

PREVALENCE OF DECIDUOUS TOOTH DECAY IN VULNERABLE POPULATION

PREVALÊNCIA DE CÁRIE EM DENTES DECÍDUOS DE POPULAÇÃO VULNERÁVEL

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ABSTRACT

The primary objective of this study is to estimate the prevalence of dental caries in primary molars among a vulnerable population in a municipality in the central region of Rio Grande do Sul. This is an observational cross-sectional study in which 49 individuals aged 2 to 12 years were included and assessed through an epidemiological survey using a dental condition assessment form. The prevalence of untreated caries in primary molars in this population was 46.94%, with at least one decayed tooth. Longitudinal studies are needed to determine the cause-and-effect relationship of dental caries in this community. Finally, this study can serve as a basis for formulating effective local public policies and can also provide a framework for research in similar populations.

Keywords: health inequality; epidemiological survey; oral health.

RESUMO

O objetivo principal deste trabalho é estimar a prevalência de doença cárie em molares decíduos de população vulnerável em município na região central do Rio Grande do Sul. Trata-se de um estudo observacional transversal em que 49 pessoas de 2 a 12 anos foram incluídas, sendo avaliadas no levantamento epidemiológico por meio de ficha de avaliação de condições bucais. A prevalência de cárie não tratada em molares decíduos na referida população foi de 46,94% com pelo menos um dente cariado. Sendo necessários estudos longitudinais a fim de associar causa e efeito de cárie dentária nesta comunidade. Por fim, destaque-se que este trabalho pode servir como base para formulação de políticas públicas eficientes a nível local e ainda, pode servir como esboço para construção de estudos em populações semelhantes.

Palavras-chave: desigualdade em saúde; levantamento epidemiológico; saúde bucal.

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INTRODUCTION

Dental caries is a multifactorial disease in which various genetic, environmental, and behavioral characteristics interact with each other (Maltz *et al.*, 2016). This means that the conditions in which an individual finds themselves, such as social factors, can also contribute to the presence of caries disease-not as necessary causes, but as collaborative factors that add to the disease process; however, these factors alone do not cause the disease (Ferreira, Guedes-Pinto, 2016).

Despite the progress in decentralizing services within the Unified Health System (SUS) resulting from Law 8080/1990 (Brazil, 1990), which ensured that peripheral communities had greater access to health services, including dental care, this has not been sufficient. There is still a pressing need for increased investment in health actions that aim for equity in these services across all Brazilian communities, as the acquisition of healthy habits will accompany individuals throughout their lives (Rossi; Gonçalves, 2022). It is important to highlight that Law 8.080 of September 19, 1990, was amended by Law 14.572 of May 8, 2023, which establishes the National Policy for Oral Health within the SUS and includes oral health as a field of action for the SUS (Brazil, 2023).

The high prevalence of caries in children is unfortunately a reality in various regions of the country, such as the North and Northeast regions, and contributing factors to this increase include inadequate hygiene, cariogenic diet, lack of information, and scarcity of accessible dental treatment and follow-up. This primarily affects low-income families who are unable to afford dental treatment (Martins, 2015).

Health education activities are necessary from childhood so that individuals are encouraged to adopt healthy lifestyles and become protagonists in their health processes. These actions can preferably be carried out by members of the oral health team, and additionally, Community Health Agents (ACS) covering the area can be trained by the dentist to expand and enhance educational efforts. Intersectoral actions can serve as catalysts for broader outreach, particularly regarding the health of school-aged children, making education one of the avenues to create new habits that promote general and oral health (Martins *et al.*, 2015).

It is worth noting that social inequalities have been highlighted as an important determinant of the health-disease process and have been recognized at both the individual and social context levels (Marmot *et al.*, 1997). In the case of dental caries, it is no different, as individuals in vulnerable situations tend to have higher risks of developing the disease; issues such as low educational attainment, low family income, and poor dietary choices are described in the literature as contributing factors to the disease's development (Brito *et al.*, 2020; Cruz, 2020; Karam *et al.*, 2023). Given this, it is crucial to conduct studies that report the prevalence of caries in vulnerable communities to better understand the reality and intervene if necessary in the future.

Thus, the present study aims to estimate the prevalence of dental caries in deciduous molars among a vulnerable population in a municipality in the central region of Rio Grande do Sul.

METHODOLOGY

The present study was conducted in a settlement aimed at seeking dignified housing in a medium-sized municipality in the central region of Rio Grande do Sul.

STUDY DESIGN

This is a cross-sectional observational study aimed at measuring the prevalence of dental caries in children from the specified population.

