REVISTA DE ODONTOLOGIA DA UNESP
www.revodontolunesp.com.br
Original Article

Prevalence and determinants of oral conditions and hygiene habits in children from traditional communities in Northeastern Brazil: a cross-sectional study

Prevalência e determinantes de condições orais e hábitos de higiene em crianças de comunidades tradicionais no nordeste do Brasil: um estudo transversal

Cecília Bezerra de Meneses Corbal GUERRA[a,b], Victor Arthur Rodrigues de SOUZA[b], Thialla Andrade CARVALHO[a], Janiele de Sá FERREIRA[a], Gina Delia ROQUE-TORRES[c], Lucas Alves da Mota SANTANA[b], Flávia Pardo Salata NAHSAN[b], Paulo Ricardo MARTINS-FILHO[a,b]*

[a]UFS – Universidade Federal de Sergipe, Hospital Universitário, Laboratório de Patologia Investigativa, Aracaju, SE, Brasil
[b]UFS – Universidade Federal de Sergipe, Hospital Universitário, Programa de Pós-graduação em Odontologia, Aracaju, SE, Brasil
[c]Loma Linda University, School of Dentistry, Center for Dental Research, Loma Linda, CA, USA

How to cite: Guerra CBMC, Souza VAR, Carvalho TA, Ferreira JS, Roque-Torres GD, Santana LAM, Nahsan FPS, Martins-Filho PR. Prevalence and determinants of oral conditions and hygiene habits in children from traditional communities in Northeastern Brazil: a cross-sectional study. Rev Odontol UNESP. 2026;55:e20250044. https://doi.org/10.1590/1807-2577.20250044

Resumo

Introdução: Comunidades tradicionais brasileiras, como quilombolas e ribeirinhas, enfrentam barreiras históricas, socioeconômicas e geográficas que limitam o acesso a serviços de saúde e saneamento, podendo impactar negativamente a saúde bucal infantil. Apesar da redução nacional da cárie dentária nas últimas décadas, persistem lacunas de conhecimento sobre a situação epidemiológica em populações socialmente vulneráveis. **Objetivo:** Avaliar a prevalência de experiência de cárie dentária, defeitos de desenvolvimento do esmalte (DDE) e placa visível em crianças de duas comunidades tradicionais no Brasil, e examinar fatores sociodemográficos, dietéticos e clínicos associados. **Material e método:** Estudo transversal realizado com 40 crianças (≤18 anos) de duas comunidades tradicionais do estado de Sergipe, Brasil. Os exames bucais foram conduzidos por examinadores calibrados, seguindo protocolos padronizados da Organização Mundial da Saúde (OMS). Dados sociodemográficos, dietéticos e clínicos foram obtidos por meio de entrevistas estruturadas com os cuidadores. Foi definido um desfecho composto pela presença de experiência de cárie dentária, DDE e/ou placa dental visível. A regressão de Poisson com variância robusta foi utilizada para identificar fatores associados. **Resultado:** No total, 65.0% das crianças apresentaram experiência de cárie dentária, DDE e/ou presença de placa visível. Os preditores significativos incluíram comorbidades clínicas (Razão de Prevalência ajustada [RPaj]: 1,77; IC95%: 1,30–2,42), amamentação por mais de 12 meses (RPaj: 1,64; IC95%: 1,10–2,44), consumo de até três refeições diárias (RPaj: 1,73; IC95%: 1,04–2,87) e consumo de farinha de mandioca (RPaj: 1,83; IC95%: 1,04–3,25). **Conclusão:** Crianças de comunidades tradicionais apresentaram elevada carga de condições bucais adversas, refletindo vulnerabilidade social e insegurança alimentar. Esses achados reforçam a necessidade de estratégias preventivas precoces e culturalmente adequadas, com foco em higiene bucal e nutrição.

Descritores: Cárie dentária; defeitos do esmalte dentário; placa dentária; comunidades quilombolas; população rural.

Abstract

Introduction: Traditional Brazilian communities, such as quilombola and riverine populations, face persistent historical, socioeconomic, and geographic barriers that restrict access to healthcare and sanitation services, potentially compromising children's oral health. Despite the national decline in dental caries over recent decades, important gaps remain in understanding the epidemiological profile of socially vulnerable populations. **Objective:** To assess the prevalence of dental caries experience, developmental defects of enamel (DDE), and visible plaque in children from two traditional communities in Brazil, and examine associated sociodemographic, dietary, and clinical factors. **Material and method:** A cross-sectional study was conducted with 40 children (≤18 years) from two traditional communities in Sergipe, Brazil. Oral examinations were performed by calibrated examiners using World Health Organization (WHO) standard protocols. Sociodemographic, dietary, and clinical data were obtained through structured interviews with caregivers. A composite outcome was defined as the presence of dental caries experience, DDE, and/or visible plaque. Poisson regression with robust variance was used to identify associated factors. **Result:** Overall, 65.0% of children presented dental caries experience, DDE, and/or visible plaque. Significant predictors included clinical comorbidities (adjusted Prevalence Ratio [aPR]: 1.77; 95% CI: 1.30–2.42), breastfeeding beyond 12 months (aPR: 1.64; 95% CI: 1.10–2.44), consumption of up to three daily meals (aPR: 1.73; 95% CI: 1.04–2.87), and cassava flour consumption (aPR: 1.83; 95% CI: 1.04–3.25). **Conclusion:** Children from traditional communities showed a high burden of oral conditions, reflecting social vulnerability and food insecurity. These findings highlight the need for early, culturally appropriate preventive strategies focused on oral hygiene and nutrition.

