods. 5. ed. Geneva, 2013. [cited 2019 Mar 19]. Available from: <[https://apps.who.int/iris/bitstream/handle/10665/97035/9789241548649\\_eng.pdf;jsessionid=96DBC133D8BB4B7E8F6C9305A8736AE?sequence=1](https://apps.who.int/iris/bitstream/handle/10665/97035/9789241548649_eng.pdf;jsessionid=96DBC133D8BB4B7E8F6C9305A8736AE?sequence=1)>.
6. Silva LFH, Amaral RC, Meirelles MPR, Sousa MLR. Socio-behavioral factors in dental caries polarization groups in schoolchildren and preschoolers in a medium-sized city. *Arq Odontol*. 2014;50:103-11.
7. Figueiredo MC, Felten VM, Silva C M, Oliveira KP Silva KVCL. Oral health conditions of schoolchildren in rural Rio Grande do Sul. *Rev Conexão UEPG*. 2018;14:122-29.
8. Nunes VH, Perosa GB. Dental caries in 5-year-old children: sociodemographic factors, locus of control and parental attitudes. *Ciênc Saúde Colet*. 2017;22:191-200.
9. Peluzio FL, Zanin L, Flório FM. Prevalence and tooth decay severity in students from Jerônimo Monteiro, Espírito Santo, Brazil. *Rev Bras Pesq Saúde*. 2019;21:7-14.
10. Lazzarin HC, Sulzler KE, Kramer IV, Camargo JB. Prevalence of dental caries in children of a public institution of the city of Cascavel – PR, Brazil *Archives MUDI*. 2016; 20:13-24.
11. Negreiros PS, Régis-Aranha LA, Rodrigues MFR. Epidemiological profile of dental caries in preschool children in a public school in the city of Manaus - AM. *Arq Cienc Saúde UNIPAR*. 2018;22:11-5.
12. Demeu AJM, Viudes LP, Barbosa LC, Nascimento VR. Caries prevalence in children of elementary school of Umuarama, Paraná. *Arch Health Invest*. 2019;8:592-96.
13. Lima LHG, Rocha NB, Antoniassi CP, Moura MS, Fujimaki M. Prevalence and severity of dental caries in elementary school students from a vulnerable municipality. *Rev Odontol UNESP*. 2020;49:e20200063

14. Queiroz FS, Costa LED, Santos KLS, Simoes TMS, Silva PV. Dental caries and associated factors in children 5-year-old children from the county Patos-PB. Arch Health Invest. 2018;7:190-4.
15. Dourado MR, Rebelo JHA, Rocha AL, Santa-Rosa TTA. Prevalence of caries in schoolchildren in the rural area of Indaiabira, Minas Gerais, Brazil. Rev APS. 2017;20:89-97.
16. Emanuelli Lopes E, Bunn G, Ramos GO, Bizzotto F, Ariotti AP, Rossoni C. Food consumption and oral health in a midwest city of Santa Catarina. Saúde Meio Ambient. 2020;9:289-98.
17. Silva DR, Ferreira SAM, Oliveira PAP, Silva ACB. Caries experience and associated factors among urban and rural schoolchildren: a pilot study. Arch Health Invest. 2018; 7:364-8.
18. Martins AN, Gori MA, Correia, AL. Inequality in access to health care between urban and rural areas in Brazil: a decomposition of factors between 1998 and 2008. Cad Saúde Pública. 2018;34:1-14.
19. Silva CHF, Lima HT, Benedito FCS, Rodrigues JC, Joaquim DC, Leite ACRM. Epidemiological survey of dmft index of schoolchildren aged 12 years in Pedra Branca, Ceará. Rev. Saúde Col. UEFS. 2019;9:16-22.
20. Silva HCA, Espinosa MM, Moi GP, Ferreira MG. Dental caries and associated factors at age 12 in the Brazilian Midwest region in 2010: a cross-sectional study. Cien Saude Colet. 2020;25:981-88.
21. Carteri MT, Dallagnol LB, Emmanuelli B, Costa AAI, Tuchtenhagen S. Factors associated with caries experience and oral health-related quality of life in schoolchildren. Rev Faculd Odontol UPF. 2019;24:242-49.
22. Scapinello A, Elsemann EB, Elsemann RB, Sangoi H, Gazzoni AF. Prevalence of childhood dental caries and its association between mothers' level of schooling and socioeconomic status of family in schoolchildren. Rev bras Odontol. 2016;73: 101-6.
23. Vilar MO, Pinheiro WR, Araújo IS. Prevalence of dental caries in children in condition of social vulnerability. Id on Line Rev Mult Psic. 2020;14:577-87.
24. Amaral RC, Carvalho DA, Brian A, Sakai GP. The relationship between oral health and dental caries in eight riverside communities - Pará, Brazil. Rev Bras Odontol. 2017;74:18-22.

### CONFLICTS OF INTERESTS

The authors declare no conflicts of interests.

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