SAMPLE

All children belonging to the settlement were invited to participate in the study, subject to the signing of an informed consent form by their guardians and an assent form. According to data from the organization, a sample of 70 children constitutes the target area.

TRAINING AND CALIBRATION

Prior to data collection, final-year dental students received training and were calibrated to conduct an epidemiological survey of dental caries according to the World Health Organization (WHO) manual (WHO, 2013). They were divided into recorders and evaluators, with all evaluators being in their 9th or 10th semesters and recorders from the 6th semester onward to obtain more consistent results. Calibration was measured using the Kappa index, with a minimum agreement result of 80%, i.e., kappa 0.8.

The training and subsequent data collection utilized a form for the survey, which considered only cavities, adapted to evaluate only the dental crown. The form also included the child's age, sex, and address, along with the name of the clinical evaluator. The name of the examined individual was kept confidential.

DATA COLLECTION

Data collection was carried out following the WHO manual published in 2013 for conducting epidemiological examinations from September to November 2023. It took place in an open space in the locality, using a tent and chairs, with the examined children seated appropriately. The evaluated children were called from their homes and directed to the evaluation tent accompanied by their guardians. During the evaluation, a wooden spatula and natural light were used for proper examination,

along with all necessary Personal Protective Equipment (cap, mask, gloves, goggles, and lab coat) for the examiner.

This survey assessed the presence of dental caries cavities and identified which teeth were affected. Cases of pain or deep caries were referred to the municipal health care network or the mobile health unit present on the day of the event. Epidemiological examinations for dental caries were conducted on 70 (100%) children by 30 dental students from the Academic League of Collective Health and Epidemiology in Dentistry, consisting of five examiners and 25 recorders. A quality control check of 10% of the sample was performed by a gold standard examiner (a faculty member of the course).

Throughout the three data collection sessions (which took place during health education actions promoted by the Academic League of Collective Health and Epidemiology in Dentistry on different dates) to maximize the number of evaluations, the evaluated children also received supervised brushing, oral health guidance using mannequins and large models, group discussions for clarifying doubts, and playful activities to promote community health autonomy. Additionally, during data collection, professionals and students from nursing, psychology, medicine, physiotherapy, and nutrition also provided guidance on relevant topics in a multidisciplinary manner.

ETHICAL CONSIDERATIONS

Since all individuals analyzed were minors, an informed consent form was provided for guardians to authorize the evaluation, along with an assent form for minors to consent to the evaluation. Furthermore, a confidentiality agreement and a document authorizing data collection in the community were signed by a representative of the evaluated community. It is noteworthy that this research involved a clinical examination, and to minimize any discomfort, the researcher took all necessary precautions and ceased the examination if requested by the examined individual.

This research, being conducted on human subjects, was approved by the Research Ethics Committee (CEP) in compliance with the ethical principles outlined in Resolution 466/12, under opinion number 6.241.565 and the Ethical Appreciation Presentation Certificate (CAAE) under number 71130523.3.0000.5306.

DATA ANALYSIS

Subsequent to data collection, data entry and tabulation of results were performed using Microsoft Excel, creating a database in Stata 12. Based on this data, the prevalence of caries in deciduous molars within this community was measured, categorized by the age and sex of the participants.

It is also important to note that an analysis using the ceo-d index (Deciduous Teeth: decayed, extracted, and filled) was not conducted due to the wide variability in age among participants, with

the majority having mixed dentition and not being in the age groups specified by the WHO, which are at five years and twelve years.

RESULTS

All the guardians of the 70 children in the population in question authorized the research; however, there was a sample loss of 21 assessed (30%), with two (2.85%) children not authorizing data collection, six (8.57%) due to inconsistencies in the collections, and 13 (18.57%) due to errors in filling out the forms, such as missing information about the evaluated person, age, or sex. Therefore, 49 children aged between two and twelve years were included in this study, representing 70% of the assessed sample. The included participants come from very similar socioeconomic conditions, as they reside in an organization striving for dignified housing.

Of the assessed children, 53.06% are female, constituting the majority of the sample. Regarding the age of the respondents, the sample included children from one to twelve years old, with $n = 14.29\%$ being six years old, as shown in Table 1.

Table 1 - Description of the sample by age and sex in a given population 2023.

AGE (YEARS)	N	%
1	1	2,04
2	5	10,2
3	4	8,16
4	4	8,16
5	5	10,2
6	7	14,29
7	5	10,2
8	5	10,2
9	3	6,12
10	3	6,12
11	3	6,12
12	1	8,16
Total	49	100
SEX	N	%
Female	26	53,06
Male	23	46,94
Total	49	100

Source: prepared by the authors, 2023.