Descriptors: Dental caries; developmental defects of enamel; dental plaque; quilombola communities; rural population.

INTRODUCTION

Oral health is an integral component of general health, influencing essential physiological functions such as mastication, speech, and swallowing, as well as psychosocial dimensions including self-esteem, social engagement, and quality of life[1,2]. Despite its relevance, oral diseases remain among the most prevalent yet neglected global health challenges, disproportionately affecting children and adolescents in socially vulnerable settings[1,3].

In low- and middle-income countries such as Brazil, social, economic, and geographic disparities significantly shape the distribution and severity of oral health outcomes[2]. The cumulative effects of environmental adversity, intergenerational inequities, and the erosion of traditional knowledge systems exacerbate oral health disparities, reinforcing a syndemic relationship between oral diseases and broader social determinants of health[2]. Children and adolescents residing in rural and remote territories often encounter structural barriers to preventive and curative oral health services[3]. These inequities are particularly evident among traditional communities, such as quilombola[1,2] and riverine[3] populations, which remain historically marginalized and underrepresented in public health surveillance and policy frameworks.

Quilombola communities are formed by descendants of African people who escaped slavery and established autonomous settlements, while riverine communities inhabit floodplain regions and maintain livelihoods based on fishing, extractivism, and subsistence agriculture[3,4]. Both are officially recognized as traditional peoples and communities under Brazilian legislation, which acknowledges their distinct cultural, social, and territorial characteristics[3,4]. However, these populations continue to experience structural disadvantages, including poverty, low levels of formal education, limited sanitation infrastructure, and restricted access to health services—all of which are associated with worse oral health conditions[4,5]. Despite the growing body of research on oral health inequalities in Brazil, few epidemiological studies have focused specifically on quilombola and riverine children, leaving critical knowledge gaps regarding their oral health conditions and related determinants.

Although national epidemiological surveys[6] in Brazil have shown a reduction in the prevalence of dental caries among schoolchildren—from 69% in 2003 to 36.9% in 2023—these aggregated figures often obscure profound regional and social disparities. The lack of disaggregated data on traditional communities perpetuates their invisibility in national health agendas and hampers the implementation of targeted interventions.

It is hypothesized that children and adolescents from quilombola and riverine communities present a higher prevalence of oral diseases, influenced by socioeconomic disadvantages, dietary practices, and limited access to health services. Based on this premise, this study aimed to estimate the prevalence of dental caries, visible plaque, and developmental defects of enamel among children and adolescents from traditional communities in Northeastern Brazil and to examine their associations with sociodemographic, dietary, and clinical factors. By providing original epidemiological evidence, the findings may inform culturally and territorially responsive public health strategies, contributing to a more equitable and inclusive approach to oral health.

METHOD

Study Design and Setting

A cross-sectional study was conducted between June and July 2024 in two traditional communities in the state of Sergipe, Northeastern Brazil: one quilombola community known as Maloca and one riverine community located in the Mem de Sá Island (Figure 1). The study protocol was approved by the institutional research ethics committee (Protocol No. 6.749.815), and informed consent was obtained from legal guardians. The manuscript follows the STROBE reporting guidelines for cross-sectional studies[7].

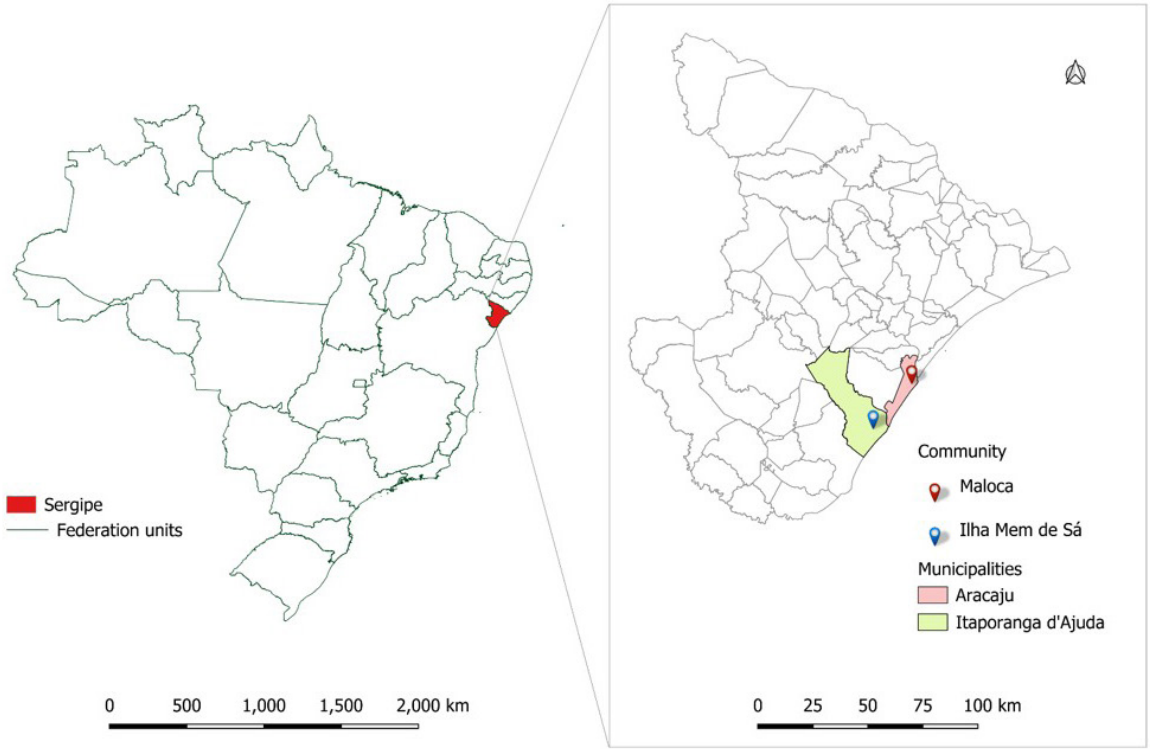

Figure 1. Geographic location of the Maloca and Mem de Sá Island communities, Sergipe State, Brazil.

Participant Selection and Eligibility Criteria

Children and adolescents (≤18 years) residing permanently in the study communities were included, selected via convenience sampling. Although non-probabilistic, this approach enabled the investigation of oral health conditions in underrepresented populations. Recruitment was supported by home visits and local leadership engagement. Some refusals and recruitment losses occurred due to travel difficulties or the absence of a legal guardian to authorize participation. This constitutes an inherent limitation of non-probabilistic sampling. Exclusion criteria included orthodontic appliance use, clinical diagnosis of amelogenesis imperfecta, or systemic conditions limiting examination.

Data Collection

Sociodemographic data were obtained from parents or guardians via structured interviews and included age, number of siblings, household income, caregiver education, and access to treated water. Health-related variables comprised prematurity, history of infectious diseases, anemia, neurological or psychiatric conditions, breastfeeding duration, previous dental consultations, and frequency of toothbrushing.

Dietary habits were assessed using a structured questionnaire adapted to reflect regionally consumed foods, including staple items such as rice, beans, beef, pork, fish, vegetables, fruits, milk, cheese, and cassava flour. Seasonal variation is unlikely to influence dietary patterns in these communities, as food availability remains relatively stable throughout the year. The intake of cariogenic foods—those rich in fermentable carbohydrates and associated with dental caries—was also assessed, covering items such as sugar-sweetened beverages, filled or sweetened biscuits, candies, and bread[8,9].

Oral Health Assessment

Oral examinations were performed by two calibrated examiners (Kappa = 0.714; p < 0.001) following World Health Organization protocols[8], under natural lighting, using wooden spatulas and appropriate personal protective equipment (PPE). Clinical assessments included the DMFT/dmft indices (decayed, missing, and filled teeth), visual inspection for developmental defects of enamel (DDE), and presence of visible dental plaque.

The DMFT index[9] was used to assess dental caries experience in permanent teeth, while the dmft index was applied to primary teeth. The assessment criteria were as follows:

- Decayed (D): Teeth with visible cavitation, undermined enamel, soft tissue response to probing, or extensive crown destruction due to caries;
- Missing (M): Teeth lost due to caries; in the primary dentition, only when loss was not attributable to physiological exfoliation;
- Filled (F): Teeth with restorations and no clinical signs of active lesions, including those restored for non-cariogenic reasons.

The prevalence of DDE was assessed using DDE Index[10], which characterizes the presence, location, and extent of enamel defects, as well as their combinations. Defects were classified as follows: demarcated opacity (well-defined borders), diffuse opacity (altered translucency without clear borders), and hypoplastic defects (quantitative loss of enamel). Individuals with a clinical diagnosis of amelogenesis imperfecta were excluded, as this condition could compromise the accuracy of DDE identification and classification.

Visible plaque was assessed to estimate biofilm accumulation, a proxy for oral hygiene and caries risk[11]. Participants were instructed not to brush teeth immediately prior to examination. All surfaces (buccal, lingual/palatal, and occlusal) were inspected for whitish/yellowish deposits near the gingival margin. Results were recorded as presence or absence of visible plaque on each tooth.