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Table 2 shows that the prevalence of untreated dental caries in primary molars was 46.94% (95% CI 38.6% to 67.6%), indicating that almost half of the studied population has at least one primary tooth with untreated cavitated caries. For the description of this variable, only children older than two years were included, as they already have complete primary dentition.

Table 2 - Description of the prevalence of untreated caries in a given population, 2023.

	PREVALENCE	
Presence of primary molar with untreated caries	46,94%	IC95% (38,6 - 67,6)

Source: prepared by the authors, 2023.

DISCUSSION

From the results obtained in this study, it is possible to observe that in the population included in this research, 46.94% have at least one primary molar with untreated caries. The literature has shown that untreated dental caries continues to be a significant global public health challenge, being highly prevalent; moreover, caries affect countries differently, particularly impacting developing nations (WHO, 2022; Qin; Zi; Zeng, 2022).

It can be noted that a study published by Schuch and colleagues in 2021 obtained results similar to those of the present research for the age group of 5 years, with a prevalence of caries in primary teeth of 48.7% among a low-income socioeconomic population (Schuch *et al.*, 2021). Although it is known that caries is a multifactorial disease, one reason for the similarity between the studies may be that the populations in question are in regions without treated water supply or with low supply. Evidence in the literature has demonstrated that the fluoridation of water supplies is an important public health measure for controlling caries disease, as, in addition to water ingestion, foods cooked with fluoridated water also increase the level of fluorides present in saliva (Lima; Tenuta; Cury, 2019).

In Brazil, a study by Ardenghi *et al.* in 2013 revealed that the prevalence of untreated caries was 48.2% in children with primary dentition (Ardenghi; Piovesan; Antunes, 2013). In contrast, a systematic review on oral diseases (532 million cases assessed), published in 2020, showed that the global prevalence of caries in primary teeth was 7.8% (Bernabe *et al.*, 2021). Based on this, there is a noticeable disparity in caries prevalence between the present study and the global level, where developed countries have a prevalence of caries much lower than that of Brazil, especially among children.

A cohort study in the South of Brazil presented a prevalence of untreated dental caries in

primary dentition of 63.4%, 45.5%, and 15.6%, respectively, in the cohorts of 1993, 2004, and 2015 (Karam *et al.*, 2023). There is a significant decrease in prevalence between 1993 and 2015, with the first evaluation occurring prior to the National Oral Health Policy (PNSB), the second during the implementation of the policy, and the third showing an even greater decrease after the consolidation of the policy, which may have influenced the reduction of this indicator.

In this study, the low-income socioeconomic pattern of the families was expected, as it is a settlement area seeking dignified housing. Numerous studies in the literature have demonstrated the association between dental caries and socioeconomic factors such as income. Furthermore, evidence shows that social inequalities are considered a collaborative factor in the development of caries disease (Brito *et al.*, 2020; Cruz, 2020; Karam *et al.*, 2023). Additionally, it can be noted that there has been an increase in the inequality of disease distribution among different population strata, highlighting the so-called phenomenon of caries disease polarization (Razera *et al.*, 2021), which occurs in socioeconomically disadvantaged populations.

As this research is a cross-sectional observational study, a limitation is that data collection in this population was performed at a single point in time, making it impossible to establish risk factors that led to these results. It is suggested that a longitudinal study be conducted in the future to address this gap. Furthermore, the sampling was convenience-based, causing bias, and it is not feasible to extrapolate the results to other populations. Lastly, data collection was conducted by dental students who, despite being calibrated, are in the learning process, which introduces bias, as some data were discarded due to filling errors.

This study has several strengths that are important to emphasize. There are few articles in the literature focused on oral health in populations from settlements seeking dignified housing. Additionally, the World Health Organization has reinforced the need to produce studies based on epidemiological data, as these aid in the construction of effective public policies for the studied populations. Another strong point is the importance of health education throughout research like this, conducted through university outreach, creating a link between the university and the community, which is an important factor for academic training and an additional device for reducing the prevalence of caries disease, as well as promoting health education and enhancing care autonomy.

FINAL CONSIDERATIONS

Based on the data presented in this study, a prevalence of dental caries in primary molars among children in a population seeking dignified housing was found to be 46.94%. The importance of this work for the formulation of local public policies is evident, as it maps the prevalence of dental caries in a given population. Furthermore, this study can serve as an example for extrapolating results to similar populations, as there are few studies like this in the literature, highlighting the external validity of the work.

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