Statistical Analysis

Prevalence estimates and corresponding 95% confidence intervals (CIs) were calculated using the Clopper-Pearson exact method. Poisson regression models with robust variance estimators were employed to identify factors associated with a composite oral health outcome, defined as the presence of at least one of the following conditions: dental caries, DDE, or visible plaque. The analytical strategy comprised univariate, full multivariate, and stepwise selection models. Univariate analyses provided crude prevalence ratios (PRs) and 95% CIs for each independent variable. In the full model, all covariates were included, and multicollinearity was assessed using the Variance Inflation Factor (VIF); variables with VIF >5 were excluded. Adjusted PRs and 95% CIs were then estimated to assess independent associations. A stepwise backward selection approach was applied to refine the model, retaining variables with $p<0.20$ in the full model. A significance threshold of $p<0.05$ was adopted for the final model. Sex and age group were included a priori to account for potential confounding. All analyses were performed using R software (version 4.5.1) using the following packages: *sandwich* and *lmtest* for Poisson regression with robust variance, *car* for multicollinearity (VIF), *epiR* for prevalence estimates, and *dplyr* for data handling.

RESULT

A total of 40 children participated in the study, corresponding to approximately 45.0% of the total population aged ≤18 years (n = 89) across both communities. Participants had a median age of 7.5 years (IQR: 5.0–12.0) and a mean age of 8.0 ± 4.5 years; 65.0% were male. Pre-existing clinical conditions, such as prematurity, infectious diseases, anemia, or neurological/psychiatric disorders, were reported in 25.0% of participants. Most families (87.5%) reported a monthly income of less than two minimum wages, 57.5% of guardians had nine or fewer years of schooling, and 37.5% resided in households without access to treated water (Table 1).

Table 1. Sociodemographic, clinical, dietary, and oral hygiene characteristics of children from traditional communities in Northeast Brazil

Variables	Total (n = 40)
Age (years)*	7.5 (5.0 – 12.0)
Sex	
Male	26 (65.0%)
Female	14 (35.0%)
Pre-existing Clinical Conditions	10 (25.0%)
Prematurity	3 (7.5%)
Infectious Diseases(1)	2 (5.0%)
Iron-Deficiency Anemia	5 (12.5%)
Neurological/Psychiatric Disorders(2)	2 (5.0%)
Guardian's Education Level	
> 9 years	17 (42.5%)
≤ 9 years	23 (57.5%)
Monthly Household Income	
> 2 Minimum Wages	5 (12.5%)
≤ 2 Minimum Wages	35 (87.5%)
Number of Siblings	
Only One Sibling	19 (47.5%)
≥ 2 Siblings	21 (52.5%)
Treated Water at Home	25 (62.5%)
Daily Number of Meals	
More than 3 Meals	18 (45.0%)
Up to 3 Meals	22 (55.0%)
Daily Cariogenic Food Consumption	
No	0 (0.0%)
Yes	40 (100.0%)
Rice Consumption	
No	0 (0.0%)
Yes	40 (100.0%)
Bean Consumption	
No	2 (5.0%)
Yes	38 (95.0%)
Meat / Fish Consumption	
No	0 (0.0%)
Yes	40 (100.0%)
Vegetable Consumption	
No	11 (27.5%)
Yes	29 (72.5%)
Fruit Consumption	
No	9 (22.5%)
Yes	31 (77.5%)
Milk Consumption	
No	5 (12.5%)
Yes	35 (87.5%)
Cheese Consumption	
No	12 (30.0%)
Yes	28 (70.0%)
Cassava Flour Consumption	
No	8 (20.0%)
Yes	32 (80.0%)
Breastfeeding Duration (months)*	8.0 (6.0 – 12.0)
Up to 12 months	31 (77.5%)
More than 12 months	9 (22.5%)
Daily Toothbrushing Frequency	
≥ 2 Brushings	32 (80.0%)
< 2 Brushings	8 (20.0%)
Dental Consultation	
No	8 (20.0%)
Yes	32 (80.0%)

*Median (Q1 – Q3). (1)Toxoplasmosis, Leishmaniosis. (2)Cerebral Palsy.

Daily consumption of cariogenic foods was reported by all participants. Staples included rice (100.0%), beans (95.0%), meat or fish (100.0%), vegetables (72.5%), fruits (77.5%), milk (87.5%), cheese (70.0%), and cassava flour (80.0%). The median daily meal frequency was 3.0 (interquartile range [IQR]: 3.0–5.0), and 55.0% of children consumed three or fewer meals per day. The median duration of breastfeeding was 8.0 months (IQR: 6.0–12.0), with 22.5% breastfed beyond 12 months. Additionally, 20.0% of the children brushed their teeth less than twice daily, and an equal proportion had never undergone dental consultation.

The overall mean DMFT/dmft index was 1.4 (±2.3), with a median of 0.0 (interquartile range: 0.0–2.0). Dental caries experience was observed in 45.0% of participants (95% CI: 29.3–61.5), and visible plaque was present in 47.5% (95% CI: 31.5–63.9). Developmental defects of enamel were identified in 10.0% (95% CI: 2.8–23.7), including two cases of diffuse opacity, one of demarcated opacity, and one presenting both types. Overall, 65.0% (95% CI: 48.3–79.4) presented at least one of the assessed oral health conditions.

Several variables were excluded from the regression analysis due to lack of variability. The universal consumption of cariogenic foods, rice, and meat/fish precluded their inclusion, while access to treated water was excluded due to perfect collinearity with community type. In the adjusted model, a higher prevalence of adverse oral health outcomes was associated with pre-existing clinical conditions (adjusted PR = 1.77; 95% CI: 1.30–2.42; p < 0.001), breastfeeding beyond 12 months (adjusted PR = 1.64; 95% CI: 1.10–2.44; p = 0.015), consumption of up to three daily meals (adjusted PR = 1.73; 95% CI: 1.04–2.87; p = 0.034), and cassava flour consumption (adjusted PR = 1.83; 95% CI: 1.04–3.25; p = 0.038) (Table 2).

Table 2. Poisson regression analysis with robust variance for predictors of dental caries experience, visible plaque, and developmental enamel defects among children from traditional communities in Northeast Brazil

Variables	Total	Outcomes of Interest		Univariate Analysis		Multivariate Analysis			
						Adjusted Full Model		Adjusted Stepwise Model	
		Yes	No	PR (CI 95%)	p-value	PR (CI 95%)	p-value	PR (CI 95%)	p-value
Community									
Riverine	25	14 (56.0%)	11 (44.0%)						
Quilombola	15	12 (80.0%)	3 (20.0%)	1.43 (0.93 – 2.20)	0.104				
Sex									
Female	14	8 (57.1%)	6 (42.9%)						
Male	26	18 (69.2%)	8 (40.8%)	1.21 (0.72 – 2.04)	0.470	0.97 (0.54 – 1.71)	0.907		
Pre-existing Clinical Conditions									
No	29	16 (55.2%)	13 (44.8%)						
Yes	11	10 (90.9%)	1 (9.1%)	1.65 (1.13 – 2.40)	0.009	2.08 (1.21 – 3.60)	0.009	1.77 (1.30 – 2.42)	< 0.001
Guardian's Education Level									
> 9 years	17	11 (64.7%)	6 (35.3%)						
≤ 9 years	23	15 (65.2%)	8 (34.8%)	1.01 (0.64 – 1.60)	0.973	0.92 (0.55 – 1.55)	0.754		

PR = Prevalence Ratio; CI = Confidence Interval.

Table 2. Continued...

Variables	Total	Outcomes of Interest		Univariate Analysis		Multivariate Analysis			
						Adjusted Full Model		Adjusted Stepwise Model	
		Yes	No	PR (CI 95%)	p-value	PR (CI 95%)	p-value	PR (CI 95%)	p-value
Monthly Household Income									
> 2 Minimum Wages	5	4 (80.0%)	1 (20.0%)						
≤ 2 Minimum Wages	35	22 (62.9%)	13 (37.1%)	0.79 (0.47 – 1.30)	0.351	0.68 (0.32 – 1.44)	0.315		
Number of Siblings									
Only One Sibling	19	11 (57.9%)	8 (42.1%)						
≥ 2 Siblings	21	15 (71.4%)	6 (28.6%)	1.23 (0.77 – 1.97)	0.380	1.40 (0.87 – 2.24)	0.162		
Daily Number of Meals									
More than 3 Meals	18	9 (50.0%)	9 (50.0%)						
Up to 3 Meals	22	17 (77.3%)	5 (22.7%)	1.55 (0.92 – 2.58)	0.097	1.81 (0.88 – 3.73)	0.108	1.73 (1.04 – 2.87)	0.034
Vegetable Consumption									
No	11	6 (54.5%)	5 (45.5%)						
Yes	29	20 (69.0%)	9 (31.0%)	1.26 (0.70 – 2.29)	0.438	1.43 (0.63 – 3.24)	0.391		
Fruit Consumption									
No	9	6 (66.7%)	3 (33.3%)						
Yes	31	20 (64.5%)	11 (35.5%)	0.97 (0.57 – 1.65)	0.904	1.19 (0.54 – 2.63)	0.672		
Milk Consumption									
No	5	4 (80.0%)	1 (20.0%)						
Yes	35	22 (62.9%)	13 (37.1%)	0.79 (0.47 – 1.30)	0.351	1.58 (0.85 – 2.94)	0.150		
Cheese Consumption									
No	12	6 (50.0%)	6 (50.0%)						
Yes	28	20 (71.4%)	8 (28.6%)	1.43 (0.77 – 2.63)	0.254	0.93 (0.46 – 1.89)	0.850		
Cassava Flour Consumption									
No	8	4 (50.0%)	4 (50.0%)						
Yes	32	22 (68.8%)	10 (31.2%)	1.38 (0.66 – 2.86)	0.393	1.98 (0.93 – 4.22)	0.075	1.83 (1.04 – 3.25)	0.038

PR = Prevalence Ratio; CI = Confidence Interval.

Table 2. Continued...

Variables	Total	Outcomes of Interest		Univariate Analysis		Multivariate Analysis			
						Adjusted Full Model		Adjusted Stepwise Model	
		Yes	No	PR (CI 95%)	p-value	PR (CI 95%)	p-value	PR (CI 95%)	p-value
Breastfeeding Duration									
Up to 12 months	31	18 (58.1%)	13 (41.9%)						
More than 12 months	9	8 (88.9%)	1 (11.1%)	1.53 (1.05 – 2.23)	0.027	1.99 (1.10 – 3.60)	0.023	1.64 (1.10 – 2.44)	0.015
Daily Toothbrushing Frequency									
≥ 2 Brushings	32	22 (68.8%)	10 (31.2%)						
< 2 Brushings	8	4 (50.0%)	4 (50.0%)	0.73 (0.35 – 1.51)	0.393	0.76 (0.35 – 1.66)	0.488		
Dental Consultation									
No	8	3 (37.5%)	5 (62.5%)						
Yes	32	23 (71.9%)	9 (28.1%)	1.92 (0.76 – 4.81)	0.166	1.20 (0.47 – 3.10)	0.700		

PR = Prevalence Ratio; CI = Confidence Interval.

DISCUSSION

This study identified a substantial burden of oral health problems among children from traditional communities investigated in Northeastern Brazil. Despite low overall DMFT/dmft scores, two-thirds of participants presented at least one oral health adverse condition, such as dental caries, DDE, or visible plaque. To better capture this multifactorial burden, these conditions were analyzed as a composite outcome, since they are interrelated and reflect hygiene practices, food insecurity, and broader health vulnerabilities. These outcomes reflect underlying systemic inequities that shape oral health in marginalized populations, a perspective consistent with findings from previous studies conducted in similar settings, which have linked such challenges to structural disadvantages and cultural barriers that limit access to preventive and curative services[2-4,12-16]. When compared with SB Brasil 2023, which reported mean dmft of 2.56 and DMFT of 1.99 among children living in the countryside of the Northeastern region, the values observed in this study highlight persistent disparities affecting quilombola and riverine communities[17]. The scarcity of epidemiological investigations specifically targeting these populations reinforces the originality and public health relevance of the present study[6].

Despite the existence of public health policies aimed at expanding access to healthcare for riverine and traditional populations in Brazil, such as the *Unidade Básica de Saúde Fluvial* (UBSF) and the *Equipe de Saúde da Família Ribeirinha* (eSFR), which were designed to reduce geographic and social barriers by delivering primary care directly to riverine territories, these initiatives are not uniformly implemented. According to Ordinance GM/MS No. 8,114 of September 16, 2025, none of the municipalities in the state of Sergipe were covered by these services, which may help explain the persistent barriers to healthcare access observed in the studied communities[18].

In addition, the oral health disparities observed among quilombola children should be interpreted within the context of structural racism in Brazil, which has historically placed Black populations at social, economic, and territorial disadvantage. These longstanding inequities limit access to education, sanitation, and healthcare services and contribute to poorer oral health outcomes, beyond individual behaviors, among traditional Afro-descendant communities[4,5].

Among the contributing factors, dietary patterns were key determinants. The universal consumption of cariogenic foods and limited meal frequency suggest nutritional insecurity. While the frequency of carbohydrate intake is a well-established determinant of caries development, irregular meal patterns may exacerbate acidogenic challenges throughout the day, especially in the context of high exposure to refined starches and sugars[17]. Moreover, nutritional deficiencies, common in low-income contexts, can also impair enamel development and immune defense, increasing susceptibility to DDE and caries[19].

Cassava flour, a dietary staple in these communities, may also play a role in dental caries development. Although considered non-cariogenic in its natural form, it is commonly consumed with added sugars in this geographic region. When hygiene is inadequate, frequent intake may exacerbate biofilm formation and demineralization[20]. Breastfeeding practices were another contributing factor. While exclusive breastfeeding in early infancy is protective[21,22], continuation beyond 12 months without adequate oral hygiene may increase caries risk, particularly when combined with nighttime bottle-feeding of sugar-containing formulas[23,24]. Integrating oral hygiene counseling into breastfeeding support programs may offer a feasible preventive strategy.

Pre-existing clinical conditions, such as prematurity, anemia, and neurodevelopmental disorders, also emerged as strong predictors of poor oral health. These conditions affect enamel integrity, saliva production, and immune function[25], and may further limit access to dental care due to caregiving demands or physical impairments. In addition, the high prevalence of visible plaque in this pediatric population reflects hygiene-related vulnerabilities, including inadequate brushing techniques, absence of fluoridated toothpaste, irregular routines, and lack of adult supervision—factors commonly observed in socioeconomically disadvantaged settings.

Although public policies such as Ordinance No. 822/GM/MS allocate resources to quilombola communities, significant challenges remain. Afro-descendant populations in Brazil, including those in urban areas, frequently face inadequate housing and limited access to public services, reflecting deep-rooted structural inequities. In remote communities like Ilha Mem de Sá, geographic isolation further restricts access to healthcare and sanitation. Addressing these disparities requires multisectoral strategies targeting structural determinants of health. Preventive initiatives like the *Programa de Saúde na Escola*[6] should be reinforced through culturally sensitive approaches that incorporate community participation and traditional knowledge. Schools can serve as key platforms for health promotion, offering oral hygiene education, supplies, and early detection of health needs.

Some limitations should be considered when interpreting these findings. The use of convenience sampling and the restricted number of participants limit the external validity of the results. Although the findings provide relevant insights into the oral health conditions of the communities studied, they should not be generalized to all quilombola or riverine populations. Local socioeconomic, cultural, and geographic characteristics may vary substantially across traditional communities in Brazil, reinforcing the need for context-specific analyses.

CONCLUSION

Children from traditional communities, investigated in this study, in Northeastern Brazil face a high prevalence of dental caries, enamel defects, and visible plaque, driven by poverty, inadequate nutrition, and insufficient oral hygiene. Addressing these disparities requires early, sustained, and culturally appropriate interventions focused on health education, hygiene practices, and food security.

Future studies with larger samples and longitudinal designs are encouraged to confirm these findings and to assess the long-term effects of preventive and educational interventions among children from traditional communities in Brazil.

AUTHORS' CONTRIBUTIONS

Cecília Bezerra de Meneses Corbal Guerra: Conceptualization, Methodology, Investigation, Formal analysis, Writing – original draft, Writing – review & editing. Victor Arthur Rodrigues de Souza: Investigation, Writing – original draft, Writing – review & editing. Thialla Andrade Carvalho: Formal analysis, Writing – original draft, Writing – review & editing. Janiele de Sá Ferreira: Formal analysis, Writing – original draft, Writing – review & editing. Gina Delia Roque-Torres: Formal analysis, Writing – original draft, Writing – review & editing. Lucas Alves da Mota Santana: Formal analysis, Writing – original draft, Writing – review & editing. Flávia Pardo Salata Nahsan: Conceptualization, Supervision, Methodology, Investigation, Writing – original draft, Writing – review & editing. Paulo Ricardo Martins-Filho: Conceptualization, Supervision, Methodology, Investigation, Formal analysis, Writing – original draft, Writing – review & editing.

ACKNOWLEDGMENTS

P.R.M.F. is a productivity fellow at the National Council for Scientific and Technological Development (CNPq), Brazil. C.B.M.C.G. and J.F.S. thank the Coordination of Higher Education and Graduate Training (CAPES) (Finance Code 001) and FAPITEC/SE/FUNTEC (Protocol number 019203.00650/2024-0) for the scholarship.

REFERENCES

1. Silva EKP, dos Santos PR, Chequer TPR, Melo CMA, Santana KC, Amorim MM, et al. Saúde bucal de adolescentes rurais quilombolas e não quilombolas: um estudo dos hábitos de higiene e fatores associados. Cien Saude Colet. 2018;23(9):2963-78. https://doi.org/10.1590/1413-81232018239.02532018.

2. Silva-Sobrinho AR, Lima NLB, Ramos LFS, Jerônimo SF, Costa Araújo FA, Sette-de-Souza PH. Access to dental services in an elder population of African descent in Brazil. Gerodontology. 2024 Mar;41(1):54-8. https://doi.org/10.1111/ger.12726. PMid:37948317.

3. Maia CVR, Mendes FM, Normando D. The impact of oral health on quality of life of urban and riverine populations of the Amazon: a multilevel analysis. PLoS One. 2018 Nov;13(11):e0208096. https://doi.org/10.1371/journal.pone.0208096. PMid:30500840.

4. Gomes KO, Reis EA, Guimarães MD, Cherchiglia ML. Utilização de serviços de saúde por população quilombola do Sudoeste da Bahia, Brasil. Cad Saude Publica. 2013 Sep;29(9):1829-42. https://doi.org/10.1590/S0102-311X2013001300022. PMid:24068228.

5. Schenkman S, Bousquat A. Intersectional equity in Brazil's remote rural municipalities: the road to efficiency and effectiveness in local health systems. Front Public Health. 2024 Sep;12:1401193. https://doi.org/10.3389/fpubh.2024.1401193. PMid:39319294.

6. Brasil. Ministério da Saúde. Secretaria de Atenção Primária à Saúde. Departamento de Estratégias e Políticas de Saúde Comunitária. SB Brasil 2023: Pesquisa Nacional de Saúde Bucal: relatório final. Brasília: Ministério da Saúde; 2025.

7. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. The strengthening the reporting of observational studies in epidemiology (strobe) statement: guidelines for reporting observational studies. J Clin Epidemiol. 2008 Apr;61(4):344-9. https://doi.org/10.1016/j.jclinepi.2007.11.008. PMid:18313558.

8. World Health Organization – WHO. Manual epidemiological survey of oral health. Geneva: WHO; 1991.

9. World Health Organization – WHO. Oral health surveys: basic methods. 5th ed. Geneva: WHO; 2013.

10. World Dental Federation – FDI. A review of the developmental defects of enamel index (DDE Index). Commission on Oral Health, Research & Epidemiology. Report of an FDI Working Group. Int Dent J. 1992 Dec;42(6):411-26. PMid:1286924.

11. Ainamo J, Bay I. Problems and proposals for recording gingivitis and plaque. Int Dent J. 1975 Dec;25(4):229-35. PMid:1058834.

12. Souto RA, Souzas R, Silva EKPD, Pereira LL, Nery JS. Therapeutic itineraries of quilombola adults for oral health care in a rural district of Bahia, Brazil. Cien Saude Colet. 2024 Mar;29(3):e04302023. https://doi.org/10.1590/1413-81232024293.04302023en. PMid:38451639.

13. França TKXS, Lima MDM, Lima CCB, Moura MS, Lopes TSP, Moura JSS, et al. Quilombola children and adolescents show high prevalence of developmental defects of enamel. Cien Saude Colet. 2021 Jul;26(7):2889-98. PMid:34231701.

14. Silva EKPD, Santos PRD, Chequer TPR, Melo CMA, Santana KC, Amorim MM, et al. Oral health of quilombola and non-quilombola rural adolescents: a study of hygiene habits and associated factors. Cien Saude Colet. 2018 Sep;23(9):2963-78. https://doi.org/10.1590/1413-81232018239.02532018. PMid:30281734.

15. Cohen-Carneiro F, Rebelo MA, Souza-Santos R, Ambrosano GM, Salino AV, Pontes DG. Psychometric properties of the OHIP-14 and prevalence and severity of oral health impacts in a rural riverine population in Amazonas State, Brazil. Cad Saude Publica. 2010 Jun;26(6):1122-30. https://doi.org/10.1590/S0102-311X2010000600006. PMid:20657977.

16. Bidinotto AB, D'Ávila OP, Martins AB, Hugo FN, Neutzling MB, Bairros FS, et al. Oral health self-perception in quilombola communities in Rio Grande do Sul: a cross-sectional exploratory study. Rev Bras Epidemiol. 2017 Jan-Mar;20(1):91-101. https://doi.org/10.1590/1980-5497201700010008. PMid:28513797.

17. Firestone AR, Schmid R, Mühlemann HR. Effect of the length and number of intervals between meals on caries in rats. Caries Res. 1984;18(2):128-33. https://doi.org/10.1159/000260760. PMid:6583005.

18. Brasil. Ministério da Saúde. Portaria GM/MS nº 8.114, de 13 de novembro de 2025. Diário Oficial da União [Internet]. Brasília, 2025 [cited 2026 Jan 20]. Available from: https://bvsms.saude.gov.br/bvs/saudelegis/gm/2025/prt8114_13_11_2025_rep.html

19. Chen Z, Lv X, Hu W, Qian X, Wu T, Zhu Y. Vitamin D status and its influence on the health of preschool children in Hangzhou. Front Public Health. 2021 May;9:675403. https://doi.org/10.3389/fpubh.2021.675403. PMid:34079788.

20. Rebelo Vieira JM, Rebelo MA, Cury JA. Evaluation of the cariogenic potential of cassava flours from the Amazonian region. Caries Res. 2002 Nov-Dec;36(6):417-22. https://doi.org/10.1159/000066530. PMid:12459614.

21. Tham R, Bowatte G, Dharmage SC, Tan DJ, Lau MX, Dai X, et al. Breastfeeding and the risk of dental caries: a systematic review and meta-analysis. Acta Paediatr. 2015 Dec;104(467):62-84. https://doi.org/10.1111/apa.13118. PMid:26206663.

22. Branger B, Camelot F, Droz D, Houbiers B, Marchalot A, Bruel H, et al. Breastfeeding and early childhood caries. Review of the literature, recommendations, and prevention. Arch Pediatr. 2019 Nov;26(8):497-503. https://doi.org/10.1016/j.arcped.2019.10.004. PMid:31685411.

23. van Meijeren-van Lunteren AW, Voortman T, Elfrink MEC, Wolvius EB, Kragt L. Breastfeeding and childhood dental caries: results from a socially diverse birth cohort study. Caries Res. 2021;55(2):153-61. https://doi.org/10.1159/000514502. PMid:33706311.

24. Kato T, Yorifuji T, Yamakawa M, Inoue S, Saito K, Doi H, et al. Association of breast feeding with early childhood dental caries: Japanese population-based study. BMJ Open. 2015 Mar;5(3):e006982. https://doi.org/10.1136/bmjopen-2014-006982. PMid:25795694.

25. Lai PY, Seow WK, Tudehope DI, Rogers Y. Enamel hypoplasia and dental caries in very-low birthweight children: a case-controlled, longitudinal study. Pediatr Dent. 1997 Jan-Feb;19(1):42-9. PMid:9048413.

CONFLICTS OF INTERESTS

The authors declare no conflicts of interest.

DATA AVAILABILITY

The data that support the findings of this study are available from the corresponding author upon reasonable request.

*CORRESPONDING AUTHOR

Paulo Ricardo Martins-Filho, UFS – Universidade Federal de Sergipe, Hospital Universitário, Laboratório de Patologia Investigativa, Rua Cláudio Batista, s/n, Sanatório, 49060-100 Aracaju - SE, Brasil, e-mail: prmartinsfh@gmail.com

Received: December 2, 2025
Accepted: January 22, 2026

Edited by
Editor: Ronald Jefferson Martins

Associate Editor: Wilton Mitsunari Takeshita